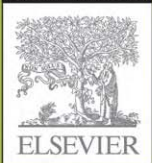


Textbook of **Remedial
Massage**



CHURCHILL
LIVINGSTONE



Sandra Grace & Mark Deal

TEXTBOOK OF REMEDIAL **Massage**

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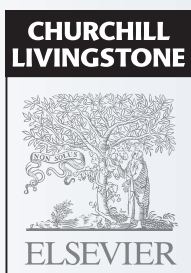
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2

Assessment procedures for remedial massage: an evidence-based approach

The content of this chapter relates to the following Units of Competency:

- HLTAP501B Analyse health information
- HLTREM504C Apply remedial massage assessment framework
- HLTREM505C Perform remedial massage health assessment

Health Training Package HLT07

Learning Outcomes

- Demonstrate an understanding of the role of assessment in remedial massage practice.
- Demonstrate an understanding of the current evidence-based approach to musculoskeletal assessment.
- Identify red and yellow flags when conducting remedial massage assessment.
- Perform appropriate remedial massage assessments (case histories, outcome measures, postural observation, gait analysis, functional assessments and palpation) on a range of clients.
- Analyse and interpret assessment findings to guide the assessment process.

INTRODUCTION

As primary care practitioners, remedial massage therapists are required to make clinical judgments including identifying those clients whose treatment lies outside their scope of practice. It is estimated that between 34% and 40% of clients who visit complementary medicine practitioners have not been previously assessed by a general medical or other health practitioner.^{1,2} It is, therefore, a key safety requirement of remedial massage training to adequately prepare practitioners for their primary contact role. Moreover, remedial massage is not entirely risk free, even though adverse events appear to be rare.³ Competent performance and analysis of appropriate remedial massage assessments, including the selection of appropriate assessment procedures for individual clients, is essential for safe and effective remedial massage practice.

