Leon Chaitow

Maintaining Body Balance Flexibility and Stability

A PRACTICAL GUIDE TO THE PREVENTION AND TREATMENT OF MUSCULOSKELETAL PAIN AND DYSFUNCTION

CHURCHILL LIVINGSTONE

Foreword by

Douglas C. Lewis

Foreword

I first met Leon Chaitow in 1988 when he taught a workshop in soft tissue manipulation in Seattle, Washington. What I learned in that workshop changed forever the way I would practice medicine. I was shown a set of tools that has allowed me to be far more help to my patients than I might otherwise have been. To this day, I use these techniques with almost every patient I see whether their complaint is musculoskeletal or not.

The human body is a complex collection of bones, muscles, connective tissues, nerves, and organs. It is all of these parts, working together in concert, which make us what we are. The important part of that last sentence is 'working together'. When these parts aren't cooperating, disease and dysfunction result.

In a very real sense, we are what we have become as a result of our adaptation to stress. We may adapt well or we may adapt poorly, but we *will* adapt in some way. What should be obvious is that we need to learn to adapt well. Unfortunately, much of our adaptation is without thought and intent and becomes maladaptation. We survive, but we don't function well.

Stress causes us to prepare for 'fight or flight', but we don't fight or fly, we just stay tight and ready. We armor, we guard, and we never let go. Many of us sit all day slumped in front of a computer or over a desk with our heads forward and our shoulders up. Eventually our brain begins to think that's the position we want to be in and we adapt. Then we develop mid back pain and perhaps chronic headaches. Often we begin to develop numbness and tingling in our arms and hands that some inexperienced doctor thinks is carpal tunnel syndrome and off we go to surgery that doesn't help. Instead, we should be stretching the muscles in our neck and back that are crushing the nerves to our arms. We should learn a better adaptation to that stress.

Sitting, we allow the muscles in the front of our thighs to shorten and tighten and when we stand up that tension pulls our pelvis forward. When that happens, we adapt with a 'sway back', develop chronic low back pain and occasionally sciatic neuralgia. And it's off to surgery we go for a herniated lumbar disk that isn't really the problem.

I recently saw a patient with this very condition. He had been treated with chiropractic. He had been treated with massage. He had been treated with strengthening exercises by a physical therapist. He had been sent for an MRI that showed a little disk disease, but he never got any relief from his low back pain. A friend suggested that he come to see me.

I found that his quadriceps were tight (the muscles in the front of his thighs), his pelvis was tilted forward, and his low back muscles were tight and short as they adapted to the anterior tilt of his pelvis. I stretched his quadriceps and low back extensors, adjusted his lumbar spine and pelvis, and showed him how to

stretch at home. After two visits he came back, said he felt better than he had in 10 years, and asked me why no one had shown him the stretches before. All I could say was 'nobody who you saw knew'. With this book, no one has an excuse for not knowing.

It is through the application of simple, straightforward techniques such as those presented here that we learn a better way to adapt. I believe that everyone alive today would benefit from the advice contained here. For those persons lucky enough to have a practitioner who uses these techniques the book will act as a reminder and guide for self-care. For anyone not that lucky, it may act as a guide in the selection of a new (and better) practitioner.

I, and several thousand of my patients, owe a debt of gratitude to my friend Leon Chaitow for introducing me to this work. Since 1990 I have taught much of this material to my students at Bastyr University and it has served them well in their practices also. I hope that you find the information contained herein to be as useful for yourself. And I hope that you introduce the book to your friends and families so that they might obtain and *Maintain(ing) Body Balance, Flexibility and Stability.*

Douglas C. Lewis
Washington, USA, 2003

Preface

How to use this book

The most common problems we take to our doctors relate to aches and pains and restrictions of the musculoskeletal system, the 'machinery' of the body. There is a great deal that individuals can do for themselves to prevent such problems, as well as to help in treatment and rehabilitation once problems have occurred.

The book is not intended to be a substitute for professional attention and treatment, but should be used to support the treatment and guidance of the treating practitioner. It offers ways of preventing new or recurrent musculoskeletal problems as well as outlining first-aid options for the self-management of aches, pains and restrictions until professional advice and treatment can be obtained. The book also contains numerous options for self-application of toning, stretching and mobilizing exercises which may be used as part of a planned recovery and rehabilitation program under the guidance of a medical doctor, chiropractor, physiotherapist, osteopath, massage therapist, athletic trainer or other healthcare provider.

The individual exercises and techniques described and illustrated should therefore be seen as ways of complementing professional attention, not as a substitute for this. Practitioners may wish to recommend that their patients refer to the book as a reminder on how to carry out the exercises and techniques they have instructed them to use. Many common muscle and joint problems can be eased by the use of self-help variations of osteopathic systems of care, known as muscle energy technique (MET) and strain/counterstrain or positional release technique (PRT). A detailed summary of these useful and safe first-aid bodywork methods is given in later chapters. Most descriptions of self-help exercises or techniques will contain details of the aims and objectives of the particular method and the correct position to get into, how to perform the maneuver and the timing and frequency of the exercise or technique.

Sometimes there will also be notes on particular patterns of breathing and eye movement to assist in successful application of the method. Choices for helping to prevent, or to ease, musculoskeletal problems are therefore easy to identify, either for first aid, or as homework following the advice of a healthcare provider.

In general, if a muscle or joint restriction exists, one or other of the variations of MET can be used to produce more relaxed soft tissues, so that stretching or increased range of movement can follow. If muscular weakness exists, other versions of MET can be used to increase tone and strength. Before using any of these methods it is important to recognize that if any pain is felt while performing them, which is more than simple discomfort, they should be

stopped. If the correct technique has been selected, and is used as described, then there should be no pain. Detailed descriptions of how MET works are given in Chapter 1.

MET, when used to generally loosen muscles which have become tight, whether through misuse or overuse, is safe and effective. However, it is important to remember that the human body is complex, and apart from using these methods as first aid, individuals should always seek the advice of a qualified expert before applying MET or other self-care methods.

Traditionally, the methods used in osteopathy to release and relax tense, tight muscles and joints have involved a variety of maneuvers in which the tissues have been stroked, stretched, pressed and generally manipulated by the practitioner. In recent years we have learned to better understand the ways in which the muscles and other soft tissues work, and this has led to new methods of treatment. Some of these are suitable for self-use because they are so safe and gentle that it is almost impossible to cause harm.

The words 'muscle energy' suggest that the effort and energy of the person or patient performing the movements provide the primary force involved in the process, as distinct from the effort and energy of a practitioner.

The conditions which can be helped, and often completely overcome by these methods are many, and include a wide range of joint and muscle complaints involving stiffness, restriction of movement, pain and disability. If the problem involves actual pathology, such as an arthritic condition in which damage has occurred to aspects of the joint surface, then the amount of possible improvement from use of (say) MET would be limited by the structural damage. Even so, even with an arthritic joint in the background, MET methods should usually be able to produce some degree of improvement in movement or reduced discomfort, even if this is not always long lasting.

MET methods can be used to strengthen weak muscles as well as to loosen tight ones. Not all the variations of MET are suitable for self-application, as some require the restraining or supporting hands of another person. A family member or friend can often provide this extra pair of hands if the method has been approved by the practitioner/therapist. In many situations an expert is required to control the precise directions and degrees of effort, and so in the text of this book I have attempted to indicate just where self-use is possible, and where outside aid is necessary.

It is recommended that anyone attempting to use any of the individual techniques and exercises described in later chapters should first ensure that they understand the reasons for the use of these methods and their underlying mechanisms. There is no more certain way of failing to obtain benefits than by wrongly using what appear to be simple methods.

The most common mistakes made when using MET are those which involve excessive use of force, over too prolonged (or too short) a period of time. Apart from the direction in which the effort is made, these two factors are the most important, and emphasis will be placed on them many times.

Essential questions to ask are, therefore:

- For how long must a MET effort be maintained?
- With what degree of force?
- In which direction(s)?
- And what should be done after the contraction is complete?

These are the key elements in muscle energy technique.

CAUTION

- **In none of the methods which will be described in this book should any pain result.**
- **If pain is felt whilst they are being done, stop immediately.**

Excessive effort is never required, and if there is any pain then either the choice of method, or the way it is being used, is incorrect.

Positional release methods

Positional release technique (PRT) methods, such as strain/counterstrain, can also usually be effectively used to deal with painful recent strains, before, after and instead of muscle energy techniques. These are described in Chapter 8.

Once the principles of MET and PRT have been well understood they can be modified to help most muscle and joint problems. PRT methods (such as strain/counterstrain) are most useful in treating conditions where spasm and contraction are features. This sort of acute problem is often associated with injury or strain. The distressed tissues can often be gently 'persuaded' to release by careful positioning of the area or joint, using a local tender point as a guide to the most suitable position for this release (this will be explained more fully in Chapter 3). No gentler method exists for relief of injury, especially if this is recent. Such methods are just as suitable for self-help use as muscle energy techniques.

Core stability

Self-mobilization and exercise are self-explanatory terms, and the examples selected for inclusion in this book will be found to offer a variety of means for freeing restricted, tight areas, as well as for maintaining freedom once achieved. Prevention of future problems is also the aim in many of the exercises and techniques described. In recent years we have learned a lot about the degree of stability that is provided to the back when the muscles of the trunk – both front and back – are in balance. All too often the low back muscles are very tight and the abdominal muscles are weak and flabby. This problem (described as a 'crossed syndrome') is best corrected by first having treatment to release and stretch the tight low back muscles (and often the hamstrings and other upper leg muscles as well) before the process of strengthening the weak abdominal muscles is started. The term used to describe the objective is creation of 'core stability', and a number of the exercises in Chapter 6 can help to achieve this.

Local pain and referred pain

In many cases of musculoskeletal pain there is an element of referred pain or reflex activity, in which the area of pain is actually some distance from the source of the problem. In Chapter 4 the nature of so-called 'trigger points' that may

be responsible for some pain problems is outlined. A variety of methods have been used in which the trigger points are deactivated, and some of these will be explained, using combinations of MET, PRT and other methods.

CAUTION
Apart from being used as first aid, while waiting to see an appropriate healthcare provider, the methods described in the book should only be used where the cause of the problem is understood. There is little value, and there may be risks, in attempting to minimize stiffness and pain if the cause lies in a disease process which is being ignored. On the other hand, if attention is being paid to underlying conditions, there are few areas of soft tissue and joint disability and pain which cannot benefit – even if only in the short term – from the intelligent use of the soft tissue manipulation methods described in later chapters. Many osteopaths, chiropractors, physiotherapists and massage therapists are now employing these techniques because they are gentler and safer than many traditional methods or treatment. Most practitioners are also teaching their patients simple home applications, especially of MET, and it is hoped that this handbook will expand that trend, along with the use of home-applied core stability, balance and agility exercises.

Osteopathy: The background of these methods

Osteopathic medicine is now over 120 years old, and is established in its home country, the USA, as a complete alternative medical discipline, incorporating much of mainstream medicine as well as unique approaches and concepts arising from a deeply held holistic philosophy of health. This philosophy sees the person as an integrated whole, in which mechanical dysfunction is capable of affecting the overall health of a person just as markedly as can psychological and biochemical (e.g. nutritional) influences.

In Europe and other parts of the world osteopathy has become synonymous with care of musculoskeletal problems and body maintenance. Over the past century the methods and techniques of osteopathy have continued to evolve and develop, until today osteopathic practitioners have at their disposal an array of methods, techniques and systems from which to choose in dealing with the various multiple dysfunctions of the human machine. Many of these methods (including MET and PRT) are also now widely used by physiotherapists, chiropractors and massage therapists.

Osteopathic healthcare and body maintenance *always* takes account of causes rather than simply treating the obvious symptoms. A joint problem, for example, would be looked at in relation to the other structures of the body and how they influence it, and how it influences them, as well as the way the person uses (and possibly abuses) their body in daily use: their working and sporting activities, postural habits, emotional stresses, etc.

A knee problem, for example, might be due to actual injury to knee structures, but it might just as easily be caused (or aggravated) by imbalances and restrictions in the foot, the hip, or even the low back or pelvis. It might be due to local soft-tissue damage, or to irritation (muscle, tendon, joint capsule, cartilage, ligament), or to nerve irritation some distance away. All these elements, added to the history of the individual, provide the osteopathic practitioner with a broad overview of the problem, and an understanding of what is required, not only to help the present symptom picture, but to prevent recurrence, if this is possible. In recent years emphasis has increasingly been toward a greater appreciation of the importance of the soft tissues in normalizing and easing such problems. In modern healthcare provision, which bases much of its choice of treatment on what has been proven by research, these same (osteopathic) principles are usually to be found embedded in the practice of physiotherapy, massage therapy and chiropractic.

Tone, strength flexibility, agility and balance

The soft tissues include the muscles, ligaments, fascia, tendons, etc., which provide the supportive matrix which normal bodily function requires. When joint problems exist attention should first be given to the soft tissues, when attempting to normalize joint function. It is after all the soft tissues which support and move the joints.

The methods which make up the bulk of this book are therefore those which pay particular attention to the soft tissues, and many of these methods can (and indeed should) be self-applied at home as part of the homework aspect of professional care. The methods, techniques and exercises outlined in this book are therefore meant for first-aid and short-term use, or as part of rehabilitation and prevention regimes. They may usefully accompany, precede, or follow regular osteopathic, chiropractic or other manual treatment. Your practitioner/therapist should therefore help you to select for home use appropriate methods from the book that meet your specific needs.

So what is on offer in this book are methods anyone can use to loosen what's too tight, to stabilize and strengthen what's not strong enough, and to create better balance between the 'tight' and the 'loose' structures. Better agility and balance is another objective, and some special guidance will be given to help you achieve this if it is a problem.

London, 2003 Leon Chaitow

Acknowledgments

Many years ago, in a small book entitled 'Osteopathic Self-treatment', I attempted to lay out, in user-friendly terms, for practical self-application, methods derived from osteopathic medicine. Although this now out-of-print book sold well, it was soon clear, from letters and calls, that many of the people purchasing it were therapists and practitioners, rather than the general public for whom it had been designed. Now, in this new, and completely revised and expanded version, this book is directed toward the needs of the therapist and practitioner, to use in collaboration with their patients to help construct individualized programs of 'home work'. I wish to acknowledge the main lesson taught by that first incarnation, that without the professional input of trained healthcare providers, 'self-help' can often produce inadequate results.

Although osteopathy is the primary source of many of the methods described, the content of this book also relies on the pioneering work of many – too many to list – medical physicians, physiotherapists, exercise physiologists, chiropractors, massage therapists and others, who have over the years devised useful ways of helping people to apply safe self-care and rehabilitation methods at home. Without the experience of these many experts it would have been impossible to compile the series of exercises and programs that make up the bulk of this book.

I wish to also acknowledge the great help received from the Churchill Livingstone publishing team in Edinburgh in the production of this book.

Leon Chaitow

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1 The different forms of muscle energy technique

When you bend your knee (or any other joint), a muscle or group of muscles contracts in order to produce the desired movement. The active muscle(s) in bending the knee are the hamstring group on the back of the thigh. The active muscles in any action are known as the *agonists*.

At exactly the same time another set of muscles relaxes, so that the movement will be produced in a smooth coordinated manner. When the knee bends it is the muscles on the front of the thigh that relax in this way, the quadriceps. These muscles, which are capable of performing precisely the opposite movement if they contract (i.e. straightening the knee), are known as the *antagonists*.

The coordination between the opposing muscles of any area is automatic and it happens without conscious effort. It depends upon a physiological law which declares that contraction of any muscle will produce, under normal conditions, relaxation of its antagonist.

When we speak of muscles being antagonistic, we of course do not mean that they have a grudge against each other. Rather, it indicates that one muscle's action will be directly opposed by another's. They balance each other and thus work together cooperatively by virtue of the one releasing its contraction, and relaxing, as the other contracts, to produce coordinated movement.

Take another example, the elbow. As the muscles on the front of your arm (the flexors) contract, in order to allow you to lift a glass to your lips, so the muscles on the back of your arm, the extensors, relax, in order to allow this to happen smoothly without jerking or hesitation. The flexors in this example are

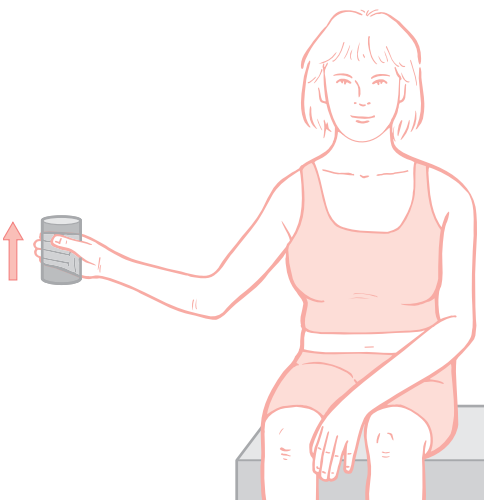


Figure 1.1 *Lifting a glass of water is achieved by a concentric contraction*

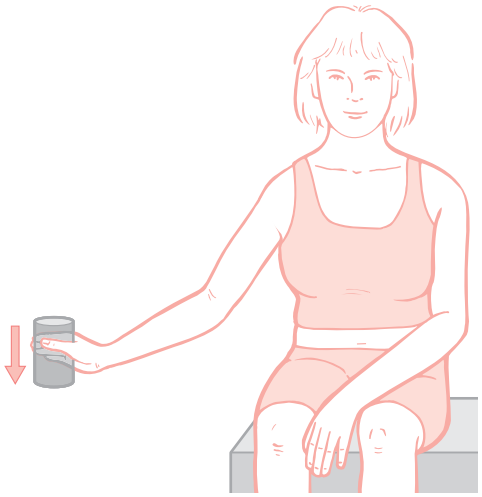


Figure 1.2 *When you put a glass down the muscles are contracting while they are lengthening. This is an eccentric contraction*

contracting and as they do so they are getting shorter. This is called a *concentric contraction* (see Fig. 1.1).

While this is happening it is important for the antagonists to continue to exert some effort, in order to maintain stability. If they were completely relaxed (e.g. paralysed) then the movement would be uncontrolled, uncoordinated, spastic and jerky (as occurs in people with nerve damage such as in cerebral palsy).

When it is time to put the glass down again, the opposite happens. As the extensors straighten out your elbow, the flexors, in a controlled manner, release their hold on your bent elbow joint.

In this particular example, the flexors of your arm (which bent it in the first place) do not just release all effort or there would be a sudden straightening of your arm and the glass would smash onto the table. Rather, they continue to contract but while they are doing so, they get longer and release the pull on your elbow. Being able to contract and at the same time stretch is a most important muscular facility. This is called an *eccentric contraction*.

To use MET efficiently we need to be aware of the fact that muscles are mutually antagonistic to their opposite numbers and that this offers us a wonderful way of making tight muscles relax. The automatic quality of an antagonist relaxing when its opposite number is tightening (contracting) is known as *reciprocal inhibition* (see Fig. 1.2).

The integrated manner in which the nervous system controls muscular tension, and the importance in this process of minute reporting stations in the soft tissues, have provided the osteopathic profession with an understanding of the way all this happens. How can we use this knowledge?

EXAMPLE OF RECIPROCAL INHIBITION IN MET

If the muscles of the front of your arm, to stay with that example, are tense, say after gardening, tennis or an injury, you could use the muscles on the back of your arm to relax these tight muscles. If you took that arm to its maximum comfortable degree of straightness, ensuring that in doing so it does not produce pain (which it would if it went beyond its present restriction barrier), and at that point, whilst restraining your lower arm with your other hand (i.e.

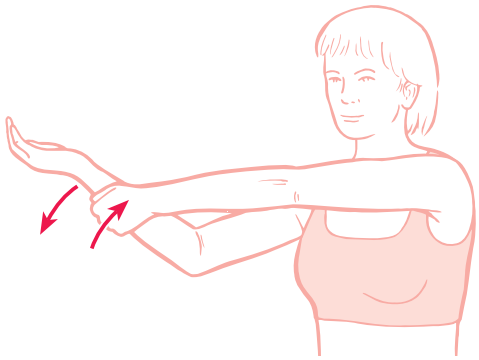


Figure 1.3 *When the flexor muscles are tight, trying to straighten the arm against resistance without movement taking place at all (an isometric contraction of the antagonists) relaxes the flexor muscles by reciprocal inhibition*

preventing it from moving), tried to gently take your arm towards a greater degree of straightness, by contracting the muscles of the back of your arm, what would happen?

As you tried to make your arm straight (i.e. pushing gently towards the restrictive barrier) you would be contracting the muscles of the back of your arm. These are the antagonists of the tight muscles which are in trouble and by preventing any movement from taking place (by using your other hand), it is possible to ensure that no strain occurs at the painful joint or in the tight muscle(s). You would in effect have a matching of forces. The extensor muscles would be trying to pull your arm straight, while your free arm resists this, completely and exactly. This is called an *isometric contraction*. The forces match each other and no movement occurs (see Fig. 1.3).

As this isometric contraction of the extensor muscles is taking place to try to straighten your arm, their antagonists (the shortened flexors) would be obliged to relax, according to physiological law. Therefore, after this MET isometric effort, which could last for 5–10 seconds, you would find that the arm which was previously limited in its ability to straighten would be capable of an increased degree of normality.

The barrier, or *point of bind*, would have been pushed back a little as the flexor muscles relax. By repeating this whole procedure several times, until no further gain in the range of movement is noted, it might be possible to completely normalize the shortened muscles.

What I have described above is an example of an isometric contraction of the extensor muscles. These are the antagonists to the short flexor muscles (the agonists), and we would be using reciprocal inhibition (RI) to achieve the objective of 'switching off' the tight flexor muscles, allowing them to be more easily stretched afterwards.

Achieving postisometric relaxation in an MET procedure

There is another, completely different method for achieving the same objective, in order to relax the tight flexor muscles.

If your arm, with its limited ability to straighten, is taken as far as it can comfortably go in that direction (to the current painless barrier of movement) and this time you try to *bend* your arm, instead of making it straighter, and if this effort to bend your arm is resisted by your other hand, you will be doing

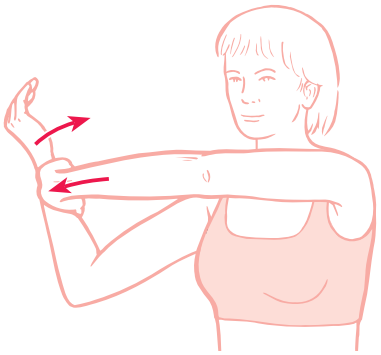


Figure 1.4 *Contracting the shortened muscles against resistance so that no movement occurs (isometric contraction of the agonists) produces postisometric relaxation (PIR)*

the opposite of the previous example which involved reciprocal inhibition. Your arm, having been taken to the point of restriction/bind, would be trying to bend, but the counterforce of your restraining hand would stop it from doing so, isometrically (see Fig. 1.4).

This time, the very muscles which had shortened (the agonists) would be contracting against resistance and, after an appropriate period, say 5–10 seconds, of this isometric contraction (no movement allowed to occur, only effort) a new phenomenon would become apparent. This is called *postisometric relaxation (PIR)*. This means that any muscle, or group of muscles, which is isometrically contracted *is obliged to relax* afterwards. So if a muscle is tense or tight and it is then isometrically contracted, it will, to some extent, release and relax afterwards, allowing it to be more easily stretched afterward. A more detailed look at the use of PIR and RI, in the elbow example, will be found in Box 1.1.

Box 1.1 Detailed examples of the use of PIR and RI

USE OF PIR

Let's look more carefully at MET treatment of an arm with some degree of muscular shortening, making it difficult to straighten fully. Let us say this is the right arm. The first objective in any MET procedure is to establish what the restriction barrier is, whether this relates to an arm that won't fully straighten or any other joint that has a limitation in its normal movement. To establish its restriction barrier, the arm should therefore be taken gently to the limit of the available degree of movement, in the direction in which it is restricted. Going too far would force it beyond the current barrier and would actually irritate the tissues of the area, so it should therefore be stretched out gently, until the 'point of bind' is felt, beyond which discomfort would start.

When you are trying to release and stretch tissues which are chronically short (this usually means they have been that way for a month or more) then the isometric contraction should start with the arm (in this example) just short of the restriction barrier or point of bind.

If the condition is acute (less than a month old or acutely painful) the contraction should start at the restriction barrier. The degree of effort used in acute and chronic conditions also varies, as you will see below.

Sitting at a table, the right arm could be rested on it (possibly on a cushion), as straight as it is comfortably possible to do, with the left hand placed at about wrist level in order to restrain a contraction of the muscles which bend the arm (the very ones which have shortened and which are preventing full straightening).

As the attempt is being made to bend the arm, the counterpressure from the left hand should prevent this. Only about a quarter of the available strength of the muscles of the right arm should be used, with the start of the contraction synchronized with the counterpressure, to avoid any jerking. This contraction should be maintained for a slow count of 7–10 before being slowly released, in a coordinated manner, together with the release of the counterpressure from the left hand.

After a moment during which the arm is relaxed fully, an attempt should be made to take the arm to its fullest, pain-free, stretched-out length (an inhalation followed by a slow exhalation can be used to make this more effective; see below). This stretch should push just beyond the previous restriction barrier if the condition is chronic (an old problem, of more than a month's duration) and just to the barrier if it is acute (a more recent, or an acutely painful, problem).

Thus a new barrier would be engaged and there should be a greater degree of movement than was possible before the isometric contraction. It should now be possible to take the arm a little straighter without effort. In a chronic condition, if stretching is being carried out, this stretch should be held for not less than 30 seconds, to give the shortened muscle tissues a chance to lengthen. In an acute condition, there is no stretching so the next isometric contraction can be perfomed straight away.

Whether acute or chronic, the whole procedure is then repeated at least once more, exactly as above, and once again, after coordinated release of the contraction and the counterpressure, another attempt could be made to see just how straight the arm could go, painlessly, either to a new barrier if acute or to a new stretched position if chronic.

USE OF RI

If the attempt at contracting the shortened muscles (agonists), as described in the exercise above, was painful, it would be appropriate to use the antagonists instead; in other words, using reciprocal inhibition to 'switch off' the tight agonists. RI is often more useful than PIR in acute conditions.

To do this, the arm should again be taken to its full comfortable resting length, with the elbow on the table, and this time the left hand is placed on the back of the wrist, as a counterforce. This time the effort would involve the extensor muscles, which would try to force the arm into a greater degree of straightness, against resistance from the other hand. Again, only partial strength is used and the timing is the same as above, starting with a 5–10-second contraction.

After a slow easing of the dual efforts (the arm trying to straighten against resistance), the arm would again be tested to see if it could achieve a greater degree of normality in straightening.

Several attempts of this type should be made, increasing the length and degree of effort (always ensuring that no pain is produced and only increasing the amount of muscular effort if the condition is chronic), until it becomes evident that no further gains could be made and at this point muscle energy methods should be stopped for the day.

Both PIR and RI would have been used and maximum gains enjoyed in terms of greater degree of movement and lessened discomfort.

Variations in the direction of the contraction are possible during these various isometric efforts, in which different angles of bending or straightening are resisted, thus using different muscle fibers. For example, the hand of the arm resting on the table could be aiming for the face, as the contraction begins, or it could be aiming for the right or left shoulder.

These variations in direction are always possible when trying to normalize tight muscles and should be incorporated into the variables of amount of effort used, amount of time of each contraction, number of contractions and type of contraction (PIR or RI).

Other variables in the previous example could include the position of the hand on the affected side during the contractions. This could be palm downwards or palm upwards, thus bringing different muscles into play. All such factors will be outlined as appropriate, in the descriptions of the various muscles and joints in the text.

SUMMARY

- By using the affected (tight, shortened, etc.) muscle(s) in an isometric contraction we induce postisometric relaxation (PIR) in the affected muscle(s). This offers an opportunity to stretch the previously shortened muscle(s) afterwards.
- By using the antagonists of affected muscles (tight, shortened, etc.) in an isometric contraction we induce reciprocal inhibition (RI) in the affected muscle(s). This also offers an opportunity to stretch the previously shortened muscle(s) afterwards.

These are two of the most important aspects of the release of troubled muscles and joints using MET methods and I will be repeating these basic instructions many times during the course of this book.

In the many examples of MET in the book, different forms of counterpressure will be used. In some cases, the resistance to your contracting muscle(s) will be provided by your own or someone else's hand(s); in other instances it will be provided by an unyielding obstacle, such as a piece of furniture or a wall, against which effort can be directed, and in other cases the counterforce will be gravity.

In all of these examples, the aim is to use the affected muscles or their antagonists appropriately, in order to achieve the release of tense, tight, shortened muscles, which are often painful and which usually produce some degree of limitation of movement.

Which method should be used – PIR or RI

The presence of pain is frequently the deciding factor in choosing one or other of the methods described (PIR or RI). It is clear that when using PIR, the very muscles which have shortened are being contracted. If the area is already painful and any contraction could well trigger more pain, it might be best to avoid using these muscles and choose instead the antagonists. The antagonists, which are usually pain free, might well be your first choice for MET use, when the shortened muscles are very sensitive. Later, when pain has been reduced by means of muscle energy (or other) methods, PIR techniques (which use isometric contraction of the already shortened muscles rather than the antagonists used in RI methods) could be used. To a large extent, deciding whether a condition is acute or chronic can determine the method best suited to treating it and advice regarding this will be found later in this chapter.

Thinking back to the example of the arm which is putting down a glass, you will recall that muscles are capable of both contracting and lengthening at the same time. This should help an understanding of other MET procedures, the isotonic variations.

Isotonic MET methods

CONCENTRIC ISOTONIC CONTRACTIONS

When the muscles of your arm contract as you bring a glass to your lips, they are both contracting and shortening. Technically this is called a *concentric isotonic contraction*. This means that the two ends of the muscle(s), the origins

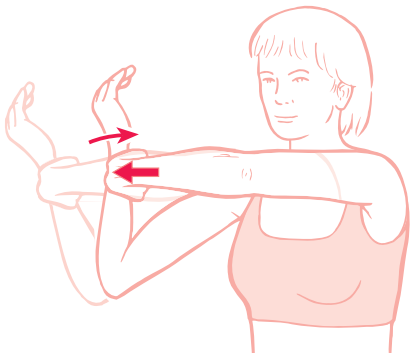


Figure 1.5 *The arm is being flexed against a degree of resistance which does not fully match the effort of the arm. Therefore an isotonic concentric contraction is taking place, toning/strengthening the arm muscles that are working.* ***1*** *start (more distant from face).* ***2*** *new position*

and insertions, that are contracting are getting closer together. This is what people do when they lift weights and, as is obvious from that activity, this helps to tone, strengthen and 'build' muscles. So we can usefully introduce concentric isometric activities when we want to achieve increased strength and tone (see Fig. 1.5).

In isotonic concentric contractions the effort of the contracting muscle is resisted but not quite overcome. The movement is allowed to take place, with effort. Should a group of muscles be weak, after disuse for example, and should you wish to tone these up, you have a perfect tool in concentric isotonic methods of muscle energy.

Now let us assume that the flexors of your arm (which bend your elbow) are weak, for whatever reason. If your opposite hand were placed on your forearm to partially restrain an attempt to bend your arm then, as they contracted, the weak muscles would be working against a degree of resistance. By repeatedly doing this, with variations in the degree of resistance applied, it would be possible to strengthen the weak muscles.

A variation exists where an area is rapidly and repeatedly moved in a variety of directions, while being partially resisted. This would produce a series of concentric isotonic contractions, known as an *isokinetic exercise*. An example of this could involve a weak ankle; while sitting with the affected leg resting across the other knee, you could use your hands to restrain a forceful effort to put the ankle joint through as full a range of movements as possible, in a short space of time (no more than 5 seconds). This has a powerful toning effect on the whole joint.

ECCENTRIC ISOTONIC CONTRACTIONS

In contrast to this last example, when your arm is putting a glass down, the muscles will be contracting but despite this they are also lengthening. Technically this is known as an *eccentric isotonic contraction*. Here the muscle's origin and insertion (where the muscle attaches into bone as an anchor point) get further apart, despite the contraction of the muscle. This can be used to dual effect in particular exercises, especially if performed very slowly (note: a slow eccentric isotonic stretch is abbreviated as a SEIS in this text). The two effects of a SEIS are to tone the muscle that is slowly eccentrically stretching, while at the same time this activity is creating a reciprocal inhibition of its antagonist, so allowing the antagonist to be more easily stretched afterwards. See the notes on the diaphragm and pursed lip breathing in Chapter 6 for an example of an exercise that uses eccentric isotonic activity (see Fig. 1.6).

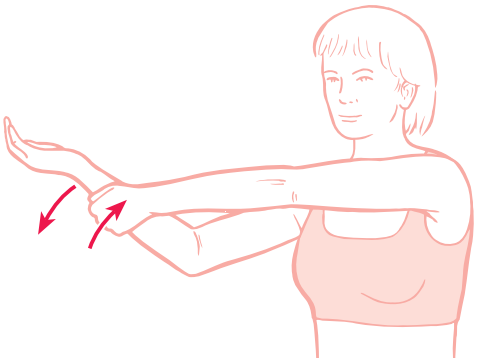


Figure 1.6 *The arm is being forced to bend as it tries to stay straight. The effort of the arm is being overcome, stretching the contracting extensor muscles of the arm (an isotonic eccentric contraction), toning them while at the same time inhibiting the tight flexor muscles (which can be stretched after this maneuver is finished)*

The major variables in MET

As in all the examples given, the essential features defining different uses of MET are:

- the amount of effort used in the contraction
- the amount of effort used in restraining a contraction, i.e. whether the contraction is matched (isometric) or overcome (isotonic eccentric) or only partially resisted (isotonic concentric).

The other major variables which are controllable are, of course, how long the contraction is allowed to continue and how often it is repeated.

- The degree of effort in isometric contractions should *always* be much less than the full force available from the muscles involved. The initial contraction should involve a quarter or less of the strength available. This, of course, will not be an exact measurement but indicates that a wrestling match should never develop between the contracting area and the counterforce, whether this be a hand, a piece of furniture, another person's hands or gravity.
- After the initial, slowly commenced contraction, subsequent contractions may involve an increase in effort but should never reach more than half of the full strength of that muscle. We want above all to achieve a *controlled* degree of effort at all times and this calls for the use of only part of the available strength in a muscle or muscle group.
- The timing of isometric contractions is usually such as to allow at least 5 and up to 10 seconds for the contraction, from beginning to end.
- It is important to remember that the start and the end of contraction should always be slow. There should never be a snatching or a quick beginning or end to the contraction. Always attempt a smooth build-up of power in the muscle(s) and a slow switch-off of the contraction at the end. This will prevent injury or strain and produces the best possible results.
- In some cases slightly shorter periods of time are suggested for the contractions and in others they will be longer. Indeed, in many instances there is a variation as the therapy progresses, with even longer periods of time involved, although 30 seconds would be a top limit, unless otherwise stated in the text. *It is far safer and more effective to contract a muscle for a longer period than it is to make the contraction stronger.*

- Use of breathing and eye movements can help some applications of MET (see Box 1.2).

Guidance as to these variables will be given in the individual examples later in the book. As a rough guide, though, the 5–10-second timing of initial isometric contractions is a useful rule to bear in mind. Repetitions are normally continued three or four times, although usually only for as long as improvements continue to be achieved in the problem muscle(s) between contractions.

Box 1.2 Influence of breathing and eye movements on MET

BREATHING

Another factor relating to these methods which has not been explained up to now is the use of breathing patterns to enhance the effects of PIR and RI.

In some cases it is necessary to breathe in deeply at the onset of a contraction and to hold the breath for the duration of the effort, releasing the breath at completion, as relaxation is taking place. In other instances it is helpful for the breath to be sighed out as the effort commences and for this to be held out until the end of the contraction.

In all cases it is desirable that after the contraction, and before any attempt is made to assess the degree of extra movement achieved, a full breath be taken and slowly sighed out, to help release all muscular effort.

The reason for the suggested breathing patterns during isometric and isotonic contractions is that there is evidence that certain muscle movements are helped by one or other phase of the breathing cycle. For example, if you bend towards your toes whilst breathing in, you will not be able to reach as far as if you bend whilst breathing out. This is true for many other movements of the body as well. Bending the neck forward and general side bending are two examples of this. The neck and low back are easier to bend backwards as you breathe out, whereas the thoracic spine is easier to bend backwards when the breath is being taken in. For instance, a bending forwards of the thoracic spine (where the ribs attach) is made easier by breathing out, whereas the reverse is true if this area is being bent backwards.

There is therefore an advantage to be gained by using the breathing phase that is most helpful in any given movement. (Guidelines to these will be given in the text of individual exercises where this is useful.)

EYE MOVEMENTS AND MET

If you try to bend forwards whilst looking upwards (with the eyes only, without any movement of the head), you will not be able to bend as far, or as easily, as if you were looking downwards. The converse also applies to coming upright from a bent position with the eyes looking downwards. So, when you bend forwards while looking down, the movement becomes easier while straightening up from such a bend, or actually bending backwards, is easier with the eyes rolled upwards.

Eye involvement is important in other movements as well. Try this experiment. Sit in a chair and turn your trunk and head to one side, while your eyes are looking in the opposite direction. Note how far you can go without undue strain and make a mental note on the wall, indicating your furthest point of rotation. Then do the same turn exactly but this time have the eyes traveling in the same direction as the turn. You will find that you can go much further because the rotation of the body is improved by the direction in which the eyes are looking. (Guidelines to these variables will be found in the text.)

Pulsed MET

There is another MET variation, which is powerful and useful. This is pulsed MET, also known as the *Resistive duction* method, first described by the osteopathic physician TJ Ruddy in the 1960s. This simple method is very useful since it effectively accomplishes a number of changes at the same time, involving the local nerve supply, improved circulation and oxygenation of tissues, reduction of contraction, etc. I now use the term 'pulsed MET' to describe Ruddy's safe and effective method, which depends entirely for its success on the 'pulsed' efforts of the person producing them being very light indeed, with no 'wobble' or 'bounce', just the barest activation of the muscles involved.

AN EXAMPLE OF PULSED MET

- Sit at a table, rest your elbows on it and tilt your head forwards as far as it will go comfortably. Rest your hands against your forehead.
- Use a pulsing rhythm of pressure with your head, about two per second (as though bending it further forwards against your hands) of one-one, one-two; two-one, two-two; three-one, etc. until ten-two is reached.
- After 20 pulsations retest the range of forward bending of your neck. It should go much further, more easily than before. This method will have relaxed the muscles of the region, especially those involved in flexion, and will have produced 20 small reciprocal inhibition 'messages' to the muscles on the back of your neck which were preventing easy flexion.
- Variations may be used for all positions of movement of your head or any other part of your body. The simple rule is to engage the restriction barrier, provide a point of resistance (with your hands if possible) and to pulse towards the barrier rhythmically.
- If pain is felt, push less hard.

The pulsing method should always be against a fixed resistance, provided by your own (or a friend's) hands, just as in other MET methods. You can use the same positions outlined in the muscle energy chapters, for the various regions and

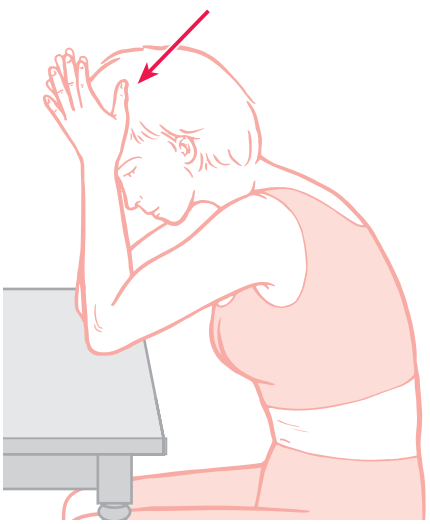


Figure 1.7 *The head and neck are flexed to their comfortable end of range and the hands offer resistance as the head is 'pulsed' 20–30 times, in the direction of resistance, against the firmly fixed hands. The pulsing contractions release the tight muscles at the back of the neck (by means of RI), allowing further movement into flexion afterwards*

muscles of the body, to create a starting position for pulsed MET usage, wherever a feeling of tightness or restriction is noted. The key to its successful use is to apply approximately 20 painless contractions, against resistance, in 10 seconds. This can be repeated several times or until tenderness and restriction ease.

Conclusion

The intensity, direction, duration and frequency of contraction are all important factors in successful application of muscle energy methods. Whether to use the affected muscles or their antagonists is the fundamental decision (pain will help to decide this). Breathing and eye movement are peripheral, but useful, refinements which can make the techniques more successful.

This, then, is the essence of muscle energy technique. It is simple and yet the rules are important, since too much effort or incorrect timing will negate the results.

Box 1.3 **Explanations and summary of MET methods**

WHAT IS AN ISOMETRIC CONTRACTION AND WHAT EFFECT DOES IT HAVE?
This is a light contraction in which the effort of the muscle, or group of muscles, is exactly matched by the counterpressure, so that no movement occurs, only effort. The effect of this is to create a period of relaxation of the muscle itself (postisometric relaxation) as well as of its antagonist (reciprocal inhibition) for about 20 seconds after the contraction, allowing stretching to be more easily accomplished.

WHAT IS PULSED MET?
A series of very small, rhythmically pulsing, isometric contractions toward the restriction barrier creates multiple reciprocal inhibition effects and usually allows an increase in range of movement. These pulsing methods can also be used to increase strength when used in previously weakened muscles.

WHAT IS A CONCENTRIC ISOTONIC CONTRACTION AND WHAT EFFECT DOES IT HAVE?
A concentric isotonic contraction is one in which the effort of the muscle, or group of muscles, is not quite matched by the counterpressure, allowing a degree of resisted movement to occur. This tones and strengthens the muscle itself.

WHAT IS AN ECCENTRIC ISOTONIC CONTRACTION AND WHAT EFFECT DOES IT HAVE?
An eccentric isotonic contraction is one in which the effort of the contracting muscle(s) is more than matched by the counterpressure, which therefore causes the contracting muscle(s) to be stretched as it contracts. If done slowly this tones the muscle itself while (temporarily) 'switching off' its antagonists.

WHAT IS AN ISOKINETIC CONTRACTION AND WHAT EFFECT DOES IT HAVE?
An isokinetic contraction involves the movement of a joint through a full range of motion, rapidly and using full muscle strength, against partial resistance. This is therefore a multiple isotonic movement, and has the effect of toning and strengthening all the muscles involved in the process.

HOW ARE DIFFERENT ISOMETRIC MET METHODS USED?
When the actual muscles which have shortened are contracted isometrically, then the phenomenon of postisometric relaxation will induce these shortened muscles to relax after the effort. When the antagonists are used in the contraction, the phenomenon of reciprocal inhibition will induce

Box continues

the shortened muscles to relax after the effort. Depending on whether the problem is acute or chronic, the short muscle may be gently taken to a new resting length without stretching (acute) or stretched (chronic), after the contraction.

WHICH MET METHOD SHOULD BE CHOSEN?

Either PIR or RI may be used although PIR is thought to be more effective (i.e. contracting the affected/shortened muscle itself). The only reason for choosing RI as a starting method would be because of pain or spasm in the affected muscle(s), when it is asked to contract. This would not always occur but if the pain is marked or there is spasm, then RI is suggested before or instead of PIR methods.

HOW DO THESE METHODS WORK?

Reciprocal inhibition obliges a muscle to relax because of the increased tone in its antagonist. This works through the mediation of the central nervous system (CNS) which tries to prevent the agonist muscle (the prime mover in any given movement) and its antagonist tightening at the same time (this would lead to movements such as occur in spastic conditions).

Postisometric relaxation, which occurs after an isometric contraction of a muscle, happens because of the activity of minute neural reporting stations called the Golgi tendon bodies. These lie near the origins and insertions of the muscles and report to the CNS the load the muscle is having to bear. An isometric contraction, maintained for some seconds, results in a report to the CNS asking for the muscle to be released and relaxed due to excessive load.

It is in the brief latent period of 20 seconds or so after an isometric contraction that the muscle can be stretched more easily than before the contraction. Both RI and PIR therefore result from application of physiological effects.

WHAT IS THE 'BARRIER'?

When a joint is restricted or a muscle shortened, thus reducing its range of motion, there will always be a direction in which movement is most limited. As the limit of movement, in that restricted direction, is reached, a 'point of bind' will be noticed, beyond which no more comfortable movement is possible.

When a *normal* joint is taken to its limit, it will usually be found that at the end of the range there is still a bit more movement available, a sort of springiness, in the joint. When there is *abnormal* restriction, however, the limit does not have this spring but rather, as with a jammed door or drawer, it is fixed at that point and any attempt to take it further is uncomfortable and the feel is distinctly of 'bind', blockage or jamming, rather than springiness. This is the barrier through which muscle energy methods will attempt to take the joint or area, by inducing relaxation in the muscles which are holding it fixed.

This 'endpoint', or barrier, can be described as having either a 'soft' or 'hard' end-feeling. Soft tissue restrictions always have a softer end-feel than internal joint restrictions which have a sudden or hard end-feel, especially when damaged by conditions such as arthritis.

HOW SHOULD THE ISOMETRIC EFFORT BE COMMENCED?

In acute conditions, having engaged the barrier (see below), the counterpressure is applied and the contraction commences, slowly.

There should be a build-up of muscular effort, coinciding with the counterpressure. The slow commencement of the effort prevents any jerking or sudden movement, which would ruin the strategy of inducing relaxation in the affected musculature. In chronic conditions, the contraction used is often stronger than that suggested in acute conditions and should start short of the barrier to reduce the slight chance of cramp.

HOW SHOULD THE ISOMETRIC EFFORT CEASE?

The same slow easing of effort is desirable at the end of the effort. After this a full breath is taken and sighed out slowly, as the muscles of the area involved are consciously relaxed. During the exhalation, in acute conditions, the tissues are taken to a new barrier, without stretch. In chronic situations a *very slight* stretch is made just beyond the restriction barrier, in order to introduce elasticity into fibrous, shortened

tissues. The stretch should be held for not less than 30 seconds for best results.

WHAT IS COUNTERPRESSURE?

Counterpressure is the force applied to an area which is designed to match exactly (isometric contraction) or partially (concentric isotonic contraction) or to overcome (eccentric isotonic contraction) the effort, or force, produced by the muscles of that area.

This counterpressure, or holding force, can be applied via the hand(s) of the person doing the exercise, someone else's hands, an immovable object against which pressure can be applied (furniture, wall, etc.) or against gravity, whichever is more appropriate.

HOW CAN GRAVITY BE USED AS COUNTERPRESSURE?

If you lie with a folded towel or pillow under your shoulders, your head will hang backwards, putting stretch onto the muscles on the front or side of your neck (if the head is turned). Gravity would be pulling the head towards the floor and the restraining muscles would be holding the head and would be under tension (see Fig. 1.8).

If you then slightly lift your head toward the ceiling, using the tense muscles, and hold this new position, then an isometric contraction would be taking place, in which the contracted muscle's effort would be matched precisely by the pull of gravity against it.

If this position is held for 5–10 seconds and then slowly released, these muscles would be affected by PIR; they would now be looser and could more easily be stretched by letting the head hang back to be supported by the surface on which you are lying.

This is an example of gravity-induced PIR and other examples will be found in the text.

Figure 1.8 *The head is hanging down in order to allow gentle stretching of the anterior muscles of the neck, after an isometric contraction against gravity (CAUTION: avoid this position if dizziness is felt)*

HOW CAN AN IMMOVABLE OBJECT BE USED TO APPLY COUNTERPRESSURE?

If the muscles on the back of the thigh are shortened, it would be difficult to use your own hands, or gravity, to act as counterpressure to any contraction. This could be achieved by placing the heel of the outstretched leg onto a bench or stool, which serves as a resistance to an isometric contraction of the muscles of the back of the leg. Maintaining such a position for 7–10 seconds would produce PIR in the muscles, allowing them to be more easily stretched further after the isometric contraction, simply by leaning forward (see Fig. 1.9).

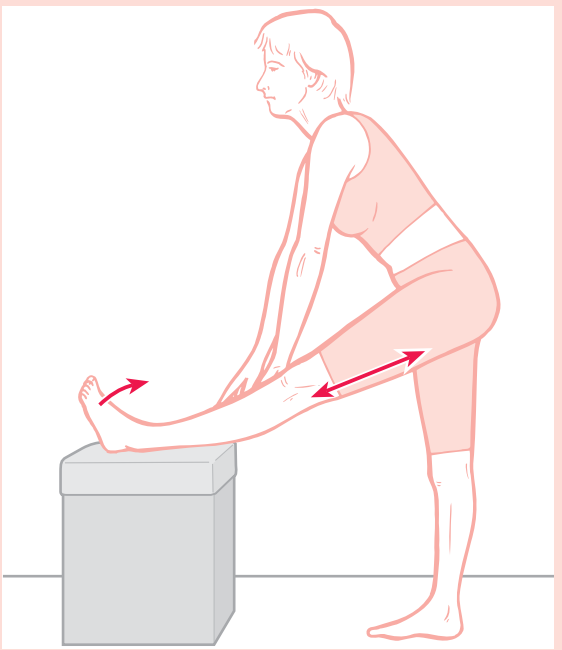


Figure 1.9 *Isometric contraction and stretch of hamstrings using PIR*

Box continues

HOW MUCH FORCE SHOULD BE GENERATED BY THE MUSCLES CONTRACTING WHEN ISOMETRIC AND OTHER MET METHODS ARE USED?

With most isometric contractions this should start at about 25% of the strength of the muscle for the first contraction. A subsequent contraction in chronic conditions (more than a month's duration) could involve greater degrees of effort but *never more* than about 40% of the available strength. Many experts use only about 10% of the available strength in muscles being treated for contractions, and increase effectiveness by employing longer periods of contraction. In acute conditions only light contractions are used, starting at the restriction barrier and moving to the new barrier afterwards, unlike the method applied to chronic conditions where the contraction starts just short of the barrier and stretches slightly through it afterwards.

In isotonic contractions greater effort may be employed, especially if isokinetic measures are involved, in which case full strength is used. In eccentric isotonic contractions an effort involving about half the full muscle strength is asked for.

Contractions and counterpressure should never become a struggle. Always maintain a controlled degree of effort in all such maneuvers.

HOW IS BREATHING USED IN MET PROCEDURES?

The use of coordinated breathing to enhance particular directions of muscular effort will be outlined where appropriate. Sometimes muscular effort is enhanced by inhaling as the effort is made, although this is not essential for successful application of MET. It is important when moving to a new barrier, or when starting stretching after a contraction, that full relaxation is achieved and this is often helped by breathing slowly and deeply, and by moving the area to its new position on an exhalation.

HOW LONG SHOULD THE MUSCLE ENERGY CONTRACTIONS LAST?

Isometric contractions should last 5–10 seconds. Isotonic and isokinetic contractions are usually accomplished in 4–7 seconds.

HOW OFTEN SHOULD CONTRACTIONS BE REPEATED AT ANY ONE SESSION?

Not less than two repeats of isometric contractions – more is not usually necessary. Concentric and eccentric isotonic contractions are often repeated several times depending on the effect needed. Isokinetic contractions are usually limited to two or three efforts at any one time.

HOW REGULARLY SHOULD MUSCLE ENERGY PROCEDURES BE USED?

In chronic cases regular employment of these methods is suggested until normalization, or no further improvement, is achieved. This could mean daily or on alternate days, for many weeks.

WHAT CONDITIONS CAN MET METHODS HELP?

Isometric contractions, those designed to induce both PIR and RI, are best used in treatment of muscular spasm, stiffness, contraction and shortening of muscles. They are also useful in loosening stiff joints, whatever the cause might be. However, the degree of improvement possible in such cases will depend upon the degree of actual joint damage.

PIR and RI are useful in preparing a joint for subsequent manipulation. Relaxing a previously shortened muscle so that it can reach its normal resting length is important in eliminating trigger points which lie in such muscles and which might be causing pain and other symptoms elsewhere in the body (see Chapter 4).

Isotonic concentric contractions, as well as slow eccentric isotonic stretches (SEIS), are used for toning weakened muscles.

Isokinetic contractions are used for toning weakened musculature and building strength in all the muscles involved in a particular joint's function.

ARE ALL JOINT PROBLEMS THE RESULT OF MUSCLE SHORTENING?

No, although if there are other reasons such as joint damage or cartilage or tendon injury, the muscles will be involved to some extent, since they are the prime movers of the bones.

Thus, even if there are causes other than muscle problems for a joint's stiffness, the application of MET methods will to some degree be helpful.

However, where muscles are the major cause, and this is in the majority of cases, the condition can often be normalized by MET alone.

HOW LONG DO THE PIR AND RI EFFECTS OF RELAXATION IN THE TIGHT MUSCLES LAST?

Tests have demonstrated that just one 7–10-second isometric contraction produced increases in the range of movement in joints of between 10% and 15%, which is still measurable some hours aftewards.

In practice it is found that, once relaxed, a tight muscle will not tighten up again unless provoked or irritated in some manner. If stretching is used following MET the muscle should maintain its new length, if the reasons for its shortness are not repeated (wrong use, strain, etc.).

It is suggested that normal use be resumed after muscle energy measures but that any violent or potentially irritating exercises be avoided for a few days. The beneficial effects should be permanent, if no reinjury is sustained.

SUMMARY OF PIR OR RI MET METHODS

1. Choose the type of MET method according to guidelines above.
2. Take the restricted area or joint to its comfortable limit, i.e. engage the barrier. In chronic conditions back off from the barrier before starting the contraction. In acute conditions start at the barrier.
3. Ensure the correct type and placement of counterpressure.
4. Commence contraction and counterpressure simultaneously. Never use more than 25% of strength unless otherwise instructed.
5. Hold the contraction and counterpressure for the appropriate time, which is usually 7–10 seconds.
6. Ease off both effort and counterpressure in a slow, coordinated manner.
7. Breathe in and sigh out slowly, as the muscles are consciously relaxed.
8. Slowly and carefully reengage the barrier to assess increased range of movement in acute conditions, whereas in chronic states go to a point just beyond the barrier to stretch the tight muscle(s). If possible, actively move the area into its stretched position. Hold the stretch for not less than 30 seconds.
9. Never, under any circumstances, forcibly stretch the shortened muscle(s) to the point where pain is produced (mild discomfort is acceptable), as this can produce a reflex reaction, contracting them again.
10. Repeat the whole process at least once more.
11. If no more improvement is noted, cease this type of MET and try the other (i.e. if PIR was used, now try RI or vice versa).
12. Variations in angle of effort can be used to involve a greater number of muscle fibers, with possible benefit.

SUMMARY OF CONCENTRIC ISOTONIC CONTRACTION

1. Place counterpressure hand(s) in position and contract the weak muscle, while the counterpressure just fails to control the movement so produced.
2. Although it is permissible to utilize the full force of the muscle involved in isotonic toning maneuvers, the start of the contraction should be a slow build-up of force, not a snatching jerk. The action should become one involving maximum muscle effort and the movement achieved should be slow, as the counterpressure allows movement to take place.
3. Effort and counterpressure should cease simultaneously.
4. Repeat three or four times.

SUMMARY OF ECCENTRIC ISOTONIC STRETCHING

1. The appropriate muscle is placed at maximum stretch and you should try to maintain this position as your other hand (or someone else's) attempts to overcome this and return the tissues to a neutral position.
2. Less than maximum effort is used (40–80% of strength), at the same time as the counterpressure is applied to slowly stretch the contracting muscle(s).
3. This may be repeated several times.

Box continues

SUMMARY OF ISOKINETIC CONTRACTION

1. Hold the affected joint (such as the ankle) with one or both hands.
2. Forcibly, and with maximum available effort of the muscles of the joint, attempt to move the joint through its full range of movements (flex, extend, rotate in each direction, etc.), whilst partially restricting this by counterpressure.
3. Only 3–4 seconds is needed at any one time for this to be effective.
4. Repeat several times.