PRINCIPLES OF ASSESSMENT IN REMEDIAL MASSAGE PRACTICE

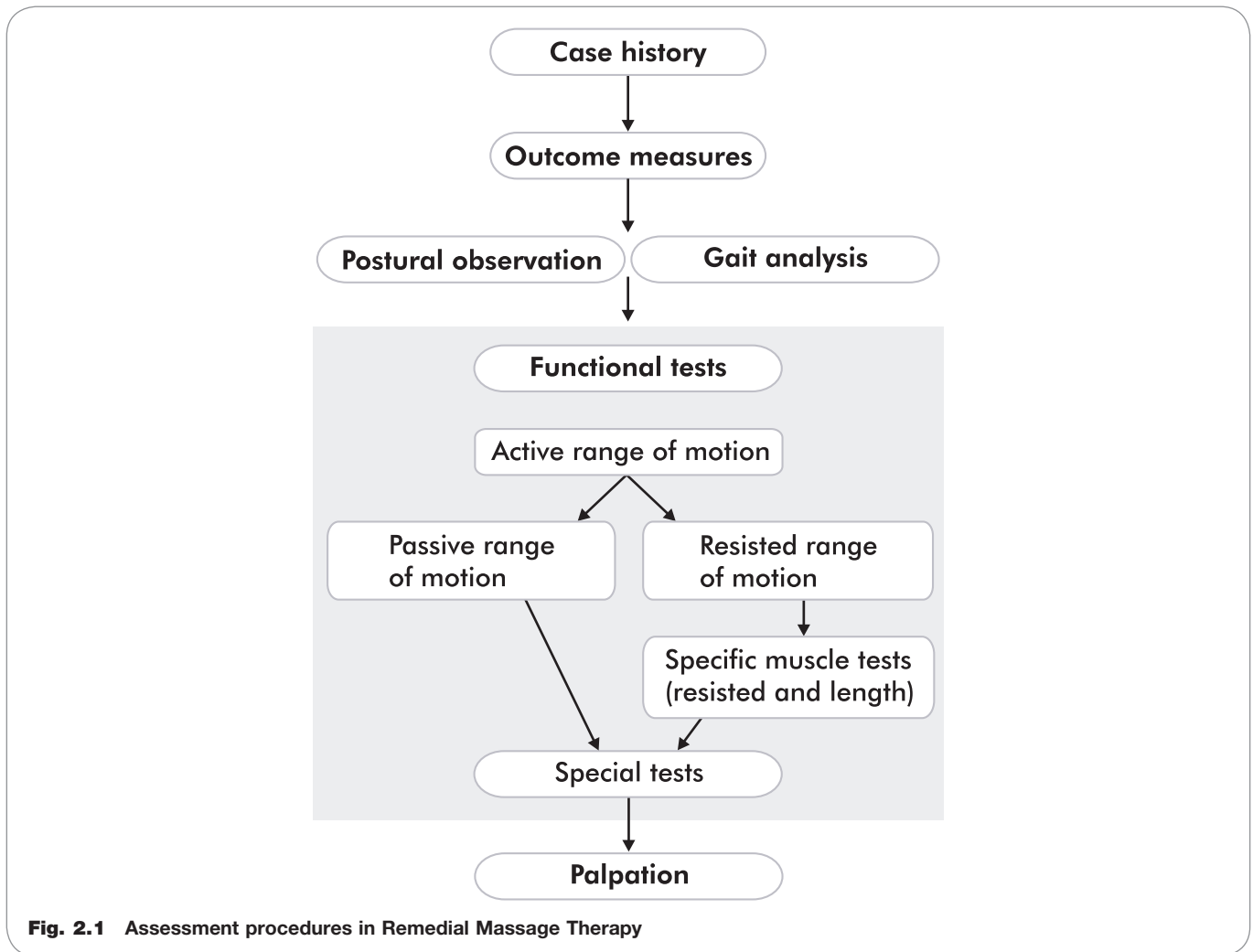
- Remedial massage should always be performed in conjunction with appropriate and ongoing assessment.^a
- A definitive assessment is not always possible or necessary for many musculoskeletal problems. It is essential, however, that clients requiring referral to other healthcare practitioners are identified (red and yellow flags).
- A holistic approach to assessment considers all aspects of a client's biopsychosocial health.
- Remedial massage assessments are conducted in a logical order, usually beginning with a case history. Interpretations of assessment findings progressively guide the need for further assessments.
- Findings of individual assessments should always be interpreted cautiously and correlated with findings from other assessments.
- Assessment findings guide remedial massage practice: negotiating treatment plans with clients, monitoring responses to treatment, adjusting treatments and reviewing plans as required.
- Strategies for assessing remedial massage clients may change with emerging evidence about the efficacy of individual assessments.

PURPOSE OF ASSESSMENTS

The purpose of remedial massage assessment is to:

- identify indicators of serious conditions (red flags)
- identify the presence of psychosocial factors that may influence presenting symptoms and response to treatment (yellow flags)
- assess clients' functional limitations
- guide treatment and management options
- monitor clients' responses to treatment so that treatment plans can be adjusted if required
- assess treatment effectiveness.

^aThis is the current view of educators and professional associations of remedial massage in Australia. However, remedial massage, particularly seated massage, corporate massage and post-event sports massage is frequently performed without full assessment of clients.



DEMONSTRATING TREATMENT EFFECTIVENESS

To monitor clients' responses to treatment, remedial massage therapists must first collect suitable baseline data, including information collected from case histories and observed or measured by practitioners. The pain scale is commonly used for this purpose. Repeated collection of pain scale data enables changes in clients' perceptions of pain to be recorded and may demonstrate the perceived effectiveness of treatment. The amount of medication that clients require to manage symptoms can also be used in this way. Recording details of medication at the initial consultation and changes in medication use over the ensuing period of treatment provides evidence of progress towards treatment goals.

ASSESSMENT PROCEDURES

The most commonly used assessment tools in remedial massage therapy are presented below in the order in which they are usually applied and easiest to learn. In reality, assessments are overlapping and ongoing throughout the consultation from first encounters with clients in waiting rooms to the continual assessments and adjustments that are required when

applying any technique (e.g. for pain tolerance, for age, to meet clients' expectation). A flowchart of remedial massage assessments is illustrated in Figure 2.1.

CLIENT HISTORY

Taking a comprehensive client history is one of the most important assessment tools of healthcare practitioners. It is an important opportunity to establish relationships with clients that enhance positive outcomes of treatment.^{4,5} It also enables the practitioner to learn about the biopsychosocial influences on the client's health. The first responsibility of remedial massage therapists is to determine clients' suitability for remedial massage or for referral to another healthcare practitioner. The term *red flag* refers to clinical features (signs or symptoms) that may indicate the presence of serious underlying medical conditions requiring further investigation. Such conditions include cancers, fractures and infections (see Table 2.1 on p 12). Clients who choose to complement medical treatment of serious conditions with remedial massage therapy require supervision by their medical practitioner and liaison between practitioners (or at the very least awareness of the entirety of their clients' treatment). Clients should always be encouraged to disclose their remedial massage treatment to

NAME	DATE OF BIRTH
ADDRESS	
..... POSTCODE	
PHONE B/H	A/H
Mobile	
FAX	EMAIL
OCCUPATION	
SPORTS / HOBBIES	
REFERRED BY	
PRESENTING SYMPTOMS <i>How can I help you?</i> Record nature of complaint and duration. Inquire and record: nature of pain, frequency and intensity of symptoms, first occurrence, mode of onset. If recurrent, previous treatment. Associated symptoms. Aggravating and relieving factors. Any other symptoms. IDENTIFY POSSIBLE RED AND YELLOW FLAGS.	
PAST HISTORY <i>Have you ever had any major illnesses or diseases? Any hospitalisations? Any major accidents?</i> IDENTIFY POSSIBLE RED AND YELLOW FLAGS.	
FAMILY HISTORY <i>Has any member of your family had a major illness or disease?</i>	
OBSTETRICS HISTORY Ask any female client about pregnancies and births.	
SOCIAL HISTORY <i>Do you drink or smoke? Recreational drugs?</i>	
MEDICATION <i>Are you taking any medication?</i> Record all details.	
ALLERGIES <i>Do you have any allergies?</i> Record all details.	
SYSTEMS REVIEW Either by questionnaire or orally, ask a few questions relating to each system as required. (Central nervous: headaches, dizziness, numbness. Cardiovascular: chest pain, shortness of breath. Respiratory system: shortness of breath, wheezing, cough. Alimentary: nausea, vomiting, indigestion, abdominal pain, change in bowel habit. Urogenital: pain on urination, frequency of urination. Endocrine: Heat or cold intolerance, change in sweating, excessive thirst.)	

Fig. 2.2 A typical case history form for remedial massage

Table 2.1 Red and yellow flags

Red flags	Yellow flags
Clinical features that may be associated with the presence of a serious physical condition.	Psychosocial and occupational factors that may influence presenting symptoms, treatment approach and outcomes.

their doctor. However, many remedial massage clients do not have serious medical conditions. If there are no signs or symptoms associated with specific diseases or serious conditions, further investigations (such as X-rays, MRIs or blood tests) are generally not indicated.^{6,7}

Once practitioners have dismissed the likelihood of serious conditions, they gather information to guide further assessments: identifying likely contributing factors, types of tissues that could be involved, clients' responses to previous treatments, aggravating and relieving factors and psychosocial

factors that could affect clients' responses to treatment (yellow flags). Questions should proceed logically and presenting conditions prioritised. A sound grounding in physiology, pathology and symptomatology is required for analysing the health information collected and for recognising deviations from normal findings and signs and symptoms of common pathophysiologicals. Practitioners are not required to read X-rays, MRIs or other diagnostic imaging but they are expected to interpret their reports. Figure 2.2 is a typical remedial massage case history.