These methods do not replace other types of self-help and should be combined with whatever else is helpful, whether this involves self-mobilization, exercise, self-massage or any other treatment. MET methods are very useful in preparing a joint for subsequent manipulation, making treatment easier and more effective.

MET techniques are very suitable for home therapy since little, if any, harm can ever come from their use, even when wrongly applied (except for excessive force being exerted). They should never cause pain and this should be a guide to their use. Pain means that too much effort or an inappropriate method of MET is being used.

These methods can be used daily or several times daily if helpful or only when necessary and can safely be employed where joints are damaged, as in arthritic conditions, because they do not involve movement of the joints and can therefore enhance the muscular status, either by releasing tight muscles or toning weak muscles.

There is no joint or muscle problem which cannot be helped, to some extent, by appropriate muscle energy technique and in many instances, where the causes involve strain or injury, the results are almost instantaneous and permanent. Spasm, contraction, tightness, stiffness and shortening of muscles represent major causes of pain and disability and MET methods can reduce this and lead to greater freedom of movement and relief of pain in many cases.

Testing for shortness in muscles 2

Different muscles in the body, as you might expect, play different roles. What you may not realize is that there are two very different types of muscles in the body and that these react differently to stress and strain and also have quite different functions.

These two kinds of muscles have been given different names (postural/phasic, mobilizer/stabilizer, deep/superficial, global/local, and many others). It will be easiest if we simply call them type 1 and type 2.

- Type 1 muscles are mainly concerned with stamina and endurance functions. Their work relates in large part to static, postural or antigravity tasks, requiring long periods of contraction and little speed of action.
- Type 2 muscles are those that are mainly involved in activity, power and speed and which have (unlike type 1 muscles) little ability to perform tasks of endurance.

The ways in which these different muscles derive their energy are not the same and neither is the way in which they react to being overused, underused or abused.

- The static type 1 muscles, which have a primary role in long-term endurance and postural work, will shorten and tighten (and possibly weaken) in response to dysfunction or abuse.
- The phasic type 2 muscles, which are primarily involved in movement, become inhibited and weak in response to dysfunction or abuse and may actually lengthen and become slack.

Which problem should be tackled first: weak or tight muscles?

You might think that the first priority in postural correction, or the regaining of fitness, should be the strengthening and toning of weak muscles but this is not necessarily correct. The fact is that by freeing and loosening tight muscles, you will achieve increased strength in the weak muscles automatically.

If the muscles of the body are in a general state of unfitness and stiffness, some will be weak and others will be tight. In Chapter 1 we saw how tightness in a muscle will automatically create inhibition in the antagonist muscle – after all, this is the basis of reciprocal inhibition in MET! Releasing and relaxing this tightness takes away this inhibition and restores tone to the previously inhibited/weak muscle(s). There is a basic physiological law which states that if a muscle weakens, its antagonist tightens and conversely, if a muscle tightens, its antagonist weakens.

Some people argue that by starting the other way around, by toning up what is weak, you would begin to inhibit the tight antagonists and this is partly true. The problem is that where you have some muscles overused and tight and their antagonists inhibited and weak, and you try to strengthen the weak muscles by exercising them, there is almost no way of stopping the additional use of the already overtense muscles at the same time, creating even more tension in them. As a result there will be more dysfunction (pain, stiffness, etc.) than if the tight muscles were dealt with first, and released. On the other hand, it is easy to focus on stretching what's tight, switching off the excess tone (using MET type exercises), and so beginning the normalization process. Later on, when the very tight structures are looser, exercise for the previously inhibited ones is useful, indeed essential.

So the evidence is that to begin a program aimed at improving function with the toning up of the weak muscles is a mistake. The correct sequence should be to loosen the tight muscles, which then allows a natural regeneration of tone and strength to take place in the weak muscles.

After exercises for the release of tightness in the postural muscles have started, several weeks should elapse before commencing any attempt at toning weak muscles, either by exercise or MET isotonic methods, since many of these will automatically strengthen.

In the chapters dealing with muscle energy techniques it will be seen that if a muscle (or group of muscles) is contracted, the antagonist(s) will relax and weaken, thus allowing us to gently stretch the tight muscle, had it been short. Muscle energy techniques are superbly designed to assist in the freeing and relaxing of tight muscles (which are most often the type 1 muscles) and any weakness which is found to remain in type 2 muscles, after this has been achieved, can be further treated by using isotonic muscle energy methods, as well as other functional exercises.

CROSSED PATTERNS OR 'SYNDROMES'

An example of this might be of an individual with a protruding or sagging abdomen and a general slouching posture, including a depressed rib cage and rounded shoulders, usually with tight low back muscles and tight neck muscles. This posture creates two patterns of 'crossed' influences of tight and weak muscles – lower and upper (Figs 2.1, 2.2).

A common practice in advising such individuals, before our newfound knowledge of type 1 and type 2 muscles and their different responses to overuse/misuse, was to suggest, for example, abdominal toning exercises. This assumed that the abdominal muscles would benefit from toning by using sit-up type exercises ('crunches'). When electrical readings are taken of the abdomen and the low back muscles when such exercises are being done, in someone who starts with weak abdominal and tight low back muscles, it is almost always found that a great deal of work will be done by the low back muscles, although they should play no part in sit-ups! And this inappropriate activity further inhibits the abdominal group that the exercise is trying to tone.

On the other hand, in such a case, when MET or other releasing methods are applied to the tight type 1 muscles of the back, an improvement in overall posture soon becomes apparent, as the abdominal muscles start to perform their stabilizing task more efficiently.

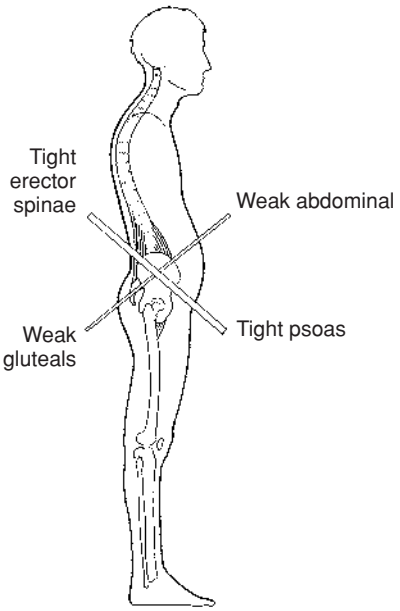


Figure 2.1 *Lower crossed patterns of weakness and tightness*

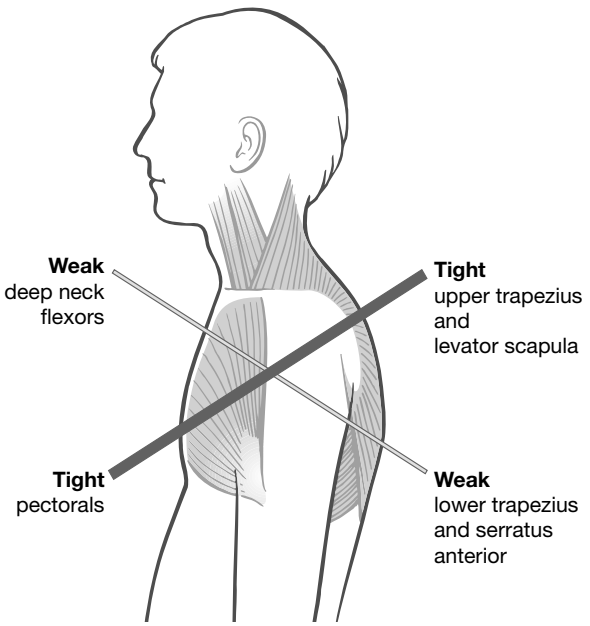


Figure 2.2 *Upper crossed patterns of weakness and tightness*

The correction of the protruding abdomen does not, at the start, lie in *toning* these overworked muscles but in removing the inhibitory effect of the tight back muscles. MET can do this effectively, as can other methods of soft tissue manipulation, later on supported by rehabilitation exercises, when the time is right and inhibition has been reduced by stretching.

The methods outlined in the book will help in normalizing those tight muscles which play mainly postural, supporting roles in the body.

MEET THE TYPE 1 (POSTURAL OR ENDURANCE) MUSCLES

Among the more important of the type 1 muscles, which become shortened in response to disuse or stress, are the following (see Fig. 2.3).

- Trapezius (lying between the neck and shoulder)
- Sternocleidomastoid (from behind the ear to the breast bone)
- Scalenes (see note below about this superficial group of three accessory breathing muscles at the front of each side of the neck)
- Infraspinatus, supraspinatus, subscapularis (the rotator cuff (shoulder) group of muscles)
- Levator scapulae (above the shoulder blade)
- Latissimus dorsi (back of trunk, from pelvis to upper arm)
- Upper fibers of pectoralis major (chest)
- Quadratus lumborum (low back)
- Sacrospinalis (erector spinae)
- Rectus abdominis, iliopsoas (front of the abdomen, via the groin, to the hip)
- Tensor fascia lata (outer muscle of the thigh)
- Rectus femoris (front of thigh)
- Biceps femoris, semitendinosus and semimembranosus (the hamstrings)
- Adductors of the leg (the inner thigh muscles – adductors longus, brevis and magnus)
- Piriformis (sacrum to upper leg)
- Gastrocnemius, soleus (calf muscles)
- Tibialis posterior
- Flexor muscles of the arms

Most of these muscles can usefully be stretched and relaxed using one or other variation of MET. Specific directions for different muscles are given in Chapter 3.

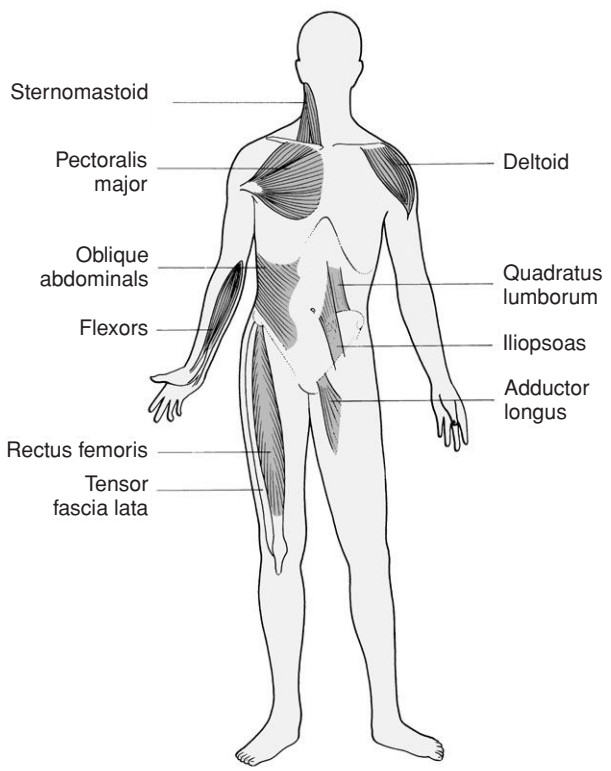


Figure 2.3 *Type 1 postural or endurance muscles that shorten in response to overuse, misuse and disuse*

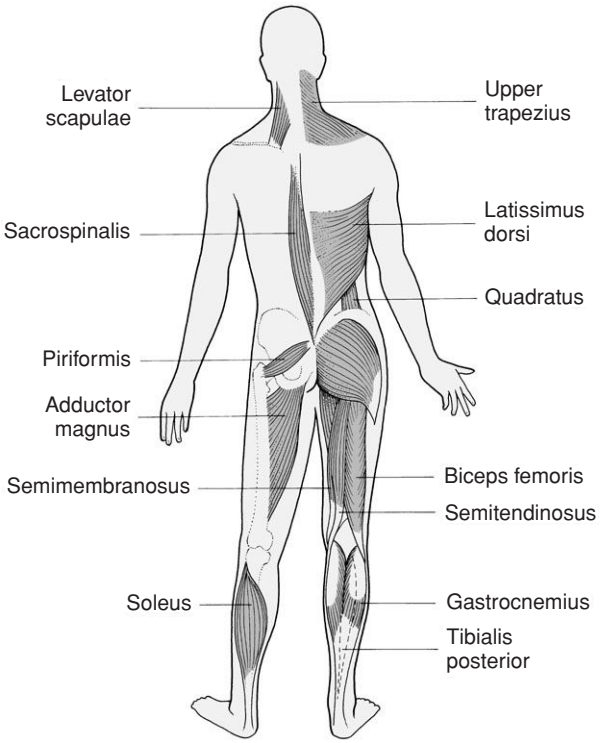


Figure 2.4 *Type 1 postural or endurance muscles that shorten in response to overuse, misuse and disuse*

MEET THE TYPE 2 (PHASIC, ACTIVE) MUSCLES

Type 2 are those muscles which are largely phasic (they move the parts of the body but have no great stamina) and which are subject to weakening rather than tightening. They include the following (see Fig. 2.4).

- Scalenes (see note below as to why these are on both lists)
- Deep neck flexors (deep muscles at the front of the neck)
- Extensors of the arm
- Abdominal aspects of pectoralis major
- Middle and inferior branches of trapezius (below the shoulder blade)
- Serratus anterior (assists in breathing)
- Rhomboids (between shoulder blade and spine)
- Internal and external obliques (abdominal muscles)
- Multifidi (small spinal muscles)
- Gluteus maximus, medius and minimus (buttocks)
- Vastus intermedius, lateralis and medialis (thigh muscles)
- Muscles of lower leg, peroneus brevis and longus, as well as tibialis anticus (shin muscles)

These type 2 muscles seldom shorten overall (apart from the scalenes, as described below) but may at times require MET stretching attention, if they have been strained or contain active trigger points. Type 2 muscles are more likely to require toning up, by use of isotonic maneuvers, after their type 1 antagonists have been suitably released and stretched.

Any muscle of either type 1 or 2 can be strained and thus become acutely shortened. However, chronic shortening of whole muscles only happens to those in the type 1 group.

MUSCLE TYPES ARE NOT 'FIXED'

All muscles can perform both functions, stabilizing and mobilizing, but each muscle has a primary role (and specific characteristics) that decides whether it should be listed as type 1 or 2, depending on what its main role is and whether its basic tendency is towards tightness or weakness, when chronically stressed.

It is always possible, however, for a type 1 muscle to become weak as well as short and tight and for parts – local areas – of type 2 muscles to shorten, for example when local trigger points are present. Scalenes in particular (and possibly quadratus lumborum) have also been shown to be capable of altering their function when particular demands are made on them. When someone is an asthmatic or has a tendency to habitually breathe with the upper chest, rather than the diaphragm, the scalenes change from type 2 to type 1 and shorten. This is why scalenes appear in both lists.

Testing for shortness and weakness

Testing a muscle to discover whether it is either tight or weak usually requires a trained expert for accurate assessment, especially in relation to muscle weakness.

Where shortness is concerned it is usually possible to give general guidelines as to what is more or less normal and to judge from this whether a degree of tightness is evident in particular muscles. Unfortunately not all muscles can be self-assessed, so some of the tests described in this chapter call for help from another person.

Weakness is less easy to self-assess and so detailed descriptions are not given in this book, apart from a very few examples. It can usually be assumed that if any group of type 1 (postural) muscles is overactive, the antagonists are going to be inhibited, less strong. The inhibition eases or disappears, however, when the tight antagonists are released and stretched, at which time some benefit is likely from toning exercises for the previously inhibited structures.

In deciding how to self-treat a tight muscle, group of muscles or a stiff joint, there is one obvious method which does not depend upon tests of particular muscles, because when restrictions are obvious, the best course of MET action will also be obvious. If, for example, a knee, an elbow or a finger is limited in any of its normal ranges of motion, it will be obvious to you. By comparing it with what is normal or with what the other fingers, knee or elbow can do, you should be able to identify the direction(s) of the restriction.

This is all that is needed to begin using MET. If the knee cannot bend fully (suggesting shortness of the muscles at the front of the leg), then the knee should be bent to its pain-free limit and one or other of the isometric MET methods (PIR or RI; see Chapter 1) should then be used. By restraining the knee with your hands or an immovable object, the bent knee joint should be made to try to bend further for 7–10 seconds, using no more than 25% of strength. This uses the antagonists to the presumably tight front-of-leg muscles, which may be preventing the knee from bending, so releasing them using RI. After the contraction the knee should be able to bend further.

Alternatively, the knee, having been bent to its pain-free limit, should be prevented from straightening by your restraining hands. This would involve use of the very muscles which are tight and which are preventing bending of the

knee, producing (after the 7–10-second contraction) PIR, thus helping to normalize them.

The nature and degree of the restriction determine the self-treatment. Either the antagonists or the involved muscles themselves are used, producing either RI or PIR respectively. This same method could be applied to any joint restriction, without any knowledge as to which muscles are involved. The restricted joint is forced by its own controlling muscles either towards or away from the barrier and in each case no movement is allowed, only an isometric contraction. If the effort of the muscles is towards the barrier, then RI of the shortened muscles will result and if the effort is away from the barrier, then PIR of the shortened muscles will result.

Both efforts will increase the range of free movement available after the contraction. The only test necessary is to decide how much improvement has been gained after each isometric contraction, when relaxation of the tense muscles has been achieved and the joint can be taken to its new barrier, before repeating the exercise.

A stiff neck, restricted low back, etc., all call for similar action and if the methods are applied as directed, then nothing but benefit can be achieved, for no excessively strong effort or strain will be involved and no additional pain created, as part of MET, when the simple guidelines outlined in Chapter 1 are followed.

CAUTIONS

The only dangers associated with this sort of self-help approach relate to the possibility of ignoring underlying pathology. This is why MET (and PRT) methods are suggested to be used as first aid, before you can get to a suitable practitioner or therapist, as well as being used under the guidance of a practitioner/therapist.

An example of when not to use MET would be if there is an acute disk problem in the spine, causing spasm and marked limitation of movement. In such a case, the pain factor would determine that no real application of MET should be attempted until something had been done about the underlying problem. So, safety is assured if the existence of severe pain is used as an absolute bar to the use of MET.

Self-treatment can therefore be safely used in any restricted joint or muscle, *if pain is not increased,* and if the procedure is stopped if anything more than discomfort is noted.

PRAGMATISM AND COMMON SENSE

Muscles in all areas of the body will be discussed and illustrated in the text to give guidelines as to general positions, movements and directions of isometric contraction. Suitable methods for applying counterpressure will also be outlined and illustrated. This should allow most examples of stiffness and restriction to be tackled in a pragmatic way.

- If it's restricted, use MET by taking it to the barrier of movement and then use PIR or RI to ease or release it.
- If it hurts, stop, and try PRT instead as first aid, and make an appointment to see a suitably qualified practitioner.

Testing for short, tight muscles

IDENTIFICATION

Before deciding what MET procedure to use you should try to identify particular muscles which are shortened or tight (or that may contain active trigger points – see Chapter 4), so that the very best self-care method can be selected. Once a muscle is identified as being involved in the tightness of a region, specific isometric contractions (the MET variations as discussed in Chapter 1) can be used to help ease or resolve the problem speedily. The tests for tightness given below should be used, where appropriate, to identify specific muscles, or groups of muscles, as being in need of MET attention.

The list of the main postural muscles given earlier in this chapter (see p. 20) will help you to record those that seem to be short, based on the various tests outlined below. As you perform the tests, keep a record of what to identify and recheck from time to time when you have been using appropriate stretching methods to release and relax the muscles.

Table 2.1 **Muscle shortness tests. E = equal (circle both if both are short). L or R is circled if left or right is short**

Muscle	Test	Result
Gastrocnemius (calf)	Tests 2, 10, 20	E L R
Soleus (calf)	Tests 2, 10, 19	E L R
Medial hamstrings (inner thigh)	Tests 3, 4, 6, 8, 10, 13, 14, 15, 16	E L R
Short adductors (inner thigh)	Test 6B	E L R
Rectus femoris (front of thigh)	Tests 13, 17, 18	E L R
Psoas (hip to spine)	Functional tests 2, 4 + tests 13, 15, 17	E L R
Hamstrings:		
upper (near buttock)	Tests 3, 4, 8, 10, 13, 14, 15	E L R
lower (near knee)	Tests 3, 4, 8, 9, 10, 13, 14, 15	E L R
Tensor fascia lata (side of thigh)	Tests 16, 17 + functional test 2	E L R
Piriformis (behind hip)	Test 5 + functional test 2	E L R
Quadratus lumborum (low back)	Test 22 + functional tests 1, 2	E L R
Pectoralis major (chest)	Test 23	E L R
Latissimus dorsi (pelvis to shoulder)	Test 23	E L R
Upper trapezius (neck to shoulder)	Test 29, 30 + functional tests 5, 6	E L R
Scalenes (front of neck, accessory breathing muscles)	Functional test 3	E L R
Sternocleidomastoid (neck to breast bone)	Test 28	E L R
Levator scapulae (scapula to neck)	Test 29 + functional tests 5, 6	E L R
Infraspinatus (shoulder)	Tests 24, 26, 27C	E L R
Subscapularis (shoulder)	Tests 25, 26, 27B	E L R
Supraspinatus (shoulder)	Tests 26, 27A	E L R
Flexors of the arm	Test 31B	E L R
Areas of spinal flattening		
Seated legs straight	Tests 1, 2, 3, 4	Yes No
Seated legs flexed	Tests 1, 2, 3, 4	Yes No
Cervical spine extensors short?	Test 29	Yes No

The tests listed next to muscle name are for shortness. Functional tests show overactivity, and suggest shortness in type 1 muscles, but do not prove shortness.

OBSERVATION

Look at yourself in a mirror or in photographs. Compare what you see with the crossed pattern pictures (Figs 2.1, 2.2). Which areas/muscles seem short to you?

NB: All self-treatment and stretching exercises mentioned in the rest of this chapter can be found in Chapter 3.

- Is your head held forward of the shoulders? (Possible shortness of **sternocleidomastoid** and **scalenes**; **extensors of the neck** muscles if neck curve is deep)
  See self-treatment exercises 1, 6, 7, 11, 12
- Does your chin poke forward? (Shortness of the small muscles at the base of the skull, the **suboccipital** group, is likely; also possible shortness of the muscles that control the jaw)
  See self-treatment exercises 3, 7
- Are your shoulders rounded? (**Pectoral muscle** shortness, probable **upper trapezius** and **levator scapulae** shortness; rotator cuff muscle shortness involving **supraspinatus, infraspinatus, subscapularis**)
  See self-treatment exercises 1, 8, 9, 13, 14, 15, 16
- Is your abdomen prominent or sagging? (Shortness of **lower back muscles**, possibly also **rectus abdominis, external obliques**)
  See self-treatment exercises 28, 29
- Do you have an arched low back? (Tight **low back muscles**, probably also **psoas** and **quadratus lumborum**, and possibly **hamstrings**)
  See self-treatment exercises 22, 23, 26, 32
- Do you seem to be slightly bent forward at the hip? (**Psoas, rectus femoris** shortness probable)
  See self-treatment exercises 26, 27
- Are your knees braced/locked (pushed backward) when standing? (**Rectus femoris, tensor fascia lata** shortness possible)
  See MET exercises 27, 33

SIX FUNCTIONAL TESTS FOR OVERUSE AND TIGHTNESS IN TYPE 1 MUSCLES

There are a number of everyday movements and functions that can be used to identify overactive muscles. If these routine movements involve overuse of specific postural muscles, this tells us that the type 1 muscles involved will be short and tight (and that their antagonists will be inhibited).

Functional test 1

- Lie on your side, pillow supporting your head, with the legs – one on top of the other – in line with the rest of your body.
- Place your hand on your waist, just above the pelvic crest, fingers pointing toward your feet. The fingers should be lying softly (no pressure) on the muscles above your hip joint, with your thumb on the soft tissues at your waist (no pressure, just touch).
- Relax completely and then raise your upper leg a few inches. Where do you feel muscle activity first with your palpating hand – at the fingers or at the thumb? If it is at the thumb this suggests that **quadratus lumborum** is overactive and short (this is common where there are low back problems) (see Fig. 2.5).

See MET exercise 23

Figure 2.5 *Self-assessment of overactivity (and therefore shortness) in quadratus lumborum*

Functional test 2

- In this same position but with your upper arm relaxed, have someone observe your leg before and after it has been raised.
- You should start with the legs lying in line with your trunk.
- If after raising the upper leg by about 20°, the leg drifts forward of your trunk, this suggests either **psoas** and/or **tensor fascia lata** shortness. These, when short, are often associated with back, pelvic, hip and/or knee problems (see Fig. 2.6).
- If the foot turns outward after it is raised this suggests **piriformis** shortness. This is commonly a source of hip, pelvic and sciatic-type pain.

See MET exercises 26, 31, 33

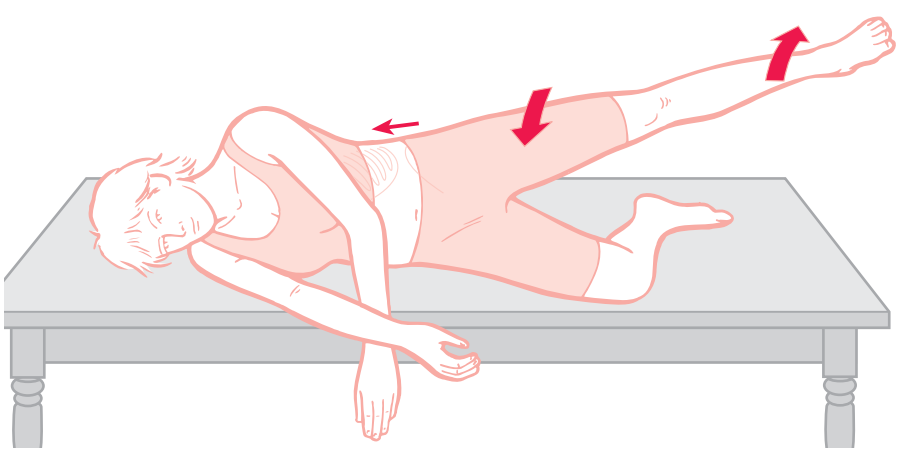


Figure 2.6 *Side-lying test shows the following results on or after leg raising (hip abduction).* ***1*** *A contraction above the pelvis if quadratus lumborum is short.* ***2*** *Forward drift of leg if tensor fascia lata (and/or psoas) is short.* ***3*** *Outward turn of foot if piriformis is short*

Functional test 3

- Stand in front of a mirror and observe your shoulders as you breathe in and out normally.
- Is there any hint of a rise of the shoulders on inhalation?
- If so **scalenes** (posterior, medius and anterior) are probably shortened. These are often a source of neck and/or arm pain.

See MET exercises 1, 6, 12

Functional test 4

- Lie on your back and extend your arms in front of you as in a 'sleep walking' position.
- With your back flat against the floor and your legs straight, try to lift your head and then your shoulder blades off the floor using your abdominal muscles (see Fig. 2.7A).
- If your heels leave the floor before your shoulder blades do, your **psoas** muscles are overactive and probably short (see Fig. 2.7B).

See MET exercise 26

Functional test 5

- Stand in front of a mirror, arms hanging freely, and observe the area between the base of your neck and your shoulder as you gently swing your arm backward, as you would when walking. Is there an apparent contraction or bulge?
- This is your **upper trapezius** muscle (and **levator scapula**). If it is actively firing when you swing your arm back it is working when it should not be and is almost certainly short and the muscles below the shoulder blade (middle and lower trapezius, serratus anterior) will be weakened.

See MET exercises 1, 8, 9

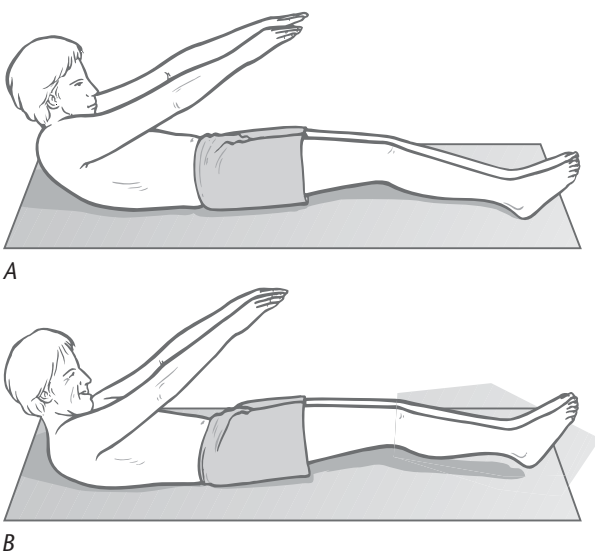


Figure 2.7 *A: Normal trunk flexion. B: Abnormal trunk flexion test, showing overactive/short psoas muscle activity*

Functional test 6

- Still standing in front of the mirror with arms hanging down, bend one arm at the elbow to 90° and slowly raise the arm sideways. If the area between your neck and shoulder tip contracts/bunches before you have reached about 60° of sideways raising of the arm, **upper trapezius** and **levator scapulae** are certainly overactive and both are short. The muscles below the shoulder blade (middle and lower trapezius, serratus anterior) will be inhibited/weakened (see Fig. 2.8).

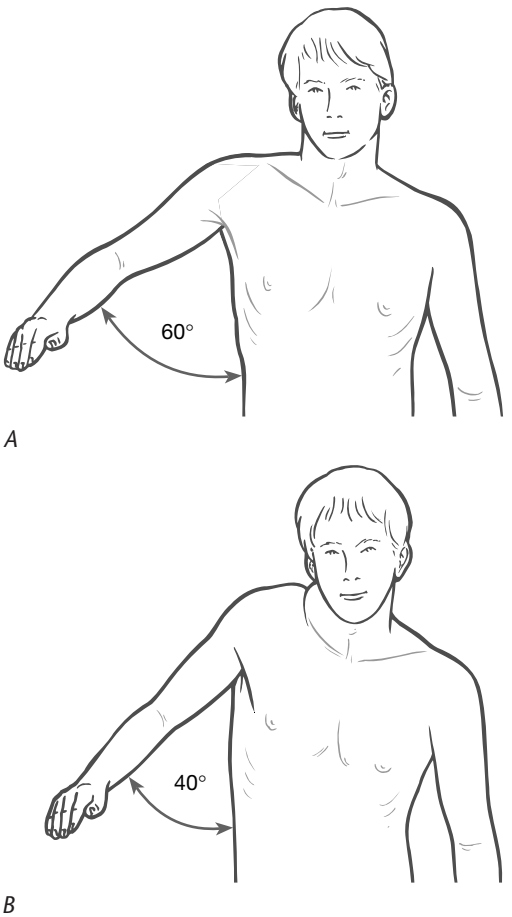


Figure 2.8 *A: Normal sideways arm raise. B: If there is bunching between the base of the neck and the shoulder tip as the arm is raised sideways, before 60° of elevation, the test is positive for shortness of upper trapezius and levator scapulae*

ASSESSMENT TESTS FOR MUSCLE SHORTNESS

See MET exercises 1, 8, 9

Note: In the first four shortness tests it is useful to observe for flattened areas of the spine, where flexion is limited, as this suggests shortness of the erector spinae group in that area.

Shortness test 1

- Sit on the floor with your legs straight out in front of you.
- Bend forward with hands outstretched in an attempt to reach your toes. If you can do this without strain and at the same time can bring your toes slightly towards your head by flexing your ankle, then there is probably normal length of all the muscles of the back of your leg, as well as your low back (see Fig. 2.9).

Shortness test 2

- If you can almost reach your toes but they tend to point downwards as this is done, then there is probably shortness in the muscles of the back of your lower leg, **gastrocnemius** and **soleus**.
- These are both type 1 muscles and should be treated by MET to stretch and relax them (see Fig. 2.10).

See stretching exercises 35, 36

Shortness test 3

- If in the same position touching your toes is impossible, even though your lower back is quite rounded, and tension is felt strongly in the back of your upper leg, then it is probable that your **hamstrings** are tight.
- These include **semitendinosus, semimembranosus**, and **biceps femoris** and they should be stretched and relaxed by MET (see Fig. 2.11).

See MET exercises 32A and B

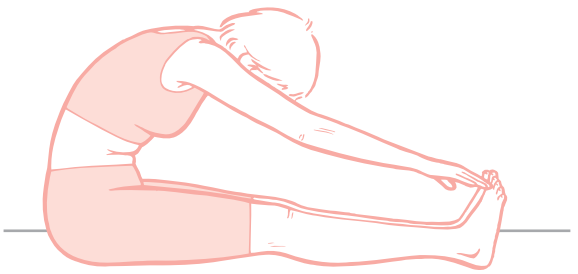


Figure 2.9 *Normal flexibility of spine and posterior leg muscles*

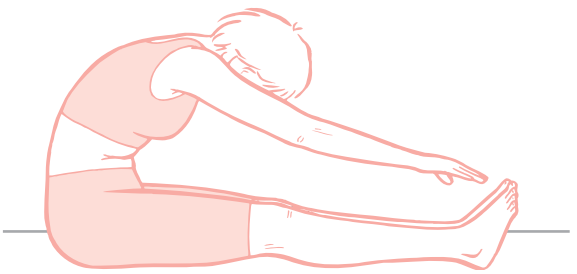


Figure 2.10 *Normal flexibililty of spine but shortness in posterior lower leg muscles*

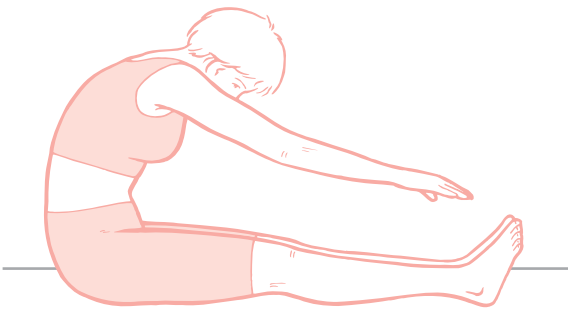


Figure 2.11 *Normal flexibility of spine but shortness of posterior thigh muscles (hamstrings)*

Shortness test 4

- Sometimes the **hamstrings** in only one leg may be shortened.
- Assess this by sitting as described above but with one leg bent, so that the foot of that leg touches the knee of the outstretched leg and the knee of the bent leg is resting on the floor, or close to it.
- Attempt to touch the toes of your outstretched leg, without bending that knee; then change leg positions and attempt to do the same thing with the other leg. Compare the distance which can be reached, as well as the sensation of tightness in the back of each leg. If they are much the same then both hamstrings are probably equally tight but if there is a noticeable difference then identification of the leg with the major tightness should be simple.
- Treat this with MET methods for the appropriate hamstrings.

See MET exercises 32A and B

Shortness test 5

- Lying on your back, legs outstretched, assess which of your lower legs is turned out more than the other. (They may both be turned out.)
- If one is noticeably so, and there is a history of low back or leg pain on that side, then the **piriformis** muscle on that side may be shortened. MET treatment for this is simple and is described in the next chapter (see Fig. 2.12).

See MET exercise 31

Figure 2.12 *If a foot/leg is obviously turned outward it may be due to piriformis shortness*

Shortness test 6 A

- Lying on your back with legs flat on the floor, knees straight, move one leg out sideways as far as is comfortable. It should be able to travel to a 45° angle from the midline before a stretching feeling is noted.

- Then do the same with the other leg and compare the range.
- If the range of one leg into abduction is more limited than the other, then the **adductors** (inner thigh muscles) of the leg on that side are shortened and may be treated with MET (see Fig. 2.13).
- If both are shortened then only a limited excursion sideways will be possible (under 45°).

B

- You should now perform the same test again but this time with the knees slightly bent.
- Observe whether either leg can now travel further outwards than when the knees were straight, without strain.
- If the leg can abduct further with the knee bent, then when MET is applied it should be with the knee straight.
- If, however, the leg cannot travel outwards more when the knee is bent rather than straight, MET should be applied with the knee bent.

See MET exercises (A)32A and B, (B)34

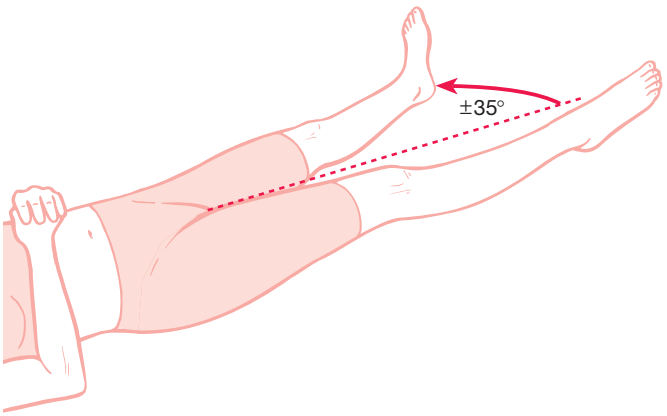


Figure 2.13 *The leg is taken sideways to test the range of adductor muscles*

Shortness test 7

- When sitting with both legs outstretched, you should be able to touch your toes with the low back well rounded. If you perform this test with no difficulty skip to test 12 (see Fig. 2.14).

See stretching exercises 20, 21, 22, 32B

Figure 2.14 *Normal spinal flexion*

Shortness test 8

- If in this same position your low back is actually tilted backwards as you attempt forward bending, then both your **hamstrings** and your **low back muscles** may be tight and require attention.
- In such a case there is often a compensatory degree of stretch in the muscles of the upper back and this could do with toning later, after all tightness has been attended to (see Fig. 2.15).

See MET exercises 20, 21, 22, 32A and B

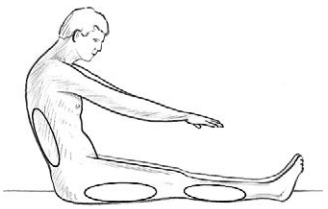


Figure 2.15 *Short hamstrings and low back muscles*

Shortness test 9

- Sometimes it is possible to actually reach the toes as a result of excessive stretch in the hamstrings.
- This stretch is hard to assess without outside observation of the test by an expert, but the movement of bend in the back is felt to be coming mainly from the upper back, with the **middle and lower back muscles** tight, as the bend is performed (see Fig. 2.16).

See MET exercises 20, 21, 22, 32B

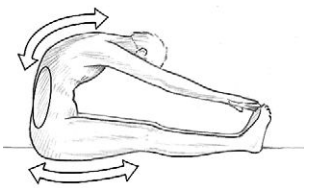


Figure 2.16 *Short low back muscles and stretched hamstrings*

Shortness test 10

Not illustrated.

- If on attempting to touch your toes in this position, the furthest you can reach is roughly knee level or just below and a sensation of pull is noted in the back of your legs, then probably all the posterior leg muscles (**hamstrings, soleus, gastrocnemius**) are tight, as are the low back muscles.
- All these should be appropriately treated with MET, beginning with the leg muscles.

See MET exercises 32A and B, 35, 36

Shortness test 11

- If, on bending forward, your low back remains in a completely straight or even backward bent position, then the muscles of your **low back** are extremely tight and would benefit from MET and stretching (see Fig. 2.17).

See MET exercises 20, 21, 22, 32B

Figure 2.17 *Extremely tight low back muscles*

Shortness test 12

You may need some assistance for this test.

- Lie on the floor on your back, with one leg flat against the floor as you raise your other leg.
- This should be able to reach an angle of about 90° (i.e. be able to point straight up at the ceiling) and at the same time your pelvis should be seen to roll slightly backwards to allow this movement to be fully free (see Fig. 2.18).
- Your low back should remain constantly in touch with the floor throughout. If, however, your leg cannot be raised beyond about 45°, despite the pelvis rolling somewhat backwards and the spine staying flat on the floor, then your **hamstrings** on that side are short and tight.

See MET exercises 32A and B

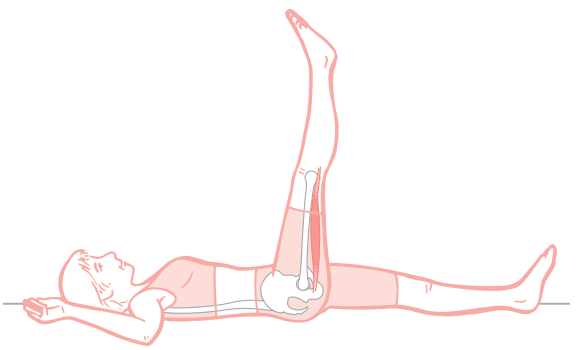


Figure 2.18 *Normal straight leg raising*

Shortness test 13

- If in the same position your leg can only be raised to a similar angle (i.e. 45–50°) but this time the low back arches upwards as this is achieved, with the pelvis failing to roll backwards, then there is tightness of your **low back muscles** and of the muscles at the front of the hip of the leg which remained on the floor (**psoas, rectus femoris**) (see Fig. 2.19).
- These are the flexor muscles of the hips and guidance will be given on using MET to stretch them.

- It might be necessary, when doing this test, to actually hold your opposite leg down toward the floor, as the tested leg is raised.

See MET exercises 20, 21, 22, 26, 27, 32B

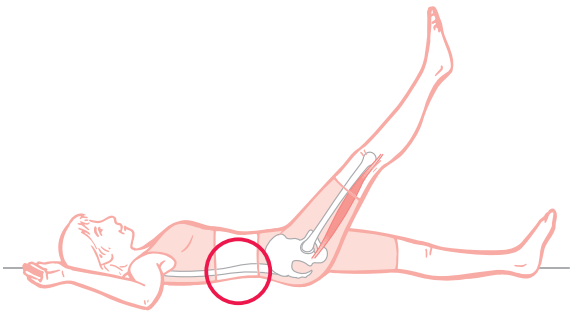


Figure 2.19 Tight low back muscles

Shortness test 14

A

- If your leg comes up to about 45° and your pelvis tilts backwards as it ought to (while the opposite leg is held firm to the floor), this indicates that your low back muscles are normal or stretched and that your **hamstrings** are tight (see Fig. 2.20).

See MET exercises 32A and B

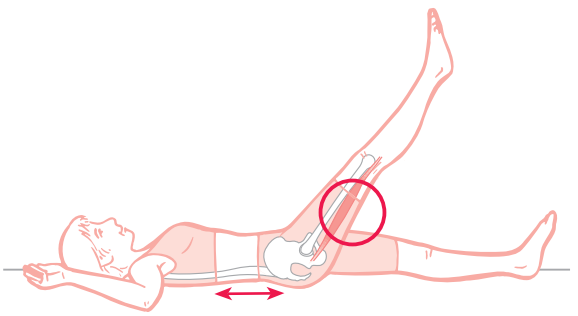


Figure 2.20 Tight hamstrings

B

Not illustrated

- If your leg rises to beyond 90° and your low back stays flat with the pelvic tilt normal (i.e. rolling backwards as the leg is raised) then your hamstrings are stretched or you have hypermobile ligaments/joints.

Toning and core stability exercises as outlined in Chapter 6 should be useful.

Shortness test 15

- If your leg rises to 90°, your pelvis fails to roll backwards and your low back arches, then your **hamstrings** are stretched whilst your **low back muscles** and the opposite hip flexors (e.g. **psoas**) are tight (see Fig. 2.21).

See MET exercises 20, 21, 22, 26

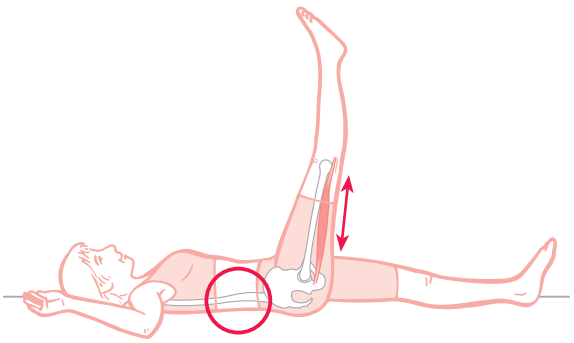


Figure 2.21 *Tight low back muscles, stretched hamstrings*

Shortness test 16

Not illustrated.

A table or bed is needed for the next three tests.
It is possible to self-test for the following position but someone should help by checking the position of your leg.

- In a side-lying position on a table or bed, your lower leg should be comfortably bent and your upper leg held backwards of the midline (i.e. slightly extended behind you) so that your foot drops down over the edge.
- The entire trunk of the body should remain in contact with the table or bed when this is being done and should not arch upwards at all.
- If your foot and leg fail to drop down behind your body when the pelvis is held in this position, then the **tensor fascia lata** (TFL) and **iliotibial band** (ITB) are shortened.

- This is common in people who have recurrent lower back problems, as these stabilizing, postural soft tissues frequently shorten and cause imbalance in the pelvic–lumbar mechanics.
- TFL lies above the hip joint and its fascial fibers (iliotibial band) run down the side of the leg from above the hip to below the knee. Methods of stretching TFL with MET will be found in the text and self-stretching is described in later chapters.

See MET exercise 33

Shortness test 17

- Lie on your back with your buttocks near the end of the table or bed, with one leg flexed with the knee held as close to your chest as possible. The opposite thigh (not the one being flexed) should be parallel with the surface of the table and the lower leg should hang over the edge (see Fig. 2.22A).
- If your unflexed thigh cannot easily lie flat in this position, then the hip flexor group of muscles (in front of the hip) is shortened. This includes **iliopsoas, rectus femoris** and **tensor fascia lata**. Methods of treating these are described in the text (see Fig. 2.22B).

See MET exercises 26, 27, 33

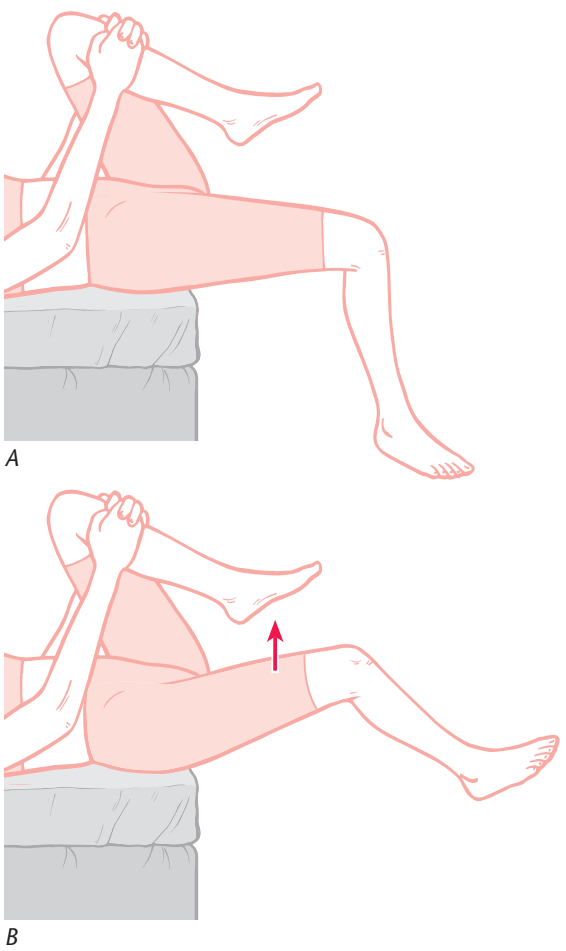


Figure 2.22 *A: Normal length of hip flexors*

B: Shortness of hip flexors (iliopsoas, rectus femoris, TFL)

Shortness test 18

- If the knee of the leg lying on the table tends to straighten as the thigh is held against the table and the other knee is pulled to the chest, then **rectus femoris** is tight.
- The remaining hip flexors may have allowed hip extension but the shortened thigh muscle would have transferred the tightness to the knee, making it straighten (see Fig. 2.23).

See MET exercise 27

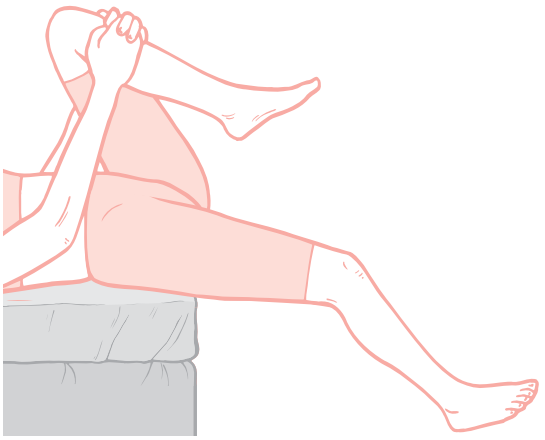


Figure 2.23 *Shortness of rectus femoris*

Shortness test 19

- Standing with your legs about 15 inches apart, go into a full squat.
- If it is possible to go right down, with your knees fully bent and your buttocks approaching the floor, without your heels being raised from the floor, then the muscles in your calf are normal (see Fig. 2.24).
- If your heels leave the floor on one side only, then the **soleus** muscle is shortened on that side and if both heels leave the floor, both are short.

See MET exercise 35

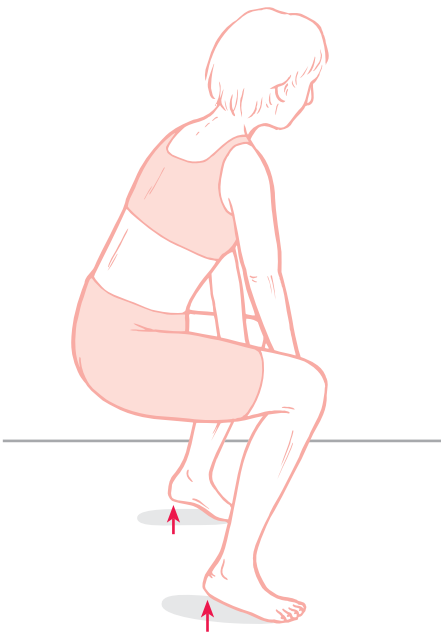


Figure 2.24 *If squat is not possible or heels rise during squat, soleus muscles are short*

Shortness test 20

- Lie on your back with legs straight. It should be possible for the soles of the feet to be vertical to the floor (not pointed away) and you should be able to bring the top of the foot toward your face slightly, without difficulty (the top of the foot is more accurately called the dorsum, which is why this movement is called *dorsiflexion*) (see Fig. 2.25A).

- If this movement is only possible after you have placed a cushion under the knee to bend it slightly, then **gastrocnemius** is shortened.

See MET exercise 36

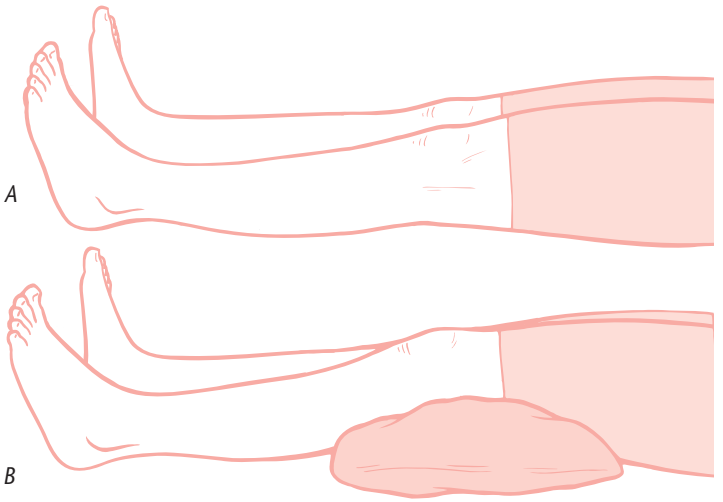


Figure 2.25 *A: Normal B: Shortened gastrocnemius*

Shortness test 21

- Sitting on the edge of a table or firm chair, place your hands on the crest of your pelvic bones, fixing the pelvis.
- Bend forward, taking your forehead toward your knees. If this bend fails to reverse the normal curve of your low back, then the **erector spinae** muscles in the low back are shortened (see Fig. 2.26).

See MET exercises 20, 21, 22, 32B

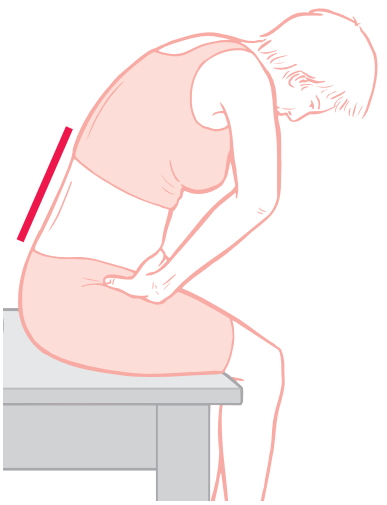


Figure 2.26 *If when bending forward there is still some low back curve present, this shows some shortness of the erector spinae muscles*

Shortness test 22

- Standing with your legs shoulder width apart, bend as far as possible sideways, running your hand down the side of your thigh (see Fig. 2.27).
- Try to ensure that no forward bending is combined with side bending in this test.
- Do this on each side.
- If it is not possible to go as far to the left as it is to the right, then the **quadratus lumborum** (QL) muscle on the right is probably shortened.
- If limitation is noted on both sides then both QL muscles are short.
- It should be possible to bend so that your hands reach to below the knee crease. MET for such shortening is described in the text.

See MET exercise 23

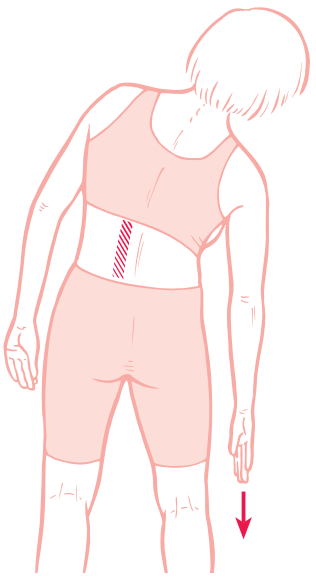
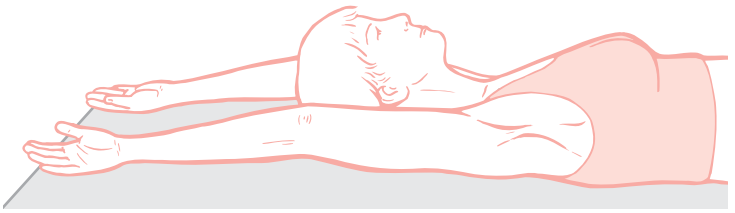


Figure 2.27 *Testing for QL shortness*

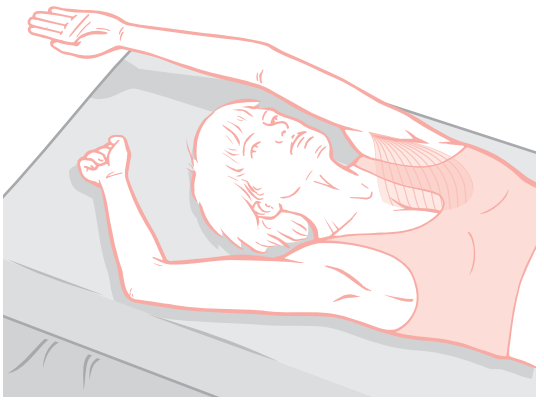
Shortness test 23

- Turn onto your back and rest your arms above your head, palms upward, as close to your head as possible (see Fig. 2.28A).
- Keep your back flat all the time and flex your knees and hips.
- It should be possible to rest the entire length of your arm flat on the floor or table, above your head.
- If this is not possible, then tightness exists in the adductors and internal rotators of the arms, including **pectoralis major** and **minor**.
- If the elbows are not straight but are pulled sideways as you relax the arms, **latissimus dorsi** is short and **teres major** and **subscapularis** may be short (see Fig. 2.28B).

See MET exercises 13, 16, 25



A



B

Figure 2.28 *A: Normal lengths of pectoralis major and latissimus dorsi. The arms lie flat along their entire length and are not deviating away at the elbow. B: Left arm cannot lie flat on the surface so pectoralis on that side is short and the right arm is deviating from straight, indicating latissimus dorsi shortness*

Shortness test 24

- Lie on a bed close to the edge with your upper arm extending sideways from your shoulder, with the elbow bent to 90° so that your lower arm points to your feet.
- Keep the back of your shoulder pressed toward the bed (see Fig. 2.29).
- If **infraspinatus** is normal length the arm will be able to lie palm down, parallel with the edge of the bed.
- If the lower arm is elevated, infraspinatus is short.

See MET exercise 15

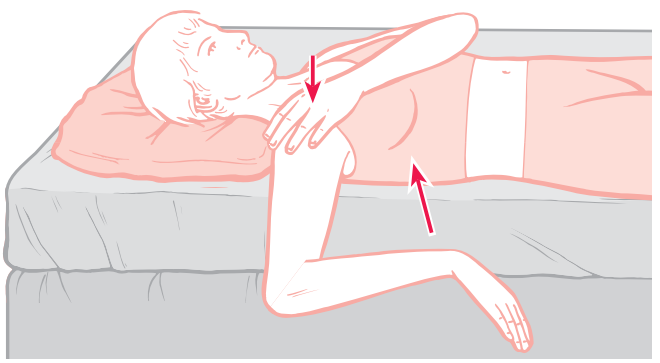


Figure 2.29 *Shortness in infraspinatus means the arm cannot lie flat in this position*

Shortness test 25

- Lie on a bed close to the edge with your upper arm extending sideways from your shoulder, with the elbow bent to 90° so that your lower arm extends upwards so that your hand lies, palm upward, level with or above your head.
- Keep the back of your shoulder pressed toward the bed (see Fig. 2.33).
- If **subscapularis** is normal length your arm will be able to lie palm up, parallel with the edge of the bed.
- If the lower arm is elevated, subscapularis is short.

See MET exercise 16

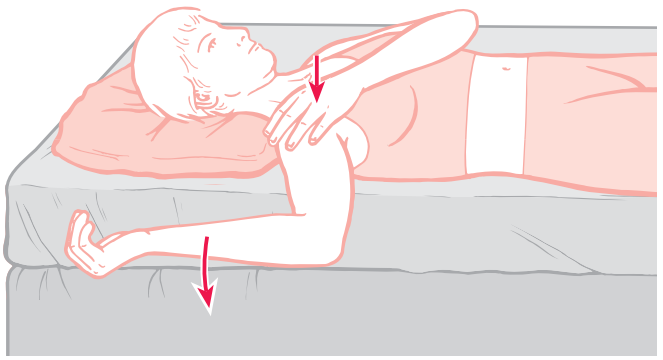


Figure 2.30 *Shortness in subscapularis means the arm cannot lie flat in this position*

Shortness test 26

- Sit with the arm to be tested behind your back, palm facing backward. Try to reach across to touch the area just above your opposite hip with your fingertips. If this is not easily achieved, **supraspinatus** and/or **infraspinatus** may be short (see Fig. 2.31).

See MET exercises 14, 15

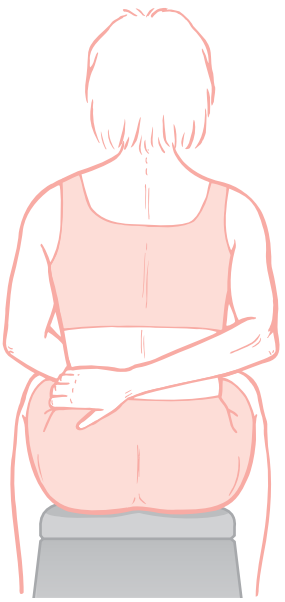


Figure 2.31 *Trying to reach across to your opposite hip area tests infraspinatus and, more particularly, supraspinatus*

Shortness test 27

Rapidly check the rotator cuff muscles for movements that are restricted in the shoulder by performing the following three movements and assess for discomfort or limitation of movement (and use appropriate MET to increase the range if you notice restriction). Compare one side with the other.

A

- Stand in front of a mirror and slowly raise your arms sideways until they are above your head as far as they will go, palms facing forward. Stay in this position for 10 seconds and then slowly lower your arms to your side (tests **supraspinatus** and other rotator cuff muscles) (see Fig. 2.32A).

B

- Place your hands together behind your head (tests external rotation of the shoulders – **subscapularis**) (see Fig. 2.32B).

A

Figure 2.32 *A: Raising arms to test range of shoulder motion. B: Testing external rotation of the shoulders. C: Testing internal rotation of the shoulders*

C

- Place your hands, palms backward, behind your back (tests internal rotation of the shoulders – **infraspinatus**) (see Fig. 2.32C).

See MET exercises (A) 14, (B) 16, (C) 15

B

C

Shortness test 28

- Sitting upright, turn your head as far one way as possible.
- You should be able to turn at least 90°.
- When you have turned fully, note the distance turned and then test turning to the other side (see Fig. 2.33).

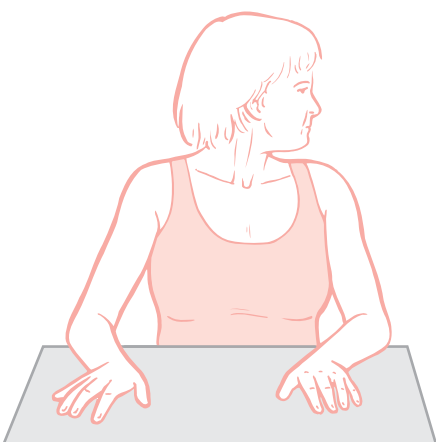


Figure 2.33 *Testing range of motion of the neck into rotation*

- If it is possible to go further in one direction than the other, then there is shortening of muscles on the side opposite to the way in which you are turning (i.e. if the head is restricted turning left then there is muscle shortening on the right).
- This could involve a number of muscles with fibers at the side of the neck, including **sternocleidomastoid**.
- MET measures for the neck, described in the next chapter, will help to improve this range of motion.

See MET exercises 1, 6, 11, 12

Shortness test 29

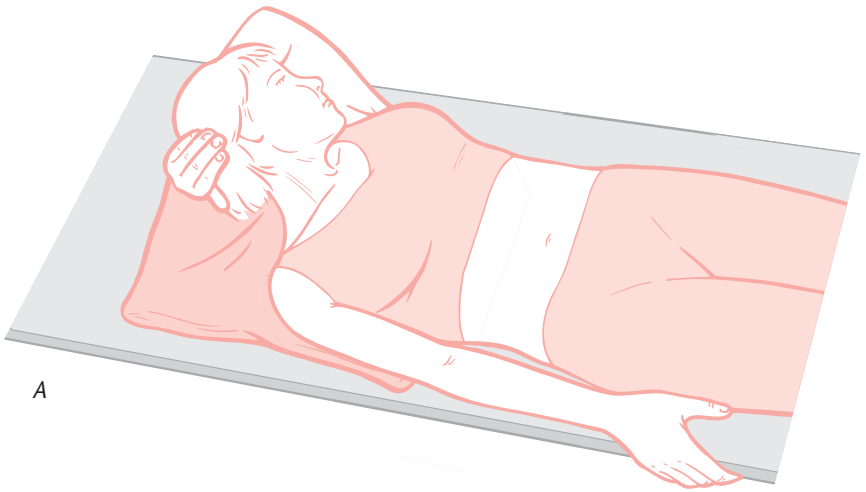
- Sit with your hands clasped together on the base of your skull/top of your neck (see Fig. 2.34).
- Use your hands to bend your head and neck forward into full flexion. (Your chin should be able to touch your chest.)
- Shortness in the **neck extensors**, including **semispinalis, longissimus**, the upper branches of **trapezius** and possibly **levator scapulae**, as well as other small muscles lying at the back of the neck, could be the cause of any restriction preventing the full range of flexion.
- MET measures for the neck, described in the next chapter, will help to improve this range of motion.

See MET exercises 1, 2, 3, 5, 8, 9, 20

Figure 2.34 *Using arm leverage to ease the chin toward the chest, testing freedom of movement into flexion*

Shortness test 30

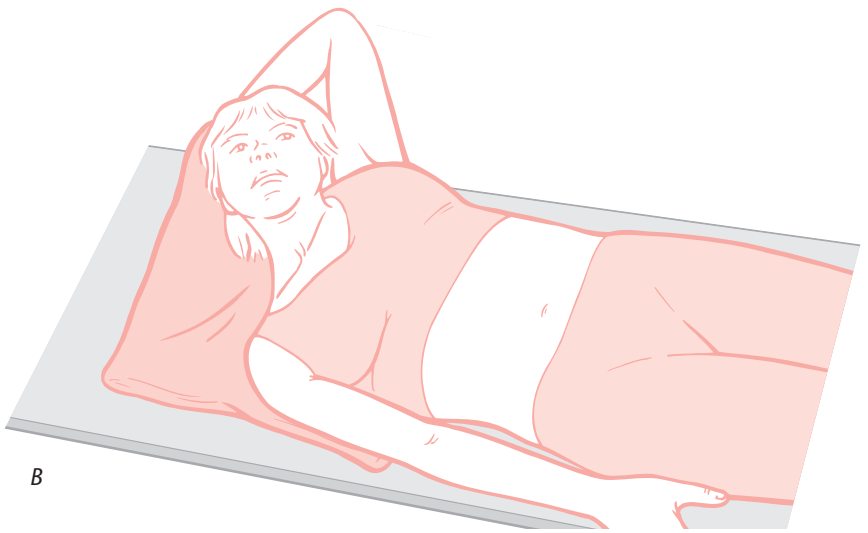
- Lie on your back on a bed or table. Hold the edge of the bed or table with the hand on the side to be tested – in this example it will be the right side – with the arm fully extended (see Figs 2.35A, B, C).
- Turn your head fully to the left and with your left hand, reach across the top of your head and ease it as far to the left as is comfortable.



A

Figure 2.35 *Testing fibers of upper trapezius. A: Posterior. B: Middle. C: Anterior*

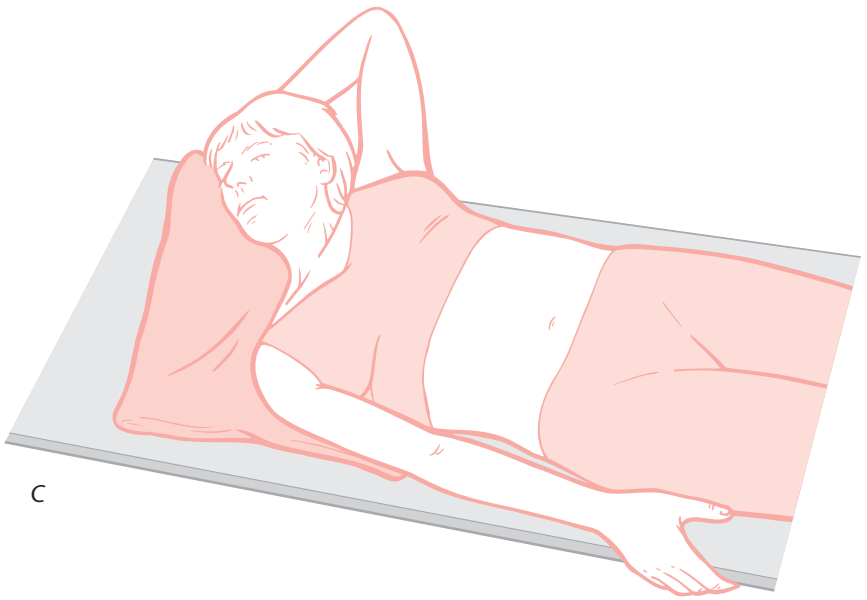
- If your neck and head can side bend toward the left shoulder easily (without strain or pain) to an angle of 45°, your range is normal.
- If it cannot easily reach 45° of side bend then the posterior fibers of the **upper trapezius** muscle are short.



B

- Perform exactly the same test but this time with your head only half turned to the left, and then once again with the head turned slightly toward the right.
- In each test you should be able to reach 45° side bend without strain.
- In these last two examples you are testing the middle and then the anterior fibers of the **upper trapezius** muscle.
- MET treatment methods for these will be described in the next chapter. You should now test the other side in the same way.

See MET exercises 1, 9, 10, 24



C

Shortness test 31

- Sit resting one elbow on a table, with the inner aspect of the forearm facing you. Using your free hand, placed on the back of the other hand, bend the wrist toward you to its easy limit (no strain) (see Figs 2.36A, B).
- If the angle of the hand with the forearm is not 90°, the **extensor muscles of the wrist** are short.
- Release the wrist and change position so that the back of the forearm faces you and, using the free hand, bend the wrist backward to its easy limit.
- This should also reach a 90° angle between the hand and the forearm.
- If not then the **flexor muscles** of the arm are short.
- Treatment using MET is described for both the flexor and the extensor muscles in the next chapter.

See MET exercise 18

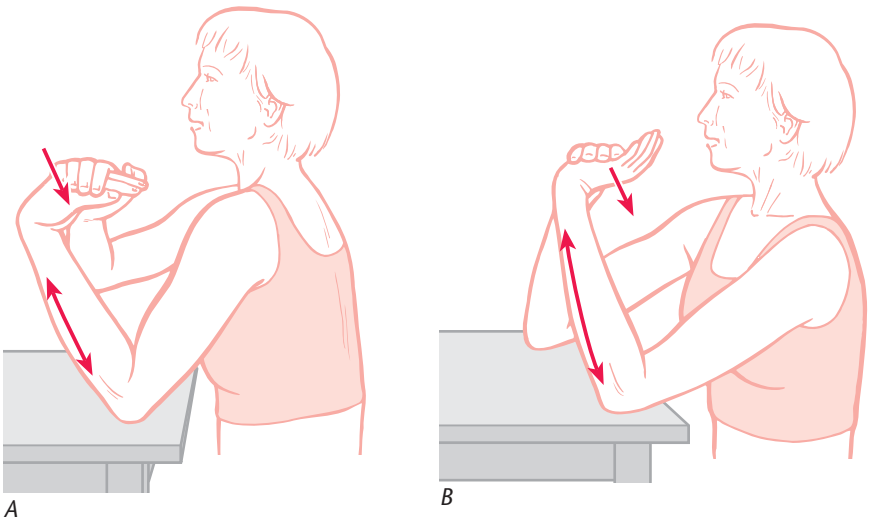


Figure 2.36 *A: Testing for shortness of the extensor muscles of the arm. B: Testing for shortness of the flexor muscles of the arm*

Shortness test 32

- Stand in front of a mirror and observe your jaw as you open your mouth slowly (not illustrated).
- If there is a deviation of the jaw to one side this may be because the **masseter** or **temporalis muscles** on one side are shorter than the other.
- Appropriate MET methods are given in the next chapter to ease or to normalize these. Note: *The temporomandibular joint may be at fault, however, and this may need expert dental or manipulative attention, especially if there is accompanying pain and/or noise when the mouth is opened.*

See MET exercise 38

Tests for muscle weakness

Testing for weakness in particular muscles will not be described because very few of these can be adequately self-tested. Accurate assessment requires someone else to be an observer, who is trained to grade the results. There is never, or almost never, an 'all or nothing' response in terms of strength or weakness in muscles. By this it is meant that few muscles are so weak as to be totally unable to respond, unless paralysis is involved. Therefore, weakness might be slight or of a medium, moderate or great degree. Comparison with other muscles or with norms has to take into account age, gender, body type, health history, occupation and other factors.

In the context of self-help measures, muscle weakness which is obvious, and for which there is no apparent reason, should lead to seeking advice from an expert. If the reasons are known (prolonged disuse as in an immobilized limb after an injury, for example), then this may be helped by use of the isotonic or isokinetic measures as discussed in Chapters 1 and 3.

The major aim of the description of MET methods in this book is the introduction of safe measures by means of which tight, shortened muscles may be released and relaxed. In describing MET methods, isotonic methods of

strengthening weak muscles have been mentioned and these are safe and can be used wherever weak muscles exist.

However, the emphasis should be on releasing tight muscles, as these are often the primary reason for weakness in their antagonists. An inhibited muscle's strength improves spontaneously when the shortened, taut antagonist muscles are freed.

If there are known muscle weaknesses, treatment of these should be left until release of tight, shortened muscles has commenced, at which time weak muscles should be given attention if they have not fully recovered tone and strength spontaneously.

It is not unusual, after stretching of tight muscle, for the inhibited weakened antagonist to strengthen spontaneously, sometimes immediately, sometimes within a few days, without any additional treatment.

Karel Lewit MD, author of *Manipulative therapy in rehabilitation of the locomotor system* (Butterworth Heinemann, 1999), gives a clear message.

> *First the hyperactive muscles, showing increased tension (spasm, trigger points, shortening) should be relaxed; after this, the weak (inhibited, flabby) muscles should be trained. This order is mandatory, in particular if the muscles with increased tension are the antagonists of the weak muscles.*

Plan of action to restore body balance

- Identify tight, shortened muscles (this chapter).
- Use MET to relax and release these. This will automatically deactivate many trigger points that lie in these tight muscles (see Chapter 3).
- If any noticeable weakness remains, employ exercise or isotonic MET methods to strengthen these muscles and/or pay attention to trigger points that may be inhibiting them (see Chapter 4).
- Undertake appropriate reform of poor postural, breathing, occupational and leisure habits and activities, to ensure that whatever led to previous problems is understood and eliminated (see Chapters 5, 6 and 7).
- Introduce regular toning, stretching and agility/balance exercises (see Chapter 7).
- Preferably all such self-care should be approved by a suitably qualified healthcare provider.

Important cautions

There are times when symptoms of extreme tightness in muscles should be left alone. In osteoporosis (a decalcification or 'thinning' of the spinal bones), there is frequently an accompanying contraction or spasm of the overlying muscles. If a vertebra actually collapses in such a situation, there is great pain and extreme spasm in the muscle of the area. This is protective and designed by the body to prevent movement which could produce even more pain or, worse, an actual fracture of the bone.

Similarly, a bone tumor in the lower spine or neck, for example, could be accompanied by a similar protective spasm.

In neither of these examples would MET be of any use since any relaxation it achieved (and this would be unlikely under these conditions anyway) would obviously be against the best interests of the body, which requires, and should receive, immobilization of the damaged area.

In a joint which is actively inflamed and swollen, such as in rheumatoid arthritis, there is little that MET could do for the tissues of the area. In such conditions, the tense and/or weak muscles can often be helped by MET and other methods once the inflammation is reduced but in the very acute phases these tissues do not require activity, however gentle. Arthritic and other damaged joints can be helped by MET to regain some freedom of movement but not if the methods produce pain, which should in any condition be seen as indicating that MET, or any other self-help method, should be stopped. Furthermore, not all symptoms need to be overcome. Some, such as pain and restricted movement, need to be recognized for what they are, as in the examples given above, in which they play a vital protective role for damaged bone or tight muscles.

It is always important to try to find out *why* there is pain or stiffness before trying to change behavior of muscles since, while most stiff muscles and joints can be helped by MET, caution should be exercised in situations such as those described above. In any condition of pain, stiffness or disability which does not resolve itself fairly rapidly, it is suggested that a qualified osteopathic or chiropractic practitioner or a physiotherapist or licensed massage therapist should be consulted. The methods described in this book are used by many such practitioners, along with a host of other specialized methods which can comprehensively assist in the normalization of musculoskeletal problems, where possible.

In dealing with the pains and dysfunctions of the body the skilled practitioner, of whatever discipline, does not look at the local symptoms alone but at their relationship with the other parts of the body as well as the relationship of the body as a whole with its environment.

- How is the body used and abused in daily life?
- What inborn defects exist (such as one leg shorter than the other) and what has resulted from the vicissitudes and traumas of life?
- How do posture, reflex activity, occupation, emotional stress, poor breathing habits, sporting activity, etc. relate to the current situation?

These are all vital questions which often require answers before a condition of bodily dysfunction can be normalized. Treatment of symptoms alone is never enough. The self-help methods, as adapted in this book, should not replace expert advice but should be used as first aid and as a source of guidance for ongoing maintenance of mobility, once this has been regained.

Muscle energy techniques: treatment and self-treatment methods 3

Active home treatment methods for normalizing muscular imbalance

Statistics show that most backaches and joint problems are better within 3 weeks whether the treatment received involves active manipulation, traction, physiotherapy or rest (although rest is not advised for backache except during periods when the condition is so bad that it is impossible to walk around). Only a small percentage of back problems last for as long as 6 weeks or require specialized attention. It is as well to remember that any treatment method requires active involvement in rehabilitation by the individual to help avoid relapse.

The self-care MET methods outlined in this chapter will help to speed up recovery from a backache that has a muscular origin (and most backache derives from muscular rather than joint problems). However, it is the methods described in Chapters 5, 6 and 7 (on flexibility, stability and balance) that will help to prevent recurrence.

Many of the world's experts in treatment and rehabilitation of the injured back in particular, and musculoskeletal problems in general, have helped to develop a range of methods and exercises which focus on stretching tight postural muscles, followed or accompanied by the toning of weak/inhibited muscles. In the case of back problems this should be followed by methods that ensure 'core stability' (explained in Chapter 6). This approach helps to ensure the avoidance of relapse of many neck, back and other musculoskeletal problems.

Appropriate stretching exercises as described in this chapter need to meet the individual's particular requirements (involving possible shortening of soleus, gastrocnemius, hamstrings, tensor fascia lata, adductors, psoas, piriformis, quadratus lumborum, spinal erectors, latissimus dorsi, upper trapezius, sternomastoid, levator scapulae, rectus abdominis, pectoralis major, etc.) and should be performed several times daily. These should be integrated into a daily routine and replaced by the more advanced rehabilitation methods, described in later chapters, once recovery is established, in order to maintain mobility and prevent future problems.

If you do not have access to the guidance of specialists in spinal mechanics, muscular and joint dysfunction, who are capable of identifying which muscles need stretching in any particular case – such as osteopathic, chiropractic or appropriately trained physiotherapy practitioners – you should try to assess your own imbalances using the self-testing procedures for tight muscle groups as outlined in Chapter 2.

Methods for normalizing those muscles in need of stretching are detailed in this chapter.

MET neck sequence

MUSCLES INVOLVED

Sternomastoid, scalenes, posterior cervicals, upper trapezius, semispinalis, longissimus, longus capitus, longus coli and other smaller muscles of the neck. These support and move the head and neck in various directions.

ASSOCIATED PROBLEMS

Headache, neck stiffness and pain. These muscles should be searched for trigger points which are often involved in referred pain and other symptoms related to the head, eyes and face (see Chapter 4).

WHAT MIGHT STRESS THESE MUSCLES?

Sleeping with the head and neck in an unsupported position. Reading a book or computing with your head and neck in a stressed position. Working with arms above your head. Carrying heavy or awkward loads.
See the following tests in Chapter 2: functional tests 3, 5, 6; shortness tests 28, 30

MET POSITIONS AND METHODS

- After each of the following six isometric exercises you should take your head/neck as far as is comfortable (that is, move it gently toward a new barrier).
- If you are using RI, you should move the head/neck in the direction towards which you were isometrically pushing, in order to gain an increased range of motion, where stiffness was previously felt.
- If you are utilizing the release of PIR, you should move the head/neck in the opposite direction to the isometric push, in order to gain an increased range of motion, where stiffness was previously felt.
- Unlike the methods listed later in this chapter, for specific muscles, these six exercises are aimed at general mobility improvement.

1. MET (RI) to release side of neck muscles (sternomastoid, scalenes, upper trapezius)

- Sit at a table with your elbows resting on it.
- Tilt your head to the left (in this example), taking your ear toward your shoulder, as far as is comfortable.
- Place a hand (left hand in this example) on the side of your head/face.
- Stabilizing your head with your open hand, try to take your head further sideways against your hand – without any movement being allowed – using only about a quarter of the available strength in the muscles on the left side of your neck (see Fig. 3.1).
- Hold this isometric contraction for 5–7 seconds.
- Relax the effort, breathe in and out slowly and as you release your breath, ease your head further to the left.
- Hold this new position for approximately 30 seconds before repeating the contraction one more time, using the same degree of effort.

Figure 3.1 *MET for general release of muscles on the right side of the neck*

- This method uses RI to release the muscles on the right of the neck. You could equally well have placed your restraining hand on the right side of your neck (while the head/neck was tilted left) and introduced a contraction of the muscles on the right, in order to release these by PIR.
- Perform the same isometric contraction but this time with the head/neck tilted to the right, restraining hand on the right (for RI effect) or left (for PIR effect), for the same length of time. Repeat this once.

Pulsed MET. As an alternative to the MET methods described above you could introduce a series of rhythmic pulsations (20 in 10 seconds) against your firmly restraining hands, after which you should be able to take the area to a new barrier before repeating the process. This is pulsed MET, as described in Chapter 1. For more detail see the note at the end of the next method.

2. MET (RI) to release back of neck muscles (extensors)

- Sitting at a table, bend your head/neck forward as far as is comfortable and rest the forehead on your hands (elbows on the table).
- Using less than a quarter of your available strength, attempt to take your head and neck into further forward bending, pushing your forehead against the resistance of your hands, creating an isometric contraction.
- Hold this for 5–7 seconds.
- Relax the effort, breathe in and out slowly and as you exhale, ease your head further into a forward stretch, to its new barrier.
- Hold the stretched position for about 30 seconds before repeating the process once more.
- This method uses RI to achieve release of the muscles at the back of the neck. In the next example PIR is used to achieve the same effect.

Pulsed MET. If you refer back to Chapter 1 (p. 10) you will see that the position in which this particular maneuver is carried out is identical to the one used to demonstrate Ruddy's pulsed MET method in that chapter (Fig. 3.2). The only difference is that in the method described above, a sustained isometric contraction is used and in pulsed MET a rhythmic, repetitive, pulsing series of mini-contractions is performed.

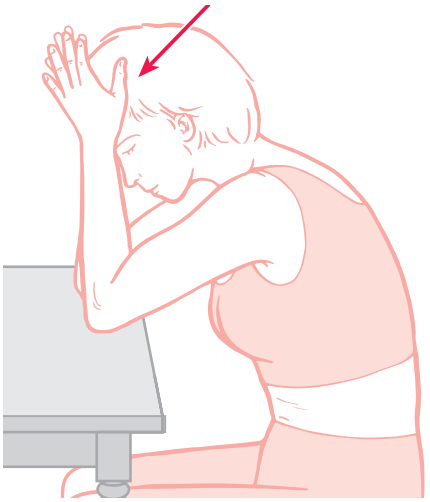


Figure 3.2 *Using MET (RI) to release muscles of the back of the neck*

This highlights the way in which you can modify *any* MET procedure – using the antagonists to the short, tight muscles (as in the method described above) in a sustained way or in a pulsed way or choosing to use the agonists (which would mean introducing an isometric contraction of the back of neck muscles instead).

As in all self-applied MET methods, the choice is yours, based on what feels easiest. The results are likely to be very similar whichever you choose.

3. MET (PIR) to release back of neck (extensor) and suboccipital muscles

- Sitting upright, take your chin as close as is comfortable towards the upper border of your breast bone (sternum).
- If the back of neck and suboccipital muscles are shortened, the chin will not be able to touch this region.
- If three or more finger widths distance separate your chin from the breast bone, then these back of neck muscles are very short and almost certainly contain trigger points. Assess this distance again after the isometric maneuvers, described here and in method 5.
- Sit with your neck flexed and your chin as near to your chest as is comfortable. Place one (or both) hand(s) on the back of your head (see Fig. 3.3).
- Try to straighten the neck against the resistance of your hand(s), using no more than a quarter of your strength.
- This contracts the muscles at the back of the neck and induces PIR in them after the contraction (5–7 seconds).
- Relax the effort, breathe in and out slowly and as you release your breath, assisted by your hand(s), ease your head further forward, chin toward chest, in order to stretch shortened muscles in the back of the neck.
- Hold this position for approximately 30 seconds before repeating the process once more.

Pulsed MET. As an alternative to the method described above you could introduce a series of rhythmic pulsations (20 in 10 seconds) against your firmly restraining hands, after which you should be able to take the area to a new barrier before repeating the process.

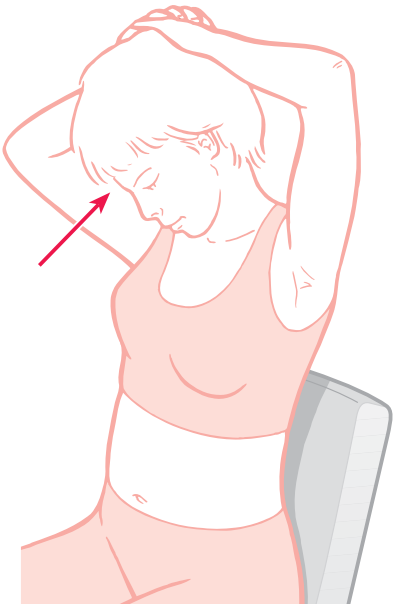


Figure 3.3 *Using MET (PIR) to release muscles of the back of the neck*

4. MET (isotonic concentric) to tone and strengthen the deep muscles of the neck

- The deep neck flexor muscles are always weak when there is tightness in the muscles of the back of the neck and/or when there is a tendency for the head/chin to be held in a poked forward position.
- Carefully tilt your head backwards to look upwards at the ceiling.
- Restrain your head by pressure on your forehead with one or both hands as you attempt to bring it back toward an upright position.
- Because this is a concentric isometric exercise, you need to allow movement of the head by resisting it only partially.
- The action of the head and neck is first toward coming upright and then moving the chin toward the chest.

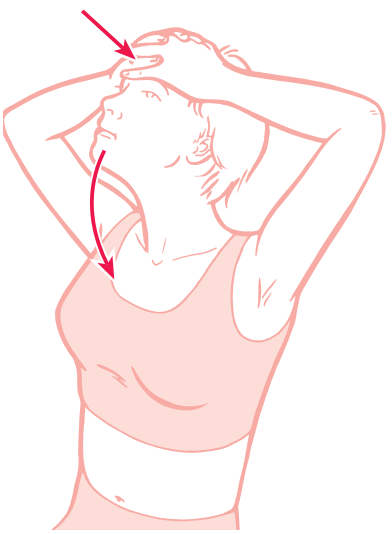


Figure 3.4 *Using MET (concentric isotonic) to tone deep front muscles of the neck*

- You need to practice resisting these efforts while still allowing the movements to happen in a smooth, non-jerky manner.
- At first use only about 25% of strength but when you repeat it once or twice more, increase the amount of effort (and resistance).
- By toning these deep neck flexor muscles you will be adding to the release of tightness in the back of neck muscles, as described in methods 3 and 5 of this sequence (see Fig. 3.4).

CAUTION Holding the head and neck in a backward tilted position can sometimes cause stress on the blood vessels carrying circulation to the head. If you experience dizziness or nausea when performing this maneuver, stop immediately.

5. MET to release deeper back of neck muscles (extensors)

- This method is used to assist in further releasing the back of neck muscles (as in methods 3 and 4).
- Sit upright and ease your chin backwards as though it were going through the back of your neck.
- This shunting movement (known as posterior translation) opens the facets of the spine.
- In this position, place a hand on your chin and restrain your own effort to return it to its normal position, using no more than 25% of your available strength.
- Hold this isometric contraction for 5–7 seconds, then relax the effort, breathe in and out slowly and as you release your breath, ease your chin further back, creating a sensation of 'opening' the back of the neck, in order to stretch shortened back of the neck muscles.
- Hold this stretched position for not less than 30 seconds before releasing and repeating (see Fig. 3.5).

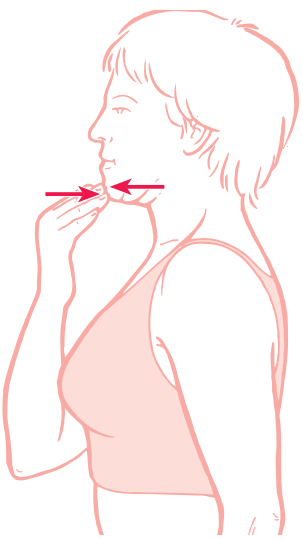


Figure 3.5 *Stretching the small muscles at the back of the neck using MET*

Pulsed MET. As an alternative to the method described above, you could introduce a series of rhythmic pulsations (20 in 10 seconds) against your firmly restraining hands, after which you should be able to take the area to a new barrier before repeating the process.

6. MET (RI) to release rotator muscles of the neck

- Sit at a table and turn your head as far left (in this example) as is comfortable.
- In order to release the muscles that rotate the neck and head, place your left hand on your left cheek and with this hand, restrain an attempt to turn your head further to the left, using no more than 25% of available strength.
- Relax the effort, breathe in and out slowly and as you release your breath, ease your head further to the left until you reach a new restriction barrier and hold this turn for not less than 30 seconds (see Fig. 3.6).
- Repeat and then do the same by turning to the right against resistance.

Pulsed MET. Once again, the choice of using pulsed MET is available. Instead of a sustained contraction, you could introduce a series of rhythmic pulsations (20 in 10 seconds) against your firmly restraining hands, after which you should be able to take the area to a new barrier, before repeating the process.

Figure 3.6 *Using reciprocal inhibition to release tight muscles on the right side of the neck, allowing easier rotation to the left*

NOTES ON THE MET NECK SEQUENCE

- The order in which these six MET applications for the neck region is applied is not important. By using all of them you should be able to ease neck/head problems caused by muscular tensions because in this sequence, most of the major and minor neck muscles will be released and the major inhibited group (deep neck flexors) will be toned.
- If there is any specific direction in which limitation of your head or neck movement is noted, then take your head as far as you can, painlessly, in that direction before using your hands to restrain it. Then either try to take it further towards that barrier or away from the barrier, resisting isometrically for 5–7 seconds (whether using PIR or RI) or using pulsed MET, before moving to the new barrier, as muscles release and relax.
- The isometric or pulsating contractions should start at the furthest pain- and strain-free limit, in the restricted direction.
- The use of general neck-releasing methods such as these is appropriate for most forms of headache and where the neck is abnormally stiff, especially if

this follows being in a static position such as typing, driving, etc. for a long period.
- Additional specific neck muscle-releasing methods will be found in this chapter as we progress through individual muscle problems. However, the general measures described will often be all that is required to keep the neck supple.
- *Remember to stretch the tight muscles painlessly after each isometric contraction.*

MET for specific neck-related muscles

7. SHORT EXTENSORS OF THE NECK (SUBOCCIPITAL MUSCLES)

These muscles are the small ones at the base of the skull and they have control of fine head movement and are involved in balance. They shorten when stressed. A posture with a forward head position, or 'poked' chin, will severely stress these muscles and result in shortening.

Associated problems

Neck stiffness and head or eye pain, loss of balance.

See the following test in Chapter 2: Shortness test 29

MET (PIR) position and method

- Sit on a low chair, leaning backwards.
- Place your fingers on the base of your skull (where the skull meets the neck) and rest your thumbs on your cheek bones, just below your eyes (see Fig. 3.7).
- Draw your chin back toward your neck ('double chin' position).
- Stabilize the whole area with your hands as you breathe in and look upwards at the same time (eyes only, no conscious neck movement).
- There will be a tendency at this moment for your head to move upward and backward, *which your hands should restrain.*
- This eye position should be held (with the breath) for 5 seconds and then, as the breath is slowly released, look downward and actively take your chin a little closer to your throat, with the hands on the back of the head offering some overpressure, to help this movement.
- This stretches the muscles of the upper neck (this process is helped by simultaneously keeping your eyes looking downward). Hold the stretch for 30 seconds or so and then repeat this once or twice.

Note: Leaning backwards onto the chair will bring your chin closer to your throat on relaxation.

This MET method illustrates the use of breathing and eye movement as a way to introduce muscular contraction, which is isometrically resisted by counterpressure from your hands. The degree of muscular effort created by the eye movement is not great but the PIR which can be achieved by several repetitions of this exercise makes it a powerful aid in normalizing tension at the base of the skull, a common factor in headache and eye strain conditions. It is also possible to use RI in this position. The only difference is that the isometric contraction involves the eyes looking down rather than up, creating a mild flexion of the neck to be restricted by the hands. After this the stretch is the same as that described above.

Figure 3.7 Head and hand position for MET treatment of suboccipital muscles

8. LEVATOR SCAPULAE

This muscle attaches from the spinous processes of the top four vertebrae of the neck and inserts into the top of the shoulder blade. Its function has to do with shoulder stability, shrugging the shoulder and arm movement.

Associated problems

Pain in the upper neck (side) and upper aspect of shoulder blade. Trigger points in this muscle cause pain in the neck, shoulder and shoulder blade. The muscle may be very tense if you suffer from asthma or habitually breathe with the upper chest.

See the following tests in Chapter 2: Functional tests 5, 6; Shortness test 29

MET positions and methods

A. MET(PIR) levator scapulae stretch in lying position

- Lie on a bed or on the floor, with a thick pillow or cushion under your head so that the neck is fully flexed.
- Reach down as far as is comfortable with the hand on the side you are treating (right hand in this example) and place the palm under your buttock or upper thigh, to lock it there.
- Your right shoulder should be pulled toward your feet by this action, as far as is comfortable.
- Your left hand should reach up behind your head so that your fingers rest over your right ear.
- Turn your head to face left and with your left hand ease your head as far to the left as is comfortable.
- You should become aware of tension in the muscles at the back of your neck on the right, pulling down toward your shoulder blade.
- To introduce an isometric contraction of the shortened muscle (levator scapulae), using only a small amount of effort, push your neck and head toward the right against the firm resistance of your left hand, while you also push back toward the cushion with your neck. *At the same time* shrug your shoulder, which should not be able to move very much because you are lying on your hand.
- Hold these combined contractions for 5–7 seconds.

- After 7 seconds or so release all these efforts, breathe fully and slowly in and out and as you breathe out, use your left hand to pull your head a little further to the right (side bending and rotating the neck further), taking it to its new barrier of resistance and increasing the tension in the shortened muscle.
- Then lift your buttock and stretch the right hand toward your feet a little further and then lie on the hand again.
- Hold this stretch for not less than 30 seconds and then repeat the procedure once more before treating the other side in the same way.
- Make sure that no pain is created by your efforts to contract and then stretch the muscle. If pain is caused you are probably trying too hard so ease off and perform the procedure more gently (see Fig. 3.8).

B. (MET-RI) levator scapulae stretch in seated position

- Sit in front of a table with a pillow between your chest and the edge of the table.
- To treat the right side levator scapula, circle your left arm around the pillow.
- Your right arm should rest on your lap.
- Turn your head to the right, to its fullest comfortable degree, side bend it to the left and rest the left side of your head on the pillow.
- You will feel a slight stretch down the side of your neck toward your shoulder blade.
- Consciously make an effort to ease your shoulder blade downwards, toward your lower back, and hold this for 5–7 seconds. This contracts the antagonists to the levator scapula and produces RI.
- As you release this effort slip the right arm off your lap and let it hang down between your legs and at the same time increase flexion of the neck. Take your neck a little further into rotation to the right, as well as side bending left.
- Hold this position for not less than 30 seconds to stretch the levator scapula. Repeat and then perform the same sequence on the other side (see Fig. 3.9).

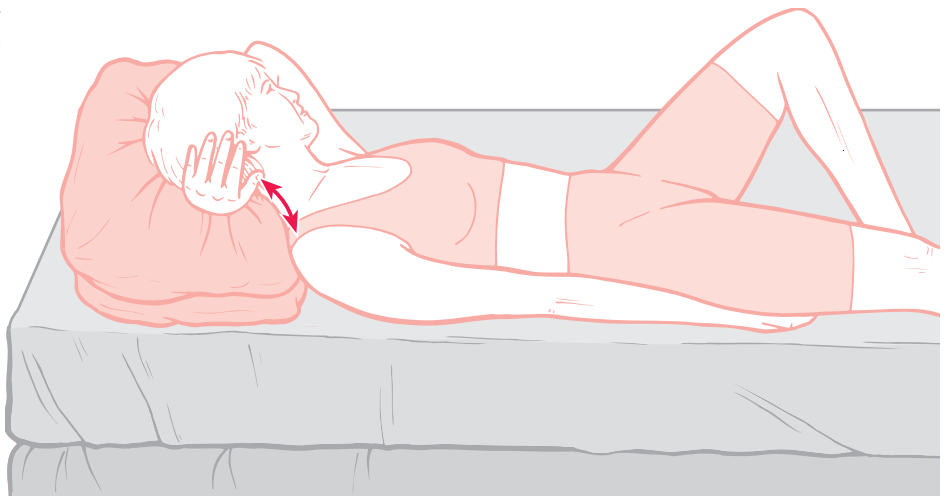


Figure 3.8 *MET treatment of levator scapulae on the right*

Figure 3.9 *Self-treatment of levator scapulae in seated position*

9. TRAPEZIUS (UPPER FIBERS)

The trapezius is a flat, triangular muscle covering the back of the neck and shoulders. Its fibers run from the base of the skull to the neck, outer aspect of the collar bone and tip of the shoulder. Its action is to draw the head backwards and to stabilize and lift the shoulder when arm movement is taking place.

Associated problems

Neck and shoulder and arm problems. Trigger points in this muscle can cause pain in the jaw region, face and the side of the head and may be involved in pain and problems in the ears and eyes.

See the following tests in Chapter 2: Functional tests 5, 6; Shortness tests 29, 30

Note: Assessment 30 (Fig. 2.35 in Chapter 2) describes and shows the positions involved in assessment of shortness in upper trapezius, which are identical to those used in its treatment.

MET (PIR) position and method

- Lie on your back on a bed or the floor, using a thin pillow.
- Grip the edge of the bed or table with the hand on the side you are treating (right side in this example) with your arm at about a 45° angle from your shoulder. If you are on the floor place the hand and wrist under your buttock and lie on it to lock it in position.
- Turn your head fully to the left and side bend it fully to the left (in this example) to engage the posterior fibers of the muscle.
- Note: After completing the stretching of these posterior fibers, as described below, the same procedures should be followed with the head half turned to the left (for middle fibers) and turned slightly to the right (for anterior fibers). Whichever fibers are being treated, side flexion to the left (in this example) should also be introduced.

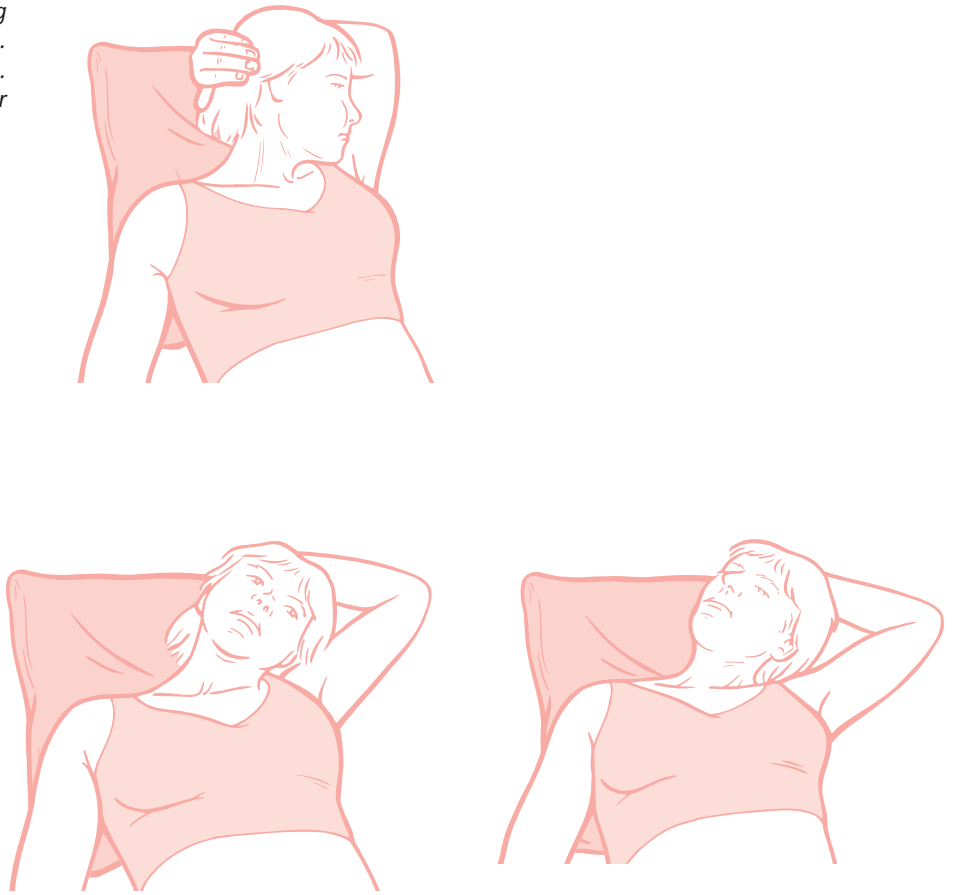


Figure 3.10 *Treating fibers of upper trapezius. A: Posterior. B: Middle. C: Anterior*

- With your other hand, reach across the top of your head and pull your head as far to the left as is comfortable.
- When all the slack has been taken out, introduce an isometric contraction by trying to bring the tip of your right shoulder and your right ear toward each other.
- This should be totally resisted by your left hand and the fact that your arm is fixed because you are lying on it.
- After 5–7 seconds inhale slowly and as you release your breath, ease your neck/head into slightly further left side bending and rotation, while at the same time lifting your buttock and taking the hand further toward the feet before lying on it again or stretching further down to grasp the edge of the bed or table (see Fig. 3.10).
- This stretch should be held for not less than 30 seconds before repeating once more and then treating the middle and anterior fibers, before self-treating the other side.

10. MIDDLE AND LOWER TRAPEZIUS

These muscles are designed to support and move the shoulder blade from below. They are type 2 (phasic) muscles that become weak when the upper trapezius is overactive. They seldom shorten overall but can house trigger points and in treatment of these stretching is required.

Associated problems

Related to trigger point activity which can refer pain to the mid-back, lower back, shoulder, chest and abdomen.

MET (PIR) position and methods

- Sit at the edge of a chair that has armrests.
- Cross your arms so that each hand rests on the opposite armrest.
- Bend forward so that you round your middle and upper back.
- At the same time tuck your chin to your chest so that you feel a stretch in your middle back.
- Rotate *away* from the side that you intend to stretch, as far as is comfortable (to the left in this example), to stretch right middle and lower trapezii.
- Bracing yourself in the forward bend and rotation, simultaneously pull on the arms of the chair, as though you were bringing your shoulder blades together, and also twist back an inch (2.5 cm) or so toward the midline and sit upright a little.
- Hold this combined contraction for 5–7 seconds.
- On releasing, go further into forward bending and left rotation and hold this position for not less than 30 seconds.
- Repeat on the other side (see Fig. 3.11).

Figure 3.11 *Seated self-treatment of lower and middle trapezii*

Pulsed MET

- In precisely the same seated, slumped and rotated position, introduce a series of mini-pulsations (20 in 10 seconds) toward the direction of rotation.
- After this series relax and ease yourself further into stretch and repeat the process.

11. STERNOCLEIDO-MASTOID

Sternocleidomastoid (SCM; commonly called sternomastoid) runs from the mastoid bone (behind the ear) to the top of the breast bone, with another attachment to the collar bone. Its function is as a neck stabilizer and neck flexor, side flexor and rotator (because of its diagonal pathway, when the left sterno-mastoid contracts the head turns right). It also lifts some of the structures of the chest during breathing.

Associated problems

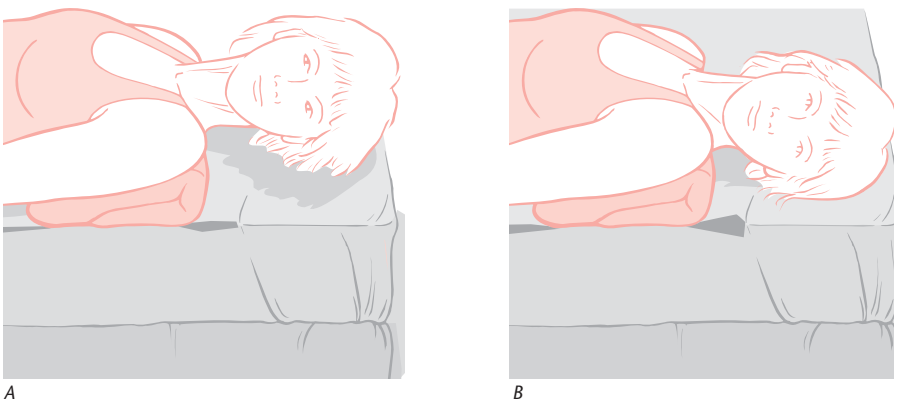
Pain on the outer end of the collar bone or upper chest; pain in the upper neck. Trigger points in the muscle produce pain in the jaw, throat and forehead. Active trigger points have been associated with sinus problems, allergies and alterations in skin function on the face and head (greasy or very dry).

See the following test in Chapter 2: Shortness test 28

MET positions and methods

A. MET (PIR) for SCM lying

- Lie on your back on the floor or a bed. Have a folded towel or thin cushion under your shoulders so that, when relaxed, the head and neck will hang down to allow the head to rest on the floor.
- In this position gravity will be exerting a pull on the muscle as your head hangs slightly down, especially when it is fully turned one way or the other.
- Turn your head away from the side to be treated, as far as is comfortable (turning left in this example, to treat the right SCM).
- Breathe in and hold your breath for a few seconds and at the same time lift your head sideways so that it is just off the surface (bed/floor).
- Hold this position for 5–7 seconds, release your breath and let the head rest on the surface again (see Fig. 3.12).



A B

Figure 3.12 *The stretching position for SCM treatment after an MET contraction. A: Head held off surface to contract muscle B: Head resting – allowing stretch*

- Rest in this position, with gravity stretching the right SCM muscle, for not less than 30 seconds.
- This sequence should be repeated once or twice more, before performing the same sequence on the SCM on the other side.

B. MET (RI) for SCM seated

- Sit on a chair with your back against a wall.
- Place a pillow behind your neck and shoulders so that the back of your head can touch the wall.
- Ease yourself forward in the chair so that your head begins to tilt backward a little.
- Turn your head as far as you comfortably can to the left in order to self-treat the right SCM.
- You should become aware of a slight stretch in the SCM, close to your upper chest.
- To create an isometric contraction, use your eyes only to look upward and to the left for 10 seconds.
- Now close your eyes and ease your neck further into left rotation and tilt your head further back until you feel a stretching sensation. By slightly altering your head position you can vary which part of the muscle is being stretched (see Fig. 3.13).
- Hold this for 30 seconds. Repeat once and then stretch the other side.

Figure 3.13 *Seated stretch of right side SCM*

CAUTION Holding the head and neck in a backward tilted position can sometimes cause stress on the blood vessels carrying circulation to the head. If you experience dizziness or nausea when performing this maneuver stop immediately.

12. SCALENES

The scalenes have three divisions:

- *anterior* which runs from the front of the sides of the 3rd to the 6th cervical (neck) vertebrae to the 1st rib
- *middle* which runs from the sides of the 2nd to the 7th cervical vertebrae to the 1st (and sometimes the 2nd) rib(s)
- *posterior* which runs from the sides of the 5th to 7th cervical vertebrae to the 2nd rib.

Associated problems

When short, these can affect respiration, especially feelings of being unable to take a deep breath. As discussed in Chapter 1, when they are stressed by asthmatic or upper chest breathing, they shorten. They may contain trigger points which often refer pain to the arms.

See the following tests in Chapter 2: Functional test 3

MET (PIR) position and method

- Lie on your back on the floor or a bed. Have a folded towel or thin cushion under your shoulders so that, when relaxed, the head and neck will hang down to allow the head to rest on the floor.
- In this position gravity will be exerting a pull on the muscles as your head hangs slightly down in a backwards bent and rotated position. If the head is turned to the left, there would be tension on the right scalene muscles and, depending on the degree of rotation, this would involve scalenus anticus, medius or posticus.
- The more rotation there is, the more involvement there will be of the posterior or middle aspects of the muscle.
- Lying with the folded towel or shallow pillow under your shoulders, head hanging back slightly, and with your head fully turned to the left (to treat right-side posterior scalenes), place your left hand on the right side of your forehead/face and use this to resist the contraction which will occur when the following three simultaneous actions take place:
  1. take and hold a deep breath
  2. as you inhale fully your eyes should be turned to look as far as possible to the right
  3. at the same time, slightly lift your head, together with a slight turn towards the right, resisted by your hand resting on your head.
- No movement should be allowed because of your restraining hand on the head.
- The amount of 'lift and turn' of the head should be slight.
- Hold this for 5–7 seconds and then, as your breath is released and your eyes close, let the head ease back to rest on the floor, allowing your muscles to stretch, via gravity's pull on the head, for about 30 seconds.

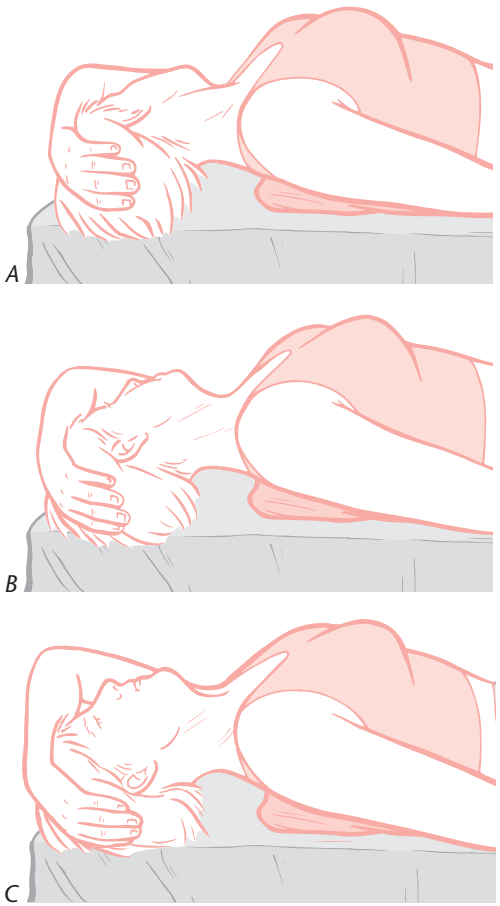


Figure 3.14 *Scalene self-treatment. A: Posterior. B: Middle. C: Anterior*

- Repeat this sequence once more before performing the same procedure with the head half turned left (middle scalenes) and then with the head not turned at all, facing straight upward to the ceiling (anterior scalenes) (see Fig. 3.14).
- Then treat the other side in the same way, with the head turned to the right.

MET for chest and shoulder-related muscles

13. PECTORALIS MAJOR

This is a fan-shaped muscle which runs from the inner half of the collar bone, the breast bone and ribs, inserting into the upper arm. It helps to raise the arm at the shoulder and is often contracted when arm pain is noted.

Associated problems

Round-shouldered posture, chest pain, shoulder pain.

Trigger points in this muscle produce pain in the upper chest muscles, usually to the side of the nipple and running towards the armpit. This muscle is often tense in stress conditions.