Assessing the well client

Remedial massage has long played a role in health maintenance and preventive medicine. Assessment of the well client is based on lifestyle history, postural and gait observations, functional tests, particularly those for muscle and joint function, and palpation. Clients who present for massage therapy without symptoms are sometimes surprised when massage elicits pain or tenderness or when they feel the ropiness of fibrotic tissues or the tightness of a muscle being stretched.

They are being made aware of potential muscle imbalances that could lead to future problems (sub-clinical indicators). Early interventions (e.g. correcting posture, improving manual handling techniques, or modifying an exercise program) may divert many potential problems.

THE NATURE OF PAIN

Pain is a common presenting symptom of remedial massage clients. Perceptions of pain are complicated by its multi-dimensional nature and its changing nature over time. Questioning clients about pain helps determine their suitability for remedial massage and possible sources of pain. Ask clients about:

- the location of the pain
- the character of the pain, e.g. sharp shooting pain in a relatively narrow band (radicular pain), a dull ache that is hard to localise (referred pain), burning pain (from trauma to sympathetic and somatic sensory nerves)
- the severity of the pain
 - A number of pain intensity measures are available although the validity and reliability of such measures continues to be debated.⁸ A simple procedure is to ask clients to rate their pain on a pain scale from 0 to 10, where 0 is no pain and 10 is extreme pain. Alternatively, practitioners can use a Visual Analogue Scale of Pain Intensity (VAS), a 10 cm line on which clients are asked to put a mark to show their current pain level.
- the onset of the pain
- the duration of the pain
- the course of the pain, e.g. intermittent, constant, episodic
- aggravating and relieving factors.

Questions designed to distinguish between pain of local origin and pain referred from a distant site (in particular, from a spinal segment) are useful in directing treatment to the source of pain. As a guide for determining the nature of pain, consider the following:

- local pain
 - usually sharp
 - well localised
- referred pain
 - dull
 - poorly localised
 - often refers in a predetermined pattern (e.g. nerve impingement at the spinal segment will refer pain in dermatomal patterns, trigger points refer in predictable patterns).

If a client reports numbness in an area of skin, the nerves supplying that dermatome^b could be damaged. Similarly, if a client reports weak muscles in a particular myotome, the motor neuron in that spinal segment may be damaged. Knowing the spinal cord segment which supplies each dermatome and myotome can help locate the source of pain (see Figure 2.3).

^bEvery spinal nerve contains both sensory and motor neurons. Somatic sensory neurons carry impulses from the skin to the spinal cord and brain stem. A dermatome is the area of skin that provides sensory input to one pair of spinal nerves. Somatic motor neurons carry impulses from the spinal cord to skeletal muscles. All muscles innervated by the motor neurons in a single spinal segment constitute a myotome. In general, dermatomes overlie corresponding myotomes.

Table 2.2 (p 15) is designed to assist practitioners identify red flags associated with pain of the lumbar, thoracic and cervical regions.

Identifying yellow flags

Yellow flags are indicators of psychosocial and occupational factors that may affect clients' presenting symptoms and responses to treatment. Identifying the presence of yellow flags may prompt early interventions and better outcomes for clients. For example, clients with high stress levels may benefit from referral to a counsellor; clients with concern about job security after extended absences from work may benefit from reassurance from their employer. The presence of yellow flags is not a contraindication for remedial massage. Rather, yellow flags alert the practitioner to possible complicating factors which may prompt referral to other health practitioners or delay the normal recovery process.

Yellow flags include:⁶

- belief that pain and activity are harmful
- sickness behaviours (e.g. extended rest)
- low or negative moods, social withdrawal
- problems with claims and compensation
- overprotective or unsupportive family
- apportioning blame
- overt anxiety or depression
- non-compliance with rehabilitation program
- long time between injury and referral.

Informed consent

As part of the initial interview clients need to have proposed assessments and treatments and any associated risks fully explained. Informed consent must be obtained for all assessment and treatment procedures.⁹

OUTCOME MEASURES

Outcome measures are standardised questionnaires in which clients record perceived changes to their health status. They are used to assess clients' perceived health status and also to demonstrate the benefits of treatment. Three common outcome measures for musculoskeletal pain and disability are the Oswestry Disability Index, the Vernon Mior Neck Disability Questionnaire, and the Patient Specific Scale which can be used for disability in any region of the body. Research into the use of Outcome Measures demonstrate high validity^c and reliability^{d, 10-12} for some questionnaires which may account for their increasing use in clinical trials and in clinical practice. They are simple to administer and their standardised scoring systems allow comparisons of clients' responses over time. They are also readily interpreted by healthcare practitioners from other disciplines.

Completing questionnaires takes time and clients with low levels of English literacy will need assistance. Appointment times may need to be adjusted accordingly or clients invited to come to the clinic a few minutes before their scheduled appointment to complete the questionnaires. Outcome

^cValidity is the extent to which a measure estimates the true nature of what it purports to measure.

^dReliability is the consistency of repeated applications of a measurement.

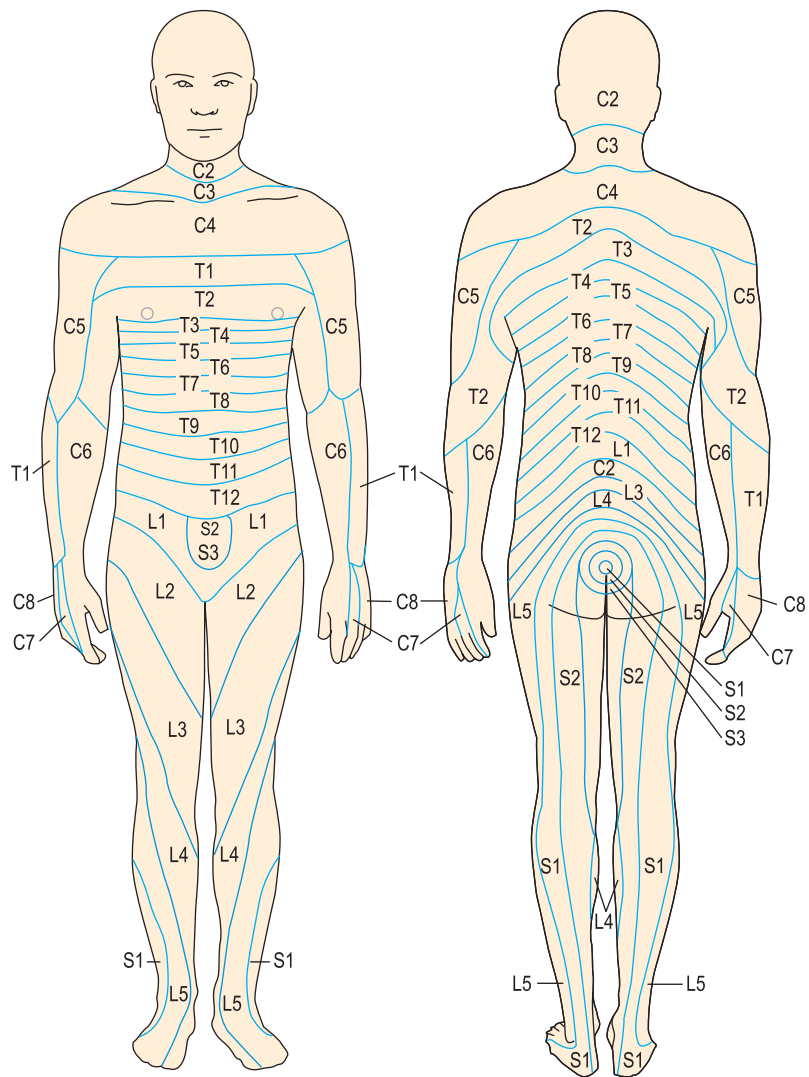


Fig. 2.3 Dermatomes: anterior and posterior view

measures should be used at every opportunity by remedial massage therapists to demonstrate perceived effectiveness of their treatments.