See the following test in Chapter 2: Shortness test 23

MET (PIR) position and method

- Lie on your back, on a table or bed, with the side to be treated close to the edge (right side in this example).
- Your right arm should be outstretched to your side, palm upwards.
- The edge of the bed should be supporting your upper arm just below the shoulder joint.
- Depending on the angle of your arm from your trunk, different fibers of this large muscle can be stretched. The fibers involved in any stretch will be in

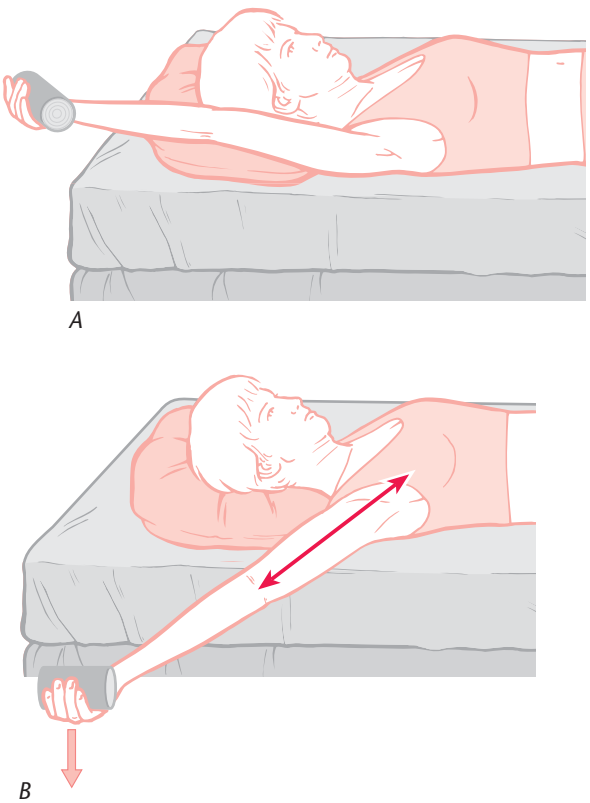


Figure 3.15 *A: Isometric contraction of abdominal fibers of pectoralis major. B: Gravity-assisted stretching of abdominal fibers of pectoralis major*

line with the position of your upper arm. For example, if your arm is held so that it is elevated above the shoulder, the fibers will be those that attach to the lower sternum (abdominal fibers). If the arm is held straight out sideways the fibers will be those that attach to the middle and upper sternum and if the arm is held so that it is angled downward, the fibers involved will be those attaching to the collar bone.

- To effectively self-treat the whole muscle all these angles should be used.
- With your arm outstretched, raise it toward the ceiling a small degree (1 inch/2.5 cm) and hold this for 7–10 seconds. This contracts aspects of the pectoralis major muscle with gravity providing the counterforce.
- On releasing the elevation of the arm, allow it to ease toward the floor so that gravity can create a stretch. You should be aware of a stretching sensation (but not pain) in front of your shoulder and across the chest, especially if the muscle is very short (see Fig. 3.15).
- Allow the arm to hang in this way for 30 seconds or more, then repeat the procedure once again in this same position, before moving on to other angles and fibers, as described above.
- Holding a light weight in the hand (for example, a can of vegetables) can assist, as this increases the gravity-induced stretch, after the contraction.

14. SUPRASPINATUS

This muscle runs from above the ridge on your shoulder blade, outwards to your upper arm, which it assists in sideways movements.

Associated problems

Difficulty raising the arm sideways as well as lowering it. Reaching above your head.

Trigger points in this muscle refer pain to an area between the neck and shoulder, mainly on the outer aspect of the shoulder joint itself and running down the outer arm. 'Frozen shoulder' conditions usually involve this muscle.

See the following tests in Chapter 2: Shortness tests 26, 27A

Figure 3.16
Self-treatment of supraspinatus using MET

MET (PIR) position and method

- Sit with the arm on the side to be treated (left in this example) bent at the elbow and carried across your chest so that your elbow is as far across as is comfortable (see Fig. 3.16).
- Your other hand (right in this example) should grasp your elbow and cup it to exert a pull toward the right shoulder, taking out the slack of the muscle to be treated.
- Breathe in and push your elbow towards the left, against the resistance of your right hand.
- Maintain this light (25% of strength) isometric contraction for 5–7 seconds.
- Exhale and release the contraction gently, not suddenly, and as you exhale take your arm a little further to the right by drawing it across your chest with your right hand.
- When a comfortable degree of stretch has been achieved hold this for not less than 30 seconds, before repeating the procedure once more.
- Then treat the right side supraspinatus muscle in the same way.

Figure 3.17 *Assisted MET treatment of supraspinatus*

Note: If someone is helping you they should stand behind you to hold the arm (in the position described and illustrated in Fig. 3.17). Only minimal effort (no strain, no pain) is required for good results.

15. INFRASPINATUS

This thick, triangular muscle runs from the inner border of your shoulder blade to the back of your upper arm which it stabilizes and assists in outward rotation and lifting.

Associated problems

Pain sleeping on the affected side. Problems when raising and/or rotating the arm, such as when putting your hand behind your back (into back pocket or doing up a bra). Trying to turn the arm outwards against resistance would be painful if the muscle is disturbed.

Trigger points found in infraspinatus refer pain to the outer upper arm, especially to the front of the shoulder, and down the arm as far as the two fingers next to the thumb. The muscle may be involved in 'frozen shoulder' conditions.

See the following tests in Chapter 2: Shortness tests 24, 26, 27C (and 23 for teres major)

MET (PIR) position and method

- Lie on a bed with your affected arm over the side.
- Your upper arm (right side in this example) should extend sideways from your shoulder and your elbow should be bent so that it forms a right angle, with your lower arm directed towards the foot of the bed.
- Your arm should be positioned so that the palm faces the floor.
- Your upper arm should be resting on the edge of the bed.
- It is important to try to keep the back of your shoulder, on the side being treated, in touch with the bed all the time, as there will be a tendency for it to lift away from the surface during this procedure. You should be able to use your opposite (in this case left) hand to hold the shoulder flat against the surface (see Fig. 3.18).
- In this position allow your right arm to relax fully, placing maximum stretch on the muscle via the pull of gravity on your lower arm (you might want to

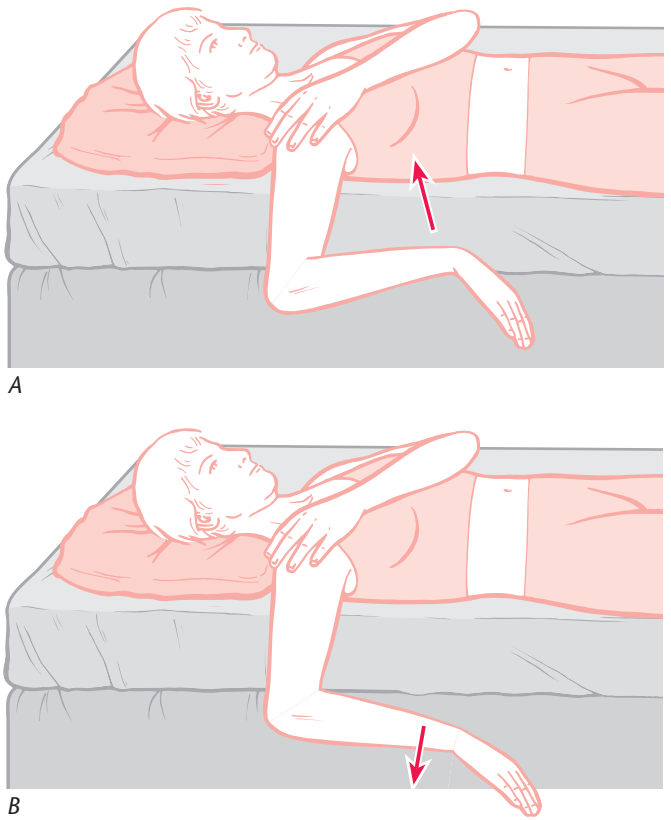


Figure 3.18 *A: Raising the forearm creates an isometric contraction in infraspinatus, with gravity as the counterweight. B: After the isometric contraction the arm is allowed to ease toward the floor to stretch infraspinatus*

hold a small weight, such as a can of vegetables, in the hand to assist in the stretch).
- Now raise your hand and forearm towards the ceiling by an inch (2.5 cm) or two.
- Hold this isometric contraction against gravity for 10–15 seconds before slowly releasing the effort and allowing the muscle to be taken again to its maximum degree of pain-free stretch as the forearm and hand ease toward the floor.
- Stay in this stretch position for no less than 30 seconds, before repeating the process once more, and then doing the same to the left infraspinatus muscle.
- Teres major will also be stretched during this procedure (it is only necessary to target teres major for stretching if it houses active trigger points).

Pulsed MET

- Lying with the arm as at the beginning of the procedure described above, the front of your forearm could be lightly and rhythmically pulsed toward the floor.
- Movement should be minimal; the merest starting and stopping of the action is needed.
- After 20 pulsations in approximately 10 seconds it should be possible to ease the forearm closer to the floor to introduce a stretch, which should be held for no less than 30 seconds before repeating the process.
- As in the PIR example above, the other, free, hand should hold the shoulder toward the surface on which you are lying.

16. SUBSCAPULARIS

This muscle runs from the outer two-thirds of the surface of the front of your shoulder blade to your upper arm, to which it attaches, in order to help to raise and rotate it.

Associated problems

Since this muscle assists in bringing your arm toward and across the body, as well as rotating it inwards, any shortening leads to restriction in turning the arm outward and raising it sideways. It is often associated with 'frozen shoulder'. Trigger points found in this muscle send pain into the arm, across the shoulder blade, mainly to the back of the shoulder joint.

See the following tests in Chapter 2: Shortness tests 25, 26, 27B

MET (PIR) position and method

- Lie on your back with your upper arm extended sideways from your shoulder, over the edge of the table, and with your elbow bent at right angles, so that your upper arm is palm upwards with your hand at a level with, or above, your head.
- **Caution.** It is possible that the condition of your shoulder may limit your ability to reach this position and so the maximum possible, pain-free stretch into this position should be attempted.
- As in the example of infraspinatus described above, it is important to try to keep the back of your shoulder, on the side being treated, in touch with the bed all the time, as there will be a tendency for it to lift away from the surface

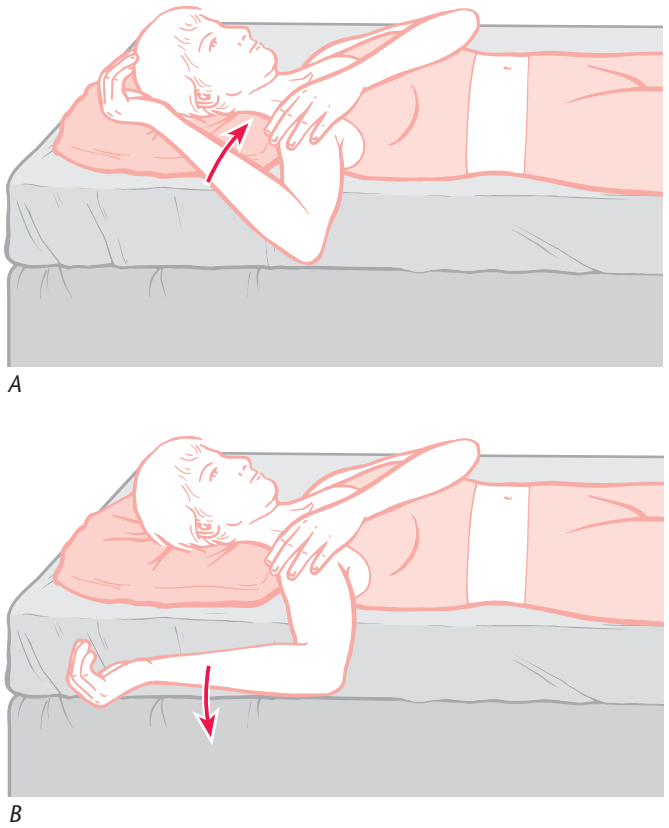


Figure 3.19 *A: Raising the forearm creates an isometric contraction in subscapularis, with gravity as the counterweight. B: After the isometric contraction the arm is allowed to ease toward the floor to stretch subscapularis*

during this procedure. You should be able to use your opposite (in this case left) hand to hold the shoulder flat against the surface.

- With your arm in this position, and with your left hand holding your shoulder to the surface on which you are lying, allow your upper arm to stretch as much as possible toward the floor.
- Raise your wrist and forearm an inch (2.5 cm) or so and hold this contraction against gravity for about 10–15 seconds.
- Release the effort slowly and allow the arm to stretch further toward the floor, introducing maximum stretch to the muscle. Holding a light weight (e.g. a can of vegetables) in your hand will assist, as this increases the gravity-induced stretch after the contraction (see Fig. 3.19).
- This stretch should be held for not less than 30 seconds and then repeated before performing the same process on the left subscapularis muscle.

Pulsed MET

- Lying with the arm as at the beginning of the procedure described above, the back of your forearm could be lightly and rhythmically pulsed toward the floor.
- Movement should be minimal; the merest starting and stopping of the action is needed.
- After 20 pulsations in approximately 10 seconds it should be possible to ease the forearm closer to the floor to introduce a stretch, which should be held for no less than 30 seconds before repeating the process.

- As in the PIR example above, the other, free, hand should hold the shoulder toward the surface on which you are lying.

17. BRACHIORADIALIS

This muscle runs from the elbow to the wrist and hand on the thumb side of your forearm.

Associated problems

Elbow, forearm and wrist pain.

See the following test in Chapter 2: Shortness test 31

MET (pulsed) position and method

- To treat right side brachioradialis, sit in a chair with armrests and place your left arm across your stomach to rest on or grasp the armrest on the right.
- Let your right arm hang down toward the floor supported on your left wrist.
- Straighten your arm and bend the right wrist so that your right thumb is pointing towards the floor.
- This position will apply a slight stretch in brachioradialis.
- Now introduce a rhythmic (pulsing) series of contractions (2 per second) in which you straighten the arm and pulse the wrist further toward the restriction barrier (thumb pointing more toward the floor on each pulsation) (creating a series of mini reciprocal inhibitions).
- After this, ease the arm straighter and the wrist into more flexion, and hold the stretch for not less than 30 seconds before repeating the process (see Fig. 3.20).

Figure 3.20 *Stretching right side brachioradialis*

18. FLEXORS AND EXTENSORS OF THE LOWER ARM, BICEPS AND SUPINATOR

These are involved in all movements of the lower arm and hand.

Associated problems

Painful outer or inner aspect of elbow (tennis elbow, golfer's elbow, etc.).

See the following test in Chapter 2: Shortness test 31

MET (PIR) positions and methods

Use shortness test 31 in Chapter 2 to identify whether your flexor or your extensor muscles (or both) are short.

A To treat the extensors

If these are short there may be pain on the external aspect of your elbow.

- Sit with the elbow of the arm to be treated (left arm in this example) on a table, with the inner aspect of your forearm turned towards you, wrist bent, so that your hand is pointing towards your face, palm down.
- Use your right hand to flex your affected wrist as far as possible without pain.
- Maintain this as you make an effort to extend your wrist (i.e. straighten it) against this counterpressure for 5–7 seconds (see Fig. 3.21A).
- On relaxation, increase the degree of flexion in your wrist and hold this for 30 seconds.
- Repeat the process once more.

B To treat the flexors

If the flexors are short there may be pain on the inner aspect of your elbow.

- Sit at a table with your elbow resting on it (left in this example), back of your forearm turned toward your face.
- Turn your palm upwards, extending your wrist as far as is comfortable, fingers pointing towards your face.

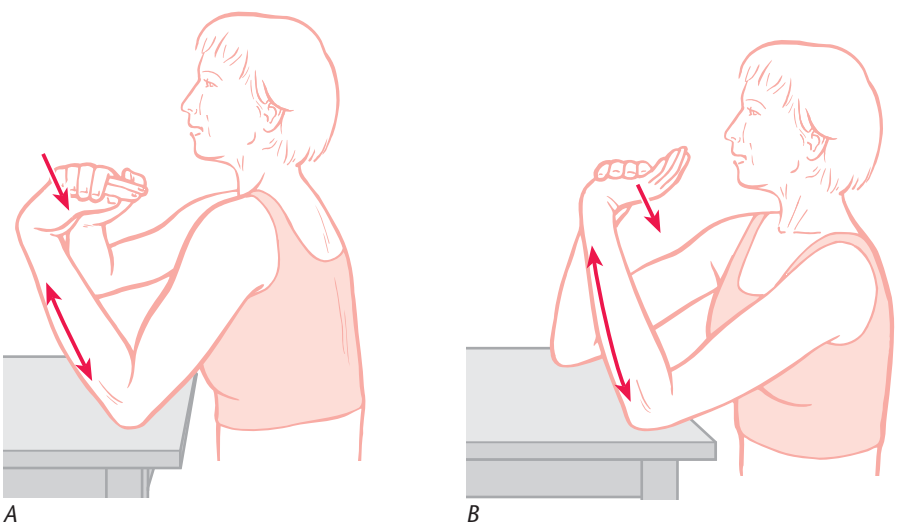


Figure 3.21 *A: Treating the extensors of the forearm. B: Treating the flexors of the forearm*

- Your right hand should be placed so that there is pressure downwards on the little finger side of your palm, pushing this aspect gently further into an outwards rotation of your hand.
- Introduce an isometric contraction by turning your left hand towards internal rotation as you also try to straighten the wrist, against the unmoving resistance of your right hand.
- Hold this light contraction for 5–7 seconds.
- On releasing increase the extension and outward rotation of the wrist/hand and hold for 30 seconds (see Fig. 3.21B).
- Repeat at least once more.

19. BICEPS ATTACHMENT

Associated problems

If there is pain localized in the front of your upper arm, several inches (5–7 cm) below your shoulder joint, this may relate to irritation at the biceps insertion which is probably caused by shortness of the biceps.

MET (PIR) position and method

- Treatment involves moving the affected arm (right in this example) behind your back and across your body as far as is comfortable.
- Ensure that your palm is facing downwards.
- With your left hand, take out the slack by easing it as far as possible (painlessly) to the left, as well as restraining the right arm at its furthest rotation (palm down) (see Fig. 3.22).
- The isometric contraction is achieved by attempting to derotate (i.e. turn your right palm upwards) against the counterpressure for 5–7 seconds.
- On release, take out more slack by turning your wrist further into rotation and stretch your arm further to the left.
- Repeat once more.

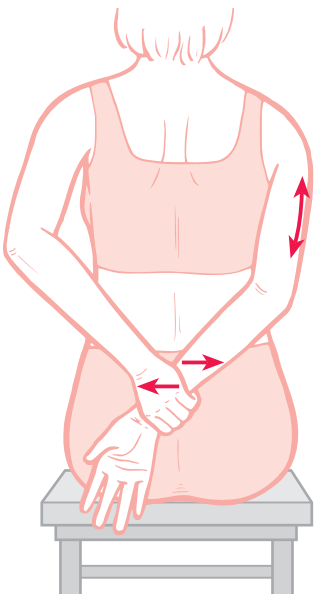


Figure 3.22 *Position for stretching biceps to affect the attachment*

MET for back, pelvis and leg muscles

20. UPPER ERECTOR SPINAE GROUP

These are the type 1 (postural) muscles which extend from the base of your spine to your neck and which provide stability and, to some limited extent, movement.

Associated problems

This massive supporting group of muscles extends from the sacrum to the head. In the upper spine it lies deep, crossing from one vertebra to the next at the back, and so is involved in bending the head and neck backwards as well as sideways tilting and rotation. These muscles are often shortened and in need of relaxation, especially in relation to headaches, stiff neck and upper back symptoms.

Trigger points in this area can refer pain to the head, neck and shoulder blade. Turning the neck and looking up and down might be restricted.

See the following tests in Chapter 2: Observation tests, as well as shortness test 29

MET (PIR) position and method

- Lie face downwards on a bed or table, with the upper part of your head and face over the edge so that, when your head is turned, there is support at a point between your ear and chin. Alternatively lie on a bed or on the floor with a thick cushion under your chest so that the head and neck can hang down as described above.
- In this way only that part of your head from about your mouth upwards will be over the edge (see Fig. 3.23).
- Turn your head towards the side of the neck to be treated.
- For MET to have an effect on the upper fibers of erector spinae, in the upper neck, you should fully relax your head in this slightly 'hanging down' position, before lifting it slightly (i.e. your whole head should be raised sideways towards the ceiling) by half an inch (1 cm).
- Gravity will be producing the counterpressure, creating an isometric contraction which will produce PIR afterwards.

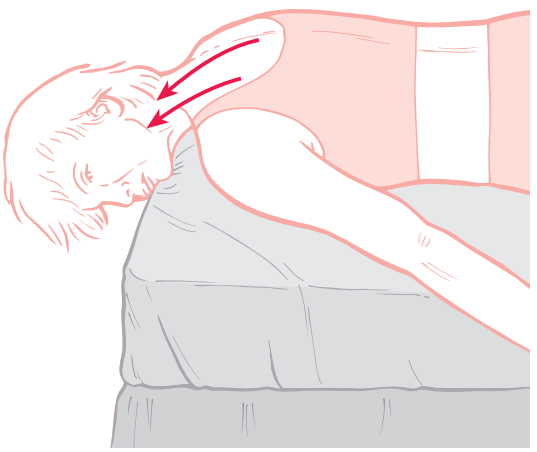


Figure 3.23 *Head and neck position for MET of erector spinae of the upper back and neck*

- This contraction should be held for 5–7 seconds.
- Release and relax the head and neck, letting the head hang down, as you exhale to encourage a stretching of the shortened muscles.
- Hold this position for half a minute before repeating this sequence.
- Do the same on the other side.

In order to treat/stretch the erector spinae fibers of your upper thoracic spine, the raising of your head to create an isometric contraction should be greater, perhaps several inches (5 cm) or more. All other aspects of the method are the same.

21. MID-SPINE ERECTOR SPINAE

These are the type 1 (postural) muscles which extend from the base of your spine to your neck and which provide stability and, to some limited extent, movement.

Associated problems

Stiffness and pain in the back.

Trigger points from this muscle group can affect the back, ribs and shoulders.

See the following tests in Chapter 2: Shortness tests 8, 9, 10, 11, 21

MET (PIR) Position and method

- In a sitting position, place the hand of the side *not* being treated on the top of your head (right hand on head in this example).
- Twist your trunk away from the side to be treated (in this example twist right to treat left erector spinae).
- With the right hand ease your head into a position of flexion (forward bending), rotation to the right, bending sideways to the right.

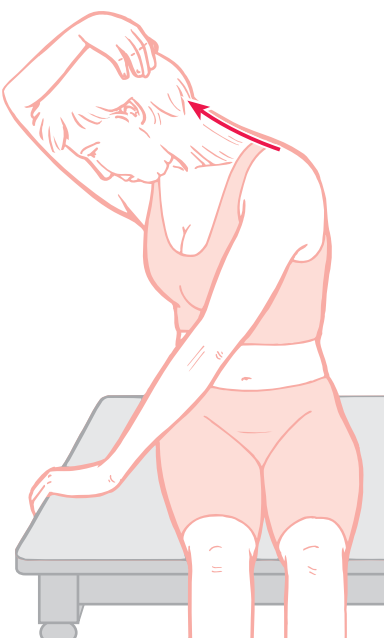


Figure 3.24
Self-treatment of upper thoracic erector spinae muscles

- The left hand (in this example) should reach across the right thigh to rest in a position which maximizes the degree of rotation of the trunk. If there is something to hold on to (edge of chair or table, for example), the left hand should grasp this.
- It is possible to localize the area to be stretched by bending and rotating in this way until a sense of stretch is felt in the appropriate area of your back.
- Having established this position, turn your eyes towards the left and at the same time inhale fully. Hold the breath for 5–7 seconds while maintaining the gaze to the left.
- This produces a tendency for the affected muscles to contract, which is resisted by the pull from your hand on your head.
- As you release the breath, turn your eyes towards the right and add a degree of additional stretch by turning the trunk further, using light additional pressure on the head contact (to increase forward bending of the neck as well as side bending and rotation) (see Fig. 3.24).
- Hold this position for 30 seconds before repeating the process as above, once more.
- Then perform the procedure in the opposite direction.

Assisted MET

If this whole process can be assisted by someone else, the hands of the person being treated may be interlocked at the back of the head.

If the left side is to be treated, the helper, who should be standing behind the seated person, passes the right hand under the right shoulder, past the front of the neck and rests the hand on the left shoulder (see Fig. 3.25). This allows a good deal of leverage and stabilizing force to be applied to bending forwards and sideways, as well as to rotation of the trunk to the right. Once positioned, all other features (breathing, etc.) are as described in the self-treatment sequence above.

Note: See also Figure 3.39B later in this chapter which illustrates a general stretch that helps lengthen erector spinae as well as hamstrings.

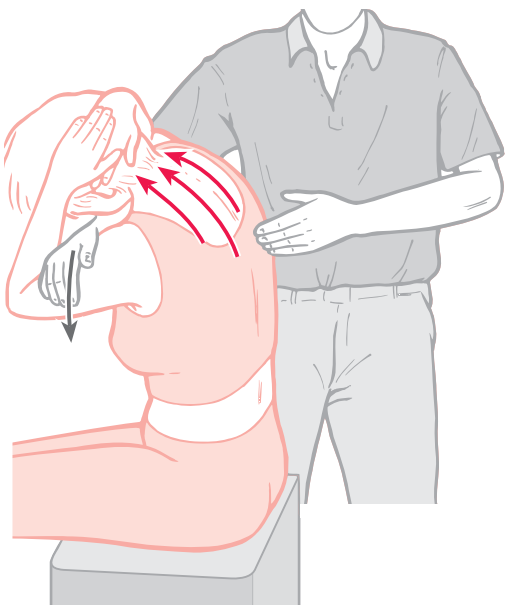


Figure 3.25 *Assisted treatment of upper thoracic erector spinae muscles*

22. MID AND LOWER BACK ERECTOR SPINAE (INCLUDING LONGISSIMUS DORSI)

These are the type 1 (postural) muscles which extend from the base of your spine to your neck and which provide stability and, to some limited extent, movement.

Associated problems

Back pain and stiffness.

Trigger points in this muscle group may affect the low back and buttocks or the pelvic region.

See the following tests in Chapter 2: Shortness tests 8, 9, 10, 11, 21

MET (PIR) position and method

- Lie on the opposite side to that which is to be treated (in this example lie on your right side).
- Place yourself approximately 6 inches (15 cm) from the edge of a bed or table, facing the edge.

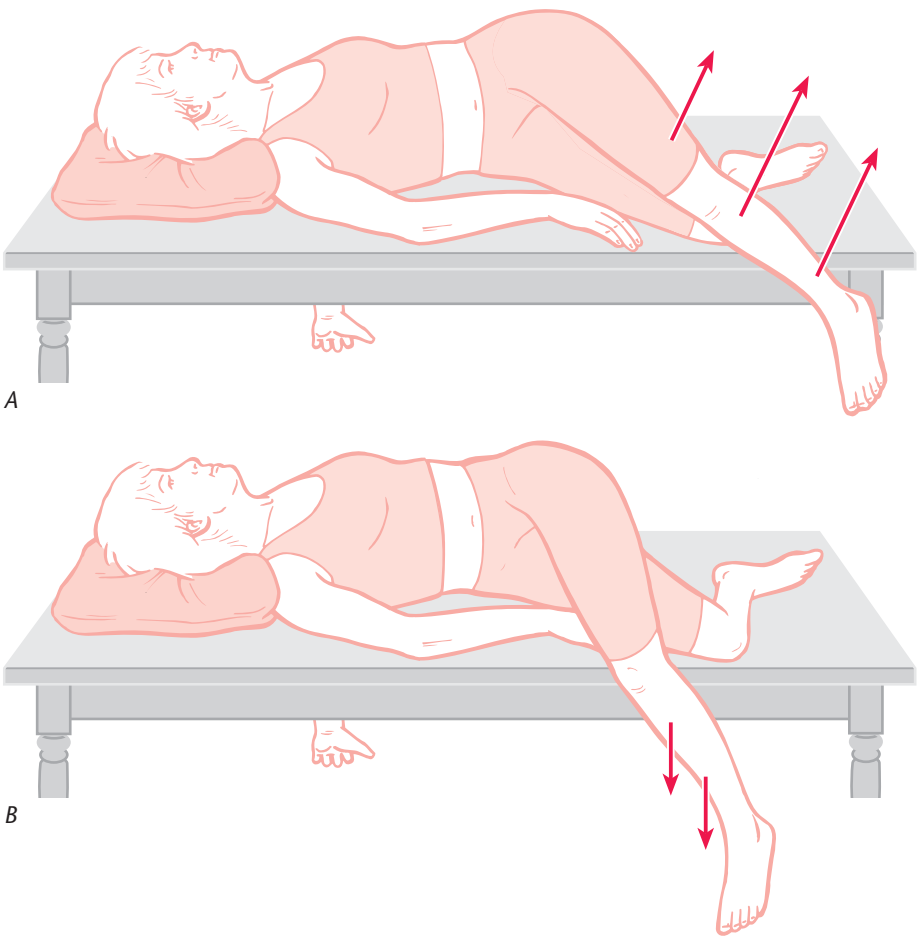


Figure 3.26 *A: The leg is being raised to create an isometric contraction against the counterforce of gravity. B: The leg is allowed to ease closer to the floor as greater rotation and stretch is introduced after the isometric contraction*

- Your upper arm (left in this example) should be taken backward and allowed to hang freely, while your right arm should be taken forward, so rotating your upper trunk towards the ceiling (see Fig. 3.26).
- Turn your head as far as it can comfortably go to face the ceiling.
- Carry your left leg forward and let it hang over the side of the bed (or table), while your right leg should be flexed at hip and knee, resting on the bed or table with the knee just over the edge.
- In this way you have introduced a twist that takes your pelvis one way (to the right) and your shoulders another (to the left).
- Relax fully in this position, so that your left leg (hanging over the edge), with the help of gravity, is placing a degree of stretch on the muscles of your low back.
- Now raise the left leg an inch or two (2.5–5 cm), as you take a slow, deep breath and hold this for 7–10 seconds.
- As you exhale release your left leg slowly, without sudden movements, allowing it to hang further down, with gravity performing traction.
- After some 20–30 seconds of this stretch, repeat the process once more before turning over and doing the same to the other side.

Note: Gravity is such an efficient counterforce in this position that little is gained by anyone assisting by providing other forms of restraint, for example by hand pressure.

23. QUADRATUS LUMBORUM

This is largely a type 1 (postural) muscle which has side-bending actions. It is also involved in breathing function as it stabilizes the lowest rib. QL also merges with the diaphragm.

Associated problems

Difficulty in bending sideways and general low back pain and stiffness. Trigger points noted in the waist area are associated with pain in this region, the lower ribs and the crest of the pelvis.

See the following tests in Chapter 2: Functional test 1; Shortness test 22

MET (PIR) position and method

- Stand with your legs 18 inches (45 cm) apart and bend sideways, away from the side you are treating (to the right in this example, to stretch left QL), making sure that there is no bending forwards or backwards.
- Having bent sideways as far as is comfortable, simultaneously take your trunk an inch or so (2–3 cm) back towards the upright, while breathing in deeply.
- Hold your breath, and the slight contraction against gravity, for a period of 7–10 seconds (see Fig. 3.27).
- As you release the breath, relax your muscles and allow the side bend to go further towards the right (right hand toward the floor).
- This stretch position should be held for at least 30 seconds.
- Repeat this process once or twice more and then apply the same approach to the right side QL as you side bend left.

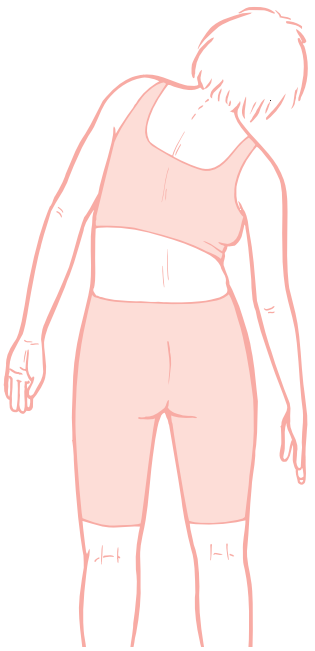


Figure 3.27 *Stretching left quadratus lumborum muscle*

24. MIDDLE FIBERS OF TRAPEZIUS, RHOMBOIDS

These lie between your spine and shoulder blade, acting to move the latter and stabilize it. They are not type 1 muscles and therefore will not shorten overall, but may require stretching if they house active trigger points (see Chapter 4).

Associated problems

Pain on the inner border of the shoulder blade and between the shoulder blades. Many trigger points are located in these muscles, affecting the regions above, below and to the sides.

MET (PIR) position and method

- You should sit with the arm on the side to be treated (left in this example) taken across your chest so that your left hand grasps the area between your neck and right shoulder.
- The angle of this may need to vary slightly depending upon which muscle fibers are involved. Thus the arm position should be varied until tension is noted in the area of discomfort between the shoulder blades.
- To produce counterpressure grasp the left elbow with your right hand (in this example) (see Fig. 3.28).
- A deep breath should be taken and this should induce a feeling that the painful area is being stretched by this action.
- As you inhale you should push your left elbow toward the left against the restraining influence of your right hand, using no more than 25% of the available strength.
- This effort (and held breath) should be held for 5–7 seconds and then gently released as the breath is exhaled.
- Your left arm should then be taken further across your chest to increase the degree of stretch on the tight muscles at the back, ensuring that your shoulder blade is stretching away from your spine.

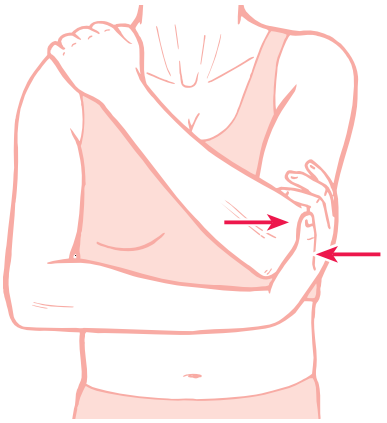


Figure 3.28 Position for stretching muscles between the shoulder blades on the left

- A slight rounding of your back may enhance the localization of forces at the painful site.
- Repeat this once more in order to produce relaxation of the tight muscles and if appropriate, do the same to the other side.

25. LATISSIMUS DORSI (AND TERES MAJOR)

The two latissumus dorsi muscles run from the back of your pelvis sweeping up and across the back to attach in the upper arms, just below the armpit. These are the muscles that cause your arms to swing when you walk as the pelvis rotates with each step. They also stabilize the sacroiliac joints.

Associated problems

A variety of pelvic, sacroiliac, back and shoulder/arm problems can result from shortening of this muscle.

See the following test in Chapter 2: Shortness test 23

MET (PIR) position and method

- To stretch the right latissimus dorsi muscle, lie on your left side with your back close to the edge of the bed, with a pillow under your waist.
- Bend your left hip and knee but leave your right leg straight and allow it to lie just behind your trunk, a little off the edge of the bed.
- Raise your right arm over your head, with your upper arm resting against your ear, and grasp the top of the bed with your right hand. If this is not possible let your right lower arm hang down above your head (see Fig. 3.29).
- You should be aware of a stretch in your latissimus dorsi.
- Raise your right leg and your right arm an inch (2.5 cm), to create an isometric contraction against the counterforce of gravity.
- Hold this for 5–7 seconds and then slowly release the contraction and let the leg hang down off the edge of the bed, behind your back, with your arm hanging down above your head.
- Hold this stretch for 30 seconds and then repeat once more before doing the same on the other side.

Note: Teres major will also be stretched in this procedure (it is only necessary to target teres major for stretching if it houses active trigger points).

Figure 3.29 Position for stretching right side latissimus dorsi

26. ILIOPSOAS

This muscle runs obliquely downwards inside the abdominal cavity, from the front surfaces of the upper four lumbar vertebrae to insert in the upper leg near the hip. It is a powerful hip and trunk flexor and also (like QL) merges with the diaphragm and therefore has an impact on breathing function when shortened.

Associated problems

A wide range of problems are associated with psoas contraction, including low back and sciatic pain, distortion of the low back, abdominal and groin pain and discomfort. If only one psoas is contracted, there may be a twisted and half-stooping posture, typical of 'lumbago'.

See the following tests in Chapter 2: Functional tests 2, 4; Shortness tests 13, 15, 17

MET (PIR) position and method

- Stand close to the end of a table with your coccyx area just touching the edge.
- Bend the knee of the side you are *not* going to treat (left knee in this example, to allow treatment of right psoas) and grasp it with both hands, bringing it up towards your chest.
- Now sit on the very edge of the table and roll backwards to lie on it, so that the right leg is hanging free and the left knee is held toward your chest.
- This places stretch on the right iliopsoas.
- If the right psoas is shortened, your right thigh will be elevated from the horizontal. If the right psoas is normal and relaxed it will lie parallel with the table surface/floor.
- If your lower leg (the part below the knee) is not hanging freely, at right angles to the floor, but appears to be fairly elevated, thus keeping your leg moderately straight, then the **rectus femoris** muscle requires treatment before psoas. This is described in the next procedure, below.

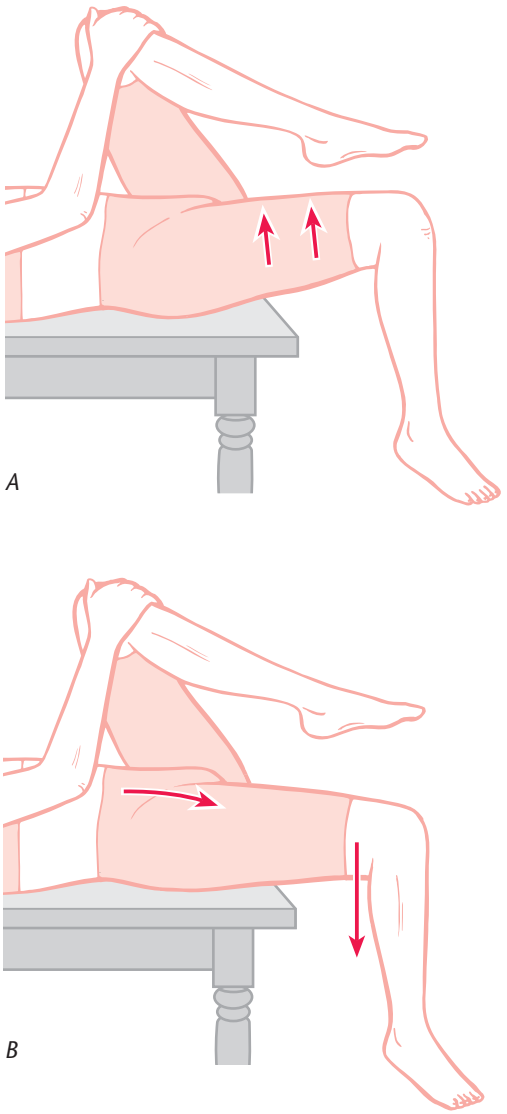


Figure 3.30 *A: Position for testing for shortness of right side psoas. B: After an isometric contraction psoas is being stretched as the leg is allowed to hang down further toward the floor*

- If your lower leg is hanging fairly freely and your upper leg (thigh) is elevated from the horizontal, then proceed with self-treatment of psoas on that side.
- The isometric contraction is achieved by raising the right knee toward the ceiling by an inch (2.5 cm) or so (see Fig. 3.30A).
- Hold this contraction for 5–7 seconds before slowly releasing and allowing it to hang freely again, for about 30 seconds, so stretching the psoas (see Fig. 3.30B).
- Repeat this sequence once more and then test and, if needed, treat the other psoas in the same way.

Other self-treatment methods for psoas

A

- Kneel on the floor with one knee on the floor (left in this example) as far back as possible from the trunk of the body and the foot of your other leg

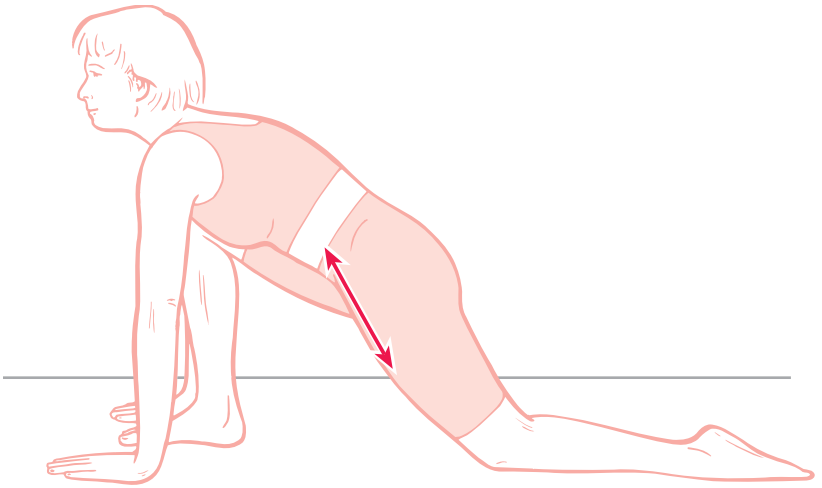


Figure 3.31 Position for stretching left psoas using MET (PIR)

(right) on the floor, about level with your shoulder (similar to 'start' position for sprinting).

- Contraction of the iliopsoas on the side of the kneeling leg (left leg in this example – see Fig. 3.31) is achieved by pressing the left knee downwards and forwards against the floor (without movement taking place) as your pelvis is pushed strongly forward.
- As this is done, tension should be felt in the thigh of the kneeling (left) leg.
- Release the effort and try to take your left knee a little further back from your body, stretching the psoas on that side.
- Hold this stretch for 30 seconds before repeating the whole sequence once more. Do the same to the right side psoas.

B

- Lie face down on the floor.
- Place a small cushion under your abdomen to prevent overarching forwards of your low back (see Fig. 3.32).
- Also place a firm cushion under the thigh on the side to be treated (left in this example), so that the leg is supported in a position behind your body, placing a slight stretch on the psoas muscle, in the groin area.
- Your other (right) leg lies flat on the floor or table.
- Introduce an isometric contraction of the left psoas by pushing your left thigh firmly downwards against the cushion.

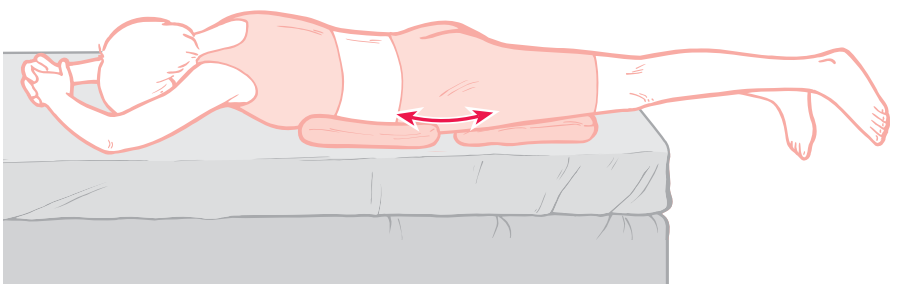


Figure 3.32 Position for stretching left psoas

- Hold the contraction for 5–7 seconds before releasing the effort.
- Increase the thickness of the pillow under the front of your thigh, so increasing the stretch on the psoas.
- Hold this degree of stretch for 30 seconds or so and then repeat.

27. RECTUS FEMORIS

This muscle runs down the front of the thigh (part of the quadriceps group). It can tilt the pelvis forward as well as flexing the thigh and extending the leg at the knee.

Associated problems

Being a type 1 (postural) muscle, rectus femoris may become shortened with stress or dysfunction, often involving knee or hip and/or pelvic dysfunction or pain.

See the following tests in Chapter 2: Shortness tests 13, 17, 18

MET (PIR) position and method

- Stand facing a wall or heavy piece of furniture and use your left hand (in this example) to stabilize yourself as you bend your right knee (the right side rectus femoris is being treated) and hold your bent leg at the ankle with your right hand (see Fig. 3.33).
- Your right knee should be bent as far as possible and your thigh extended backwards, until you feel a comfortable degree of stretch in the front of your thigh.

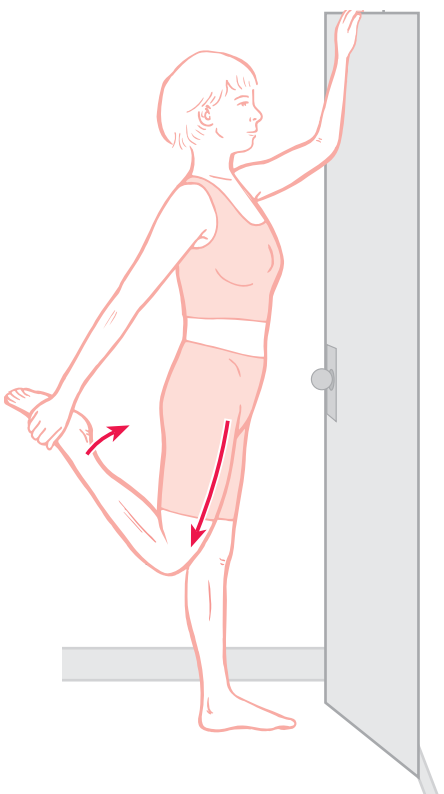


Figure 3.33 *Position for MET self-treatment of rectus femoris*

- To create an isometric contraction in the front muscles of the upper leg you should exert pressure downwards with your lower leg against the hand holding your ankle (i.e. try to straighten that leg against resistance).
- Hold this effort (25% of strength) for 5–7 seconds and then slowly release the muscles (see Fig. 3.34).
- After relaxation, extend your thigh further behind your body and also bring your heel towards your buttock, so stretching rectus femoris on the front of your thigh.
- Hold this for at least 30 seconds before repeating the sequence once more.
- Then, if appropriate (i.e. if the muscle is short) do the same to the other leg.

Note: Some discomfort may be felt as the muscle is stretched but as long as this is not actual pain, it will do no harm.

28. RECTUS ABDOMINIS

This is a major abdominal muscle running down the front of your body which is involved in movement, support and stability of the area.

Associated problems

A variety of trigger points are found in this region when this muscle is tense and these can produce pain which mimics many organ problems, including gall bladder and stomach conditions. These muscles are strained when posture is poor and the abdomen is chronically distended.

MET (PIR) position and method

Lower aspects of the rectus abdominis

- To treat the lower aspects of rectus abdominis, lie on your back on a table or bed with your buttocks right on the edge and both legs over the edge.
- The muscle is in two parts, left and right, meeting in the middle at what is known as the linea alba, and the sides need to be treated separately, one at a time.
- Your foot on the side *not* being treated (left in this example) should be resting on a stool or chair so that your knee is bent and your leg comfortable.
- Place a cushion under the buttock on the right side to raise it slightly.
- Your right leg should hang freely, unsupported.

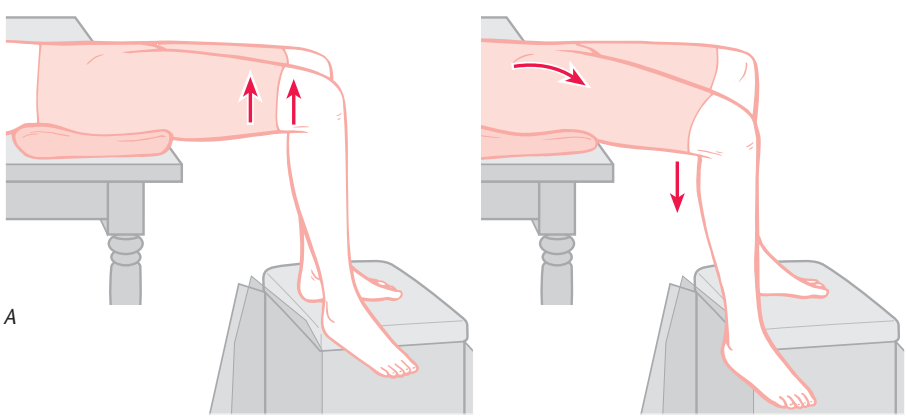


Figure 3.34 *The right leg is being held toward the ceiling, creating an isometric contraction of rectus abdominis on that side. B: Stretching of rectus abdominis after the contraction*

- To create an isometric contraction involving the right rectus abdominis, lift your right leg slightly, an inch or so (3–4 cm), and hold this for 5–7 seconds.
- As you carefully release the leg, it should be allowed to hang further toward the floor to stretch the right side rectus abdominis.
- **Caution**. Take care during this stretch that you do not arch your low back.
- Allow the stretch to continue for 30 seconds before repeating the sequence (see Fig. 3.35).
- After that, reverse the leg support (right foot supported on the stool, left leg hanging free with cushion under left buttock) to treat the left side rectus abdominis.
- Repeat a few times. The same procedure should be repeated on the other leg 3–5 times. This action will release the low end of the muscle.

Upper aspects of the rectus abdominis

- Lie on your back on the floor with a cushion under the middle of your low back, arching it upwards.
- Your legs should be out straight.
- Take a deep breath and at the same time lift your head and shoulders gently off the surface, so placing tension on the abdominal muscles.
- The amount of lift required of your head and shoulders is minimal, only an inch (2.5 cm) or so.
- Now bring your knees together and hold them together as your assistant tries to force them apart, using full strength for 3 to 5 seconds.
- After a 30-second rest in this position, repeat the sequence several times more.

29. OBLIQUE ABDOMINAL MUSCLES

These are type 1 (postural) muscles involved in maintaining stability of the spine and abdominal organs.

Associated problems

These muscles are under severe stress, particularly when posture is poor (lower crossed syndrome as explained in Chapter 1). Trigger points found in these muscles can produce local pain which mimics internal disease, such as appendicitis. See Chapter 6 for a sequence of exercises to stabilize these core muscles.

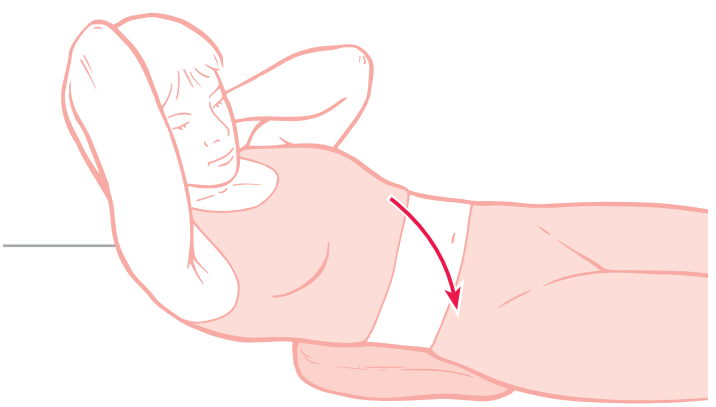


Figure 3.35 *By lifting the head and shoulders slightly from the floor an isometric contraction is occurring in the abdominal muscles*

MET (PIR) position and method

- Lie on the floor on your back, with a cushion under your waist to arch your back, pushing your stomach upwards.
- Clasp your hands behind your neck. Take a deep breath and simultaneously raise your trunk until your shoulder blades almost leave the surface, and also introduce a half twist, taking your left elbow toward your right knee.
- This will effectively contract the oblique abdominals on the right.
- Hold the slight lift and twist, and your breath, for 5–7 seconds and then release both and lie back over the cushion.
- Relax and allow the abdominal muscles to stretch freely over the arch produced by the cushion under your back for at least 30 seconds.
- Repeat the sequence once more in this direction, before reversing the twist of your trunk to allow the left oblique abdominals to be released.

30. LIGAMENTS OF THE SACROILIAC JOINT

These are not muscles but they are influenced by muscular tensions (such as hamstrings and quadratus lumborum). They support the joint that lies between the sacrum and the ilia (large bones of the pelvis).

Associated problems

This region is plagued with mechanical stress and this may involve chronic pain in either the sacroiliac or iliolumbar ligaments.

MET positions and methods

The objective of the three elements of this procedure (A, B and C, known in osteopathy as the 'shotgun' method) is to introduce a series of powerful, full-strength contractions against resistance. The various methods outlined below will affect both the tone of the ligaments and the tension of many of the associated muscles.

A

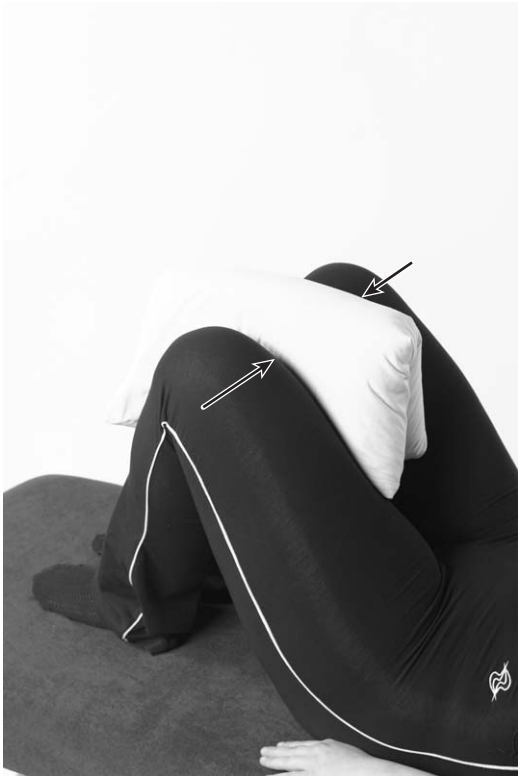
- Lie on your back on the floor with knees separated approximately 12 inches (30 cm) (see Fig. 3.36A).
- Try to maintain this position of your knees while someone else attempts to push them together, using full strength, for 3–5 seconds.
- Relax and repeat once more.

B

- Now bring your knees together and have your assistant hold them together as you try to force them apart, using full strength, for 3–5 seconds.
- Repeat once more (see Fig. 3.36B).

A

B



C

Figure 3.36 *A: Hold your knees apart while someone else tries to force them together for 3–5 seconds. B: Hold your knees together while someone else attempts to separate them for 3–5 seconds. C: Place something firm between your knees (cushion, etc.) and try to close them against the immovable resistance for 3–5 seconds*

Variations

C

- Now place a firm object (a very dense pillow/cushion is ideal) between your knees and attempt to strongly bring your knees together for 3–5 seconds against this resistance.
- Repeat once more (see Fig. 3.36C).

D

- Take up the same position as in example A.
- The difference is that this time you will be attempting to maintain separation of your knees as the person helping you *slowly* 'overrides' that effort and forces your knees together.
- This slow eccentric isotonic stretch of the external rotators of your hips (such as piriformis) produces a combined effect of toning these and at the same time inhibiting the internal rotator muscles of the hip.

E

- Have someone hold your knees together (as in position B), as you slowly force them apart.
- Repeat once more.

31. PIRIFORMIS

The muscle runs from the side of the sacrum to the back of the hip and helps to turn the leg outward (it is an external rotator). Its position allows it to cause pressure on the sciatic nerve if it is unnaturally contracted, potentially causing sciatic-type pain.

Associated problems

Contraction of the piriformis which is involved in turning the hip outwards can result in pain along the distribution of the sciatic nerve, i.e. down the leg, as well as numbness. It can also cause local pain and discomfort in the hip and buttock region, sometimes causing coccygeal pain or pain in the groin area.

See the following tests in Chapter 2: Functional test 2; Shortness test 5

MET (RI and PIR) positions and methods

There are several self-treatment methods of dealing with a tight piriformis.

A

- Lie on the floor with the knee on the affected side (left in this example) bent and your foot (heel) resting on a stool or chair.
- Pull the knee of that leg towards yourself while at the same time pushing the knee toward the right, with both movements being resisted by placing your hand(s) against your knee.
- Hold this isometric contraction for 5–7 seconds before releasing slowly (see Fig. 3.37A).
- The contraction involves the internal rotators of the hip, which are antagonists to piriformis, so producing reciprocal inhibition of piriformis.
- Stretch piriformis by rotating your foot and leg inwards (taking your knee toward the right) and holding this for 30 seconds, after the isometric contraction.
- Repeat once more.