POSTURAL OBSERVATION

Postural observation forms an important part of the physical assessment of clients. It involves observing clients standing erect to assess structural and habitual postures and their associated muscle imbalances. Observing the whole client, regardless of the complaint, is consistent with the holistic approach of complementary medicine. Postural observation is not an exact science. However, findings from postural observation, along with case history and other assessment findings, can contribute useful information to the development of treatment plans.

By observing erect postures from the posterior and lateral aspects, practitioners can compare one side of the body with the other, the upper half with the lower half, the left foot with the right foot and so on to identify postural patterns and/or factors that could contribute to presenting conditions or

predispose to future symptoms. Postural observation can provide information about the effects on the musculoskeletal system of right or left dominance, of regular sports and hobbies, of work-related activities and of adaptations to diseases and traumas. For example, cervicogenic headaches can be perpetuated by a scoliosis and without postural observation this connection could remain undetected. Failing to take such predisposing factors into account could result in short-lived treatment effects. Moreover conditions and postural tendencies identified (sometimes incidentally) can prompt appropriate advice from therapists. For example, advising a client with bilateral pes planus about appropriate footwear, or a client who works at a computer all day about the importance of regular pectoralis major stretches, may prevent compensatory muscle imbalances and reduce susceptibility to injury.

Identifying anatomical landmarks

To accurately describe and record postural observations, practitioners should be familiar with the following anatomical landmarks (see Figure 2.4 on p 16):

Table 2.2 Red flags of serious conditions associated with acute low back, thoracic and neck pain

Red flags	Possible condition
For acute low back pain	
Symptoms and signs of infection (e.g. fever) Risk factors for infection (e.g. underlying disease, immunosuppression, penetrating wound)	Infection
History of trauma Minor trauma (if >50 years, history of osteoporosis, taking corticosteroids)	Fracture
Past history of malignancy Age >50 years Failure to improve with treatment Unexplained weight loss Pain at multiple sites Pain at rest	Cancer
Absence of aggravating factors	Aortic aneurysm Other serious condition
Widespread neurological symptoms and signs in the lower limb (e.g. gait abnormality, saddle area numbness) ± urinary retention, faecal incontinence	Cauda equina syndrome (a medical emergency and requires urgent hospital referral)
For acute thoracic pain	
Minor trauma (if >50 years, history of osteoporosis, taking corticosteroids) Major trauma	Fracture
Symptoms and signs of infection (e.g. fever, night sweats) Risk factors for infection (e.g. underlying disease, immunosuppression, penetrating wound)	Infection
Past history of malignancy Age >50 years Failure to improve with treatment Unexplained weight loss Pain at multiple sites Pain at rest Night pain	Cancer
Chest pain or heaviness Movement/change in posture has no effect on pain Abdominal pain Shortness of breath, cough	Other serious condition
For acute neck pain	
Symptoms and signs of infection (e.g. fever, night sweats) Risk factors for infection (e.g. underlying disease, immunosuppression, penetrating wound)	Infection
History of trauma Minor trauma (if taking corticosteroids)	Fracture
Past history of malignancy Age >50 years Failure to improve with treatment Unexplained weight loss Dysphagia, headache, vomiting	Cancer
Neurological symptoms in the limbs	Neurological condition
Cerebrovascular symptoms or signs, anticoagulant use	Cerebral or spinal haemorrhage
Cardiovascular risk factors; transient ischaemic attack	Vertebral or carotid aneurysm

Note that acute pain in this context refers to pain of less than three months' duration.
Adapted from the New Zealand Guidelines Group⁶ and the Acute Musculoskeletal Pain Guidelines Group⁷.