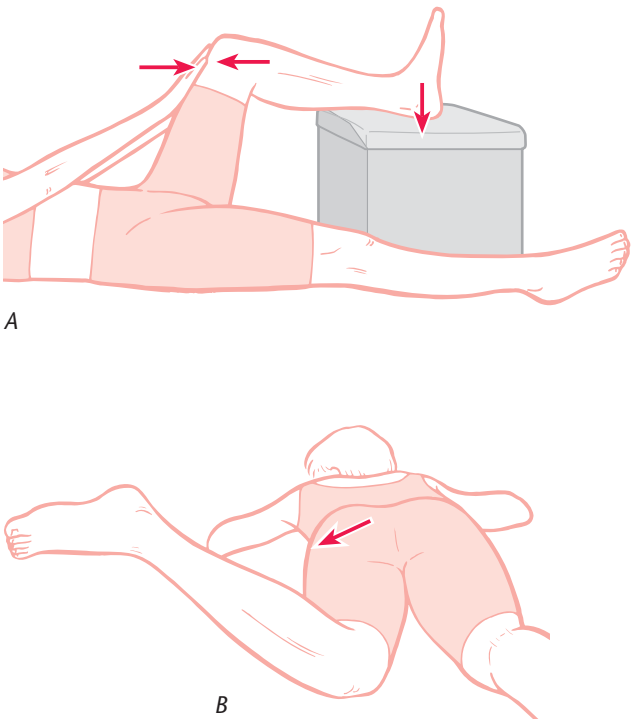


Figure 3.37 *A: Position of contraction for self-treatment of piriformis. B: Position of stretch for piriformis when lying face down*

B

- Lie face downwards.
- Your leg on the side to be treated (left in this example) should be bent at the knee and your lower leg allowed to fall outwards, rotating your upper leg internally (see Fig. 3.37B).
- When all the slack has been taken out (i.e. complete relaxation), your foot and lower leg should be moved slightly towards the upright, an inch (2.5 cm) or so, and held for 10–15 seconds before being released and allowed to fall outwards, again into rotation, for a further 30 seconds.
- Repeat this once more.

The contraction against gravity, when your lower leg is raised slightly, involves the piriformis itself and the subsequent increased stretch effect is therefore the result of PIR.

32. HAMSTRINGS

The hamstrings are semimembranosus, semitendinosus and biceps femoris and are type 1 (postural) muscles lying at the back of the thigh. They attach to the ischial tuberosity ('sit-bone') which gives them influence over the pelvis when either short or weak.

Associated problems

Pain in the leg and low back; pain in the buttock region. Pelvic problems (such as SI joint dysfunction).

See the following tests in Chapter 2: Shortness tests 3, 4, 8, 10, 13, 14A

MET (PIR) positions and methods

A. Standing stretch

- Stand with the foot of the leg to be treated (left in this example) on a stool or bench, with your knee straight, heel resting on the stool.
- The bench provides the resistant counterpressure against which the isometric contraction is achieved.
- The isometric contraction develops as you lean your trunk forward and sense the tightness in the back of your left leg.
- **Caution.** Try to avoid tilting your pelvis as you introduce the forward lean, but attempt instead to keep your spine and pelvis and stable leg (the one on the floor) in line (see Fig. 3.38A).
- This should be held for 5–7 seconds.
- As you release, breathe in and out and as you exhale, the forward lean should be taken a small degree further, until the hamstrings feel comfortably stretched.
- Hold this stretch for 30 seconds and then ease your foot further forward on the bench a little and repeat the contraction and stretch once more.
- It is possible to target areas on the inner or outer aspect of the back of the thigh by carefully rotating your foot slightly inward or outward, before starting the process of contraction and stretch.

B. Seated stretch (for spinal muscles as well as hamstrings)

- Sit on the floor with both legs outstretched and lean forward as far as possible, from the hips, with your back rounded and neck flexed, to grasp your legs with both hands.
- Your current degree of spinal and hamstring flexibility will determine how far down your legs you can *comfortably* reach; it might be to the knee or beyond or even to the ankles or feet (if you reach this far you probably do not need to do the exercise!).
- Make sure your knees do not bend, so that the stretch can focus into the hamstrings (as well as the muscles of the back) (see Fig. 3.38B).
- Holding firmly with your hands, arms outstretched, introduce an isometric contraction by trying to sit up slightly against your own resistance (your hands provide the fixation, together with gravity).

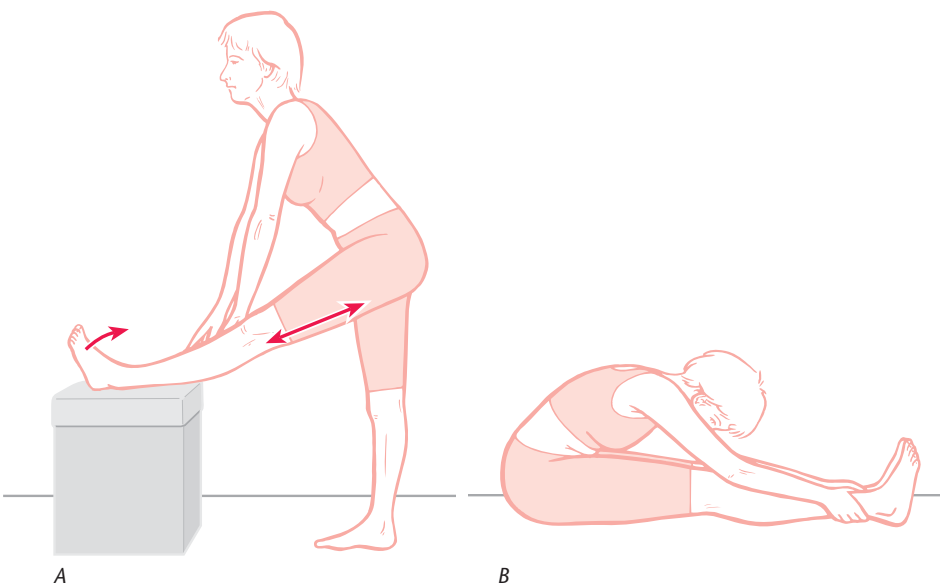


Figure 3.38
A: Stretching the hamstrings using MET. B: Position for stretching hamstring and erector spinae muscles

- After 5–7 seconds release the effort and, on an exhalation, slide your hands a little further down your legs, and grasp the legs at this new position.
- Hold the stretch for not less than 30 seconds (3–4 slow deep cycles of breathing).
- Repeat this process of an isometric contraction followed by increased stretch several times more, until you are no longer gaining length in the stretch.

33. ILIOTIBIAL BAND (ITB) AND TENSOR FASCIA LATA (TFL)

This band of fascia and muscle runs from above the hip to below the knee on the outer aspect of the thigh. It is an important postural structure with influence over pelvic mechanics as well as hip and knee function.

Associated problems

Postural problems, recurrent low back and knee problems and pain in the hips, legs and buttocks. These tissues are involved in stabilizing the pelvis as well as in moving the leg outwards (abduction).

See the following tests in Chapter 2: Functional test 2; Shortness tests 16, 17

MET (PIR) positions and methods

- Lie on your right side (in this example) on a table or bed, with your buttocks very close to the end.
- Your upper (left in this example) leg, which is to be treated, hangs down over the edge, while your lower (right) leg should be flexed at the knee and hip, and resting. Try to ensure that the lower leg is in line with the trunk, not forward of it.
- Lying relaxed with your upper leg hanging down in this way places stretch on tensor fascia lata and the iliotibial band (see Fig. 3.39).
- An isometric contraction is introduced against gravity by raising your leg some 1 or 2 inches (2.5–5 cm) and holding this for 10–15 seconds.
- As you release your leg it should be able to stretch further towards the floor, this position being held for not less than 30 seconds.
- As you release the leg to hang freely, be careful that you keep your right trunk on the bed/table, not allowing too much side bend to occur at the waist.
- It is possible to slightly modify the fibers being stretched by having your leg a little behind the line of your trunk rather than in line with it. Try not to let the leg come forward of the hip joint or the stretch will focus more into gluteus medius.
- Repeat the sequence once more and then treat the other side if needed.

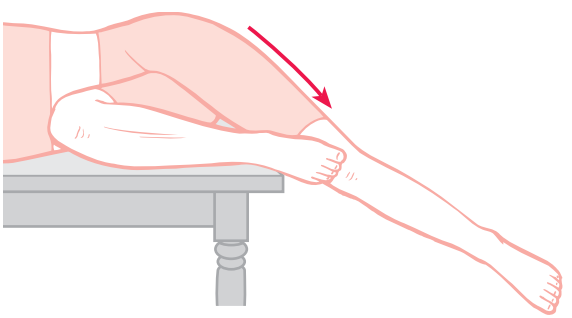


Figure 3.39 *Self-treatment of TFL and ITB using gravity as the counterforce*

34. ADDUCTORS OF THE THIGH, INCLUDING PECTINIUS, ADDUCTORS BREVIS AND LONGUS

These lie on the internal aspect of the thighs and draw the leg inwards and across the body (adduction).

Associated problems

Limitation in the free movement of the leg. These are postural muscles involved in pelvic and hip stability.

See the following test in Chapter 2: Shortness test 6

MET (PIR) position and method

- Sit on the floor, with your feet together and knees as far apart as possible.
- Your hands should rest on the inner aspect of your knees and should push your thighs outwards as far as is comfortably possible.
- An isometric contraction is produced by your knees pressing inwards against unyielding counterpressure from your hands, using no more than 25% of strength, for 5–7 seconds (see Fig. 3.40).

Note: It may be more comfortable to cross your arms as your hands provide counterpressure against the knees (i.e. left hand on right knee and vice versa).

- After the contraction, the pressure inwards should be released and your legs may now be able to travel further apart (with your feet always together flat on the floor or with soles touching each other).
- Repeat the sequence once more.

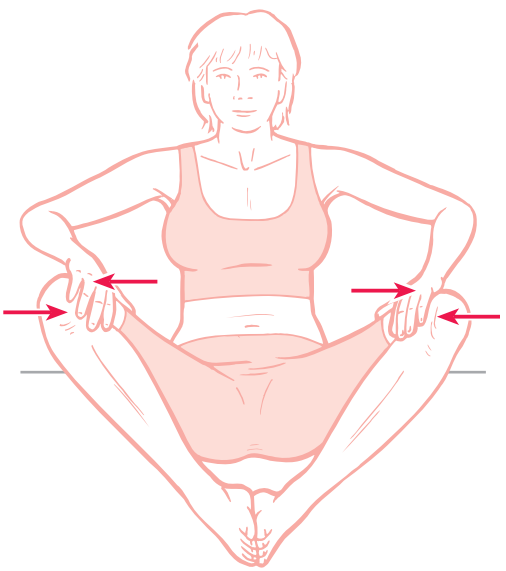


Figure 3.40 *Self-stretching of inner thigh muscles (adductors) using MET*

35. SOLEUS

This muscle forms a major part of the calf.

Associated problems

Pain in the tendon behind the ankle (Achilles tendon) and discomfort in the foot, especially under the arch.

See the following tests in Chapter 2: Shortness tests 2, 10, 19

MET (PIR) positions and methods

A

- Sit with one foot on the floor (left in this example). The leg of the affected foot (right in this example) should be crossed over the opposite thigh, so that your heel rests just above the knee of the resting leg.
- With your left hand grasp the right leg just above the ankle, to stabilize it.
- With your right hand pull your foot into dorsiflexion (i.e. the foot is bent upwards at the ankle), putting a slight stretch into the muscles at the back of the calf (see Fig. 3.41).
- Usually, one side or the other of the tendon behind your ankle is more sensitive, so your foot should be positioned to introduce maximum stretch on that aspect (i.e. turning your foot slightly inwards or outwards as the flexion upwards of the ankle is performed).
- When maximum comfortable stretch is felt, an isometric contraction can be introduced using only moderate force, by attempting to straighten the foot against unyielding resistance from your hand, for 5–7 seconds.
- After relaxation of the effort there should be some release of tension, allowing a further degree of stretch of the calf muscles. Hold this stretch for not less than 30 seconds and then repeat the sequence once more.

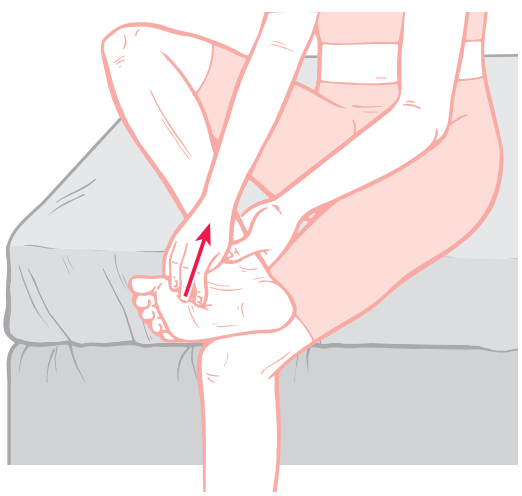


Figure 3.41 *Self-stretching of right soleus muscle using MET*

B

- In order to stretch both soleus muscles at the same time, adopt the test position as shown in Shortness test 19 (Fig. 2.24), making sure that your heels do not leave the floor as you go into a squat.
- At the point where one or both heels feel they are just about to leave the floor, you should stop trying to squat, remaining in that position for 10 seconds or so (this produces an isometric contraction of both soleus muscles).
- After this try to go a little further into the squat.
- Repetition of this for several minutes on a daily basis should help normalize the muscle.
- You may feel you are falling forwards as you squat, so it may be helpful to balance yourself by holding on to a heavy piece of furniture with one or both hands as you go down with back rounded forwards.

Note: These muscles shorten markedly when high heels are worn regularly.

36. GASTROCNEMIUS

This lies in the calf at the back of the lower leg but, unlike soleus, it goes past the knee joint.

Associated problems

Pain in the knee or lower leg.

See the following tests in Chapter 2: Shortness tests 2, 10, 20

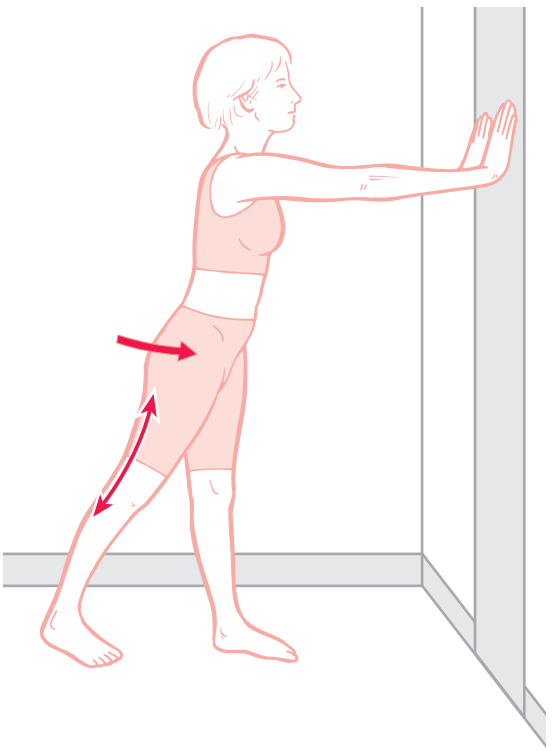


Figure 3.42 Position for stretching right gastrocnemius using MET

MET (PIR) position and method

- Stand facing a wall with your hands on the wall to stabilize yourself, feet directly below your shoulders.
- Take the leg to be treated (in this example your right leg) backwards and place your right foot flat on the floor, with your right knee straight.
- Try to achieve the maximum distance from the wall, so placing maximum stretch on the muscles behind your knee (see Fig. 3.42).
- Even more stretch is achieved by easing your pelvis forwards.
- When this has been done, an isometric contraction can be achieved by pressing downward against the floor with your right foot and holding this for 5–7 seconds, before releasing the pressure.
- After the pressure has been released and relaxed, it may be possible to take your leg a little further backwards and push your pelvis a little further forward, to stretch gastrocnemius on the right.
- Hold this for 30 seconds before repeating the sequence once more.

37. EXTENSORS OF THE TOES

These lie in front of the lower leg.

Associated problems

When these are tight pain is often felt in the front of the lower leg (shin).

MET (PIR) position and method

- Sit with your affected leg (left in this example) crossed over the other and by grasping the toes and dorsum (top) of the right foot with your right hand, bring it into maximum (plantar) flexion, stretching the affected muscles.
- To induce an isometric contraction, try to straighten the foot against the resistance offered by your right hand, using 25% of available strength, for 5–7 seconds, before relaxing (see Fig. 3.43).
- Now ease the foot into greater plantarflexion to stretch the muscles in front of the shin, and hold this for 30 seconds.
- Repeat this procedure once more.

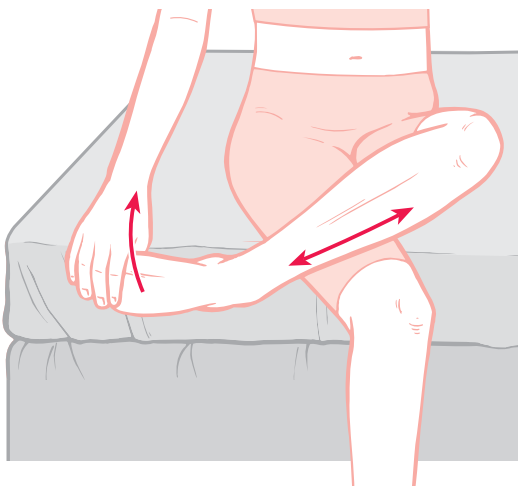


Figure 3.43 *Stretching anterior muscles of the lower leg using MET*

MET for jaw muscles

38. MUSCLES RELATED TO THE JAW, PARTICULARLY MASSETER

These lie in the facial aspect of the head and attach to and move the jaw.

Associated problems

Difficulty in opening the mouth, chewing problems, clicking and painful joints in the region (TMJ), headaches, etc.

See the following test in Chapter 2: Shortness test 32

MET (RI and PIR) positions and methods

A

- Sit with the elbow of one hand resting on a table, with your cupped hand upwards, on which your chin rests (a clenched fist may be used as an alternative).
- Your mouth should be opened to its comfortable limit.
- Attempt to open your mouth further against this unyielding resistance for 5–7 seconds. Only minimal force should be used (see Fig. 3.44).
- Relax and then open your mouth further and hold it stretched open for 30 seconds, before repeating once more.
- This method uses RI for its effect.

B

- Open your mouth fully and place two fingers of each hand onto your lower back teeth. Your index and ring fingers are best suited for the maneuver (see Fig. 3.45).
- **Caution.** It may be useful to lightly wrap the fingers in gauze to protect them.

Figure 3.44 *Isometric contraction of muscles that open the jaw, to induce RI in tense jaw muscles*

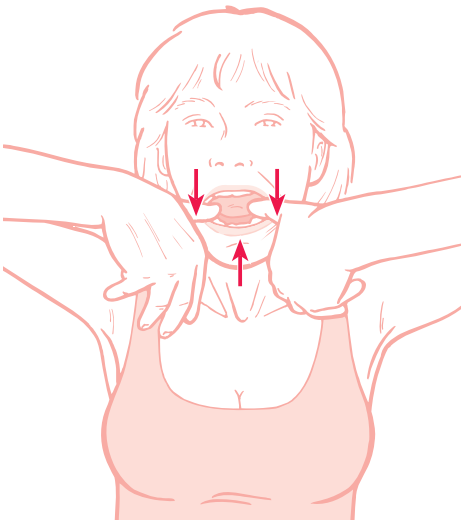


Figure 3.45 *Isometric contraction of muscles that close the jaw, to induce PIR in tense jaw muscles*

Figure 3.46 *Using MET (PIR) to release muscles which pull the jaw to the right on opening*

- Use these to offer counterpressure whilst you attempt to close your mouth, using less than 20% of the strength in your jaw muscles (which are amongst the most powerful in the body).
- Hold the contraction for 5 seconds or so before releasing and then attempt to open your mouth further, using mild additional help from the fingers in your mouth.
- Repeat once more after holding the stretch for not less than 30 seconds.

C

If deviation to one side is noted on opening your mouth, then restriction exists on the side to which deviation occurs.

- Relax the muscles of the jaw completely and, using your left hand on the right side of your jaw (with your right hand wrapping around your forehead as a counterforce), push the tip of your jaw towards the right (against your left hand) for 5–7 seconds, using minimal effort (see Fig. 3.46).
- On releasing the effort, ease the jaw toward the left and hold this position for 30 seconds.
- Repeat once more.

Freeing tight joints with MET

Any joint which is restricted, in any direction, can be self-treated by muscle energy methods.

- Take the joint towards its restrictive barrier.
- Avoid taking it to a point which is painful.
- Fix it at that point using your hands or an object (wall, piece of furniture) and then gently try to take it either further towards the barrier against resistance or away from the barrier against resistance, using minimal force (less than 20% of available strength).
- If you are using a sustained contraction (i.e. not pulsed), hold this for 7–10 seconds.
- Ease off and relax and then take the joint further towards its barrier.
- Or alternatively use pulsed MET to rhythmically pulsate small (very small) impulses towards the barrier (20 in 10 seconds).

Using MET isokinetic methods to balance small joints and tone their muscles

If any small joint, such as the wrist, is weak following injury or immobilization, self-help isokinetic methods can be used.

- A finger, wrist, toe, ankle, etc. can be held with one hand and *partial* resistance offered to an attempt to rapidly move the joint in all available directions, using its own muscles for the effect.
- Thus, a finger can be held so that whatever it does will be somewhat restrained by the grip; it should be flexed, extended, bent and rotated by its own muscles, against this resistance.
- The amount of force used in isokinetic procedures should eventually approach the full muscular strength available, as long as this does not produce pain.
- Initially a 4–5-second series of rapid, resisted movements, involving no more than half available strength, is advisable.
- Subsequent series of movements should build up to greater degrees of effort.
- Larger joints such as the knee, elbow, etc. are not suitable for self-treatment using this method but can be treated with the assistance of someone else.
- Repeat several times daily if possible until full strength returns.

Trigger points and their importance in pain control

4

When muscles (and other soft tissues such as ligaments and tendons) are placed under stress due to misuse, strain, overuse, postural strain, etc., they have a tendency to develop localized areas which become extremely sensitive and irritated. These areas, known as trigger points, are often locally painful, as well as being capable of affecting distant tissues, 'target areas', where they can cause pain and other symptoms.

Trigger points (TPs) have been shown by researchers to be the cause of a great deal of pain and other symptoms and, indeed, to be involved in most chronic pain situations (sometimes they are the main source of pain).

The characteristics of an active TP include:

- local sensitivity/pain on pressure (often very light pressure)
- referred or radiating pain, with the referral area often being some distance away (see the trigger point maps in Fig. 4.1)
- the ability to increase tone in the tissues in which it lies, as well as in the target area
- a weakening effect on the strength of the muscle in which it lies, as well as the target area.

Different types of TPs

- Local areas which are painful when pressed, but which do not radiate or refer symptoms, are not active TPs (these are often called *embryonic trigger points*).
- Some TPs hurt when pressed and do radiate or refer pain or other symptoms (numbness, etc.) but if these symptoms are not familiar to the person (that is, a regular symptom) the area is called *a latent trigger point*.
- Only those points that produce sensations, such as pain, that are recognizably part of your symptoms are considered to be *active trigger points*.
- Over time new triggers develop in target areas and are therefore known as *satellite* (or embryonic) triggers. These require attention just as much as their 'parent' TPs.
- Embryonic and latent points are considered to be potential TPs, which may become active if they are sufficiently stressed (by a cold draught, postural, emotional, overuse or other physical stress, etc.).

Influence of stress on TPs

One of the most important aspects of TPs is that *any* stress affecting you as a whole, even if it apparently has nothing to do with the area where the TP lies,

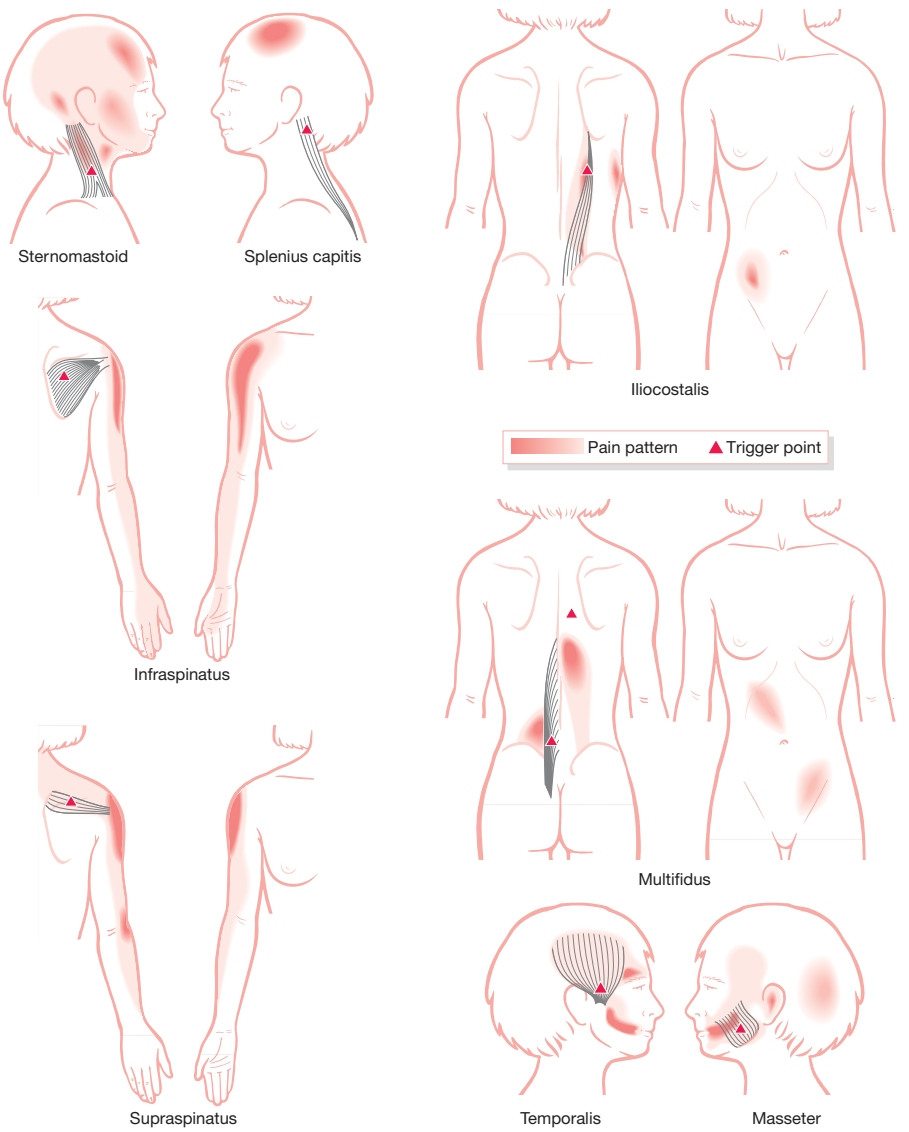
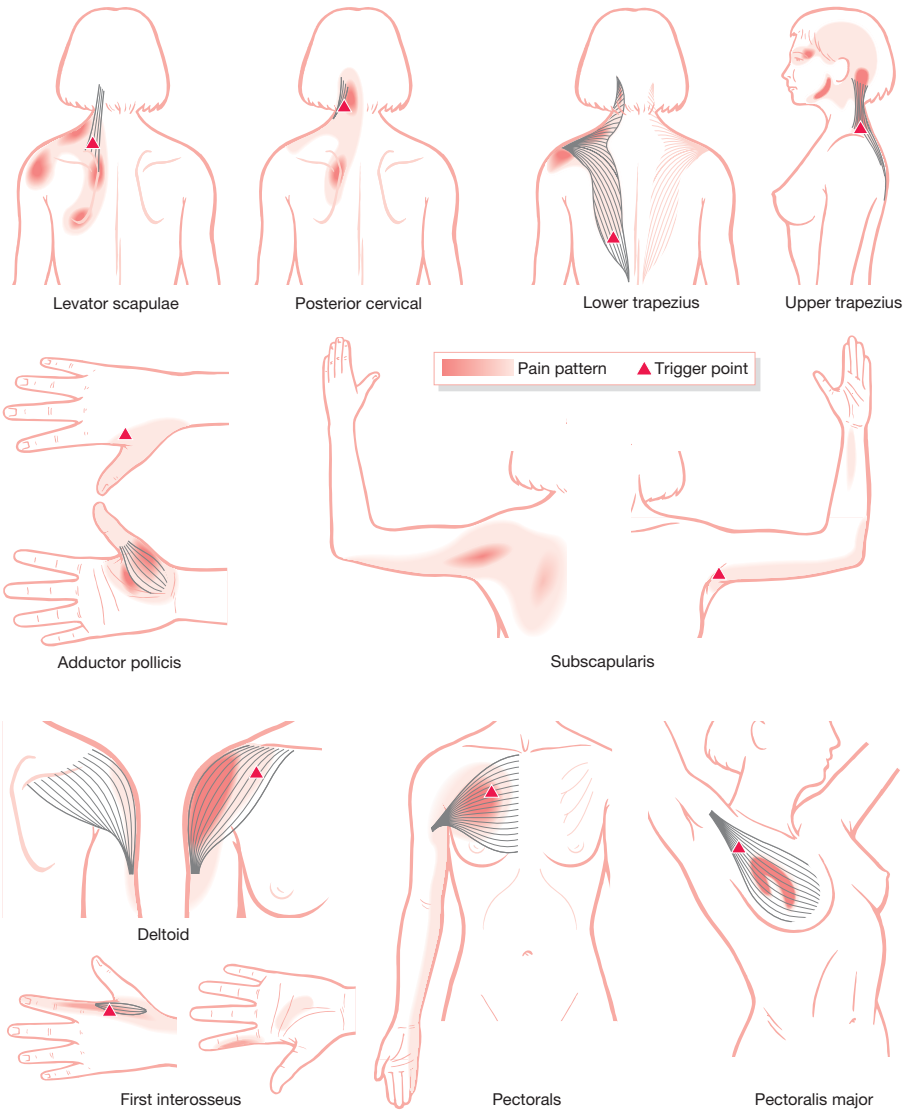


Figure 4.1 *Common trigger point sites*

will cause it to be more active. So a climatic change, an emotional event, physical effort or almost anything else which requires your body to adapt to change will produce increased activity in TPs. TPs are therefore 'barometers' of your overall stress load, acting as focal points of pain, resulting from life events.

Once a point becomes an active trigger, it may vary in the intensity of its symptoms (often relating to your levels of stress and activity), but a trigger seldom stops its activity unless and until some physical method is used to deal with it (stretching, etc.) or until the reason for the trigger's presence is removed or reduced (posture, overuse, general stress levels, etc.).

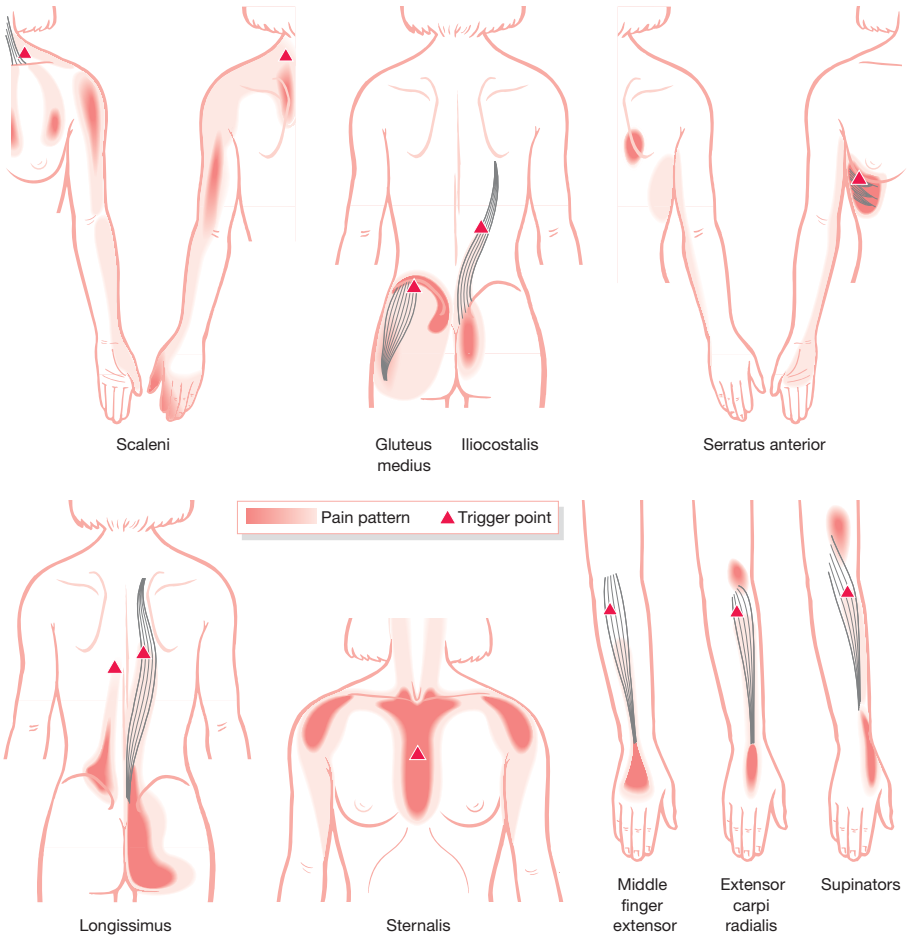
Figure 4.1 *Continued*



Trigger as alarm signal

Active triggers in specific muscle areas, produce symptoms in the same target areas in everyone, which makes their identification reasonably easy. This also allows you to back-track, in order to discover where particular TPs are located, in relation to unexplained pain. For example, pain in the facial area, if there is no local reason for it, may come from an active TP in the sternomastoid or upper trapezius muscle (see Fig. 4.2). Treating the place where the pain is felt would be useless in such a case and only deactivation of the TP would remove the facial pain, which would return if the habits or behaviors that stress sternomastoid or upper trapezius were not changed (posture, etc.; see upper crossed syndrome discussion in Chapter 1). This approach to localizing TPs is discussed in more detail later in this chapter.

Figure 4.1 *Continued*



Trigger points can therefore be regarded as alarm signals and just as it would be madness to take a sledgehammer to quieten a fire alarm, so simply 'switching off' a TP, without discovering why it is active, would be unwise. This does not mean that you shouldn't try to ease the obvious symptoms caused by a TP but that the 'alarm' should alert you to the fact that something you are doing, or have done, is creating undue stress in the region of the trigger and that unless you do something about the cause, switching the trigger off will offer only temporary benefits.

IDENTIFYING WHETHER PAIN COMES FROM A TRIGGER OR NOT

Assessing whether pain is the result of local activity or is being referred from a trigger is usually fairly easily accomplished. If you apply firm moderate finger or thumb pressure to the area where the pain is felt (as in the painful face discussed earlier) and the pain gets worse, this suggests that the pain is coming from the place which is being pressed and therefore is probably not the result of TP activity.

If, however, pressure is applied to a painful area and the pain is not felt to increase, it may be that the pain is being referred from somewhere else and reference to a chart of trigger points (Fig. 4.1) can suggest where to seek the

Figure 4.1 *Continued*

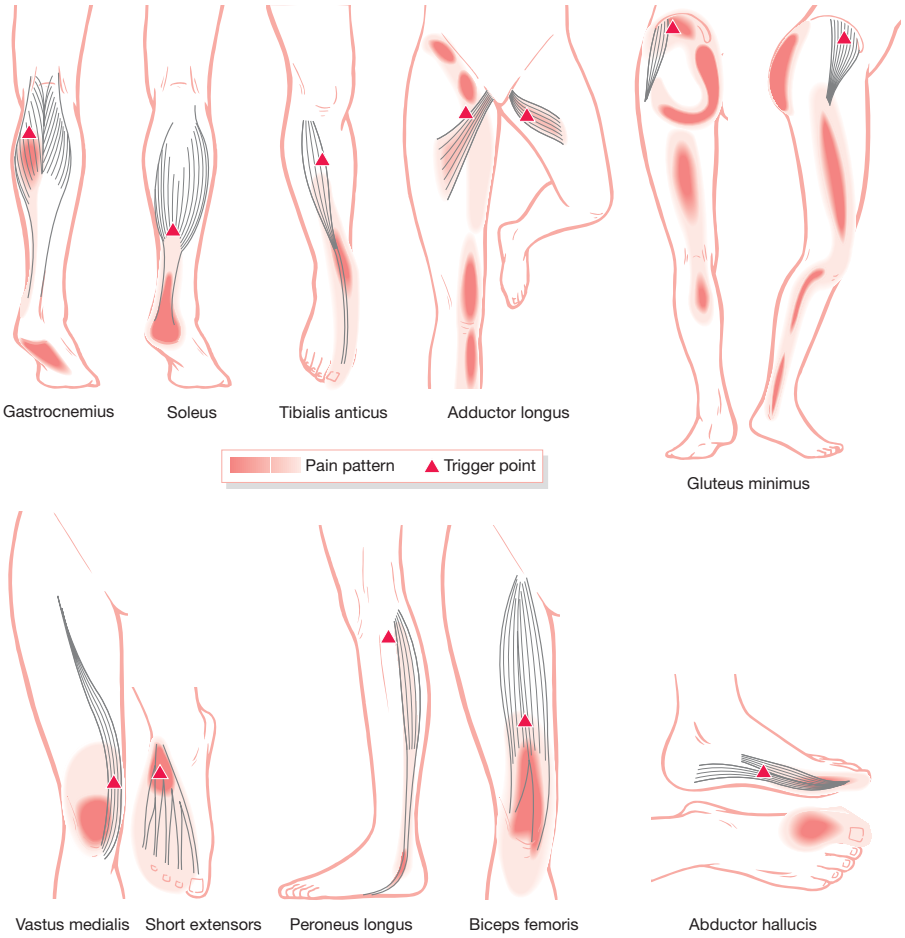


Figure 4.2 Squeezing pressure applied to a trigger point in sternomastoid muscle, with referral pattern to the head and face

active trigger requiring attention. Trigger points *always* lie in muscle fibers which have shortened and these usually, but not inevitably, lie in muscles which are hypertonic. This means they are contracted either locally or as a whole.

Finding and treating TPs

One of the main rules of TP deactivation is that whatever method of initial treatment is used, and there are many, the muscle in which the trigger lies has to be stretched to allow it to reach its normal resting length after such treatment, otherwise the trigger will remain active or will rapidly return to its previous behavior. Muscle energy technique is one of the easiest and safest ways of stretching such muscles.

Once found, TPs may be treated in several ways, all of which are equally successful but some of which are more easily applied. Some of these are amenable to self-application and will be outlined later in this chapter.

Before considering how to self-treat TPs, first we need to be able to find them.

FINDING TPs

If there is pain or tenderness in a particular area of the body, refer to Figure 4.1 showing common TPs and their target areas. First apply local pressure of a moderate but not heavy nature to the area of pain.

- Does it get worse?
- If so, the cause probably does not stem from TP activity.
- If pressure on a sensitive area (such as one which has been recurrently or permanently tender for some time) does not increase the degree of local discomfort or pain then TP activity may be causing it.

- Consult Figure 4.1 and search by diligent pressure and/or squeezing of the appropriate area, until a localized sensitive area is found. Stay pressing or squeezing this for 3–5 seconds and note whether this produces increased pain *in the target area*. If it does, you have found the trigger.
- If it does not or if pain is referred to somewhere else, you have either found a latent (non-active) trigger or a trigger relating to another target area.
- Continue to search for the one causing your particular symptom of pain.
- When this is found proceed according to one or other of the self-care options listed below.

If you do not start from the target and work back towards where the trigger may be coming from, as in the example above, then it is possible to find TPs by gently probing the various tight or aching muscles of the body with fingers or thumb.

Favorite sites for TPs are the neck and shoulder muscles, as well as those of the low back. In searching through the neck muscles, remember to squeeze the tissues between finger(s) and thumb in order to assess them wherever possible. Do not probe with fingers or thumbs over the side or front of the neck.

By carefully searching in this way it is common to find localized, slightly tense areas which are quite small (often no bigger than a lentil) but which are sensitive under pressure.

If the pressure or squeeze is maintained for 3–5 seconds, at a moderate level, and if this is an active trigger, it will begin to radiate or refer symptoms to an area some distance away (see Figs 4.1, 4.2). If you recognize the symptoms it causes this is an active TP.

TREATMENT OF TPs

Direct pressure by finger or thumb on a trigger can be used to decrease its activity (this is known as ischemic compression, inhibition pressure or trigger point release pressure). This is performed as follows.

- Press the point (or squeeze, if the trigger lies in very soft muscle tissue, such as that in the upper trapezius muscle, or in muscles of the neck where pressure would be unwise) until the referred symptoms are noted and hold this pressure for 5 seconds (see Fig. 4.3).
- Ease the pressure off by about 50% for a further 2–3 seconds.
- Continue this repetition of 5 seconds on, 2–3 seconds off, for a minute or until, when the pressure is being applied, a marked reduction in the intensity of the referred symptom is felt, as compared with the level at the outset.
- At this time, pressure or squeezing should stop. The muscle in which the trigger lies now requires stretching.

Another method of TP treatment involves acupuncture (what has been termed 'dry needling') but this is obviously unsuitable for self-treatment.

The major researcher into TPs, Dr Janet Travell, has suggested a method of chilling the TP before stretching the muscle in which it lies.

- A cold spray (the sort used in sporting settings to rapidly get the 'injured' athlete up and running again), using fluoromethane or ethyl chloride (obtainable from a pharmacy), may be sprayed over the area running from the TP to the target area, in a series of slow sweeps, covering all the muscle tissue between trigger and target (see Fig. 4.4).

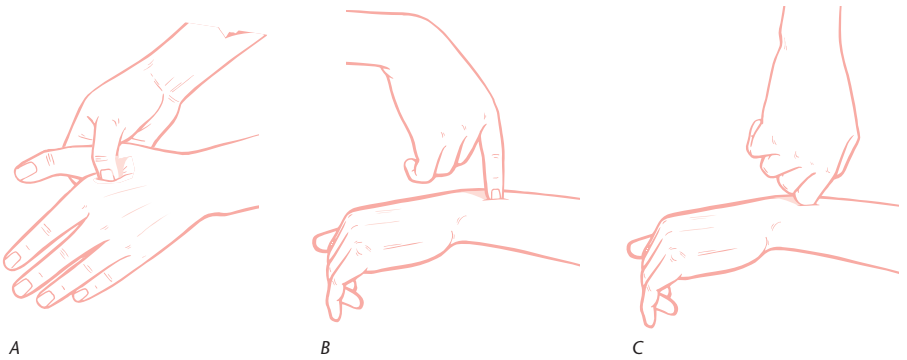


Figure 4.3 *A: Pincer pressure on TP at base of thumb. B: Finger pressure to test for sensitivity or to treat trigger point on wrist. C: Knuckle pressure to test for sensitivity or to treat trigger point on wrist*

Figure 4.4 *Use of spray ice to chill area between scalene muscle trigger point and the target area in the arm (see scalene map in Fig. 4.1). Note that the head is side bent right and extended to stretch the left scalenes at the same time as the chilling takes place*

- A piece of ice may also be used, directly against the skin, for the same purpose although this tends to be messy as the ice melts.
- Alternatively an empty soft-drink can, which has been filled with water and placed in a freezer for some hours, is a less messy and even more effective method of chilling the skin between trigger and target. The icy can should be gently rolled along these tissues for a minute or so, after the pressure method has been used and before or during stretching of the muscle, to effectively 'switch off' an active trigger.
- Once the area has received this chilling for about 20–30 seconds (with care taken not to allow blanching or frosting of the skin), the muscle in which the trigger lies requires stretching, just as it would after the pressure method described above.

Muscle energy techniques may be applied at this stage or may be used as an alternative to all the above, especially if the TP activity is of recent origin. In any case the use of MET after application of pressure or chilling is an ideal method for achieving the muscle's fully stretched resting length.

OLD (CHRONIC) AND NEW (ACUTE) TPs

If a TP has been around for some time, say months or years, then the tissues surrounding it may have become rather fibrosed and hardened. This would be unlikely to disappear with MET alone and these tissues would probably require deeper pressure treatment (neuromuscular technique, available from specially trained therapists) and active stretching (where you do your own stretches, as in Chapter 3) as well.

If, however, the TP is fairly recent and the tissues in which it lies have not yet become 'organized' and fibrosed, it might well respond to MET methods alone.

TPs, as discussed earlier, while causing symptoms themselves, are also caused by something else and unless that cause is eliminated they will almost certainly return. The cause of a TP may be a joint problem, which would require expert attention from a chiropractor, osteopath or suitably trained physiotherapist. Alternatively, the causes may lie in habitual postural or occupational stresses, which should be identified and corrected or minimized, if possible. Also, causes of TPs may lie in long-held tensions in particular muscles, resulting from emotional stresses; these, too, need identification and correction if possible.

From this it can be seen that simply dealing with a trigger is not enough, although it can provide remarkable relief from symptoms for a while. We need to be able to identify triggers, remove them using safe self-help measures (pressure, chilling, stretching, MET, etc.) and also, if possible, learn to identify causes to avoid a swift return of symptoms.

NOT JUST PAIN: OTHER TP SYMPTOMS

Travell's research, and that of many others, has shown that TPs result in symptoms much more complex than pain alone.

In an earlier book (*Instant pain control*; Thorsons, 1987) I discussed these ideas as follows.

> *The disturbing effects of trigger points go far beyond the simple production and maintenance of pain. A whole range of symptoms can be produced by triggers via their effect on the nervous system, circulatory function and hormonal balance.*
>
> *Dr Janet Travell maintains that the high intensity of nerve impulses from an active trigger point can produce, by reflex, vasoconstriction, cutting down the blood supply to specific areas of the brain, spinal cord and nervous system, thus producing any of a wide range of symptoms, capable of affecting almost any part of the body. Such symptoms as disordered vision, disordered respiration, muscle weakness and skin sensitivity are reported by her as resulting from trigger areas in specific muscles.*

Among symptoms reported by Dr Travell and others are the following, all a direct result of TP activity, as proved by their disappearance when the triggers were dealt with: pain, numbness, itching, oversensitivity to normal stimuli, spasm, twitching, weakness and trembling of muscles, over- or undersecretion

of glands, localized coldness, paleness, redness of tissues, menopausal hot flushes, altered skin texture (very oily, very dry), increased sweat production and, in triggers found in the abdominal and thoracic muscles, halitosis (bad breath), heartburn, vomiting, nausea, distension, nervous diarrhea and constipation. Travell also reports symptoms of 'hysteria' (extreme anxiety) which disappear with successful TP work.

RULES OF SELF-TREATMENT OF TPs

- Treat triggers only to ease pain. Other symptoms, as listed above, may be the result of other causes and a professional diagnosis is needed.
- Only use TP self-treatment from a first-aid point of view. If the pain does not ease, or if it eases and returns, consult a qualified healthcare professional who works with TPs (osteopath, chiropractor, some physiotherapists, massage therapists, neuromuscular therapists), as other factors such as joint dysfunction may be maintaining the trigger.
- Never treat a TP (on yourself or anyone else) which lies near or on a swelling, lump or inflamed area, without specific advice from an appropriate healthcare professional.
- Never treat a TP (on yourself or anyone else) which lies on a mole, scar, wart or varicose vein.
- Never treat a TP (on yourself or anyone else) which lies on a woman's breast.
- A pregnant woman should never be treated without medical approval.
- Take professional advice before treating a TP (on yourself or anyone else) if there has been a diagnosis of cancer or rheumatoid arthritis.
- Although TPs are often the same as acupuncture points, never use a needle to self-treat, or to treat anyone else, unless you are qualified and licenced to do so.
- Follow the guidelines given above for treatment. For example, use only moderate and intermittent pressure, stop when the pain eases or after one minute if using pressure methods. Remember that although *some* pressure helps, it does not follow that *more* will be better. **Never overtreat**. If no response is noted when following these guidelines then take professional advice.
- Always try to discover the causes of TPs, such as posture, wrong use of the body, occupation, nutritional inadequacy, stress, etc.

MET and TPs

If a muscle contains a TP, it will not be capable of reaching its normal resting length. Apart from the disruption which the TP will be causing to normal function, this imbalance in the muscle can cause problems for other muscles (its antagonists) and the joint(s) to which it relates.

MET, should therefore be used either alone (in recently active triggers) or in combination with pressure, chill and stretch, or acupuncture (not for self-treatment) methods. All that is necessary is that the muscle be asked to perform a series of isometric contractions, followed by gentle stretching of the muscle in the periods between these contractions.

Follow the guidelines in the chapters on MET (particularly Chapter 3) as to how to achieve the best results, using breathing accompaniment and repetition of the procedure, until no further gain is noted. Never use more than moderate

effort with MET and if at all possible, ensure that the area of the muscle in which the TP lies is contracting during the isometric procedure.

After full stretch is achieved, gently probe or squeeze the area again and note whether the referred symptoms are now gone or much reduced. They should be easier even if they are still present. Treat the area with respect for some days as muscles which have been disturbed in this way are sensitive and easily upset by overactivity, strain or chills.

Pressure on inaccessible TPs

THE TENNIS BALL TRICK

Where it is difficult to find a comfortable way of applying pressure to a TP or to a tight, tender muscle, it is possible to use a simple strategy which harnesses the properties of a tennis ball or two. If the area or point is on the back, place a tennis ball on a carpeted floor and lie back onto it so that the tennis ball is just pressing onto the point. It is possible to vary the degree of weight placed on the ball so that deeper or lighter pressure can be sustained for appropriate periods, as described earlier in this chapter.

A similar degree of controlled pressure can be obtained by screwing a rubber doorstop into a doorframe (or other suitably secure structure) at a height which allows you to stand in front of it, so that pressure can be exerted against chronically tight structures or TPs, simply by leaning against it.

Spinal massage with two tennis balls

- If both sides of the spine require pressure simultaneously, as when there is marked stiffness, two tennis balls may be placed in tandem, so to speak, by stuffing them into the toe of a sock and then tying them securely in position.
- By lying on these two balls so that the bony prominences of your spine (spinous processes) fall between them, with a ball resting on each side of your spine, it is not difficult to alter the pressure and even to perform spinal massage by gently moving up and down, so that the balls roll alongside your spine, applying their pressure to the tense tissues (Fig. 4.5).
- Self-massage of areas such as the back of your shoulder or your buttock muscles is easily accomplished in the same manner, using one or two balls depending on the size of the area requiring soft, even pressure.
- For general loosening up of tight muscles, you should use a tennis ball (or two) in this fashion for not less than 2 and not more than 5 minutes.
- For TPs, of course, a minute is usually adequate using the on–off pressure methods described above.
- It is also possible to use one or two balls by leaning with the ball(s) between yourself and a wall.
- Keep balls in freezer before use for improved effect.

GOLF BALL MASSAGE FOR THE FEET

To massage the tight tissues which are often found under the arches of your feet (commonly associated with painful fallen arches and heel ‘spurs’), a similar strategy may be employed but this time using a golf ball.

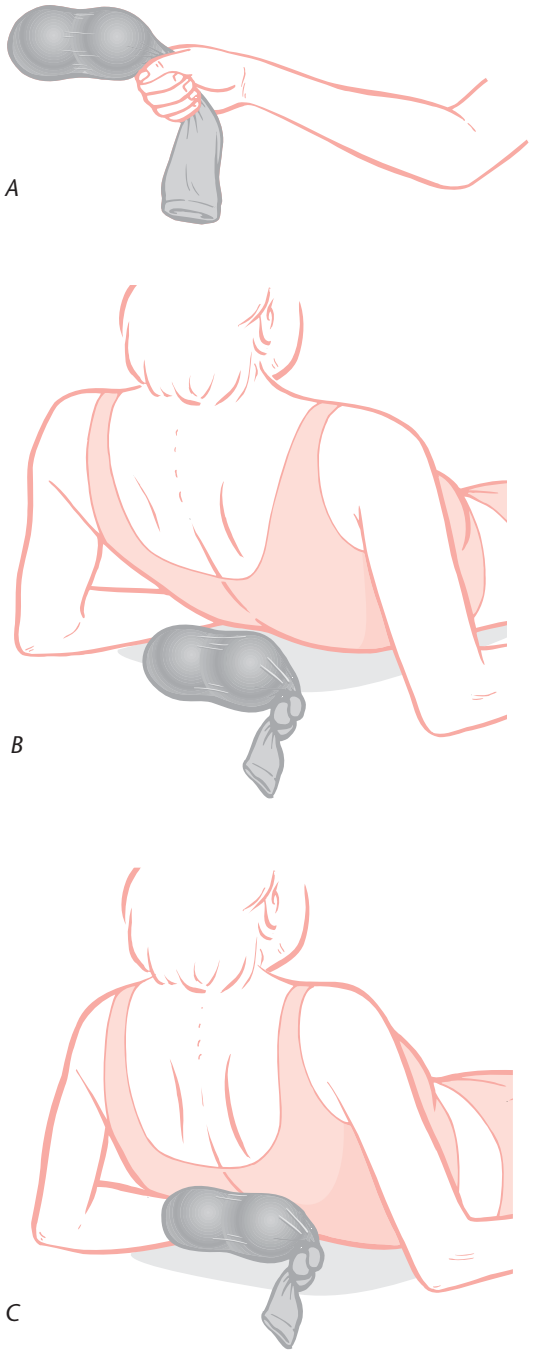


Figure 4.5 *A: Place two tennis balls into a sock. B: Place the balls on a carpeted floor. C: Lie so that your spinous processes rest between the balls and the balls press into the tense muscles alongside the spine*

- Sitting in an upright chair, place the golf ball onto a carpeted floor and rest the sole of your foot onto it. By rolling your foot up and down and controlling the degree of downwards pressure, a noticeable relaxation of these tight fascial and muscular structures can be achieved.
- Keep pressure tolerable and movement gentle and slow.

- Regular daily exercise of this sort should not create more than mild discomfort but do not be tempted to overdo things at any one session as bruising can result.

Whichever method you find most useful in applying pressure to TPs or tight structures, remember that afterwards it is most important for the muscles to be stretched and that the best way of doing this is to incorporate the MET methods which were described in Chapter 3.

Self-mobilization methods 5

Muscle energy techniques, as outlined in previous chapters, provide us with an excellent series of methods for relaxation and stretching of specific tight, shortened, contracted and painful muscles. In addition to this, as muscles relating to particular joints are loosened, the joints themselves become more mobile and improve in their ability to function normally.

Anyone who has attended yoga classes will recognize certain similarities between the concepts of some MET procedures and the methods used by yoga teachers when helping people to get into the various postures. Once you have adopted a particular yoga position (*asana*) you are asked to breathe slowly and deeply and to maintain the posture for a minute or two. In some instances, holding your breath is encouraged as part of the process. After a minute or two, you are asked to take a deep breath, release it and, as you exhale, to try to move further into the particular pose.

Now that you have looked at MET methods, you will recognize that by getting into a pain-free posture, for example sitting with legs outstretched, trying to reach your toes with your finger tips, then holding that position for a while, you are in fact creating an isometric contraction. The effort to move in the chosen direction is matched by a counterpressure of resistance from your own tight muscles.

The breathing pattern used in yoga helps the process because it allows for better relaxation. Indeed, if we were looking for a method for *general* stretching and mobilization (rather than the specific focus of the stretches outlined in Chapter 3), we would need to look no further than yoga.

It is not difficult to devise a series of exercises or postures in which general mobilization of regions of the body can be achieved, using these same principles. For example, athletes use a variety of stretching techniques in order to prepare themselves for strenuous activity.

The methods outlined in this chapter can be used selectively, for particular regions of the body, or comprehensively, to loosen most of the body, as desired. A few of the methods outlined are specific self-mobilization exercises which do not involve muscle energy mechanisms as discussed in Chapter 1, but rather utilize more direct release of tight structures.

CAUTION Care should be used in all of these exercises not to involve force. The essence of self-treatment methods is that they should be safe and gentle. If any pain is ever associated with the preparation for or the carrying out of any of the various flexibility exercises described, then too much effort is being used or the guidelines are not being followed accurately. Never do anything in self-treatment which causes more than transient, mild discomfort. In short, pain indicates a clear message to stop.

It is suggested that those procedures which are found to be successful should be repeated at least several times per week, and ideally every other day, to help regain and maintain suppleness.

Can you be too flexible?

Mobility and flexibility are two of the main features we all want for our joints and for our bodies as a whole. But it is possible to be too flexible, to be actually hypermobile. Sometimes hypermobility is the result of a genetic characteristic and sometimes individual joints can become hypermobile due to injury. This can happen to key joints, such as the sacroiliac, where repetitive injury (sometimes through excessive manipulation of the joint) leads to chronic pelvic and back problems.

Even if hypermobility is not a factor in someone's make-up, it is possible for muscle tone to be so poor that the associated joints, those that should be supported by particular muscles, become unstable, even when ligamentous tone is reasonably normal.

This instability can be seen in the neck when we look at the round-shouldered, forward head, chin-poked posture of the person with an upper crossed syndrome (see Fig. 2.2 in Chapter 2), with its weak neck flexor muscles and tight postural (type 1) muscles.

It is also possible to see the instability pattern in the lower crossed syndrome (Fig. 2.1 in Chapter 2), with its weak abdominal muscles and short, tight (and possibly also weak) low back muscles.

In such instances the spine is simply not being supported and when it is asked to perform a task (lifting, bending, etc.) that demands more than the current level of stability can manage, an acute low back problem is a very real possible consequence.

So flexibility and stability need to be balanced with each other.

One of the major elements of the next chapter (Chapter 6) is a series of well-established exercises that will allow the recovery and maintenance of stability of the core muscles of the body that were designed specifically to perform these roles. In this chapter, the objective is to create a greater degree of suppleness and general flexibility that builds on the release of tight muscles described in Chapter 3 and the release of trigger points described in Chapter 4 and which complements the core stability that will be described in Chapter 6.

Variations on a theme of self-mobilization

Osteopathic and other physicians, practitioners and therapists have, over the years, devised different methods for guiding their patients in self-mobilization. In this chapter, a variety of these are presented. No indication can be given as to which will suit one person more than another. Try them all to see which feels more comfortable for you, which achieves greatest release of your particular tensions and tightness patterns, and then incorporate these into a regular pattern, ideally to be used at least every other day.

KIRK'S METHODS

Osteopath Chester Kirk presented a sequence of exercises (which I have modified slightly) in 1977, in the *Journal of the American Osteopathic Association*. All of these should be performed in a relaxed manner, with a gentle degree of effort.

Flexibility exercise 1. Kirk's spinal stretch

- Sit in a straight chair, feet flat on the foor, resting the palms of your hands on your thighs above your knees, fingers facing inwards (see Fig. 5.1A).
- Allow the weight of your upper body to be supported by your arms by allowing your elbows to bend outwards slightly as your head and chest come forward, until a *slight* stretching sensation is felt in your low back (see Fig. 5.1B).
- Hold this position for three full cycles of breathing (breathing normally) and then, as you exhale, take your upper body back to the starting position.
- Repeat this five times.
- It should be found that the forward lean increases gradually with each repetition as your back muscles relax.
- On the 5th move forward, stay in the flexed position for at least half a minute, before returning to the starting position.
- Your head should eventually get close to your knees, by which time your hands could be offering stability by grasping your lower legs for support.

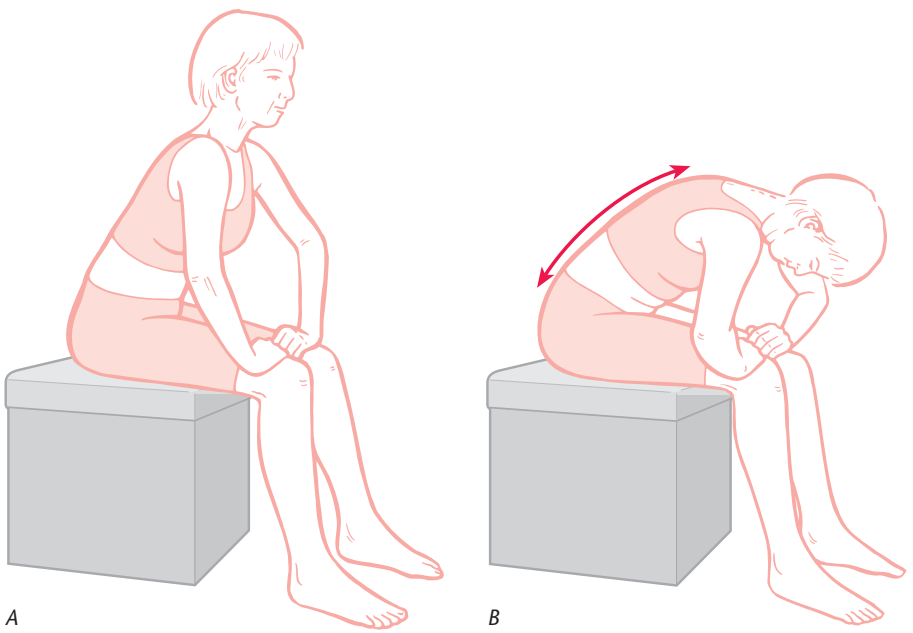


Figure 5.1 *A: Starting position for seated spinal stretch. B: Stretch position for seated spinal stretch*

Flexibility exercise 2. Kirk's side-of-body stretch

- Sit on the floor on one side of your buttocks (right in this example), knees bent and both feet together out to the left of your body.
- Sitting on your right buttock, your feet will be on the left, with your right arm straight and extended to the right, your hand on the floor and some of the weight taken by that arm.

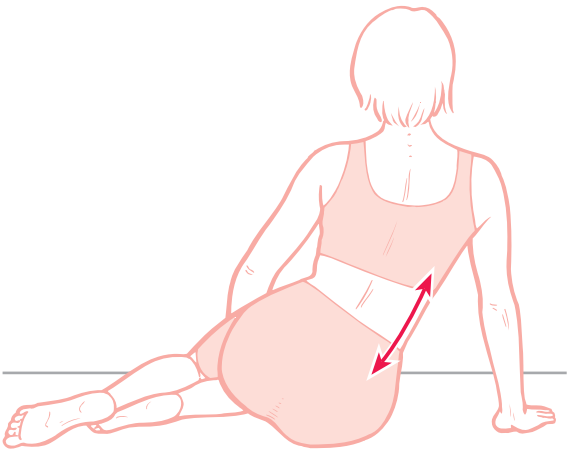


Figure 5.2 *Position in which to apply pulsing efforts towards the upright position*

- Rest your left arm on your legs.
- Push against the floor with your right arm and hand, to take your body toward an upright position, until you feel a *slight* sense of strain or stretch in your low back, your hip or knee (see Fig. 5.2).
- Now introduce a rhythmic pushing of your left shoulder and trunk towards the midline (i.e. toward the left), *always keeping your elbow straight.*
- The rhythm should be at a rate of about two per second and this is best achieved by counting with each 'push' as follows: one-one, one-two; two-one, two-two; three-one, three-two, etc. until ten-two is reached.
- After 20 'pulsations', stop for a few seconds and see if your trunk can be eased closer to upright by pushing on your arm, creating a new barrier of resistance, and then repeat the sequence of pulsations.
- These mini-pushes against resistance (resistance being offered by the tightness of the muscles that are preventing upright sitting) should be gentle, rapid, rhythmic and very small (no wobble, no bounce, just pulsing).
- After two or three 10 seconds 20 pulsations repetitions, rest for half a minute and change position so that the other side can be gently stretched and mobilized in the same way.

Flexibility exercise 3. Kirk's twisting spinal stretch

- Lie on your back on a carpeted floor, arms outstretched sideways, knees bent and your feet flat on the floor.
- Raise one leg, still slightly bent at the knee, and cross it over your other leg (left leg over right in this example), allowing gravity to take that leg towards the floor until your foot touches it (see Fig. 5.3).
- This will pull your left knee towards the floor, placing a rotational twist on your low back.
- No resistance should be offered.
- If any actual pain is felt, as opposed to a feeling of stretching, stop immediately.
- If your left arm wishes to rise from the floor, allow this to happen but try to let the whole body feel 'heavy', avoiding any tension, if at all possible.
- Now lift your left foot from the floor about 3–6 inches (7–15 cm) and start to perform a repetitive, bouncing action, towards the floor and up again.

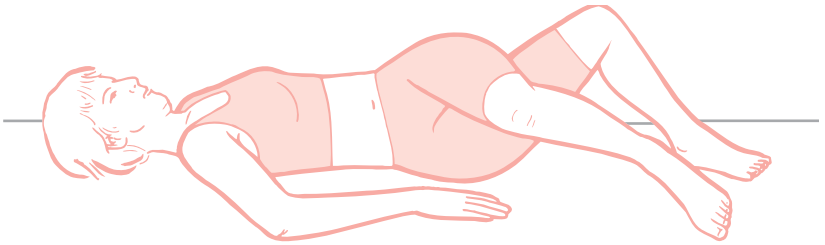


Figure 5.3 Position for spinal twist exercise

- Do this five times, springing the twisted segments of the spine gently, and then rest in this twisted position.
- Slowly and carefully return to the starting position and repeat this process on the other side of your body.
- This effectively stretches your low back, hip and shoulder regions.

Flexibility exercise 4. Kirk's middle back spinal twist

- Lie face upward on the floor with your legs apart at a comfortable angle and your hands interlocked behind your neck.
- Bring your elbows together and raise your head from the floor by a couple of inches (5 cm) (see Fig. 5.4).
- Repetitively and rhythmically twist your trunk in opposite directions, so that first one elbow strikes the floor and then the other.
- Repeat 5–10 times on each side.
- This effectively stretches your midthoracic spine.

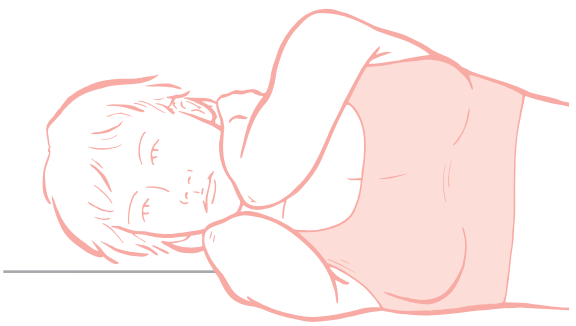


Figure 5.4 Twisting position to release mid-thoracic spine, floor exercise

Flexibility exercise 5. Kirk's spinal mobilization: prayer position

- Imagine that you are going to roll a pea along the floor with your chin! This is the position to adopt for the next exercise.
- Get onto your hands and knees, with your thighs and arms perpendicular to the floor and your fingers pointing towards each other.
- Bend your elbows to allow your head to drop towards your hands, but keep your head as upright as the position allows (i.e. not hanging downwards).
- Breathe normally and on an exhalation, take your chin as close to your hands as possible and slowly roll an invisible pea towards your knees with your chin.

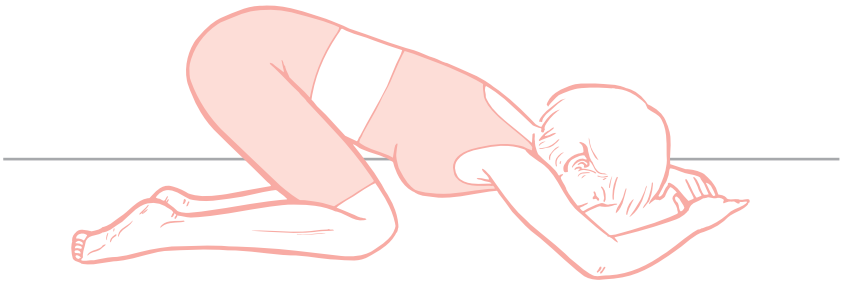


Figure 5.5 Rolling an invisible pea with chin to mobilize upper back region

- Lift your head and shoulders from the floor to the start position and inhale.
- Now exhale and take your chin towards your knees and slowly push the imaginary pea with your chin, but this time away from your knees, towards your hands (see Fig. 5.5).
- Then return to the starting position and inhale.
- Repeat each action (pea toward hands, pea away from hands) five times.
- Remember that the inhalations are taken only when you resume the position on all fours with your head and shoulders away from the floor.

Additional rotational feature

- If a rotational stretch is also needed in your upper back, then the exercise described so far can be modified by introducing a turn of the head throughout each of the positions described.
- This time try to imagine that the pea is being rolled forwards and then backwards by one ear and then the other.
- Again five repetitions of this variation should be performed with the head turned one way and then the other.

Flexibility exercise 6. Kirk's lower back and trunk stretch

- Sit on the floor with your legs outstretched.
- Cross your left leg over your right leg at the knees.
- Place your right hand between your crossed knees, to rest on the floor. This tends to lock the position of your legs.
- Take your left hand behind your body and place it on the floor 6–8 inches (15–20 cm) behind your buttocks, with your fingers pointing backwards.
- This twist should be performed to the comfortable limit, involving a full but painless rotation of your shoulders and trunk to the left (see Fig. 5.6).
- Your head should also then be turned as far to the left as possible, looking over your left shoulder.
- Stay in this position while you take a series of slow breaths, in and out.
- After five slow cycles of inhalation/exhalation, and as you exhale, try to increase the range of rotation slightly.
- Hold this new position for another five cycles of inhalation/exhalation before returning to the upright, untwisted position.
- Repeat the whole procedure to the other side, reversing all positions described above.
- No pain should be felt but a feeling of having had a great stretch is desirable.

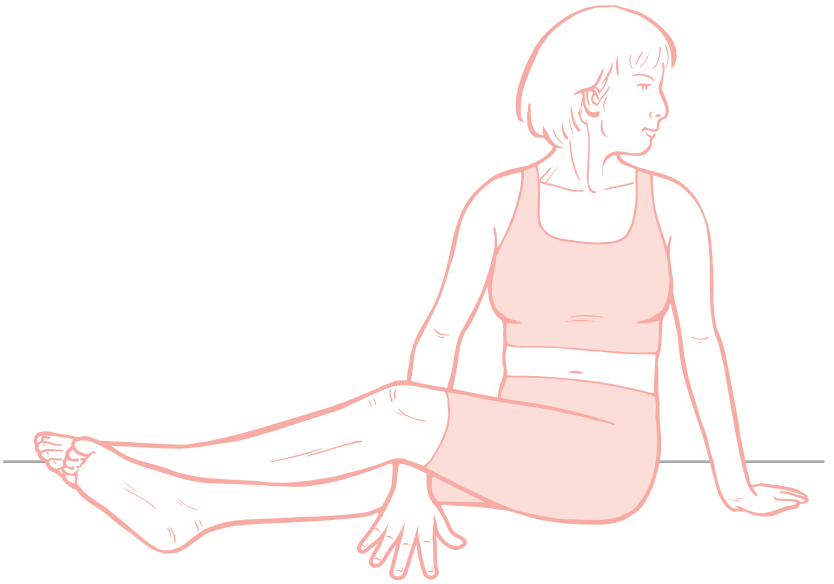


Figure 5.6 *Spinal twist position*

CAUTION
Remember that no pain should ever be experienced during or after the positions described. If pain is felt then you are forcing yourself beyond a comfortable stretch, which is all that is being asked.

JONES' METHODS

A series of four gentle self-mobilization methods, derived from osteopathic sources, are described below. These are modifications of the work of Lawrence Jones DO, the developer of strain and counterstrain (see Chapter 8).

Flexibility exercise 7. Jones' gentle gravity-induced spinal stretch

- Lie face upwards on a carpeted floor, with a pillow under your head.
- Flex your knees so that your feet, which should be together, are flat on the floor.
- Keep your shoulders in contact with the floor by having your arms stretched sideways, palms upwards.
- Allow both your knees to fall to the right (in this example) as far as possible without pain.
- This places a twist on your lower and middle back muscles.
- Allow the weight of your legs to create a gravity-aided force against the inertia of the rest of your body.
- Your shoulders and feet should stay flat on the floor throughout the exercise.
- Breathe deeply and slowly for about 30 seconds and then take a deep breath which you should hold for as long as is comfortable.
- On releasing your breath allow your legs to fall further towards the floor and stay in this position for another 30 seconds.
- Bring your knees back to the midline and repeat the process to the left (see Figs 5.7A, B).

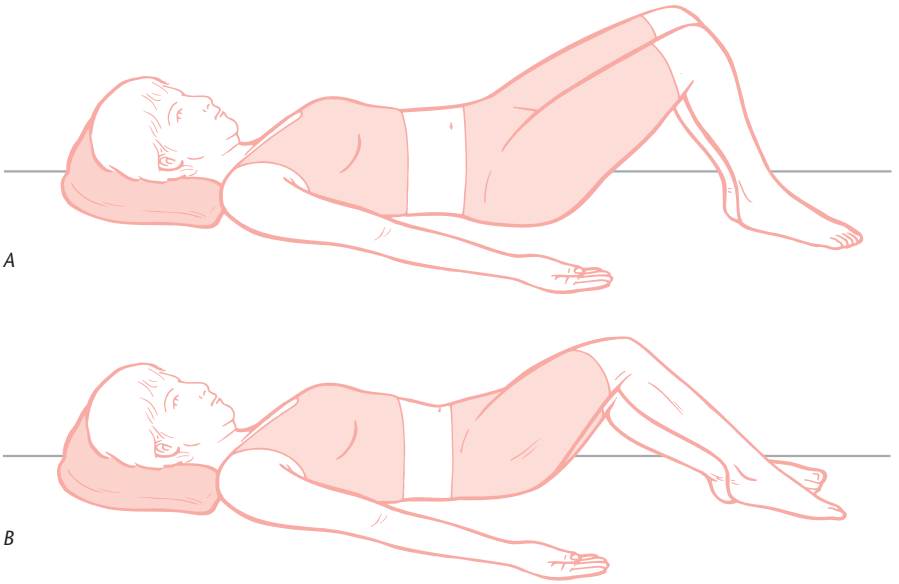


Figure 5.7 *A: Position for gravity-induced spinal stretch to the right. B: Position for gravity-induced spinal stretch to the left*

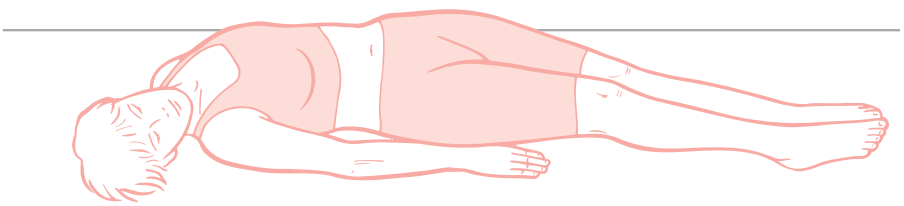


Figure 5.8 *Supine side-bending stretch position*

Flexibility exercise 8. Jones' gentle side stretch

- Lie flat on the floor, legs outstretched, arms by your sides.
- Keeping your outstretched legs together, take them to one side or the other as far as is possible from the midline and rest them there (to the right in this example) (see Fig. 5.8).
- Take your head and shoulders slowly in the same direction (to the right) as far as is comfortably possible and rest in this position. You should now be lying in a C shape.
- You will have achieved a full side bend.
- Simply maintain this side-bent posture for 30 seconds, during which you should breathe deeply and slowly, then hold your breath for as long as is comfortable.
- As you release this breath, try to take your legs and your upper body slightly further to the right, to increase the stretch.
- Hold this for a further 30 seconds.
- A variation of this position would be, during the whole of the procedure, to extend your right arm towards your feet, whilst the left arm extends above your head.
- Return to the midline and perform the same procedure to the left.

Figure 5.9 Curled position to gently stretch spinal muscles

Flexibility exercise 9. Jones' gentle curling stretch

- Lie on one side or the other (on the right side in this example), pillow under your head (see Fig. 5.9).
- Keeping your legs together, one resting on the other, bend your knees and curl up into a bent position so that your back is as rounded as possible.
- Try to bring your nose as close to your knees as possible without any pain.
- Ensure that your neck or head is supported by a cushion all the time.
- Breathe slowly and deeply for 30 seconds. This is equivalent to approximately three or four cycles of complete inhalation and exhalation if slowly performed.
- Then hold your breath for as long as is comfortable.
- As you breathe out try to curl a little further and stay in this position for another 30 seconds.

Flexibility exercise 10. Jones' gentle back-bending stretch

- Lie on your side, keeping your legs together, one on top of the other.
- Your arms may be stretched downwards and backwards or folded on your chest during this exercise, but your neck and head should always be supported on a cushion.

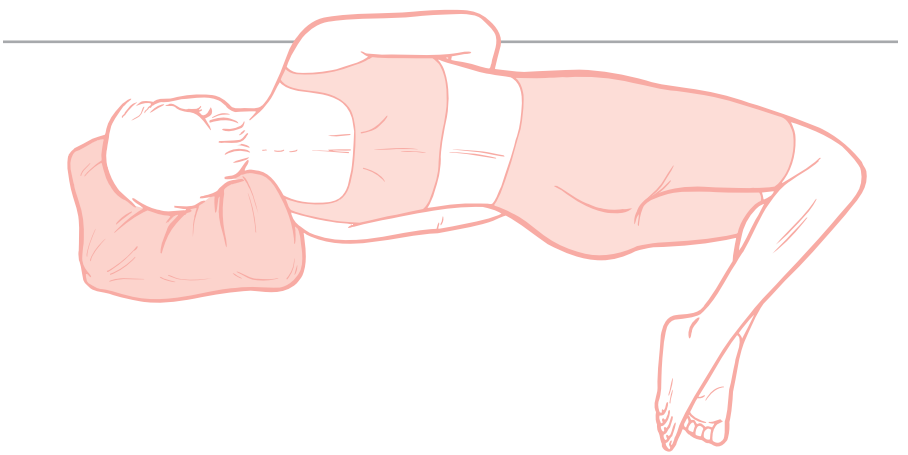


Figure 5.10 Back-bending stretch position

- Extend your legs backwards behind the midline as far as is comfortable, allowing your knees to bend (see Fig. 5.10).
- At the same time take your head and shoulders backwards, so that a side-lying, backwards bend is produced.
- Maintain this position for 30 seconds while breathing slowly and deeply and then hold your breath for as long as is comfortable.
- As you let the breath go try to stretch a little further into a back bend.
- Hold this position for a further 30 seconds.

Flexibility exercises 7, 8, 9 and 10 are all designed to be performed in a way that avoids the force of gravity being superimposed, allowing multiple releases of tight structures. The methods involve a combination of RI and PIR. A good deal of freedom of movement should be felt after doing this series, especially once it has been done for a few weeks, ideally every other day.

Remember that after the first few such sessions a degree of generalized muscle ache and stiffness is normal, as though strenuous exercise had been undertaken. This indicates nothing more than that the regions stretched were in need of this.

Methods of mobilizing specific regions

Flexibility exercise 11. Gentle release of low back and back of thigh

- Lie face upwards, with a cushion under your head.
- Keep one leg straight and bend the other at the hip and knee.
- Place your hands under your knee to grasp your lower thigh and pull this leg to your chest as close as is comfortable (see Fig. 5.11).
- Hold this position and your breath for as long as is comfortable.
- As you release your breath, pull your leg closer to your chest.
- Ensure that your other leg remains flat on the floor.
- Hold the stretch for a further 30 seconds and then repeat with the other leg.

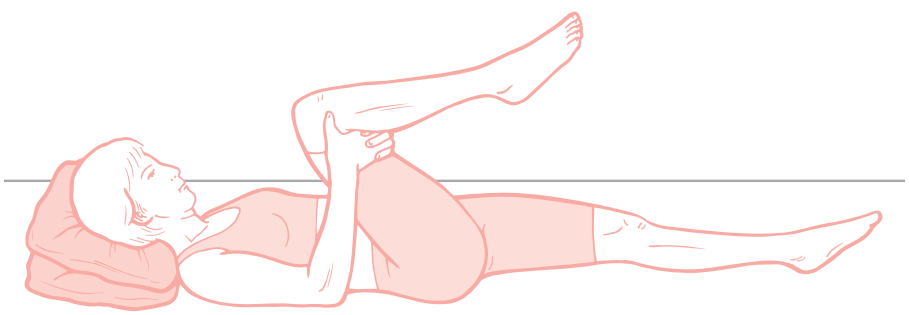


Figure 5.11 *Stretching the low back – one leg fixed*

Flexibility exercise 12. Breath-assisted release of low back

- Lie on your back without a cushion.
- Bend both legs at the hip and knee and, with legs apart and a hand on each knee, pull your legs towards their respective shoulders (see Fig. 5.12).
- When you reach the position with your knees closest to your shoulders, hold it and breathe in and hold your breath for as long as is comfortable.

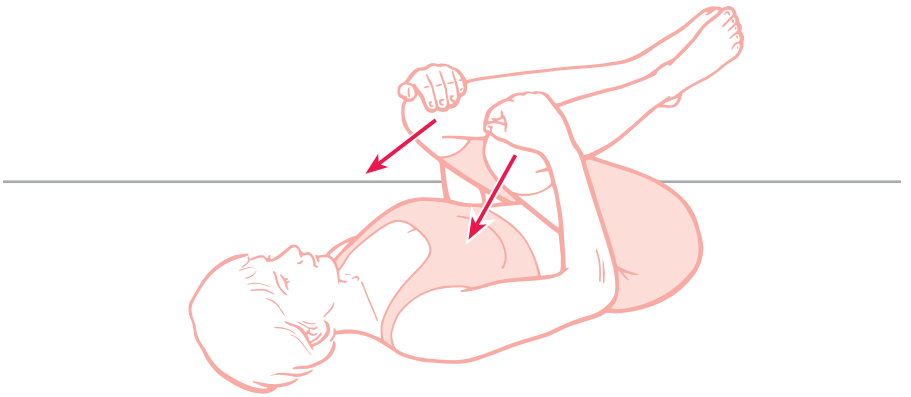


Figure 5.12 Position for low back release

- As your breath is released pull your knees a little closer to your shoulders, *not your chest*, and hold this position for 30 seconds while breathing normally.
- Release and repeat once more.

Flexibility exercise 13. Mobilization of the sacroiliac joint

CAUTION If you are aware of a sacroiliac problem and have had professional advice/attention, it would be wisest to discuss this exercise with your practitioner before using it. If your SI joint is restricted and you are awaiting attention, performing this *carefully* may produce a release. If you have never had an SI joint problem then there is probably no reason to perform this exercise.

- Lie on your unaffected side (side of troublesome SI joint uppermost, left side uppermost in this example), pillow under your head and with the lower (right in this example) leg straight.
- Allow the left knee, which should be flexed at both hip and knee, to rest on the floor, thus stabilizing the pelvis (see Fig. 5.13).
- Place the palm of the left hand on the prominent front portion of the pelvic bone so that the palm faces downwards to the floor.
- Repetitively and rhythmically 'spring' this bone in a direction roughly towards the lower ribs on the other (right) side, without any great force, for about 20 seconds.
- The repetitive downward (to the floor) and upward (toward the head) directions of this springing action cause a gentle gapping at the SI joint.

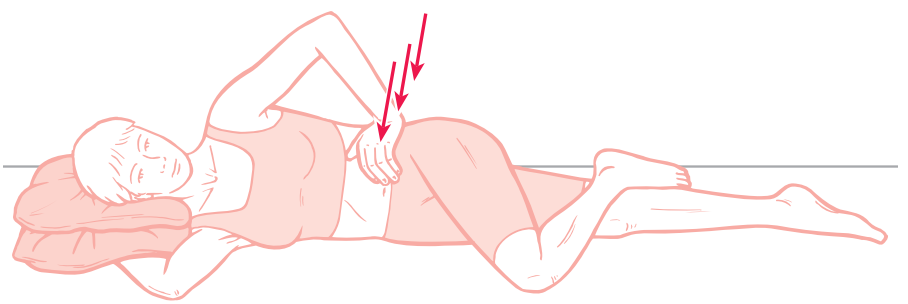


Figure 5.13 Position for springing the SI joint

Flexibility exercise 14. Low back mobilization using rotation

- Lie on your side (right side in this example) close to the edge of a bed or table.
- Your lower (right) leg should be outstretched while the upper (left) leg is flexed at hip and knee, so that the left foot rests behind the outstretched right knee.
- To focus on the lower lumbar spine the toes should rest below the back of the knee.
- Your left arm should be taken behind the body to grasp the edge of the table/bed, so taking the upper body into rotation.
- You should now be face upwards, with your right hand resting on the flexed right knee, which should be over the edge of the table/bed (see Fig. 5.14).
- There now exists a good degree of torsion between the upper and lower body, *but no pain should be felt.*
- Breathe in deeply and hold your breath and at the same time turn your head left as far as is comfortable.
- At the same time, use your right hand to exert mild downward (to the floor) pressure on the right knee to increase the rotation.
- Hold your breath for as long as is comfortable and then simultaneously release both the pressure on the knee and the breath.
- Repeat this once or twice more.
- To complete the exercise, have the hand on the knee exert a rhythmic downwards springing motion at a rate of roughly once or twice per second, for 10–15 seconds.
- Repeat the process by turning onto your other side.

Note: To focus the rotation a little higher in the low back, adopt exactly the same position and procedure, except that the foot of your upper leg should rest above the knee of the lower leg, with the lower leg being very slightly flexed at the knee.

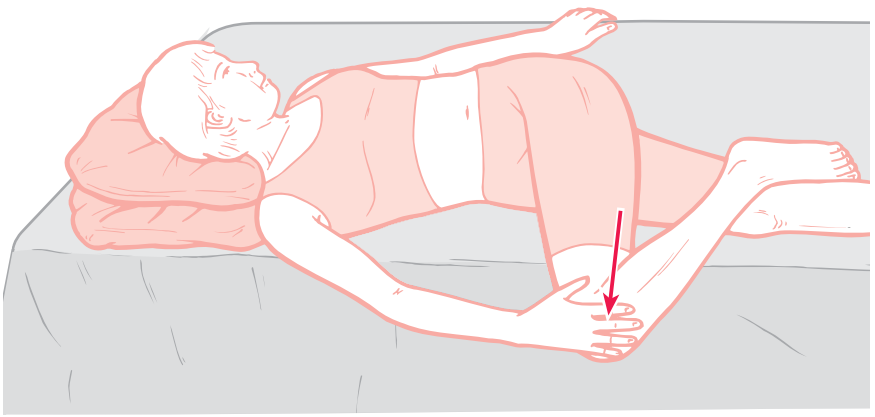


Figure 5.14 *Position for rotational mobilization of the low back*

Flexibility exercise 15. Cat/camel exercise for the thoracic spine

- Kneel on a carpeted floor so that the weight is taken on your flexed knees and elbows.
- Your thighs should be at right angles to the floor.

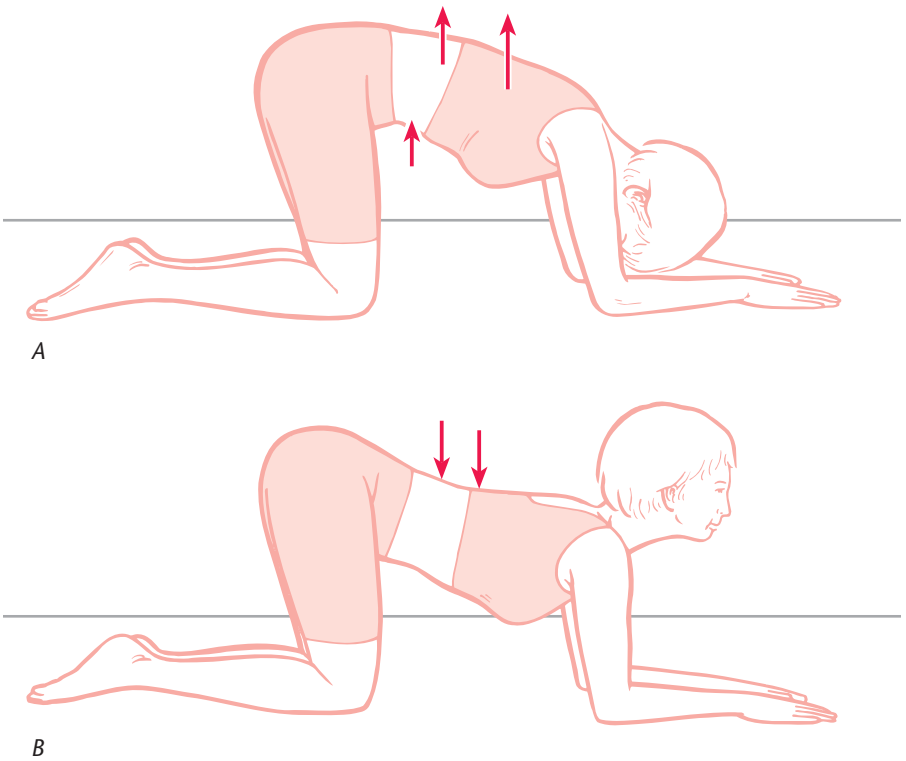


Figure 5.15 *Positions for spinal mobilization. A: Camel. B: Cat*

- To focus into the upper thoracic spine, have the elbows level with your ears.
- Breathe in deeply and arch your back upward as far as is possible, allowing your head to drop toward the floor, rounding the thoracic spine.
- Try to imagine that, as this is being done, your navel is being pulled upwards to meet the spine, thus effectively increasing the degree of arching (and increasing stability, as you will discover in Chapter 6) (see Fig. 5.15A).
- After holding your breath for 5 seconds or so, release it and simultaneously start to lower your thoracic spine toward the floor, while also raising the head (see Fig. 5.15B). This effectively flattens and depresses your thoracic spine.
- Hold this position for 5 seconds before inhaling and arching again.
- Repeat the cat/camel exercise five or six times in each direction.
- In order to localize the effect of this mobilization at the junction of the lumbar and thoracic spine, your hands, rather than the elbows, should be used for floor support. All other aspects of the procedure remain the same.

Flexibility exercise 16. Gravity-assisted mobilization of upper thoracic spine (and upper ribs)

- Sit on the edge of a table, knees apart, with head bowed forwards.
- Allow one arm to hang between your legs (left arm in this example) and the other down the outside of the other leg.
- Make sure your shoulder blades are relaxed and are not held in tension.
- Your head should be turned to the right (in this example).
- Take a deep breath in and at the same time, turn your head to its maximum degree of rotation to the right, and also stretch your left arm down towards the floor.

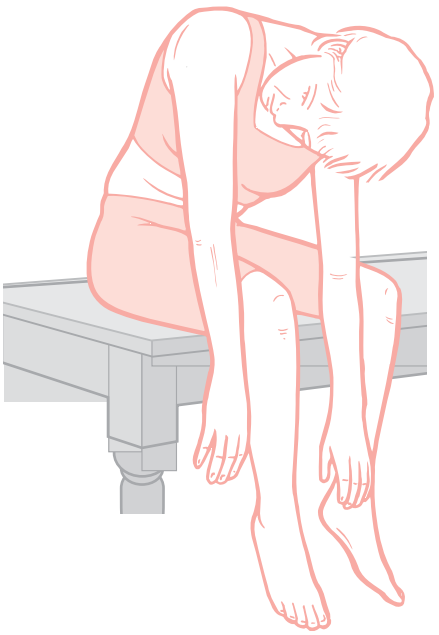


Figure 5.16 Gravity-assisted stretch to mobilize upper back and ribs

- Hold the stretch for as long as you can comfortably hold your breath and on release relax into that position for a further 15–20 seconds, allowing gravity to stretch your head and arms toward the floor (see Fig. 5.16).
- Repeat once or twice more.
- Keeping this position, with only gravity acting on the arms and the head turned to the same side as above, breathe slowly and deeply and try to 'breathe into' the tight areas you can feel in your upper back.
- This produces a separation of the ribs in this area and helps to mobilize the region further.
- Repeat the entire process on the other side.

Flexibility exercise 17. Seated upper thoracic mobilization

- Sit on the edge of a bed or table.
- Stretch your arms sideways with fingers widely spread and rotate the arms at the shoulder, in opposite directions, so that one is turned palm backwards (left in this example) and the other palm upwards or forwards (right in this example) (see Fig. 5.17).
- Make sure that your arms are actually stretched out straight.
- Turn your head towards the side on which the hand is turned backwards (left), with the thumb facing the floor.
- After 3–5 seconds rotate your arms in opposite directions and simultaneously turn your head toward the side on which the thumb now faces the floor (right).
- Try to make sure that your shoulders do not hunch but are as relaxed as possible.
- Try to synchronize the movement of the head and arms so that as you breathe in you rotate the arms and turn your head, holding that position as

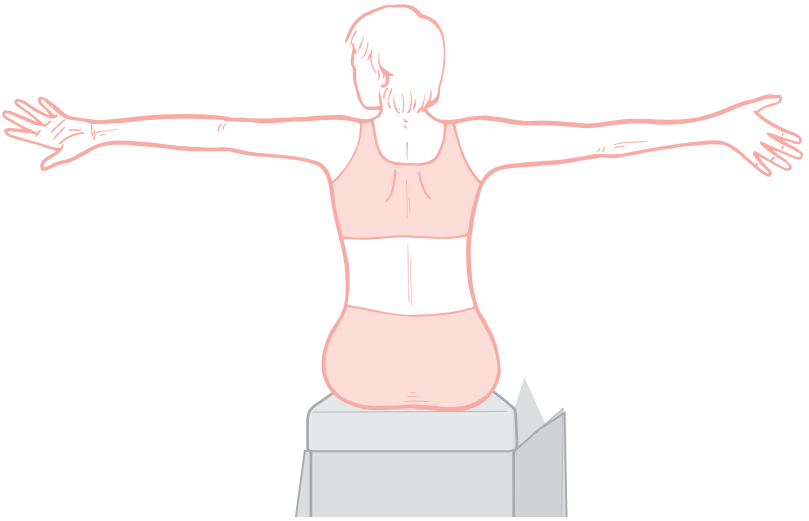


Figure 5.17 Arm and head positions for upper thoracic mobilization exercise

you slowly exhale, and then moving to the reverse head and arm positions as you inhale again.

- Repeat the process 10 times.

Flexibility exercise 18. Mobilization of lower neck and upper back

- Lie face down with your elbows together, resting just forward of a line running from shoulder to shoulder.
- This elevates the upper back and, if your head is allowed to hang free, imposes a stretch on the junction area of neck and back.
- With your head hanging in this way, in the midline, breathe in and raise your head an inch (2.5 cm) or so while holding the breath for as long as is comfortable (see Fig. 5.18).
- As you release your breath allow the head to hang freely for a further 15–20 seconds before repeating once or twice more.
- Variations can include having your head turned slightly one way or the other while performing the sequence.

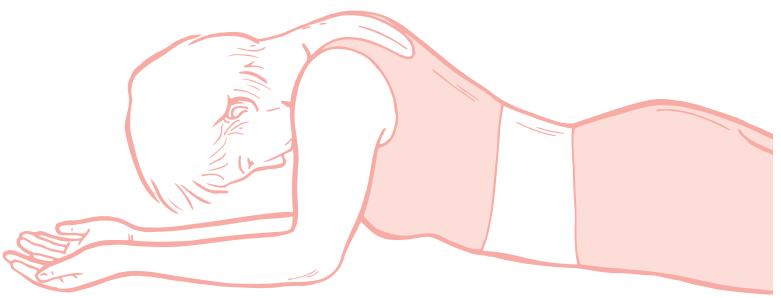


Figure 5.18 Position for lower neck mobilization

Strength plus endurance equals stability

6

CAUTION
If there is any pain while performing any of the procedures in this chapter stop at once and get professional advice. It is perfectly normal to have a degree of 'soreness' on the day after exercises to which you are unaccustomed, but this should not be excessive or last more than a day or so. If it does, take professional advice.

The function of muscles is to either produce or control joint movement, whether this be of the head, hip or finger. The strength and fine control with which joint movements take place are obviously important but unless there is stability, these aspects will be inefficient. Successful movement of joints and limbs is produced by the more superficial muscles and this depends on the tone and strength of the deeper stabilizing muscles, particularly where major postural structures such as the spine and pelvis are concerned. These deep muscles need to be able to stabilize for very long periods, so endurance is another feature that is required for a fully functional spine and body.

The key words in this chapter are therefore *stability*, achieved through strength, and *endurance* and the various exercises will emphasize the need for repetitions of simple movements in order to achieve these qualities. Starting from a point of relative weakness and instability, it should take around 12 weeks of regular, daily exercise (minutes, not hours!) to gain these objectives.

Acknowledgment

Many of the exercises in this chapter were first described or popularized by eminent researchers and practitioners, including Vladimir Janda MD, Karel Lewit MD, Craig Liebenson DC and Chris Norris MCSP. My thanks to these practitioners for their dedicated work in the field of prevention and rehabilitation of musculoskeletal injury and pain.

Toning weak muscles

As discussed in the previous chapter, flexibility and mobility are key requirements for the good functioning of joints. However, this quality of suppleness needs to operate in a stable environment, supported by deep muscles designed precisely to maintain stability for lengthy periods, as well as for brief moments of specific activity.

When muscles are weak and tone is poor and they are not performing their tasks adequately, exercises that use isotonic contractions (concentric and

eccentric) can help to stabilize larger joints, as discussed in Chapter 1. Isokinetic procedures (also described in Chapter 1) are most appropriate for smaller joint rehabilitation (ankle, etc.).

The use of weights when lifting represents a basic isotonic resistance to effort but self-help resistance methods can be used without weights, using your own resistance or gravity. For example, by holding the forearm with the other hand, as the elbow bends upwards, you would be partially resisting its effort and would be effectively toning the flexor muscles of the arm with a concentric isotonic exercise. These could also be toned by slowly and forcibly straightening your arm even though the elbow is trying to bend. This would be an eccentric isotonic maneuver that would both tone the flexing muscles while at the same time 'switching off' the extensor muscles (their antagonists), allowing you to stretch these more easily afterwards.

As discussed in Chapter 1, any attempt to tone weakened, inhibited muscles should be left until the process of loosening and stretching tight antagonists to the weakened structures (using MET or other methods) has been started. This is because the excessive degree of tension in these tight muscles is precisely what is inhibiting and weakening the inhibited muscles that appear to need toning. If attention is paid to the identification and stretching of tight structures first, later toning exercises will be more successful.

TONING SPECIFIC MUSCLES

Listed below are a selection of methods which can be used to tone muscles in the abdomen, neck, low, mid or upper back and arm, as needed. Ideally toning should commence after appropriate stretching exercises (described in Chapter 3 and determined by tests outlined in Chapter 2) of tense, short antagonists have started.

As tight type 1 (postural) muscles are stretched, the inhibitory effects (weakness) that their tension will have been causing to antagonist type 2 (phasic) muscles will be reduced, allowing self-toning of these to occur naturally. It is at that stage that more active isotonic exercises for core stabilization (described later in this chapter) may be called for to rebalance the body.

The simple toning exercises described below can specifically target identified weakened muscles and groups of muscles or those with poor endurance.

Core stability

To test for weakness of the major stabilizer muscles, and to tone them if necessary, the assessments and exercises described in this chapter should be performed regularly. Many of the toning exercises which increase endurance potential in these muscles involve the same actions as the tests that show them to be weak or lacking in endurance.

Some experts separate stabilizer muscles into 'primary' and 'secondary' but this distinction is not important as far as the exercises described here are concerned. Basically, if any of the tests suggest that any of these muscles require toning, they should receive your attention.

Note also that some muscles, iliopsoas and quadratus lumborum in particular, can, depending on the demands made on them, be stabilizers (type 1/postural) as well as active mobilizers (type 2/phasic) of the body.

The main stabilizing muscles described in this chapter are:

- gluteus maximus (see test and toning exercises 1A,B)
- gluteus medius (see test and toning exercise 2)
- lower trapezius (see test and toning exercise 4)
- deep neck flexors (see test and toning exercise 5)
- quadratus lumborum (see test and toning exercises 7A,B,C)
- internal oblique (see test and toning exercises 7A,B,C and 8A,B,C,D)
- transversus abdominis (see test and toning exercises 8A,B,C,D)
- psoas (see test and toning exercise 9)
- multifidus (see test and toning exercise 12).

Additional muscles, with stabilizing potentials, described in this chapter are:

- deltoid (see test and toning exercise 3)
- jaw stabilizers (digastric – see test and toning exercise 6)
- pelvic diaphragm (see test and toning exercise 10)
- thoracic diaphragm (see test and toning exercise 11).

1. GLUTEUS MAXIMUS

This large buttock muscle extends and externally rotates the upper leg.

Test and reasons for weakness

- Lie face down (see Fig. 6.1).
- Bend the knee and lift the thigh of the side to be tested off the table (without arching the back).
- If you cannot hold this for 10 seconds this suggests poor endurance of gluteus maximus (normal is regarded as 10–20 seconds).
- Gluteus maximus will become inhibited if there is a short/tight psoas condition. See tests 13, 15, 17 for short psoas in Chapter 2.

Toning exercises

If there are trigger points inhibiting gluteus maximus (possibly from trigger points in low back muscles) these should be deactivated.

A

- Perform the test position sequence in repetitions of 5, for as long as you can comfortably hold the position, once daily, until you can easily hold the leg in this position for more than 10 seconds.
- Do this on both sides.

B (not illustrated)

- Tone gluteus maximus by standing facing the edge of a table and placing the trunk, from the hips upwards, onto the table with one foot remaining on the floor and the leg of the side of the weak gluteus maximus raised toward the horizontal (parallel with the floor).
- Take care not to overarch your low back and keep the pelvis flat on the table (i.e. no twist) as you try to hold the leg in this position for 10 seconds.
- Rest and repeat up to five times more (on both sides if both gluteus maximus muscles are weak).
- Do this twice daily until it is easy.

Figure 6.1 *Toning exercise for gluteus maximus*

2. GLUTEUS MEDIUS AND MINIMUS

These muscles lie on the outer side of the pelvis and act as abductors of the leg (they take it out sideways).

Test and reasons for weakness

- Lie on your side.
- Keep the lower leg straight and the upper leg flexed to about 80° at the hip and 90° at the knee, foot resting on the floor (see Fig. 6.2).
- Using your foot as a pivot, raise the knee sideways by at least 45°.
- You should be able to hold this position easily for 10 seconds. If you cannot, gluteus medius is inhibited and lacks endurance.
- Gluteus medius and minimus will be inhibited if there is shortness of quadratus lumborum, piriformis or the adductors of the leg (see tests 5, 6, 22 for shortness of these in Chapter 2).

Toning exercise

- Adopt the test position as above, with the knee raised from the floor at least 45°.
- Hold this for as long as possible and then lower slowly.
- Rest and repeat up to five times on each side.
- Do this daily until it is easy to maintain the leg in this position for more than 10 seconds.

If there are trigger points inhibiting gluteus medius and minimus (possibly from trigger points in low back muscles) these should be deactivated.

Figure 6.2 *Testing for weakness and toning gluteus medius and minimus*

3. DELTOID

This thick muscle covers the shoulder joint and raises the arm upwards, forwards or backwards or rotates it.

Reasons for weakness

The deltoid may become weak when trapezius, levator scapulae or pectoralis major are tight and short (see tests for shortness of these in Chapter 2).

Toning exercise

If there are trigger points inhibiting deltoid (possibly from trigger points in deltoid, levator scapulae, supraspinatus or infraspinatus), these should be deactivated (see Fig. 6.3).

Note: When doing this exercise be careful to relax the upper trapezius muscle which lies between the shoulder and the neck.

- Stand sideways on to a wall, with the side nearest the wall being the side to be treated.
- Relax the neck/shoulder and push strongly against the wall with the side of your bent elbow.
- Hold for 10 seconds, relax and repeat up to five times.
- Do this twice daily until it is easy.

4. RHOMBOIDS AND LOWER TRAPEZIUS

These muscles overlap each other (rhomboids underneath) and lie between the spine and the shoulder blade. They stabilize the shoulder blade and move it to accommodate arm movement.

Reasons for weakness

The rhomboids, middle and lower trapezius muscles become weakened when upper trapezius, levator scapulae, spinal erectors or pectoralis major are short and tight (see test 23 for shortness of these in Chapter 2).

Figure 6.3 *Toning deltoid muscle*

Toning exercise

If there are trigger points inhibiting the rhomboids and mid and lower trapezius (possibly from trigger points in levator scapulae or suboccipital and other neck muscles) these should be deactivated.

A

- Stand, or sit upright on a stool or chair, with your hands clasped together behind your back (see Fig. 6.4).
- In this position introduce a series of tiny pulsing movements as you attempt to bring your shoulder blades together and then release, contract, release, contract, repetitively.
- These contractions should be extremely small and short and should be released as soon as they commence and then performed again, as rhythmically as possible.
- If you find this difficult then try performing the mini-contractions on one side at a time.

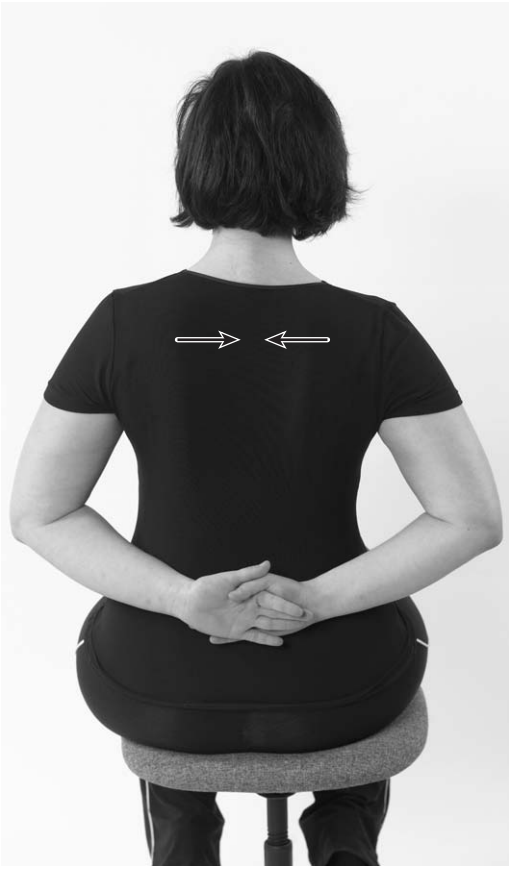


Figure 6.4 *Toning rhomboids, middle and lower trapezii*

- Once you have established a degree of control over the muscle activities individually, you should be able to do them simultaneously.
- Do a series of 20–30 of these mini-contractions and then rest for 10–15 seconds and then repeat the process.
- Do this 2–3 times, several times a day to tone the lower trapezii and rhomboids.

B

- Sit on a stool, arms hanging loose, palms facing forward.
- Introduce repetitive mini-contractions in which you simultaneously bring your shoulder blades together as you turn your arms outward.
- Perform 15–20 rhythmic contractions, then rest.
- Repeat 2–3 times to tone rhomboids and middle trapezii (see Fig. 6.5).

Figure 6.5 Position for pulsed toning of rhomboids and middle trapezius

5. DEEP NECK FLEXOR MUSCLES

These are the muscles that help to maintain your head and neck in balance with the muscles at the back of the neck. They are responsible for nodding movements and taking your chin toward your chest.

Test and reasons for weakness

If back of neck muscles, upper trapezius, levator scapulae and particularly the suboccipital muscles are shortened then the deep neck flexors are going to be inhibited and weak (see tests 29, 30 for shortness of these in Chapter 2). Observation of a head-forward, chin-poking posture is a strong suggestion of such weakness.

- Lie on the floor with no pillow (see Figs 6.6A, B).
- Lift the head off the floor by half an inch (1 cm) and tuck the chin in.
- Can you hold this position steady for 10 seconds without the jaw poking forward or a sense of strain?
- If maintaining this position is not easily accomplished, the deep neck flexors need toning.

A

B

Figure 6.6 *A: Normal head/neck coordination test (after Janda). B: Faulty head/neck coordination test (after Janda) showing short sternomastoid muscles*

Toning exercises

If there are trigger points inhibiting the deep neck flexors (possibly from sternomastoid) these should be deactivated (see Figs 6.7A, B).

- Lie face down on the floor in 'sphinx' position, elbows below your shoulders, supporting you.

A

B

Figure 6.7 *A: Starting position for chin-tuck exercise, finger on chin (after Liebenson). B: Retraction of chin-toning position for chin-tuck exercise (after Liebenson)*

- Place an index finger to touch your chin.
- Draw your chin away from your finger tip by pulling it in and up toward the ceiling.
- At the same time ease your upper back slightly further from the floor.
- Hold this for a slow count of 3.
- Relax the neck and head and repeat a total of 10 times (slowly).
- Perform this whole procedure twice daily.

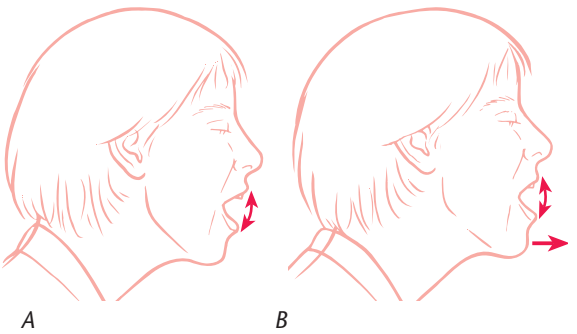


Figure 6.8 *A: Normal mouth opening. B: Faulty mouth opening (jaw projects forward)*

6. JAW STABILIZERS (SUCH AS DIGASTRIC)

These are the sling-like muscles at the base of the jaw that stabilize the jaw as you open your mouth. When this muscle is weak and the jaw is unstable, there will be excessive jaw protrusion and temporomandibular joint pain may result.

Test and reasons for weakness

If these muscles are weak, this will be demonstrated as you open your mouth.

- Have someone observe from the side, as you open your mouth slowly.
- If your chin pokes forward as you open the mouth (protrusion), digastric is inhibited (see Fig. 6.8B).
- The jaw, on mouth opening, should swing down and back and not protrude in any way (see Fig. 6.8A).

Toning exercises

A

If there are trigger points inhibiting the digastric muscle (possibly from trigger points in the sternomastoid muscles) these should be deactivated.

- To tone the stabilizers of jaw opening function, place an elbow on a table and your jaw on your hand, as in Figure 3.45 (Chapter 3).
- It is important not to let the jaw shift forward as you slowly open and close it against the partial resistance of your hand.
- Do this slowly 10 times, twice daily.

B

- Place toothpicks between your upper and lower middle incisor teeth (see Fig. 6.9).
- Sit in front of a mirror and slowly open and close your mouth, making sure that:
  1. the toothpicks do not deviate from each other, so that they stay in line, and
  2. that throughout the opening and closing of the mouth, the ends of the toothpicks stay as they started, specifically that the lower toothpick does not project forward during opening.
- Repeat the opening and closing process 10–15 times twice daily.

Figure 6.9 *Using toothpicks to maintain jaw alignment when opening and closing the mouth*

7. QUADRATUS LUMBORUM AND INTERNAL OBLIQUES

These laterally placed muscles perform major stabilizing functions. QL also assists in side bending and is involved with breathing function because it attaches to the lowest rib and also merges with diaphragm fibers.

Tests and reasons for weakness

Weakness may result from a variety of causes, including poor postural habits and trigger points in the low back muscles or in these muscles themselves.

See also test 23 and functional tests 1 and 2 in Chapter 2.

The horizontal side bridge endurance position evaluates how well these major core stabilizers are working.

A

- Lie on your side with legs straight, one on the other.
- Cross your top foot over the lower one to establish a point of support on the floor (see Fig. 6.10A).
- Use the forearm that is resting on the floor to raise yourself sideways until your hips are off the floor and your body is in a straight line (i.e. no sagging!).
- Your free arm should either lie alongside your trunk or be crossed over the chest so that the hand can rest on the opposite shoulder.
- The test involves establishing how long you can maintain this position. Normal for young healthy individuals (early 20s) is suggested to be 60 seconds for males and 40 seconds for females.
- Or whether you can perform 10 repetitions of raising yourself into this position and holding for 5 seconds before lowering and repeating.

Figure 6.10 *A: Side bridge position, ankles crossed. B: Side bridge position, hips and knees flexed. C: Side bridge position assisted by free hand*

B

- A slightly less difficult position involves lying on your side with both hips and knees bent, one leg on the other, with the rise sideways, as before, induced by pushing off with your forearm, involving the trunk and pelvis (see Fig. 6.10B).
- In all other ways the test is the same.

Toning exercises

- To turn either of these tests into exercises to tone these lateral stabilizer muscles you should push up sideways with the forearm that is on the floor and maintain the raised position for 5 seconds before lowering.

C

- If performing the raise is very difficult, use your free hand to help you (see Fig. 6.10C).
- Perform the raise-and-hold sequence five times in total at first (holding 5 seconds each time).
- Over a period of a month increase gradually to 10 repetitions of the 5-second hold and then start increasing the holding time by a few seconds.
- Ultimately you should be performing the sequence as described in A above, 10 times for 10 seconds each.
- These should be repeated daily for at least 3 months.

8. INTERNAL OBLIQUES AND TRANSVERSUS ABDOMINIS

These deep muscles are among the most important of the body's stabilizing muscles. Transversus abdominis is the first and most used of these, being activated with almost every movement of the trunk, legs or arms. When transversus is weak the body may substitute rectus abdominis or the external oblique muscles to do its work. When this happens low back problems become more likely. This can be tested quite easily, as described below.

Test and reasons for weakness

Trigger point activity in the abdominal or spinal muscles may inhibit the function of these muscles, as can excessive tightness/activity of the antagonists such as the erector spinae.

- Lie on your back, legs out straight.
- Raise your head and shoulders from the floor.
- Does your abdomen 'dome', protrude, as you do so or does it flatten (Figs 6.11A, B)?
- If the deeper stabilizing muscles, such as transversus abdominis, are weak then they cannot hold rectus abdominis down as it contracts and it will dome.
- Even if you can accomplish the head and shoulder lift without doming the abdomen, can you hold that position for 10 seconds without difficulty?
- The abdomen may dome or the lower back may either stay straight or extend (bend backwards) rather than being able to round as the sit-up movement progresses or is maintained. This is even more likely to happen if the superficial abdominal muscles such as rectus abdominis have lengthened as well as being weak (such as in someone with a protruding 'pot' belly).

A

B

Figure 6.11 *Test position to assess internal oblique and transversus abdominis strength. A: Abdomen protrudes, showing muscle weakness. B: Normal*

Toning exercises

A. Preexercise abdominal bracing

- Before you do any of the exercises described below to increase strength and endurance of the deeper abdominal muscles, you need to learn to contract these stabilizers.
- You do this by 'drawing your navel toward your spine', without holding your breath or raising your ribs (See Fig. 6.12).
- One way of doing this is to think of tightening these muscles to stiffen your back.
- Figures 6.13A and B demonstrate how to and how not to accomplish this important step in rehabilitation of spinal and postural stability.

B. Neutral spine coordination exercises (Figs 6.14A–D)

- Lie on your back with knees bent, feet flat on the floor, arms by your sides.

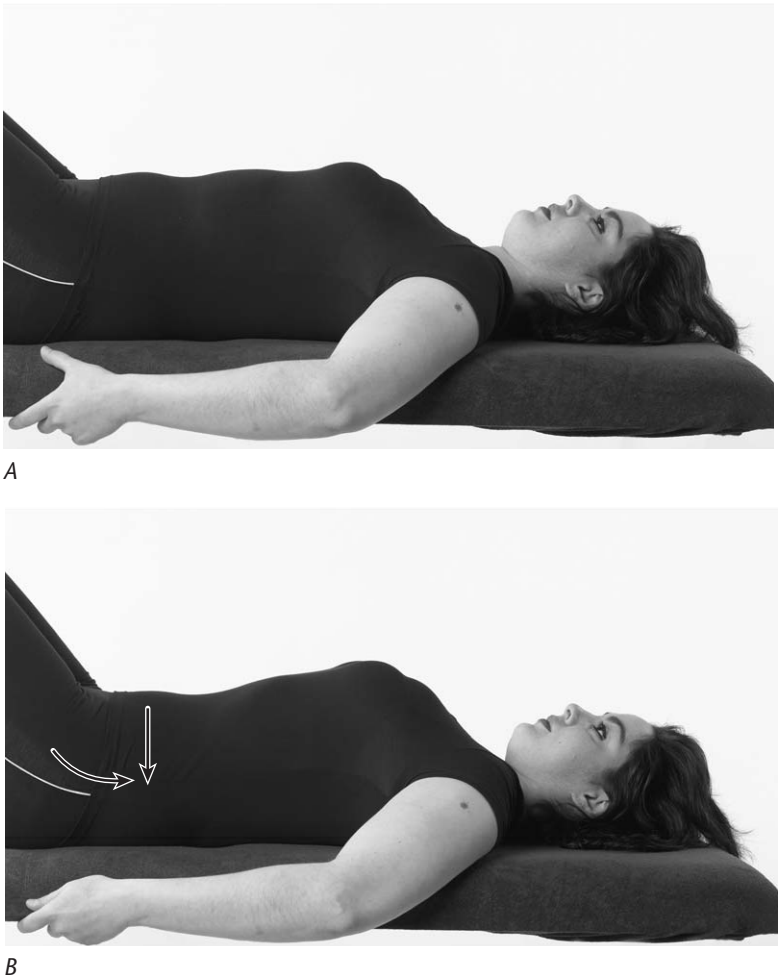
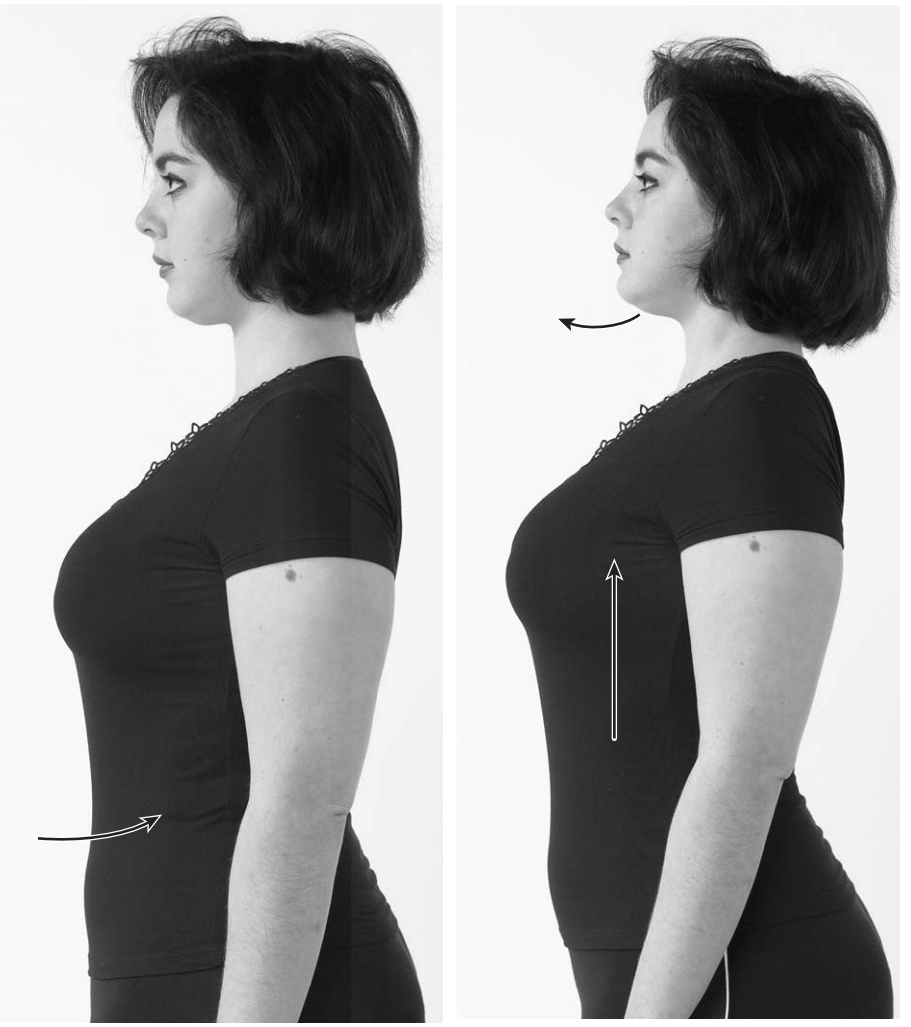


Figure 6.12 Retracting the abdomen to contract transversus abdominis and internal oblique muscles

A

B

- Brace your spine as described above by hollowing the abdomen. This braced position should be held throughout the active parts of these exercises but released in between for a second or two, as repetitions are performed.
- Raise both arms about 45° and also one foot slightly from the floor and hold this for 5–8 seconds. Do this with each leg and repeat 5–10 times. Do this daily until it is easy (Fig. 6.14A).
- When it is easy to do this, do the same exercise but this time raise one leg 12 inches (30 cm) from the floor and hold for 5–8 seconds. Do this with each leg, 5–10 times, and perform the exercise each day until it is easy (Fig. 6.14B).
- When this is easy, do the same exercise but this time raising both the feet a few inches (5 cm), for 5–8 seconds, 5–10 times. Do this each day until it is easy (Fig. 6.14C).
- When this is easy, do the same thing but with the legs raised 12 inches (30 cm) from the floor (Fig. 6.14D).



A B

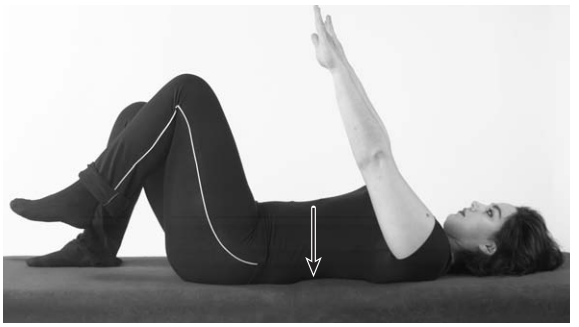
Figure 6.13 *Abdominal hollowing/retraction. A: Correct procedure. B: Incorrect procedure*

C. Dead-bug exercise (Fig. 6.15)

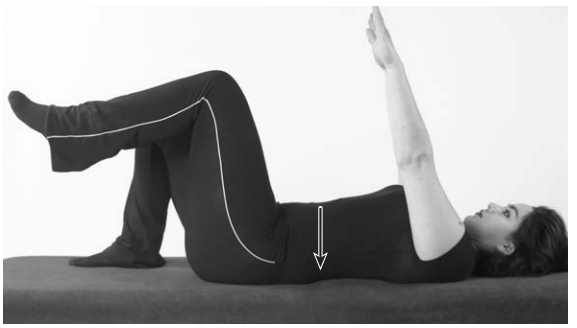
- Once the exercises described above are relatively easy to perform, adopt the same position, with arms above your head.
- Introduce the braced spine/hollowed abdomen contraction, raise both legs and start to perform slow cycling movements, taking the legs into flexion and extension alternately.
- Add arm movements and finish with a holding position in which the legs and arms are in the air, stationary, for a minute or more, as you maintain your abdominal hollowing and continue to breathe in a slow, relaxed manner.

D. Curl-up exercise (Fig. 6.16)

CAUTION Do not do this exercise as part of rehabilitation after an acute low back problem, especially if there has been disc involvement. Rather, use it preventively if the abdominals are weak, once you have worked your way through the exercises in Figures 6.14A, B, C and D.



A



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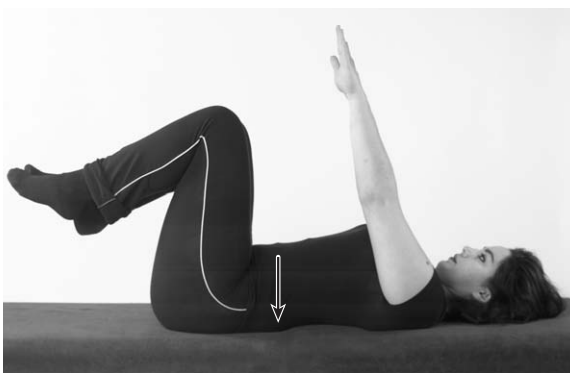


C

D

Figure 6.14 *A: First neutral spine coordination position – both arms and one foot raised. B: Second neutral spine coordination position – both arms and one foot raised further. C: Third neutral spine coordination position – both arms and both feet raised. D: Fourth neutral spine coordination position – both arms and both feet raised further*

Figure 6.15 *Dead-bug position*

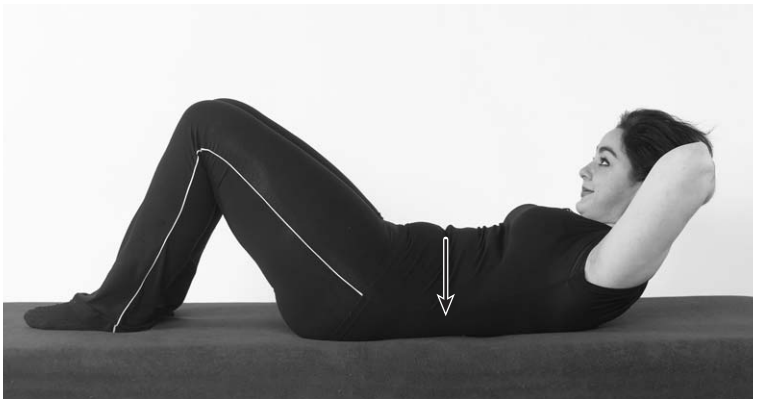


Figure 6.16 *Halfway through curl-up to tone deep abdominals*

- Lie on your back, hips bent to 45°, knees bent to 90°, feet flat on the floor and with hands behind your neck.
- Introduce the braced spine/hollowed abdomen contraction and slowly raise your head and shoulders from the floor, and then slowly round your back as you curl up further (Fig. 6.16).
- Press your feet into the floor as you start to raise your upper body from the floor.
- If you feel any strain in the back when doing this, stop, lie down again, hollow the abdomen/brace the spine and start again.
- Hold this position for 5 seconds and slowly roll down again, without arching your back or allowing your feet to leave the floor (keep the hollow abdomen retraction throughout).
- Relax and repeat up to 10 times.

9. ILIOPSOAS

This is a major hip flexor and because it attaches to the front of the lumbar spine, it also has extremely important influences on spinal stability and pelvic function.

Tests and reasons for weakness

Trigger points in the low back muscles (multifidus, iliocostalis) and in psoas itself can cause it to become inhibited.

See also tests 13, 15, 17 and functional test 2 in Chapter 2.

- Sit on an upright chair, with your spine in neutral (not extended or slumped) and, keeping the knee flexed at 90°, raise the leg on the side to be tested (right in this example) a few inches (5 cm) (see Fig. 6.17).
- If psoas is normal you should be able to hold this raised leg for 10 seconds before lowering and repeating the raise and hold nine more times, without either of two things happening:
  1. losing your upright, neutral, spinal position, with a slump occurring
  2. your muscles starting to quiver or twitch or simply not being able to perform the 10 repetitions of 10-second holds.
- If either of these occur, endurance is limited and the toning exercise below should be performed.

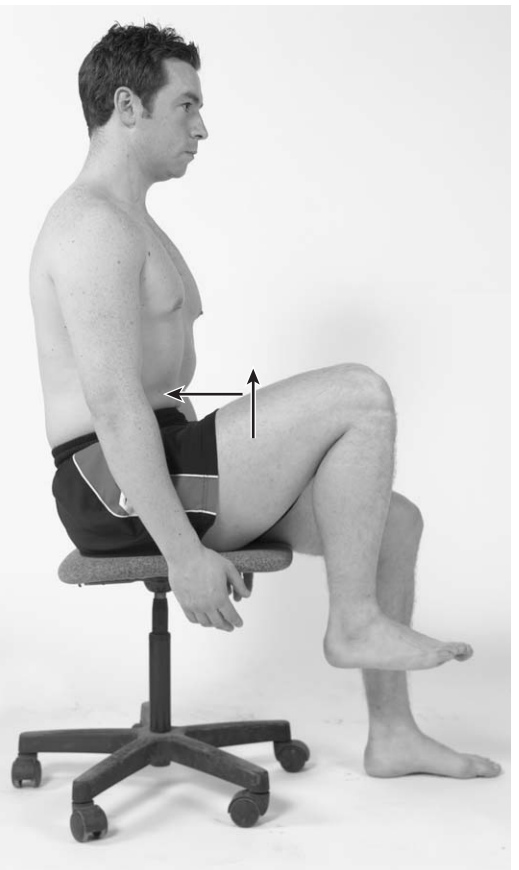


Figure 6.17 *Position for testing and toning psoas*

Toning exercise

- Perform precisely the same procedure as the test, once or twice daily, until you can do this 10 times, for 10 seconds, without strain.

10. PELVIC DIAPHRAGM

These are the structures (fascial, muscular and ligamentous) that lie at the floor of the pelvis and which offer outlets for the anus and the urethra. The tone of this diaphragm (and of its key muscular elements, the levator ani) is important to normal pelvic organ function, as well as being intimately linked with the tone of the core stabilizing muscles.

Reasons for weakness

Postural slump, obesity, recurrent pregnancies.

Toning exercise

- Sit and place one or two fingertips on your navel.
- With your other hand, hold your nostrils closed as you attempt to inhale strongly through your nose (see Fig. 6.18).
- Obviously, with the nostrils blocked, you will not be able to breathe in but as you make the effort, your navel retracts and if you focus on the area between your anus and genitalia, you will sense that the pelvic floor (diaphragm) contracts as well.
- Perform this five times altogether many times a day, not only when sitting but also when lying on your side in bed, or standing (see Fig. 6.18B).
- After doing this for a few days you should be able to draw the pelvic diaphragm into a contraction without having to hold your nose and sniff!
- When you do this contraction exercise to tone the pelvic diaphragm, ensure that you avoid clenching your buttocks. Keep these relaxed.

Toning of the pelvic diaphragm will assist the toning of the core abdominal muscles as described in Exercise 8.

11. DIAPHRAGM (THORACIC)

This remarkable muscle divides the chest cavity from the abdominal cavity and acts as the main breathing muscle as well as stabilizing the spine to which it attaches. When major postural stabilizing demands are being made of the diaphragm, as well as breathing requirements, it is the postural, spinal ones that lose out. When breathing patterns are poor (upper chest), the diaphragm becomes weakened through lack of use and once again, spinal stabilization is reduced. The diaphragm merges with massive psoas fibers as well as those of quadratus lumborum and so is easily influenced by any shortening or weakening of these major muscles.

Tests and reasons for weakness

If breathing is largely upper chest rather than diaphragmatic (see tests below) then the diaphragm will weaken. Commonly scalenes and upper trapezius substitute for the diaphragm (in which case the upper chest will rise on inhalation, which it should not do). A variety of trigger points can negatively influence the diaphragm.

A

B

Figure 6.18 *Application of the pelvic floor toning exercise. A: Seated. B: Side lying*

A. Hi-lo test

- Sit in an upright chair in front of a mirror.
- Place one hand on your upper abdomen and another on your upper chest.

- Observe your hands as you inhale and exhale several times.
- If the upper hand (the one on the chest) moves first, and especially if it also moves upward towards the chin, rather than slightly forward, and if it moves significantly more than the hand on the abdomen, this suggests an upper chest pattern of breathing, with probable weakness of the diaphragm (see Fig. 6.19).
- The ideal is to see your abdomen move forward as you breathe in, with a slight outward movement of the upper hand towards the end of the in-breath.

Figure 6.19 *Hi-lo upper chest breathing pattern test*

B. Sniff test

- Sit with a hand 2–3 inches (5–8 cm) below the end of your sternum (breast bone).
- Sniff strongly and quickly.
- Did you feel a strong outwards push from the muscles under your fingers? If not, your diaphragm is weak.

Toning exercise: pursed lip breathing

The best way of retoning the diaphragm is to use a slow exhalation pattern, breathing out through your mouth with your lips pursed into as narrow an aperture as you can manage (as though blowing out through a straw).

- Sit or lie and place a hand on your abdomen and the other hand on the chest to monitor the movement of the diaphragm as you inhale after the long slow exhalation described below (your abdomen should move forward as you breathe in, if your diaphragm is working correctly).

- Breathe in through the nose and very slowly out through the mouth with pursed lips.
- This out-breath should take anywhere from 4 to 8 seconds.
- Repeat this 20–30 times twice daily to begin the process of rehabilitating your diaphragm (see notes on breathing in Chapter 7).
- To encourage pursed lip breathing you might imagine that you are (a) blowing through a straw, (b) blowing slowly and steadily at a candle to make it flicker but not go out or (c) slowly blowing up a balloon.

Note: The action of slow controlled exhalation against resistance (which is what is happening with pursed lip breathing) is an example of an isotonic eccentric contraction. The diaphragm is being asked to work harder (by creating the force with which you are blowing) at the same time that it is relaxing from its contracted position (which it achieves during inhalation). This effectively tones it (see Chapter 1 and Fig. 1.6 for a discussion of eccentric isotonic effects).

12. MULTIFIDUS (AND ROTATORES)

The multifidi (and rotatores) are the deep muscles of the low back. Multifidi run upwards from the sacrum in small branches which each cross between two and four vertebrae, for the entire length of the spine. Their function is mainly to stabilize the segments of the spine, although they assist in some fine movements of extension, side bending and rotation. Trigger points in these muscles (particularly multifidi) affect the local muscle itself as well as referring to the abdominal muscles.

Tests and reasons for weakness

When there is low back pain a major influence is often the multifidi. These have been found to atrophy (the muscle tissue quite rapidly disappears, turning into fatty tissue and/or acquiring a 'moth-eaten' look) when unused, as often occurs when, because of back pain, a person rests instead of starting some form of rehabilitation exercising as soon as the acute phase has eased. This is known as 'deconditioning' and the exercises described here will help to prevent this or will assist in recovery of the multifidi if they have become deconditioned through lack of use. These exercises should start as soon as acute pain has subsided.

A. Trunk extension test (1)

- Lie on the floor on your stomach with your hands interlocked behind your neck, elbows pointing forward so that they lie as close to parallel with the floor as possible.
- Lift your chest from the floor approximately 2 inches (5 cm) and then lie down again (see Fig. 6.20).
- Your legs and feet should remain in touch with the floor throughout. There will be a tendency for the feet and lower legs to rise and this shows excessive effort from the superficial erector spinae (see Fig. 6.20).
- With a pause of no more than 2 seconds in between, do this repetitively 15 times and on the final lift hold for 30 seconds.
- If you can accomplish this you probably do not need to do any toning exercises for your multifidi.
- If you cannot accomplish this, perform toning exercises A and C until you can 'pass' this test.

A

B

Figure 6.20 *A: Correct spinal extension test 1 – note legs stay on floor. B: Incorrect spinal extension test 1 – note lower legs rise and back arches too much*

B. Standing arm elevation test

- Stand against a wall; your buttocks and spine should touch the wall and your heels should be placed about 2 inches (5 cm) from it.
- Raise your arms directly in front of you and try to place the backs of your hands against the wall above your head.
- If, as you do this, your low back arches forward or you cannot reach the wall with your hands (Fig. 6.21), the suggestion is that your mid-spine (mid-thoracic area) is restricted and that there is a need for both mobilization of the area (see Chapter 5) and improved stability of the deep muscles such as multifidi.

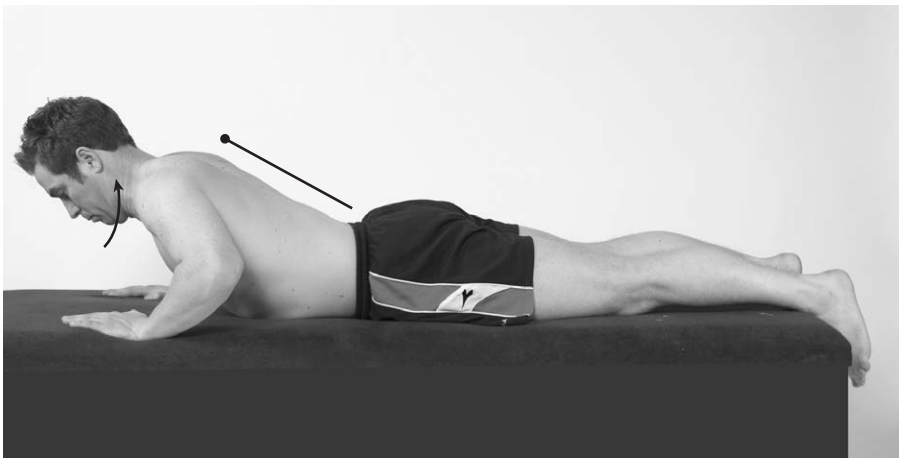
C. Prone trunk extension test (2)

- If, during the previous test, your back arches forward it suggests that the multifidi are unable to perform their role of stabilization.
- Instability can be confirmed by lying face down with your hands beneath your shoulders and pushing up off the floor *while maintaining your spine in a straight line* (Fig. 6.22A).

Figure 6.21 *Standing arm elevation test performed incorrectly: arms cannot reach wall and low back arches*

- If, as you push up, you arch your back (Fig. 6.22B), this shows weakness of the deep stabilizers of the lumbar spine (multifidi).
- Perform toning exercises B and C.

Note: It may prove difficult to self-test for multifidus weakness, so the recommendation is that if you have suffered from low back pain and/or display evidence of shortness of the erector spinae, then the multifidi muscles need to be toned for better strength and endurance, using your choice from the toning exercises listed below.



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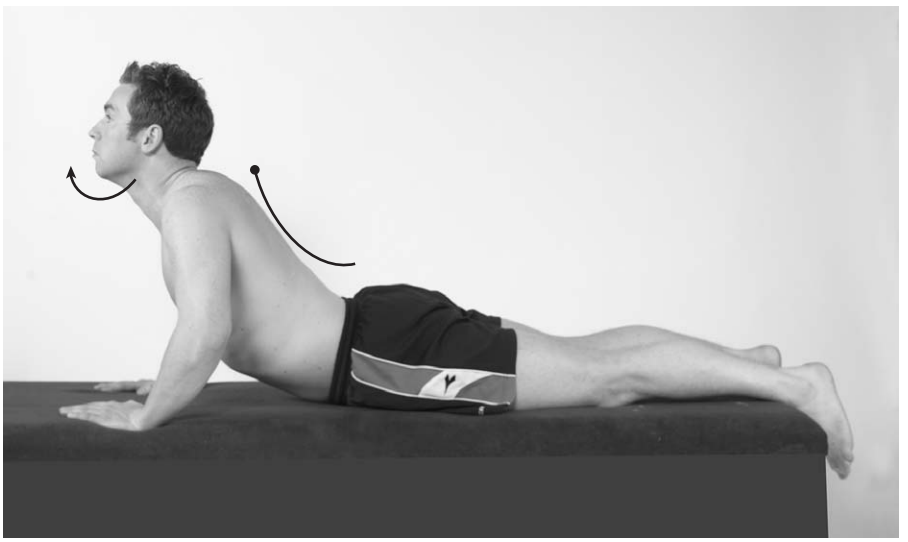


B

Figure 6.22 *A: Prone trunk extension test 2 correctly performed. B: Prone trunk extension test 2 incorrectly performed: note neck and spine extend instead of staying in line*

It has been established that when the deep stabilizing muscles of the back are weak, the more superficial muscles (erector spinae) will overwork. So if the erector spinae tested as short (see Chapter 2, Shortness test 22) the deeper multifidi are almost certainly in need of toning.

Toning exercises

A. Trunk extension test 1, as an exercise

- Perform test A above (Fig. 6.22A), involving repetitive (up to 15) short extensions of the spine, lying face down, hands behind neck, followed by a sustained 30-second hold in this position.
- It may help if, before you perform each lift, you introduce the braced spine/hollowed abdomen contraction, as described in toning exercise 8A above.
- This series of repetitions should be done daily until the test can be 'passed', i.e. you can do 15 repetitions and the 30-second hold without difficulty.
- You should also do toning exercise C below.

B. Prone trunk extension test 2, as an exercise

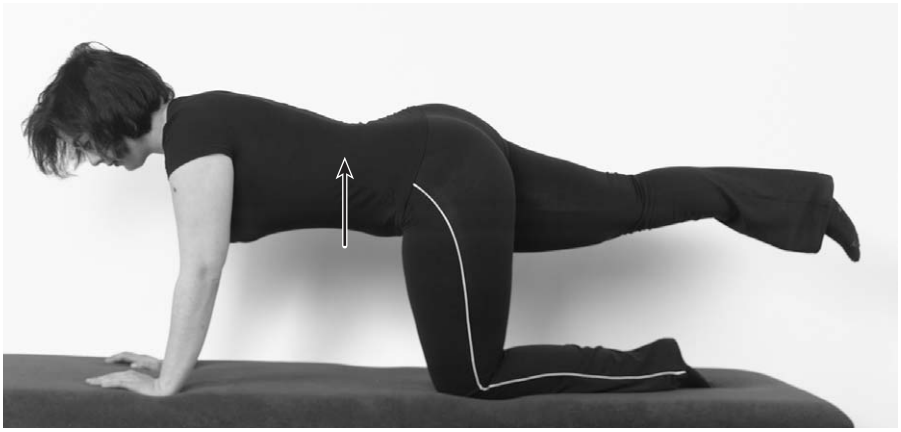
- Introduce the braced spine/hollowed abdomen contraction (see Fig. 6.12B).
- Lie face down with your hands beneath your shoulders, tuck your chin in slightly and consciously ease your shoulder blades towards your waist and perform a push-up off the floor 2–3 inches (5–8 cm) *while maintaining your spine in a straight line* (see Fig. 6.22A).
- Do not arch your back or your neck while doing this.
- Your back should remain in a straight line throughout.
- Hold each lift for 2–3 seconds and then lower, pause for 2–3 seconds and repeat up 15 times.
- Then maintain the lift position for as long as possible or until 30 seconds have passed.
- Once you can perform this sequence your multifidi are toned and will have recovered a great deal of their endurance potential.
- You should also do toning exercise C below.

C. Agonist and antagonist co-contraction exercise

- This exercise is essential for recovering tone and balance between abdominal and spinal stabilizers.
- Kneel on all fours, balanced on your hands and lower legs, spine straight.
- Introduce the braced spine/hollowed abdomen contraction (see Fig. 6.12B).
- Extend one leg behind you (you are now balanced on two hands and one lower leg), gradually raising it until it is level with your waist (see Fig. 6.23A).
- Hold this for 5 seconds.
- Maintain your 'hollow abdomen' and a straight spine throughout.
- Lower the leg and repeat until you start to find it difficult.
- Now do precisely the same with the other leg raised until you start to feel difficulty.
- When you can perform each of these 12 times, add the next progression, which involves raising one leg as well as the *opposite* arm (a sort of 'superman' position) (Fig. 6.23B).
- Once you can raise the right arm and left leg and then the left arm and right leg, 12 times, for 5 seconds each, while maintaining a 'hollow abdomen', you will have toned your multifidi to an excellent state of endurance.

Note: This selection of toning techniques is by no means a comprehensive listing of all the possible body areas which may be self-treated in this way or of the methods available. However, the methods described in this chapter are simple, safe and of proven value.

Remember that causes should always be sought for such problems, because treating the symptoms alone (weak muscles and unstable joints) is never enough. It is suggested that close attention be paid to the methods described in Chapters 5 and 7, as these complement the muscle toning procedures described in this chapter.



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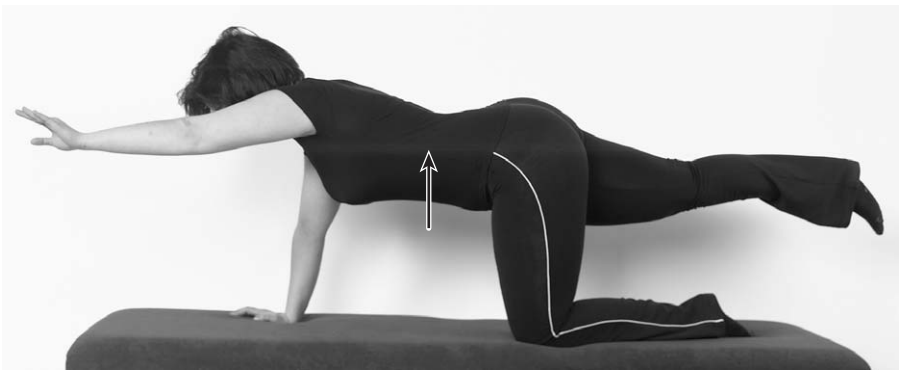

B

Figure 6.23
A: Abdomen hollowed and leg raised to achieve co-contraction of deep stabilizers. B: Abdomen hollowed and leg and other side arm raised to achieve co-contraction of deep stabilizers

Balance, agility and breathing 7

If you appropriately apply the exercises described in earlier chapters you should be able to release many of your tight and restricted muscles and joints, deactivate troublesome trigger points, increase your flexibility, make your deep stabilizer muscles more efficient and generally have a body in good working order.

But without a good sense of balance you will function far less efficiently and in this chapter some very simple, but effective, balance retraining approaches will be described.

And if you have acquired breathing habits that are stressful to the spine and trunk joints and muscles, a variety of restriction and shortening imbalances – and the problems these cause – will recur.

Balance and agility

Your brain and nervous system receive a constant stream of information from your eyes, your inner ear and from thousands of tiny nerve centers in the soles of your feet (pressure receptors), as well as from the muscles and joints of your ankles, knees, pelvis, spine and neck (mechanoreceptors, proprioceptors).

All this information is processed by your brain and central nervous system, so that at any given time your brain knows where you are in space and where the different parts of your body are. This allows you to move and function in a balanced way, without falling over. The efficiency with which this intricate barrage of information is received and interpreted decides whether you are agile or lacking in agility.

SIGNS OF LOSS OF AGILITY

- You may notice yourself feeling unsteady at times or even actually lose your balance.
- Your walk may have become more of a shuffle, with less of the spring-like action of the athlete or dancer.
- Or when you come to the top of a staircase, you may find yourself hesitating momentarily as you judge your next step – something you would not have done when you were much younger or much more agile!
- This 'hesitation' may be even more obvious when you reach the top step of an escalator that is going down.
- You may feel uncertain when you need to go up a step-ladder, even a few rungs.

- Dancing or sporting activities (such as a golf swing) may have become problematic, with a sense of clumsiness that was not apparent in the past.

Agility is balance in action and it is as important to normal function as strength, flexibility and stability.

Balance test 1A

- Stand on one leg with your eyes open.
- Your non-standing leg should be flexed to 45° at the hip and 90° at the knee, so that the flexed knee is in front and the foot behind the other leg.
- As an example, if you stand on your right leg, your left foot should be held so that it is just behind your right knee. Your left leg should at no time touch the right leg.
- Your hands should be at your sides and should not be used to touch anything for balance.
- Once you have established balance with your eyes open, you should close the eyes and remain balanced on one leg without the standing foot shifting or your eyes opening.
- The length of time during which single-leg balance can be maintained (without balance being lost, your hands being used to reestablish balance or your supporting foot shifting to assist in restoration of balance) should be measured.
- Try to establish the longest period you can maintain balance on one foot, eyes closed, in this way, first on one leg and then the other.
- Experts suggest that between *20 and 49 years of age*, a maintained balance time of between approximately *25 and 29 seconds* is normal.
- Between *49 and 59 years of age*, *21 seconds* is normal.
- Between *60 and 69 years of age*, just over *10 seconds* is acceptable.
- After *70 years of age*, *4 seconds* is regarded as normal.

Balance test 1B. Possible jaw/teeth involvement

- Do this test with your mouth closed, teeth touching, and make a note of the longest period of balance.
- Do the test again (several times) with your teeth not touching and make a note of the longest period of balance.

Interpretation

1. If your balance time matches the 'normal' ranges above, you need do nothing more about your balance.
2. If your balance time is less than 'normal' with your mouth *closed*, the causes probably lie in imbalances in your neck, feet or some other source of information for your brain and can probably be helped by the exercise described below, and appropriate balancing and normalizing of restrictions, shortnesses, weaknesses, etc.
3. If your balance time is less than 'normal' with your mouth *open*, then you may have an imbalance in your jaw or teeth and an appropriately trained dentist (one who is familiar with craniosacral methods) should be consulted.

THE MANY CAUSES OF LOST EQUILIBRIUM

- There are a variety of possible causes of a reduced sense of balance, including problems associated with the feet, spine, neck and jaw.
- There is evidence that identifying dysfunction in the neck, as well as related muscles and joints, can help normalize some of these causes.
- Treatment methods including MET (RI and PIR), particularly applied to neck (especially the suboccipital muscles) as well as jaw muscles, can be helpful.
- Dental imbalance (loss of good occlusion) may also be a factor.
- Middle ear, as well as circulatory factors may also be involved.
- Neurological causes are possible and require expert attention.
- Treating short muscles and restricted joints in key areas such as the neck and feet is often a useful first step if the causes are mechanical. The methods outlined in Chapters 3, 4, 5 and 6 can all be helpful in self-treatment of these areas, ideally with professional guidance.

Balance exercise 1

As with many of the tests in previous chapters, the rehabilitation exercise for loss of basic balance is the same as the test.

- Once daily, stand in a doorway (so that you have something to grasp if you lose balance) and practice the balance test as above (one leg, eyes closed or blindfolded), first on one leg and then the other.
- Repeat this several times.
- Over a period of weeks you should gradually increase your balance time, until you reach the 'normal' values listed above.

Balance test 2. Stepping test

- One way of evaluating the degree of neck involvement in any loss of balance is the stepping test in which you close your eyes and step in place (with your arms extended forward, horizontal and parallel, in a sleep-walking posture) for 50 steps (see Fig. 7.1).
- How far you rotate from the starting position is then assessed.
- When your head is turned to the left when doing the stepping test, your body will tend to rotate to the right (and vice versa).
- The normal degree of rotation away from the side to which your head is turned is between 20° and 30° from where you started.
- You should repeat the test with your head rotated in different directions, as well as in neutral (facing straight ahead, eyes closed).
- While performing the test there should be no sound or light source which could suggest a direction.
- As you march on the spot try not to raise your thighs excessively, an approximate 45° lift being the best.
- The pace of stepping in place should be rhythmical and moderate, not too rapid.
- It is better to use a blindfold than just to close your eyes, if possible.
- If you have rotated more than 30° after 50 steps then you may require skilled attention from an optician, an osteopath or chiropractor.

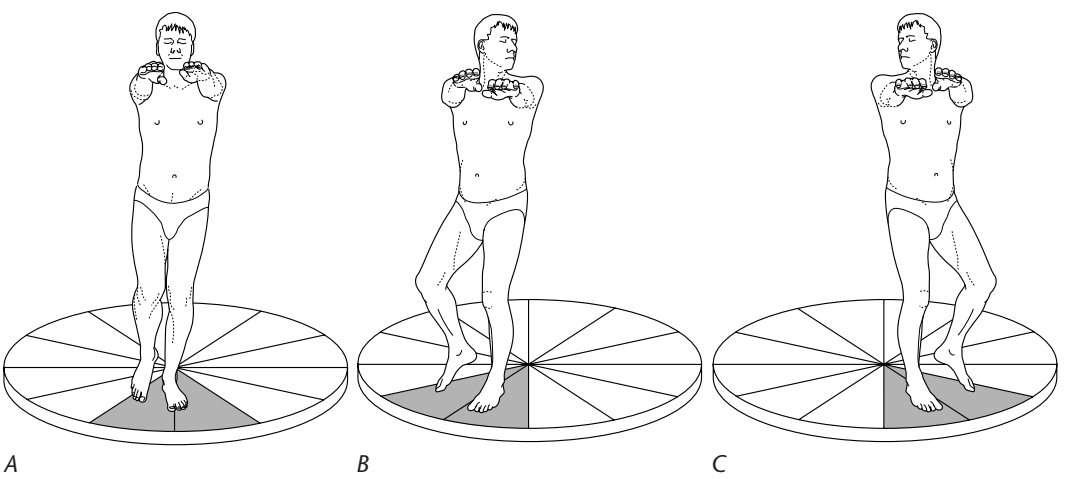

Figure 7.1 *The stepping test (Fukuda–Unterberger test). A: Normal range of rotation when facing forward, eyes closed. B: Normal range of rotation to the right when head is turned left. C: Normal range of rotation to the left when head is turned right*

- If the test results show an abnormal degree of rotation (more than 30°) then the test should be repeated periodically, during and after the use of tactics directed at normalizing dysfunctional patterns revealed during assessment, possibly involving the feet, spine, pelvis, neck or eyes.
- As the dysfunctions improve the stepping test should produce more normal degrees of rotation, indicating improved integration, coordination and balance.

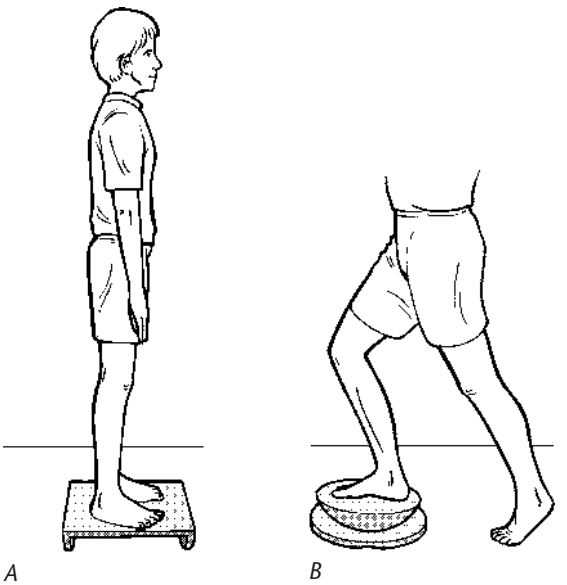

Figure 7.2 *A: Rocker board as used in balance retraining. B: Wobble board as used in balance retraining (available from OPTP (800) 367-7393 USA)*

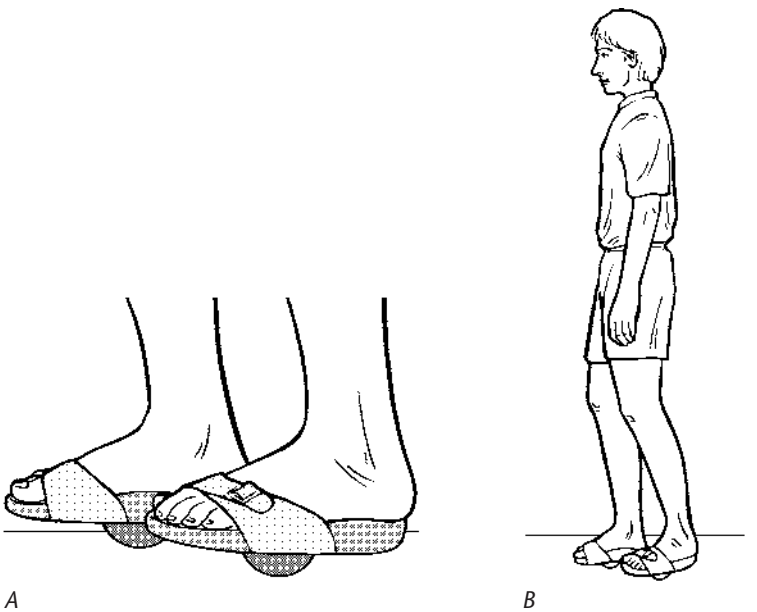

Figure 7.3 *A: Balance sandals to assist retraining (available from OPTP (800) 367-7393 USA). B: Walking on balance sandals*

ADDITIONAL TOOLS TO HELP RESTORE BALANCE

There are many tools that can be used, usually under expert guidance, to help restore balance. These include the balance board, wobble board, balance sandals, standing and walking on thick foam, etc. (see Figs 7.2, 7.3), tai chi and yoga exercises.

Breathing

Unbalanced breathing patterns create mechanical as well as circulatory problems. In this book it is the stress and strain caused by overuse of particular muscles that are the most obvious reasons for emphasizing the importance of better breathing habits.

The underoxygenation of tissues that results from an unbalanced breathing pattern (which has more to do with excessive carbon dioxide exhalation than insufficient oxygen being breathed in) is also largely responsible for the background to trigger points. This type of breathing is common in people with asthma and bronchial disorders and anyone with a tendency to hyperventilate.

Mechanically it is the neck, chest and upper back muscles that are excessively stressed with upper chest breathing. If it is these muscles that you have been self-stretching and generally trying to normalize by methods outlined in earlier chapters, it makes sense to try to improve your breathing pattern to reduce the strain and shortening that follow from overuse!

As the assessment in Chapter 2 (see Functional test 3) demonstrates, the scalenes, sternomastoid, upper trapezius, levator scapulae and pectoralis major, as well as other muscles in the region, can all shorten over time due to the overuse that flows from this breathing pattern. As you breathe into the chest (rather than the abdomen as should be the case with diaphragmatic breathing) the shoulders rise, sometimes markedly, sometimes only a little. It is therefore important to reduce this tendency for the shoulders to rise on inhalation, when practicing better breathing habits.

All or any of the following methods can be used to achieve this. In particular, Brugger's relief position should be used a number of times each day.

Breathing exercise 1. Antiarousal breathing

Note: This exercise incorporates pursed lip breathing as described in toning exercise 11 (p. 153) in Chapter 6. Research has shown it to be extremely efficient in helping to retrain poor breathing habits and inducing a sense of calm.

- Sit or lie and place a hand on your abdomen and the other hand on the chest to monitor the movement of the diaphragm as you inhale after the long slow exhalation described below (your abdomen should move forward as you breathe in, if your diaphragm is working correctly).
- Breathe in *through the nose* and *very slowly* out through the mouth, with pursed lips. To encourage pursed lip breathing you might imagine that you are (a) blowing through a straw, (b) blowing slowly and steadily at a candle to make it flicker but not go out or (c) slowly blowing up a balloon.
- The out-breath should take anywhere from 4 to 8 seconds.
- Count silently to yourself as you inhale and exhale, to establish the desired rhythm in which exhalation takes twice as long as inhalation (it may take several weeks of daily practice before you achieve this).

- Try to avoid any particular focus on your inhalation. Let this be more or less unstructured. It is the long, slow exhalation that creates the opportunity for a full inhalation and your attention should be on this out-breath.
- Once your rhythm of breathing has been established (after several weeks of practice) a full cycle (in and out) should last around 10 seconds – but only when doing the exercise.
- Repeat the inhalation and exhalation for 30 cycles, at least once and ideally twice daily, to begin the process of rehabilitating your breathing.

Breathing exercise 2. Preventing a rise of the shoulders

- Sit in an upright chair with armrests, and place your elbows and forearms on these (Fig. 7.4).
- Push moderately firmly downwards with the elbows/forearms whenever you are inhaling in breathing exercise 1 above.
- Release the pressure as you exhale.
- The downward pressure prevents your shoulders from rising and encourages a more correct use of many of the associated breathing muscles.
- This may feel odd at first but repeat the breathing cycle 30 times, twice daily, to start retraining the correct muscles and restricting the inappropriate ones.
- This method (and the others outlined in this chapter) should be accompanied by stretching of muscles such as the scalenes, trapezius, levator scapulae and sternomastoid (see Chapter 3), all of which may have shortened.
- Always remember to sit quietly for a few minutes after deep breathing in case of transient dizziness.

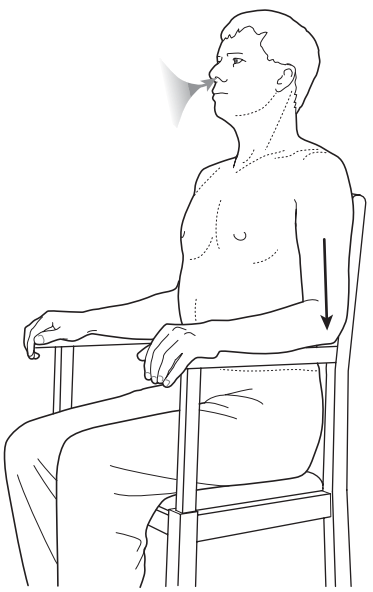

Figure 7.4 *Restricting shoulder movement by pressing forearms downward on inhalation*

Breathing exercise 3. 'Beach pose' to open the chest and restrain the shoulders

- Recline with your knees bent, feet flat on the bed/floor, head on a pillow and with your hands clasped together behind your head, as you practice breathing exercise 1 above.
- This position, known for obvious reasons as the 'beach pose', restricts shoulder movement as well as opening the chest cage (see Fig. 7.5).

Figure 7.5 *'Beach pose' for breathing retraining (after Bradley)*

- This may feel odd at first but repeat the breathing cycle 30 times, twice daily, to start retraining the correct muscles and restricting the inappropriate ones.
- This method (and the others outlined in this chapter) should be accompanied by stretching of muscles such as the scalenes, trapezius, levator scapulae and sternomastoid (see Chapter 3), all of which may have shortened.
- Always remember to sit quietly for a few minutes after deep breathing in case of transient dizziness.

Breathing exercise 4. Arms behind back as a shoulder restraint

- Sit in a chair without arms (typical dining or office chair, for example) with your arms draped behind your back (Fig. 7.6).
- Hold one wrist with the other hand and apply a downward pull on inhalation, releasing on exhalation whenever you practice breathing exercise 1 outlined above.
- This method (and the others outlined in this chapter) should be accompanied by stretching of muscles such as the scalenes, trapezius, levator scapulae and sternomastoid (see Chapter 3), all of which may have shortened.
- This may feel odd at first but repeat the breathing cycle 20–30 times, at least twice daily, to start retraining the correct muscles.
- Always remember to sit quietly for a few minutes after deep breathing in case of transient dizziness.

Breathing exercise 5. Brugger's relief position

This position should be adopted for a few minutes, several times a day, especially if you have to spend much of the day seated at a desk or computer.

- Sit very close to the edge of your chair, arms hanging down at your sides.
- Place your feet directly below your knees and then move them slightly more apart and turn them slightly outward (Fig. 7.7).
- Roll your pelvis slightly forward to produce a *very small degree* of arching of your low back.

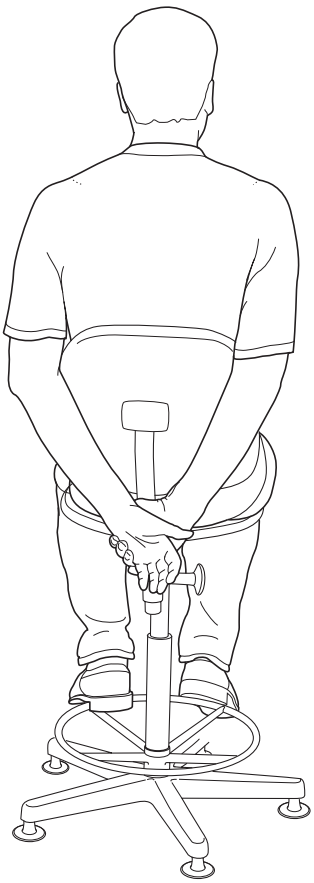

Figure 7.6 *Seated with arms behind back allows restriction of shoulder movement on inhalation (after Bradley)*

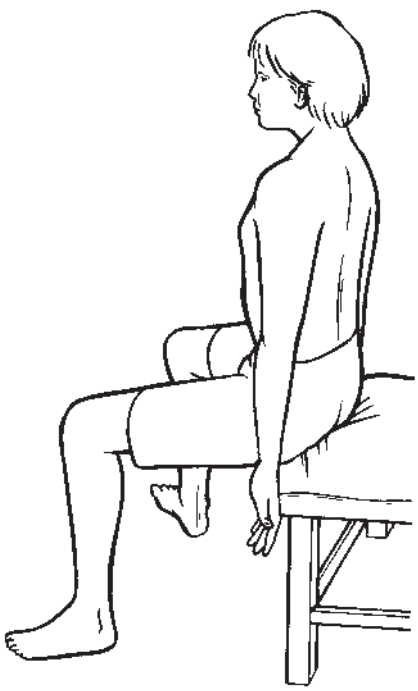

Figure 7.7 *The Brugger relief position (after Liebenson)*

- Ease your sternum (breast bone) slightly forward and up toward your throat.
- Turn your arms outward so that the palms face forward.
- Separate your fingers until your thumbs face slightly backward.
- Tuck your chin in gently.
- Maintain this posture while you practice 4–5 cycles of slow breathing as in breathing exercise 1 above.
- Repeat this whenever you sense muscle tension during sitting or if you feel the need for deeper breathing.
- This 'relief' posture ensures that the chest can be as free and open as possible and reverses many of the stresses caused by long periods of sitting.

Introducing positional release technique and strain and counterstrain

8

Not surprisingly, painful muscles are commonly also tense and releasing the tension usually helps to ease the level of discomfort, as well as normalizing the function of the muscle(s) in question.

Massage and other manual and stretching methods can often assist in relaxing tense, tight muscles, even if only temporarily. However, manual treatment is not always available and may actually be contraindicated, for example if the area is inflamed.

Stretching (such as that described in earlier chapters, using MET) may help, but at times this may be too uncomfortable or, in the case of recent injury or inflammation, it might also be contraindicated.

Fortunately there is another way of easing tense, tight muscles and improving local circulation, which can be used safely even when there is inflammation or tissue damage, and this is called positional release technique (PRT).

PRT is itself made up of a number of quite different methods, but the one that is most suitable for home/self-use, and which is described in this chapter, is called strain and counterstrain (SCS). In order to understand this method a brief explanation is needed.

It has been found in osteopathic medicine that most painful conditions involve parts of the body that have been strained or stressed in some way, either quickly in a sudden incident or gradually over time because of habits of use, poor breathing habits, bad posture, etc.

When 'strains' occur, whether acute or chronic, some tissues (muscles, fascia, ligaments, tendons, nerve fibers, etc.) may be stretched, while others are in a contracted, tense or shortened state. It is not surprising that discomfort emerges out of such patterns or that these strained, tense, shortened and basically vulnerable soft tissues are likely to react painfully when asked to do something out of the ordinary, such as lifting or stretching. The shortened structures will have lost some of their normal elasticity, so it is not uncommon for acute strains to occur in tissues which are already chronically stressed and tense.

What has been found in PRT is that if the tissues which are short can be gently eased to a position in which they are made *even shorter*, a degree of comfort or 'ease' is achieved which can temporarily remove pain from the area and allow a remarkable degree of release of the tense, defensive/protective 'holding pattern'.

But the question arises, how are we to know in which direction to move tissues which are very painful and tense? There are some very simple rules and we can apply these to ourselves in an easy 'experiment'.

PRT (SCS) EXERCISE FOR CHEST MUSCLES (see Fig. 8.1)

- Sit in a chair and with a finger, search around in the muscles between your upper ribs (on the left side in this example).
- Most of us have painful spots in these muscles, so find a place which is sensitive to pressure.

Figure 8.1
Self-treatment of upper chest pain using strain and counterstrain

- Press just hard enough to hurt and grade this pain for yourself as a 10 (where 0 equals no pain at all).
- While still pressing the point, bend your neck and shoulders forward a little, very slowly, so that your chin moves towards your chest.
- As you move forward in this way keep deciding what the 'score' is in the painful point.
- As soon as you feel the pain ease a little, start to slowly turn your head and neck toward the side of the pain, until the pain drops some more.
- By 'fine tuning' your head/neck/shoulder position, with a little turning, side bending or increased bending forward, you should be able to get the score close to 0.
- When you find the most comfortable position (where the score is as low as you can achieve) you will have taken the pain point to its position of ease. If you stay in that position (you don't have to keep pressing the point) for another minute or so, when you *slowly* return to sitting up straight, the painful area should be less sensitive to pressure, the area will have been flushed with fresh oxygenated blood and the muscles will have relaxed.
- If you self-treat the muscles between the ribs (as in this exercise) in order to ease feelings of tightness or discomfort in the chest, breathing should become easier and less constricted.
- The tender points that can help you to release tight muscles between the ribs are often found either very close to the sternum (breast bone) or between the ribs, either (for the upper ribs) in line with the nipple or (for ribs lower than the 4th) in line with the front of the axilla (armpit).
- If you follow these instructions carefully, creating no new pain when finding your positions of ease and not pressing too hard, you cannot harm yourself and might release tense, tight and painful muscles.
- If this were a really painful area – and not just an 'experimental' one – the pain would be expected to continue to ease over the next day or so, in response to this 'treatment', and the local tissues would stay relaxed (unless you did something to aggravate the area).
- You can self-treat any pain point in this way, anywhere on the body, including a trigger point (see Chapter 4).
- This method may not 'cure' the problem (sometimes it will, especially in recent strains) but it usually offers ease from pain, even chronic pain.

Jones' work

The osteopath who first discovered the principles of SCS was Lawrence Jones. His research showed that the position of ease, in which a tender point feels less sensitive, is usually identical to the position in which the original strain or injury occurred.

For example, if someone is standing on a ladder and painting a ceiling and she subsequently develops a pain in the low neck or shoulder, it is probable that some strain occurred whilst the arm was extended and the neck was tilted back. It is in some variation of this position that either the pain itself would feel considerably reduced or the pain noted in a tender point being contacted by a probing finger would reduce (in such a strain the tender point would probably be located around the base of the neck).

Jones also found that the shortness of muscles that have been strained (chronically or acutely) gives a clear guide as to the ideal position of ease when using tender points as a guide toward comfort – and this is to make what is already short, shorter; to comfortably crowd and fold the already contracted muscles and other tissues. In other words, he showed that exaggeration of the already distorted position is what is comfortable for the tissues.

We are all familiar with the stooped position adopted by someone with 'lumbago'. Try to force him to stand erect and the screams would soon stop the effort. Ask the stooped individual to bend further, however, and often this is easily and painlessly achieved if done slowly. Ask him if he recalls how it started and often you will be told that he was bending, lifting or carrying something awkward when a pain was felt and he was been stuck that way ever since.

The fascinating final piece of Jones' jigsaw puzzle is that the tender point in a condition which resulted from bending forwards is not to be found in the region of the pain which the person feels in his back, but rather on the front of the body, in the abdominal muscles. The tender point for the injured low neck is found on the back of the body near the spine, when the injury occurred with the individual stretching up and bending backwards. In the same way the tender point for a forward-bending strain can be found on the front surface of the body.

If a strain occurs in a twisted or side-bent position then there would also be a more lateral location of the tender point than if the strain had occurred in simply bending forwards or backwards.

How can you use this knowledge in self-treatment? If you know how a strain took place, you can use that knowledge to locate the tender point, which can subsequently be used to help find the position of maximum ease, the position of release. If you do not know in what position the strain took place, you may have to experiment in order to find either a position of maximum ease in terms of an existing pain, or a tender point, found via palpation, which you can use as your guide to find a position of release.

Guidelines for self-application of PRT (SCS)

- You could be seated or lying down (which is sometimes the best position to avoid having to counteract the influence of gravity). Examples will be given later in this chapter of different positions for self-treatment using SCS.

- Locate any painful point, anywhere on the body, and press just hard enough to score 10.
- You should consider first searching for tender points in muscles that are shortened, as identified in Chapter 2.
- If the point is on the front of the body, bend forward to ease it.
- The further the tender point is from the midline of your body, the more you should ease yourself *toward* that side (except in the neck where movement may be toward or away from the tender point you are pressing, depending on which movement eases the pain most).
- If the point is on the back of your body, ease your trunk slightly backward until the pain 'score' drops a little and then turn *away* from the side of the pain and then 'fine tune' to achieve ease (a score of 3 or less).
- Make sure that no pain is being produced elsewhere when you are fine tuning to find the position of ease.
- If the tender point is on a limb, think of trying to 'shorten' the muscles which house the tender point (*not* stretching the muscle), by slowly moving the area into different positions and judging what each new position does to the pain 'score'.
- When you are positioning an area, following the guidelines given above, if the score is not reducing, you should abandon the guidelines and try other directions of movement until you eventually identify a position of ease (this is why these suggestions are called 'guidelines' and not 'rules').
- Hold the final position of ease (where the pain score is 3 or less) for not less than 30 seconds (longer would be better, usually up to 90 seconds) and then very slowly return to the neutral starting position.
- It is advised that you do not treat more than five pain points on any one day as your body will need to adapt to these self-treatments and you might feel stiff and sore if you treat too many.
- Expect improvement in function fairly soon (immediately or within minutes) after such self-treatment, but reduction in pain may take a day or so and you may actually feel a little stiff or achy in the previously painful area the next day. This will soon pass.

Note: Those practitioners who use PRT as part of their treatment methodology are mainly osteopaths and physiotherapists, as well as some chiropractors and massage therapists.

A self-help formula

How can you know where to search for a suitable tender point to press on, while going through the positioning process described above? A simple formula exists to help you.

- Firstly you need to identify a movement that hurts or that is restricted.
- The formula states that the area of tenderness that you need to be monitoring (during the positioning process) will be located in muscles that would perform the opposite movement to the one that is painful or restricted.

REMINDER
It is important to emphasize that tender points to be used as 'monitors' during the positioning phase of this approach are not looked for in the muscles opposite those where pain is felt but in the muscles opposite those which are *actively moving* when pain or restriction is felt.

CAUTION
Because assistance is required for some of the positioning, as well as for the monitoring of tender points, when trying to ease the symptoms caused by backward bending of the spine, only a brief outline will be given of these strains.

It is not suggested that you offer treatment, or are treated, using these methods except as an emergency first aid approach while waiting for an appointment to see a qualified healthcare professional trained to deal with strains of the back.

PRT exercises

PRT (SCS) EXERCISE 1. NECK ROTATION

- If you feel pain (*irrespective of where the pain is felt*) when you turn your neck to the right, a tender (monitoring) point should be found in the muscles which turn the head to the left (and which are probably short and tight).
- The tender point (and the muscles in which it lies) will usually be 'eased' by carefully positioning the neck and head (using the guidelines outlined above) until the tenderness goes from the tender point.
- Hold this for 30–90 seconds. This could be done lying down or sitting (see Fig. 8.2).

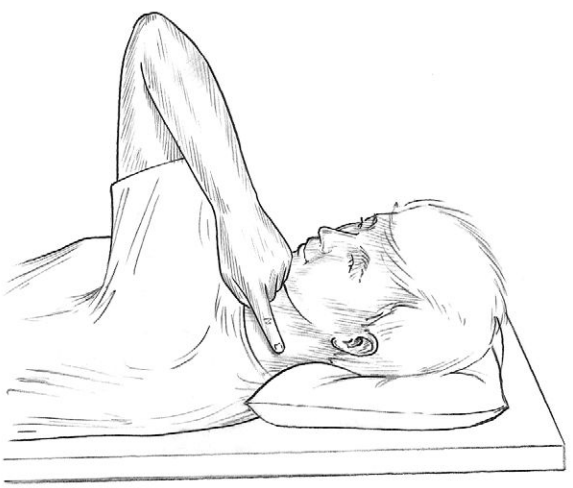

Figure 8.2
Self-treatment using PRT (SCS) for restriction to the right

PRT (SCS) EXERCISE 2. LOW BACK STRAIN

- In the case of someone who is bending forward because of acute pain and spasm, and who has even more pain when trying to stand up straight, the

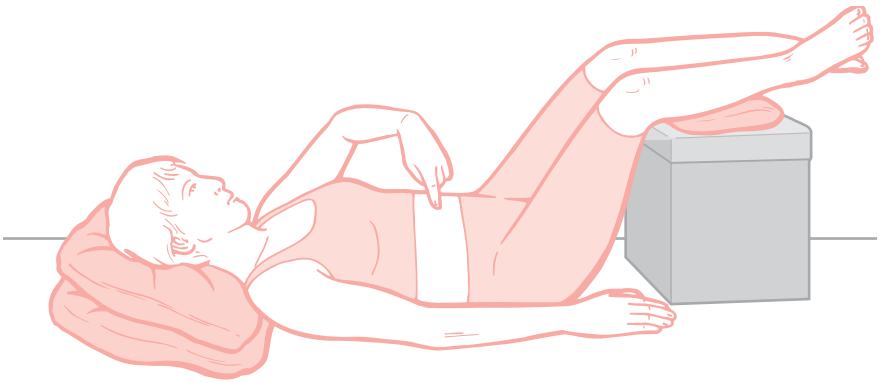

Figure 8.3
Self-treatment using PRT (SCS) for a low back strain that occurred when bending forward or which has 'locked' the person into a forward-bending posture

tender point to be monitored would be on the front of the body, probably in the abdominal muscles or psoas, which are shortened and which would have been in a shortened state when bending forward at the time of the strain.

- The tender point will be 'eased' by carefully positioning the whole body (probably in a lying position) using the guidelines outlined above, until the tenderness goes from the tender point, and holding this for 30–90 seconds (see Fig. 8.3).

REMINDER
It is important to emphasize that tender points to be used as 'monitors' during the positioning phase of this approach are not looked for in the muscles opposite those where pain is felt, but in the muscles opposite those which are *actively moving* when pain or restriction is felt.

The following are some of the most common of Jones' tender point sites relating to spinal and other strains. In some of the examples below, great detail is given as to the possible variations in position. In others only an outline is given. It is suggested that you carefully read and follow the detailed examples and then use the same principles for the outlined examples.

PRT (SCS) EXERCISE 3. UPPER NECK STRAIN (FORWARD BENDING)

Tender points for strain of the very top of the neck, if this area was strained while forward bending, are usually found between the angle of the jaw and the mastoid process behind the ear or just in front of the angle of the jaw. There will probably be difficulty or pain when looking upward.

- You should be lying on a bed or the floor with a cushion under the head to introduce forward bending of the head.
- Having located the tender point, apply pressure to it sufficient to produce tenderness locally and score this as a 10.
- The position of ease for the very top of the neck is usually found by bending the neck forward gently, turning it away from the side of the painful point and perhaps also bending it a little to the side of the pain.
- It may be necessary to experiment with more or less bending forwards, more or less rotation away from the side of pain and more or less side bending

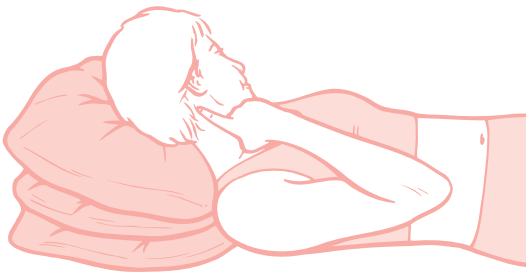

Figure 8.4
Self-treatment using PRT (SCS) for the upper neck strained in forward bending

(taking the ear towards the shoulder) or even turning toward the side of pain (as is usual in the lower neck tender points) (see Fig. 8.4).

- Do this fine tuning until the most relaxed position is found, as indicated by the pain score going down to 3 or less.
- When the ideal ease score is achieved, stay in that position for up to 90 seconds.
- Release the pressure and slowly return the neck to its neutral position.

PRT (SCS) EXERCISE 4. LOWER NECK FORWARD-BENDING STRAINS

For strains which occurred in bending forwards and which are affecting the neck below the very top joint (especially when trying to look upward), the tender points are usually located on the tips of the corresponding transverse processes. These are the bones which protrude sideways from the vertebrae and the tips of which, in the neck region, are felt in a line running down the side of the neck, roughly in line with the ear lobe.

- Lying on the floor with a cushion under your head, the positions of ease for these points are commonly found by bending/tilting the neck forward, rotating it away from the painful side and sometimes, especially in the region of C5 and C6, side bending away from the painful side as well (see Fig. 8.5).
- If the painful point is somewhere around the middle of the neck, backward bending may help most to ease the tender point sensitivity.
- For a forward-bending strain of the low neck, the tender point often lies close to the collar bone and the ease position involves forward bending of the neck and rotation and side bending until ease is achieved (see Fig. 8.6).
- Stay in the position of ease for 90 seconds.

Figure 8.5
Self-treatment using PRT (SCS) for the lower neck strained in forward bending

Figure 8.6 *Self-treatment using PRT (SCS) for the very low neck strained in forward bending*

PRT (SCS) EXERCISE 5. BACKWARD-BENDING NECK STRAINS (TOP OF NECK)

This type of strain will be characterized by difficulty or pain when tipping your head forward.

- The treatment of extension strains (backward bending) usually involves taking the area into extension, in the direction in which the strain occurred.
- Pain or restriction after such strains will usually be experienced when trying to take your head forward and down. This sort of 'crick in the neck' is often experienced after waking with your head in an awkward position.
- Self-treatment of the neck region is best achieved by lying on your side, head on a pillow, with the painful side uppermost.
- Extension strains of the top of the neck usually create tender areas (a) in the muscles at the base of the skull (suboccipitals) or (b) just to the side of the prominence on the skull which lies just above the occiput.
- For (a), locate the tender point and extend your head and rotate it towards the side of the pain that takes the pain score down to 3 or less.

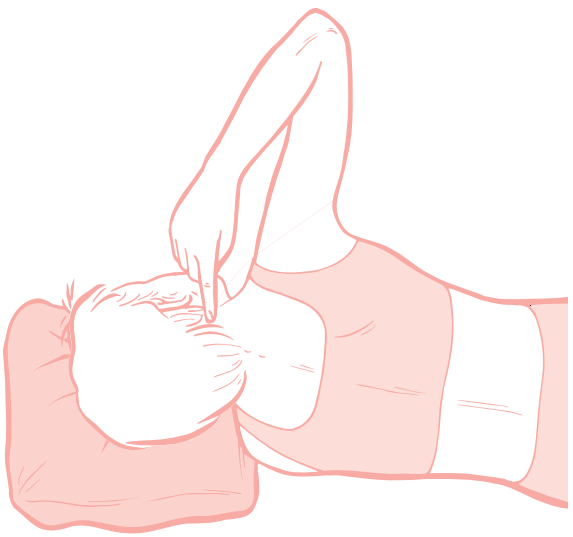

Figure 8.7 *Treating the top of the neck when strained in backward bending, position (a)*

Figure 8.8 *Treating the top of the neck when strained in backward bending, position (b)*

- Fine tuning is achieved by increasing the degree of extension, not of the neck itself but of the head on the neck (i.e. tilt your head slightly backwards on the neck) (see Fig. 8.7).
- For (b) the opposite is required. Side lying, head on a pillow, with maximum *flexion* (forward bending) of the neck, place your chin close to the upper chest or lower throat (see Fig. 8.8).
- No rotation is usually needed for (b) as the tender point felt to the side of the back of the skull will usually vanish as your head is taken forwards.
- Hold the appropriate position, whether (a) or (b), for 90 seconds then slowly release and return to neutral.

PRT (SCS) EXERCISE 6. BACKWARD-BENDING NECK STRAINS (REST OF NECK)

This type of strain will be characterized by difficulty or pain when trying to take the head and neck forward.

- Extension strains of the rest of the neck tend to produce tender points close to the spine itself, in the groove lying alongside the prominent bones on the midline (the spinous processes).
- Lie on your side, with the painful side uppermost, your head on a cushion, so that it is kept in the midline and is not allowed to tilt sideways.
- Take your head and neck backwards and rotate towards or away from the painful side (whichever reduces tenderness in the point most) (see Fig. 8.9).
- If fine tuning is not successful in easing the tenderness, introduce side bending as well, until maximum ease is noted in the tender point.
- Hold the ease position for 90 seconds.
- The exception to this may be experienced in the middle area of the neck which, instead of being taken backwards, may need to be taken into forward bending to reduce the tenderness score.

Note: It is suggested that if, when you are following the guidelines given in this section, you find that it is not possible to positionally ease the tender point pain, try variations until you find the right position. Your body will always tell you when you are in the correct position of ease. Always position areas slowly and in a controlled manner, never quickly, and *never* to produce increased pain of any sort. This is essentially the most gentle of methods and should under no circumstances involve pain during positioning or holding of the position adopted for ease, apart from the initial tenderness felt in the

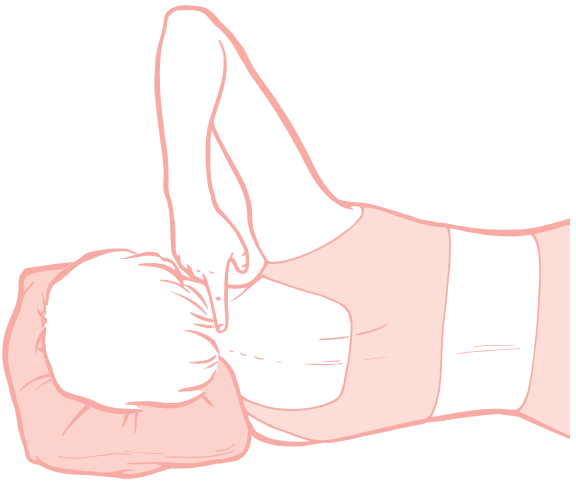

Figure 8.9 Treating the lower part of the neck when strained in backward bending

tender point. If any other pain is noted, stop immediately and consult a trained osteopath.

PRT (SCS) EXERCISE 7. FLEXION (FORWARD-BENDING) STRAINS OF THE THORACIC SPINE

This type of strain will be characterized by difficulty or pain on trying to stand up straight or bend backward.

The treatment of flexion strains in the thoracic region of the spine involves positioning the body in a curled-up or flexed position.

- Lie on your back with your knees bent up and a cushion under your head or adopt a curled-up, side-lying position.
- Tender points for upper back strains which occurred in flexion (forward bending) lie in the hollow above the sternum (breast bone).
- Fine tuning involves taking your head into full forward bending with slight rotation to one side or the other until the tenderness in the point is much reduced or non-existent (see Fig. 8.10).
- This is held for 90 seconds.
- Forward-bending strains of the middle upper back result in tender points on the sternum/breast bone itself, roughly half an inch apart.
- Self-treatment positions for these involve flexion, directing your head towards one or other foot, producing in this way a degree of side bending/rotation.

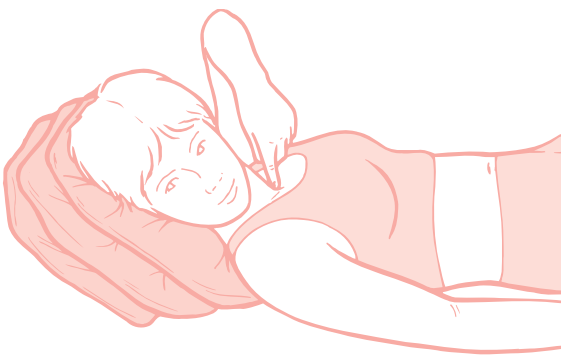

Figure 8.10 Treating the top of the spine area, below the neck, when strained in forward bending

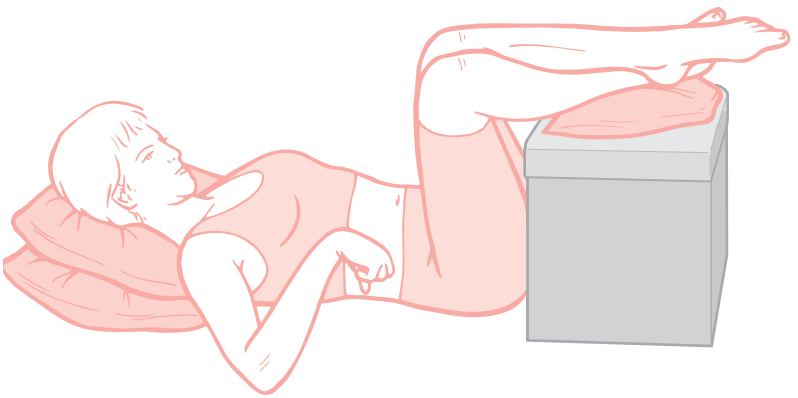

Figure 8.11 Treating the middle to lower thoracic spine area, when strained in forward bending

- The lower the problem, the more essential it is to ensure overall flexion by bringing your knees well up towards your chest as the neck and upper back are bent forward and side bent, until the tenderness in the palpated point eases to 3 or less.
- A cushion under your buttocks, flexed knees and several cushions under your neck/head/upper back can all help to produce the desired position, although it can be time consuming finding the precise position of ease.
- It may be necessary to introduce some side bending and at times crossing the ankles may help (see Fig. 8.11).
- Tender points for the lower thoracic area strained in forward bending are found either just below or slightly to the side of the small prominence at the base of the sternum/breast bone and on the abdomen itself, close to the navel or in the abdominal muscles above or below it.

PRT (SCS) EXERCISE 8. EXTENSION STRAINS OF THE THORACIC SPINE

This type of strain will be characterized by difficulty or pain when bending forward.

- Just as the tender points for extension (backward-bending) strains of the neck region were found near the spine, so are the extension strain points in the thoracic spine (that part of the spine to which ribs attach).
- The 1st thoracic vertebral extension strain tender point is found near the spinous process, close to the midline.
- The lower the strain in the thoracic spine, the more to the side the tender point is located, with 12th thoracic extension strain tender points being located near the tip of the transverse process, the part of the spine that protrudes sideways and which in this region of the spine articulates with the ribs.
- It is very difficult, if not impossible, to maintain a pressure contact on a tender point in this region when self-treatment is being performed. Assistance is therefore necessary, to do this and also to place cushions for support during the positioning stage of the treatment.
- Treatment of extension strains involves backwards bending. The suggested position is lying on the affected side. A pillow should be used to support the upper arm (place this between the arms) so that no twisting of the upper body occurs in this position.

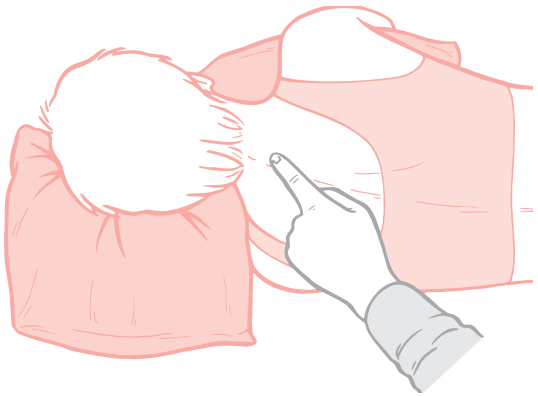

Figure 8.12 Treating the upper thoracic spine area, when strained in backward bending

A

- For upper thoracic extension strains, lie on the side with the arm positioned level with the shoulders. Backward bending of the head/neck produces extension of the thoracic spine. This and a degree of rotation and side bending of the head (usually away from the affected side) is used for fine tuning. Use cushions to support the final position, with the assistance of someone to supply and position these, as the tender point is monitored for lessening sensitivity (Fig. 8.12).
- Hold for 90 seconds once the position of maximum ease is achieved.

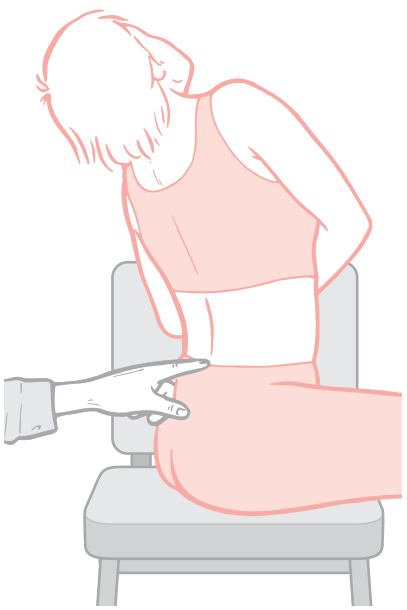

Figure 8.13 Sitting position for treating the low thoracic spine area, when strained in backward bending

B

- For middle thoracic extension strains, side lying is also suggested, with the arms above head level and supported, as above, to avoid twisting of the upper body.
- Hold ease position for 90 seconds.

C

- For lower thoracic extension strains, sit with arms folded, then bend slightly backwards to produce extension (Fig. 8.13).
- Experiment with a degree of rotation and side bending towards or away from the side of the tender point, in order to find the position of maximum ease in the tender point.
- Hold ease position for 90 seconds.

PRT (SCS) EXERCISE 9. FORWARD-BENDING STRAINS OF THE LOW BACK (LUMBAR SPINE)

This type of strain will be characterized by difficulty or pain when trying to stand straight.

- The positioning for these strains to ease tenderness in the palpated point(s) is similar to that used for thoracic flexion strains and does not require assistance.
- Lie on your back with cushions under the upper back and head, as well as under the buttocks. The knees are flexed and supported, ideally by a helper, but otherwise on a stool or seat of a chair (Fig. 8.14).
- For lumbar flexion strains, the tender points may be found in the lower abdomen (below the navel), sometimes close to the pelvic bones above the hip.
- Positioning for most of these points involves the general flexed (i.e. curled-up) position, together with rotation and side bending, usually toward the side of the tender points.
- Rotation and side bending can be achieved by crossing your ankles and ample cushioning. A great deal of patience may also be required to find the maximum position of ease.
- Fine tune until sensitivity in the tender point is reduced to a 3 or less.
- Maintain for 90 seconds.

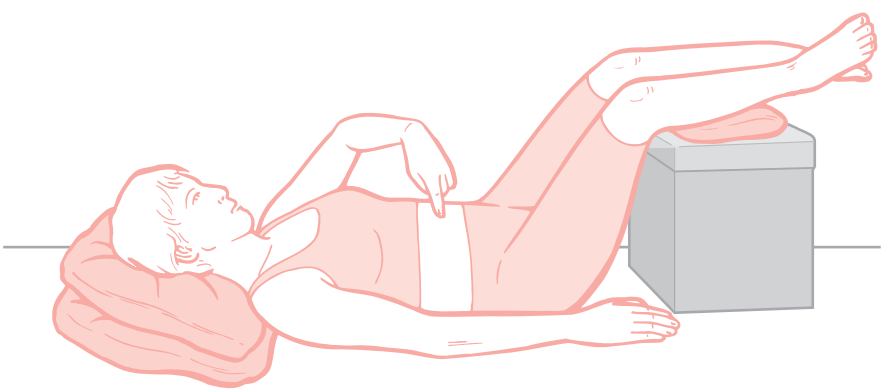

Figure 8.14 *Treating the lower (lumbar) spine area, when strained in forward bending*

PRT (SCS) EXERCISE 10. BACKWARD-BENDING STRAINS OF THE LUMBAR SPINE

This type of strain will be characterized by difficulty or pain when trying to bend forward.

A

- The tender points for *1st and 2nd lumbar* extension (backward bending) strains are found close to the tips of the transverse processes of the respective vertebrae, about 2 inches (5 cm) from the midline.
- The position of ease for tender points related to these strains is achieved by side lying with the painful side uppermost.
- Your upper leg is allowed to come backwards to introduce extension into the low back.
- The leg is then allowed to ease towards the floor in a sort of scissors movement with the other leg (see Fig. 8.15).
- Fine tuning is achieved by taking the leg into more or less extension backwards from the body, while assessing sensitivity in the tender point. Self-monitoring is possible but not easy.

B

- The tender points for *3rd and 4th lumbar* extension strains are found on the crest of the pelvic bone, close to the base of the spine, where the crest of the pelvis ends.
- Self-treatment may be achieved in the side-lying position, with the painful side uppermost and the upper leg extended behind the body, as above.
- Unlike the method used for L1 and L2, the leg should be raised from the floor into a degree of elevation (abduction) supported by an assistant, a stool or firm cushion (see Fig. 8.16).

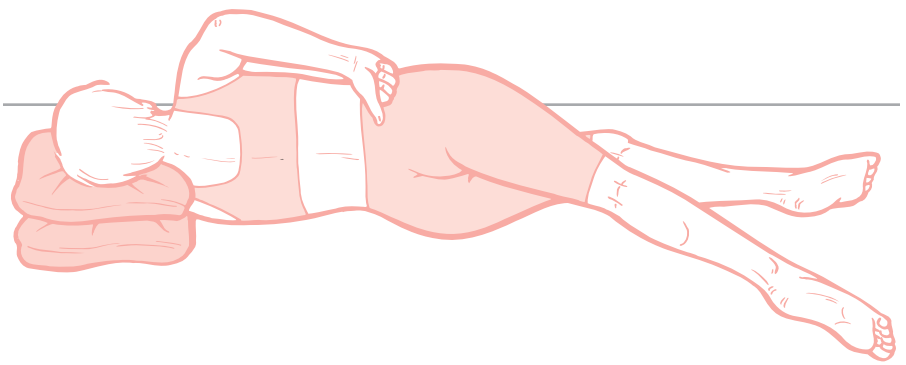

Figure 8.15 *Treating the lumbar spine area (L1 and 2), when strained in backward bending*

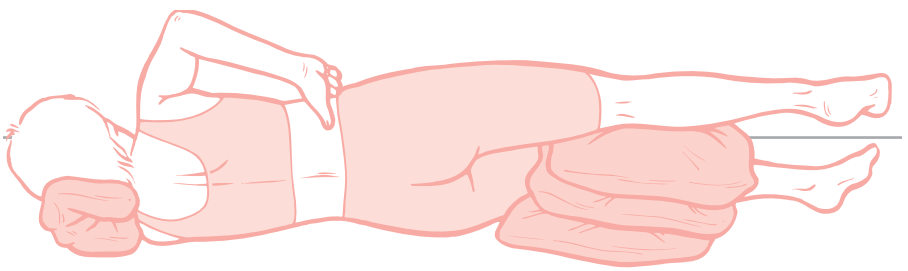

Figure 8.16 *Treating the lumbar spine area (L3 and 4), when strained in backward bending*

- You will probably need help with positioning of cushions to achieve self-treatment in this way.
- In this position, the foot of the upper leg should be rotated outward for fine tuning.

C

- Tender points for backward-bending strains of the *5th lumbar* vertebra (lowest lumbar vertebra) are found either just above or on the sacrum.
- Treatment is the same as for the 1st and 2nd lumbar, as described above (see Fig. 8.15).

PRT (SCS) EXERCISE 11. FOR ANY JOINT PAIN OR STRAIN

To self-treat any joint strain it is suggested that you search the local muscles for tender areas, especially in the muscles which may have shortened during or after the strain. Or use the self-help formula given earlier in this chapter and search for tenderness in muscles that would produce the opposite movement to the one that is painful or restricted.

- As an example, think of a sprained ankle in which the foot 'turned' over, thus stretching the muscles on the outer aspect of the ankle.
- It is in these muscles that pain will be felt most strongly but it is in the muscles which were *not stretched* during the strain, in fact in the ones which were shortened during the strain, on the inner aspect of the ankle, where the tender point relating to this strain will be found.
- If these (usually) non-painful tissues are probed by finger or thumb, a localized sensitive area will be found.
- By maintaining pressure on it and positioning the ankle so that the tenderness vanishes from the point, a counterstrain situation will be achieved, which will often exaggerate the position in which the strain took place.
- Having found this position and maintained it for 90 seconds, the general pain in the joint should be much reduced.
- Of course, if actual tissue damage such as tearing or overstretching occurred, this will still require time to heal.

Conclusion

Not all joint strains and dysfunctions can be self-treated. However, a few are readily amenable to assistance by self-help. Use the methods already described for dealing with minor strains.

- If there is only temporary relief seek professional advice.
- These methods are not meant to take the place of expert treatment but are self-help, first-aid measures of complete safety.
- Strain and counterstrain methods are more suited to recent injuries, but some relief is to be gained for even chronic problems, which may then benefit from other methods such as muscle energy technique.

Whether a joint problem is spinal or involves a small joint anywhere else, the marvellous discoveries of Lawrence Jones can be used to ease discomfort and release spasm via this totally painless and uniquely safe system.

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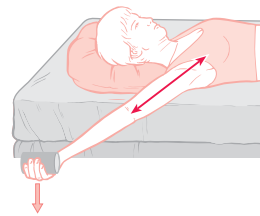
Sheet 1A Treating short/tight muscles using MET

Pectorals

Once daily lie at edge of bed holding a half-kilo can, arm out sideways. Raise arm and hold for 10 seconds, then allow arm to hang down, stretching upper chest muscles for 30 seconds.



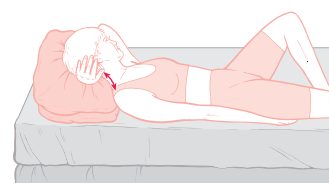
Upper trapezius

Right side, posterior fibers: Lie at edge of bed. Stretch right arm toward feet and grasp edge. Turn head *fully* left. Use left hand to ease head sideways left. Lightly contract muscle between neck and shoulder on right without movement ('ear to shoulder/shoulder to ear') for 10 seconds. Relax. Turn and bend head further to left. Stretch right arm further down edge of bed. Hold stretch for 30 seconds.

Same procedure with head *half* turned left, and turned *slightly to right* treats middle and anterior fibers of muscle respectively.

Levator scapula

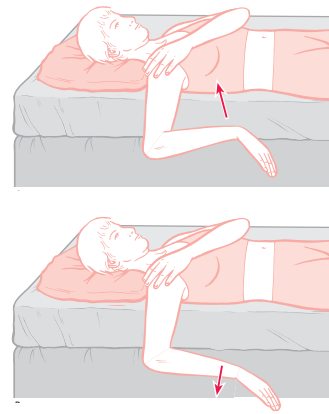
Place cushions under neck. Same position as for upper trapezius, posterior fibers. Contract by pushing head back against hand's resistance for 10 seconds. Relax. Take head/neck further forward, and left. Take arm toward feet. Lie on hand. Hold for 30 seconds.



Sheet 1B Treating short/tight muscles using MET

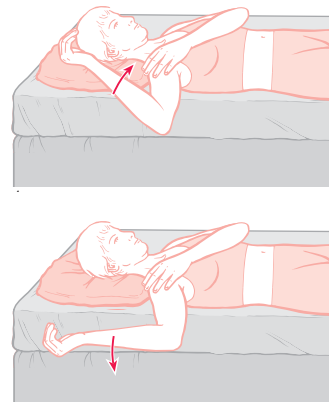
Infraspinatus

Lie at edge of bed, upper arm extended sideways, elbow bent, lower arm parallel with trunk, palm down. With other hand hold shoulder toward bed/surface throughout exercise. Raise back of lower arm toward ceiling for 10 seconds. Relax and allow arm/hand to ease toward floor. Hold position for 45 seconds. Repeat.



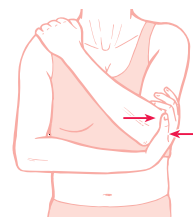
Subscapularis

Lie at edge of bed, upper arm extended sideways, elbow bent, lower arm parallel with neck, palm up. With other hand hold shoulder toward bed/surface throughout exercise. Raise front of lower arm toward ceiling for 10 seconds. Relax and allow arm/hand to ease toward floor. Hold position for 45 seconds. Repeat.



Supraspinatus

For left side: Sit. Place left hand on right shoulder. Hold left elbow with right hand. Push lightly to left against resistance from right hand for 10 seconds. Relax. Using light pressure ease left elbow further to right to stretch muscle. Hold for 30 seconds. Repeat.



Sheet 2A Treating short/tight muscles using MET

Scalenes

For right side: Lie with folded towel under shoulders. For posterior scalene turn head fully left. Place left hand on head/face. Lightly *lift and turn* head to right against resistance from hand for 7 seconds. Relax. Let head rest on surface putting light stretch on right side of neck for 30 seconds. Repeat.

For middle and anterior scalenes same sequence but with head in half turn left, or lying straight.

Sternocleidomastoid

For right side: Lie with folded towel under shoulders, head turned fully left. Raise head sideways, just off the surface. Hold for 7 seconds. Rest head on surface for 30 seconds. Repeat.

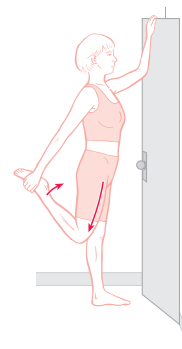
Sternocleidomastoid

For right side: Sit in upright chair, back close to wall, cushion behind neck/shoulders. Sit forward on chair so that head tilts back when resting on cushion. Turn head fully left. With *eyes only*, look upward and toward left for 10 seconds. Close eyes and let head rest back and turned further left, for 30 seconds. Repeat.

Sheet 2B Treating short/tight muscles using MET

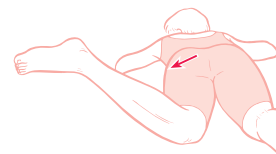
Psoas and rectus femoris

For right side: Stand facing wall. Use left hand to stabilize. Bend right knee, holding ankle with right hand. Take right thigh backward to create stretch in front, *without bending forward at hips*. Lightly straighten lower leg against right hand resistance for 10 seconds. Relax. Take thigh further back. Bend knee further. Hold for 30 seconds. Repeat.



Piriformis

For left piriformis: Lie face down. Bend left knee. Allow left lower leg to fall outward toward the floor. When relaxed, bring left lower leg slightly toward the upright. Hold for 10 seconds. Relax. Let leg fall outward for further 30 seconds. Repeat.

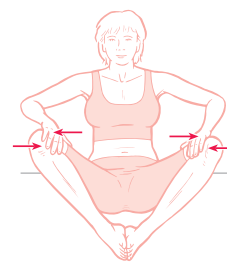


Hamstrings/low back

Sit on floor, legs outstretched. Bend forward as far as comfortable. Grasp legs. Sit up against resistance from held position for 10 seconds. Relax. Bend further forward. Hold for 30 seconds. Repeat.

Adductors

Sit on floor, soles of feet together, knees fully separated. Use hands to resist attempt to bring knees together for 10 seconds. Relax. Ease knees further apart; hold for 30 seconds. Repeat.

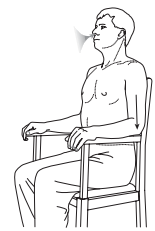


Establishing correct breathing pattern: hi-lo test

Sit in front of a mirror, one hand on upper chest, other hand on upper abdomen. Maintain this during early stages when practicing (a) pursed lip breathing, (b) antiarousal breathing, to observe that abdomen *does* move first, outward, and that chest/hand *does not* move toward the chin. If it does, use shoulder stabilization methods when practicing breathing. Once a week recheck breathing pattern using this test.

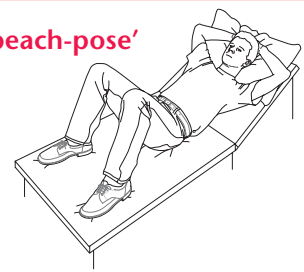
Shoulder stabilization method: chair

Sit in upright chair with arms. When inhaling during breathing exercise push down lightly onto chair arms with forearms to 'lock' shoulders. Release downward pressure as you exhale.



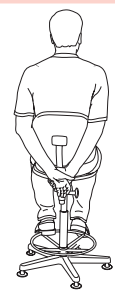
Shoulder stabilization method: 'beach-pose'

Lie or recline with hands clasped behind your neck/head. Maintain this position as you practice breathing exercise to restrict shoulder movement and 'open' chest.



Shoulder stabilization method: wrist grasp

Sit in office-style chair, hands behind back, grasping one wrist with other hand. On inhalation, during breathing exercise, pull the arm down toward floor to 'lock' shoulder movement. Release as you exhale.



Pursed lip breathing exercise

- Adopt hi-lo test position, one hand on the abdomen, the other hand on the chest.
- On inhalation your abdomen should move forward.
- Breathe in *through the nose* and *slowly* out through the mouth, with pursed lips.
- Repeat this 20–30 times twice daily.
- To encourage pursed lip breathing, imagine that you are (a) blowing through a straw, (b) slowly blowing up a balloon.

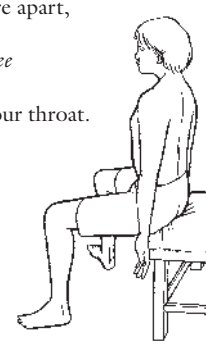
Antiarousal exercise

- Adopt hi-lo test position.
- On inhalation your abdomen should move forward with no upward movement of the chest.
- Breathe in *through the nose* and *slowly* out through the mouth, with pursed lips.
- Count to yourself as you inhale and exhale, to establish the desired rhythm, with exhalation taking twice as long as inhalation. (It may take some weeks of practice to achieve this.)
- Avoid focus on inhalation. Let this be uncontrolled, after the full exhalation.
- The long, slow exhalation creates the opportunity for a full inhalation.
- After several weeks of practice, a full cycle (in and out) should last about 10 seconds, when doing the exercise.
- You may feel light-headed after the exercise so sit quietly for a minute or two before resuming normal activities.
- Repeat 30 cycles twice daily.

Brugger position for breathing rehabilitation

Adopt the Brugger position, several times daily, especially if you spend time seated at a desk.

- Sit close to the chair edge, arms hanging down.
- Place feet below the knees, then move them slightly more apart, and turn them slightly outward.
- Roll your pelvis slightly forward to produce a *small degree* of low back arching.
- Ease your breast bone slightly forward and up toward your throat.
- Turn your arms outward, palms facing forward.
- Separate your fingers until your thumbs face slightly backward.
- Tuck your chin in.
- Maintain this while you practice 5 cycles of slow, pursed lip, antiarousal breathing.
- Repeat whenever you sense muscle tension during sitting, or a need for deeper breathing.



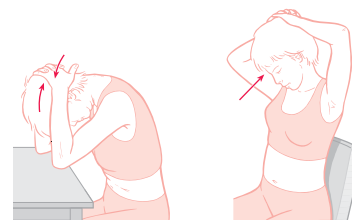
Sheet 4A Mobilising the neck

Side bending of the neck

To improve left side bending: Sit at a table, left elbow resting on it. Side bend neck to comfortable limit. Rest left side of face against left hand. Using quarter strength, push left against resisting hand, for 7 seconds. Relax. Bend neck further to the left. Repeat. Alternatively, 'pulse' head against hand 20 times in 10 seconds, before taking it further to the left. Repeat.

Improving neck flexion: 1

Sit at a table, both elbows resting on it (or sit in a chair), your head/neck bent forward as far as possible, both hands clasped behind your head to hold it forward. Using a small effort, try to straighten neck against resistance from hands, for 7 seconds. Relax. Take head/neck further into flexion. Repeat.



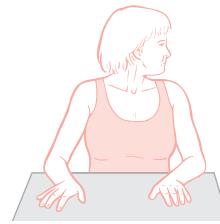
Improving neck flexion: 2

Sit at a table, both elbows resting on it, your head/neck bent forward as far as possible, forehead resting on hands. Try to bend head further forward against resistance of hands, for 7 seconds. Relax. Take head/neck further into flexion. Repeat.

Sheet 4B Mobilising the neck

Improving neck rotation: 1

Sitting upright, turn your head (painlessly) as far as possible in one direction (left in this example). With *eyes only*, look toward the right as far as possible for 7 seconds. Relax and close eyes, and turn head further to the left. Repeat. Do same with head turned to the right (eyes to the left).

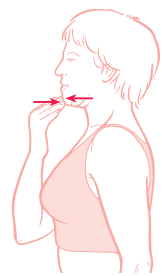


Improving neck rotation: 2

Sitting at a table, turn your head as far as you can in one direction (left in this example). Place your left hand against left side of face. Turn further to the left against resistance of left hand for 7 seconds using quarter strength. Relax. Turn head further to left. Repeat. Do same with head turned to right.

'Gapping' facets at back of neck

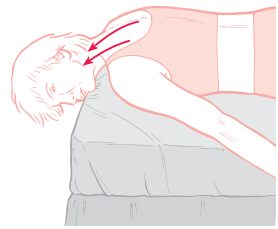
Sit upright. Ease your chin backwards toward the back of your neck (a 'shunting' movement), as far as possible. Put one hand on your chin and restrain a mild effort to push forward for 7 seconds. Relax. Take the jaw backward again to stretch the small muscles at the back of the neck. Hold for 30 seconds. Repeat.



Sheet 5A Stretching the back muscles

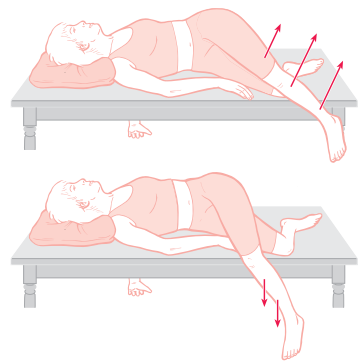
Releasing muscles of the upper back

Lie face down at end of bed, upper part of head and face over the edge. With head turned left (in this example) you are supported on the side of the face. Let your head hang down, and then lift it a fraction (1 inch/2.5 cm). Hold for 7 seconds and then relax, letting the head hang down, with gravity stretching the left upper back muscles. After 30 seconds repeat, then turn head to the right and repeat.



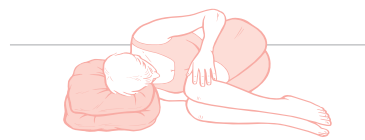
Stretching left side back muscles

Lie on your right side, 6 inches (15 cm) from the edge of a bed. Hang your left arm behind you. Stretch your right arm toward your feet. Turn your head left. Hang your left leg over the edge of the bed, right hip and knee slightly bent, right knee resting at the edge. Raise your left leg 1–2 inches (2.5–5 cm). Hold 7–10 seconds. Relax. Let left leg hang toward the floor. Hold stretch for 30 seconds. Repeat. Turn and do same on other side.



Gentle curling spinal stretch

Lie on right side (in this example), pillow under head. Keep legs together, one on the other. Bend knees and curl into bent position, back rounded, nose close to knees. Breathe slowly and deeply for 30 seconds, then hold breath and as you breathe out curl further. Stay in this position for another 30 seconds.



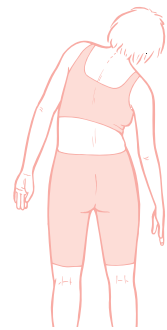
Sheet 5B Stretching the back muscles

Stretching latissimus dorsi (right side)

Lie on left, back at edge of bed, pillow under waist. Bend left knee and hip. Right leg hangs behind, off edge of bed. Extend right arm above your head, upper arm against side of face, lower arm hanging over end. Raise right arm and leg 1 inch (2.5 cm) for 10 seconds. Relax. Allow arm and leg to hang loose for 30 seconds. Repeat. Turn and do same on other side.

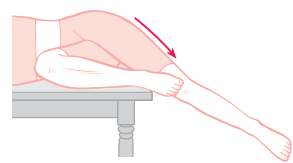
Stretching quadratus lumborum (left side)

Stand, feet shoulder width apart. Side bend to the right (to stretch left side). When side bent as far as comfortable, breathe in deeply and move slightly (1 inch/2.5 cm) toward the upright. Hold for 7 seconds. Release. Bend further to the right and hold for 30 seconds. Repeat. Do same on other side.



Stretching tensor fascia lata (left side)

Lie on right side (to stretch left) with your buttocks close to end of bed. Bend right hip and knee for stability and let left leg hang over edge. Raise left leg 1–2 inches(2.5–5 cm) for 10 seconds. Relax and allow leg to hang down, stretching muscles at side of hip and thigh, for 30 seconds. Repeat. Turn over and do same on other side.



Strengthening (left) gluteus medius

Lie on right side, right leg straight, left leg bent slightly at hip and at knee so that foot rests on floor just below the right knee. Keeping your foot on the floor, raise left knee 45°. Hold this for at least 10 seconds and lower. Repeat 5 times. Do same other side. Note: ability to maintain leg in this position for 10–15 seconds suggests normal strength.

Strengthening gluteus maximus

Lie face down. Bend knee on side to be toned. Lift that leg 2 inches (5 cm) off the floor, without arching your back. Hold this position for at least 10 seconds. Slowly lower leg to the floor and repeat 5 times. Do same on other side. Note: ability to maintain leg in this position for 10–15 seconds suggests normal strength.

Strengthening rhomboids, mid/lower trapezius

Sit upright with arms hanging down, palms forward. Start repetitive mini-contractions (start/stop, start/stop), bringing shoulder blades together and turning arms further outward. Perform 20 rhythmic mini-contractions in 10 seconds, then rest. Repeat 3 more times to tone these muscles.

Toning deep abdominal muscles ('dead-bug' exercises)

Lie on back, legs out straight. Raise your head, then your shoulders from the floor, arms at your side. Can you do this comfortably, for at least 10 seconds, *without* your abdomen 'doming' or your low back arching? If not, do the next 4 exercises until you can.

Abdominal retraction ('bring navel to spine', as in this example) and normal breathing should be maintained throughout all stages of these exercises.

Exercise A: Raise both arms and one foot 2 inches (5 cm) from the floor and hold for 5–8 seconds. Do this with each leg 5–10 times until it is easy.

Exercise B: Same as previous exercise except raised leg needs to come 12 inches (30 cm) off the floor. Do this with each leg 5-10 times until it is easy.

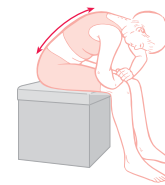
Exercise C: Same as previous exercise except both feet are held 12 inches (30 cm) from floor for 5–8 seconds. Repeat 5–10 times until it is easy.

Exercise D: Same as previous exercise except both feet are raised 24 inches (60 cm) from the floor for 5–8 seconds. Repeat 5-10 times until it is easy. In this final position gentle 'cycling' motions add to the toning effect.

Sheet 7A Spinal self-mobilization exercises

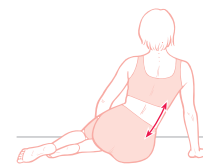
Mobilizing lower back

Sit in upright chair, feet flat, resting palms of hands on thighs above knees, fingers facing each other. Let elbows bend outwards as you bring head and chest toward your knees until a slight low back stretch is experienced. Hold this position, breathing slowly for 3 full cycles. As you exhale move back to start position. Repeat 5 times, going a little further each time. Hold the final stretch for 30 seconds. Repeat daily.



Mobilizing lower back

Sit on floor on right buttock, knees bent, feet together on the left, supported by straight right arm. Push against the floor to slightly straighten your body, until you feel a slight stretch in the lower back. Keeping elbow straight introduce rhythmic mini-pushes against the floor, taking your left shoulder toward the left. Rest after 20 'pulsations'. Ease trunk toward the midline a little, and repeat 20 pulsations. After third sequence stay in position 30 seconds, then change sides. Repeat daily.



Lower spinal twist

Lie on carpeted floor, both knees bent. Cross left leg over right. Let gravity ease left foot toward the floor. 'Stretch' but not pain should be felt. Lift the left foot slightly (3 inches/7 cm) and rhythmically bounce the foot toward the floor, and back again, 'springing' the lower back. After 5 pulsations, rest in the twisted position for 30 seconds. Repeat the exercise on the other side. Repeat daily.

Upper spinal twist

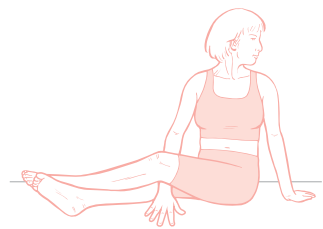
Lie on floor, hands behind neck, elbows together, knees bent, feet flat. Raise head 2 inches (5 cm) and rhythmically, repetitively, twist trunk in opposite directions so that first one elbow then the other touches the floor. Repeat 5–10 times each side. Rest. Repeat daily.

Mobilizing upper spine

Get onto hands and knees, thighs vertical to the floor, hands flat on floor at head height. Don't let head hang down. Bend elbows outward to lower head toward hands. On exhalation, take chin as close to hands as possible and imagine rolling a pea toward your knees with your chin – slowly. Return to start position and inhale. On next exhalation roll invisible pea from knees toward hands. Return to start and inhale. Repeat 5 times in each direction. Repeat daily.

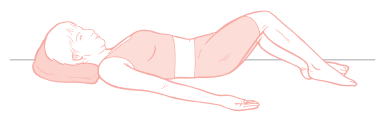
Trunk stretch

Sit on floor, legs outstretched with left leg crossed over right. Place right hand between crossed knees touching floor. Place left hand 6–8 inches (15–20 cm) behind buttocks to produce painless twist. Turn head left, as far as possible. Breathe in and out slowly 5 times. On final exhalation, twist a little further. Hold this for 30 seconds. Return to neutral and repeat on other side. Repeat daily.



Gravity stretch for spine

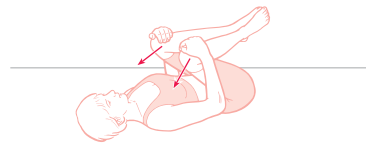
Lie face up, pillow under head. Bend knees, feet flat on floor. Stretch arms sideways, palms up. *Keeping shoulders and feet flat*, let both knees fall to one side as far as possible. Breathe in and out slowly for 30 seconds, then hold your breath for as long as is comfortable. On exhaling let knees fall further toward the floor. Hold this for another 30 seconds. Repeat on other side. Repeat daily.



Sheet 8A General self-mobilization exercises

Low back release

Lie on back (no cushion). Knees apart, bend knees and hips. Place a hand on each knee and painlessly pull these toward shoulders (not chest) as far as is possible. Breathe in and hold breath as long as comfortable. On exhalation, draw knees closer to shoulders. Hold for 30 seconds. Repeat once more. Repeat daily.



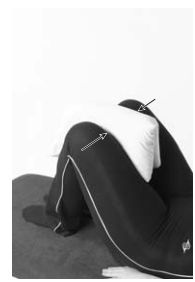
Springing the sacroiliac joint

CAUTION: Only do this exercise on advice from a practitioner

Lie on unaffected side, pillow under head, lower leg straight. Flex upper leg at knee and hip, and let knee rest on floor. Place palm of upper hand on front of pelvis, palm toward floor. With minimal force rhythmically and repetitively 'spring' the bone in a direction toward the opposite side lower ribs, for 20 seconds. Follow this with the pelvic stabilizing exercise described below.

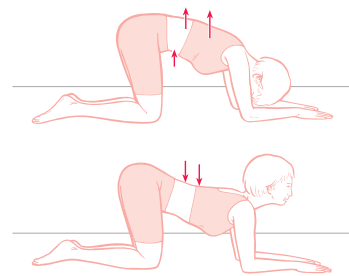
Pelvic stabilizing exercise (to follow previous exercise, on practitioner's advice only)

Lie on your back, hips and knees flexed, feet flat on floor. Place a firm cushion between knees. Using full strength squeeze your knees together for 5 seconds. Relax. Repeat twice more. This helps stabilize the pelvic joints.



Upper and lower spine flexibility ('cat/camel') exercise

Kneel on a carpeted floor, weight on your knees and elbows for upper spine, and on knees and hands for lower spine. As you inhale, arch your back upward while pulling your navel toward your spine, allowing your head to drop toward the floor. Hold for 5 seconds. As you exhale, lower your spine and lift your head. Hold for 5 seconds. Repeat sequence 5 times in each direction. Repeat daily.



Upper spine and rib flexibility

Sit on edge of table, knees apart, legs hanging free. Bend forward. Let left arm hang between legs. Turn head right. Relax shoulder blade area. Inhale fully and turn head further right, and stretch left hand toward floor. Hold stretch as long as you hold the breath. As you exhale, relax in this position for 20–30 seconds. Repeat. Repeat on other side (right hand hangs between legs, head turns left). Repeat daily.

Mobilizing upper spine

Sit, arms *fully* outstretched sideways, fingers widely spread. Rotate arms so thumb of one hand points up, and the other down. Turn head toward side of thumb-down hand. After 5 seconds simultaneously (a) inhale, (b) fully rotate arms in opposite directions (thumb down becomes thumb up) and (c) turn head toward side of thumb down. Exhale. On inhalation reverse all movements, taking care not to tense or hunch shoulders. Repeat 10 times. Repeat daily.