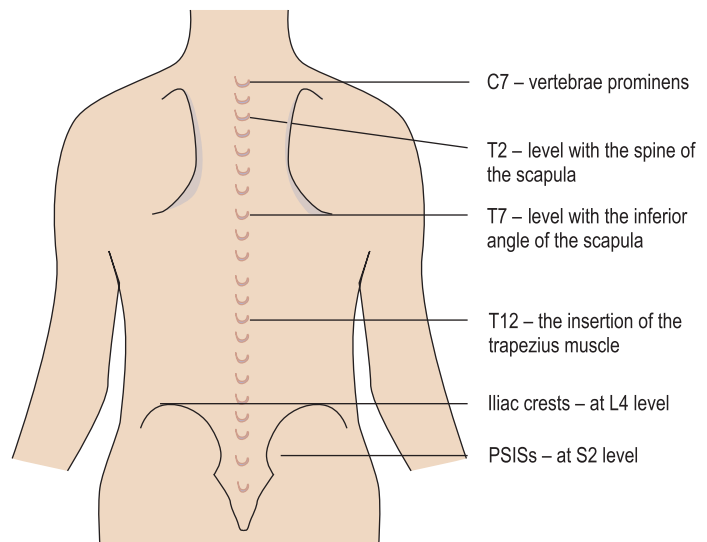


Fig. 2.4 Anatomical landmarks for postural observation.

ANTERIOR AND LATERAL

- The nipple line is approximately level with the 5th rib or 4th intercostal space.
- The umbilicus is approximately level with the L3/4 disc.
- The iliac crests are approximately level with L4.

POSTERIOR

- The spine of the scapula is approximately level with T2 spinous process.
- The inferior angle of the scapula is approximately level with T7.
- The insertion of the trapezius muscle is approximately level with T12.
- The PSISs are approximately level with S2.

Performing postural observation

Clothing that does not obscure posture is required for the most accurate postural assessments. Swimwear or sportswear are suitable. Alternatively clients may disrobe to their underwear and wear a gown that opens at the back. Stand two or three metres behind the client. Ask the client to walk up and down on the spot a few times with their eyes closed and then to open their eyes, and stand comfortably, hands by their sides.

A plumb line (either real or imaginary) is used to project a centre of gravity line onto the external surface of the body. In the ideally aligned erect posture, the plumb line should pass as follows (see Figure 2.5).

In the posterior view:

- equidistant through the heels, ankles, calves, knees and thighs
- through the midline of the trunk
- through the midline of the neck and head.

In the lateral view:

- anterior to the lateral malleolus^e

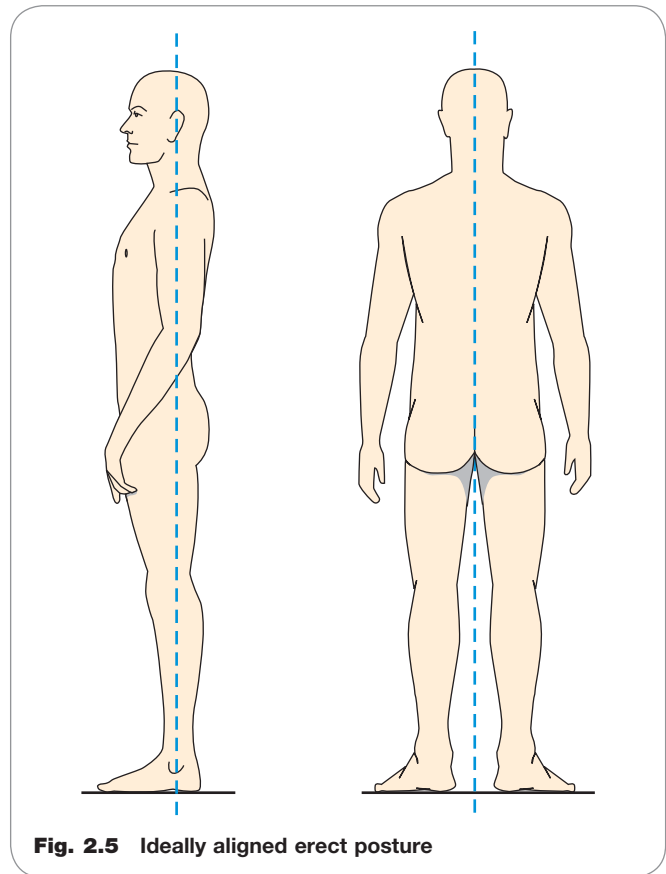


Fig. 2.5 Ideally aligned erect posture

- anterior to the axis of the knee joint
- posterior to the hip joint
- through the bodies of L1 and L5
- bisecting the shoulder joint
- bisecting the ear.

^eSome controversy exists among authors about the exact location of the centre of gravity line in the lateral view. It is sometimes said to bisect the lateral malleolus, rather than pass anteriorly to it.

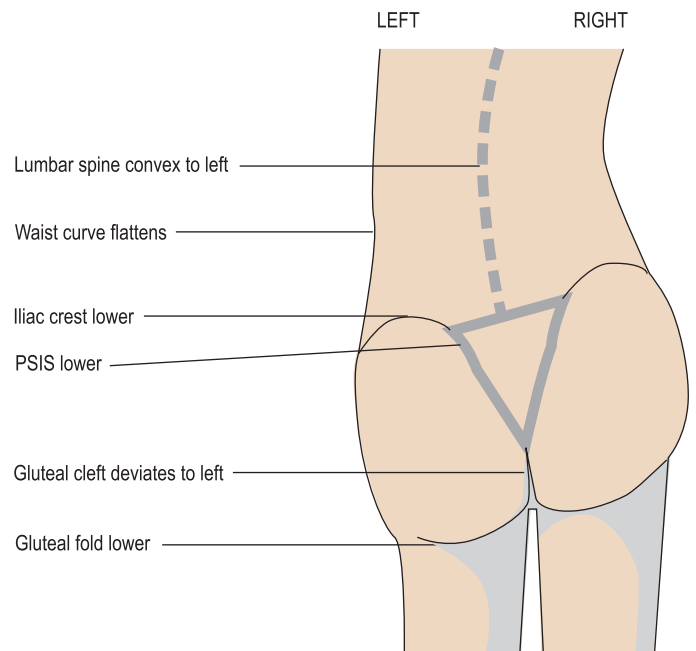


Fig. 2.6 Left pelvic tilt

General observations

A common reason that remedial massage therapists find postural observation difficult is that they look for detail before making general observations. Always begin by asking, ‘What stands out? Are there any regions of the body that appear to be overloaded, under stress or very different from normal?’ Next, focus on pelvic alignment which is useful for identifying common posture deviations like hyperlordosis or scoliosis. Learning to observe details like colour changes (e.g. the pallor of poor circulation, butterfly rash across the cheeks in rheumatoid conditions, a hairy tuft in the lumbosacral area in spondylolisthesis^f), and unusual skin markings (e.g. petechiae, surgical scars, stretch marks, moles^g) can be developed after the basics of postural observation have been mastered. Remember that postural observations are never definitive. They only indicate possibilities. In most cases clients present with minor deviations from normal standing alignment and communication with clients about postural observations should always make this clear.

In the posterior view, observe:

1. The level of the pelvis. One of the most important findings of postural observation is the level of the pelvis, as many treatment plans address imbalances associated with pelvic tilt. The pelvis comprises two ilia which articulate with each other at the symphysis pubis anteriorly and with the sacrum at the sacroiliac joints. Observe the level of the gluteal folds, PSISs, iliac crests, deviation of the gluteal cleft, the waist curvature and the distance between arms and trunk. To assist your determination of

the level of the pelvis, the following describes the pattern of postural changes most often observed when the pelvis tilts. In this example, the client’s pelvis is lower on the left than the right (see Figure 2.6). (For a client whose pelvis tilts lower on the right, the reverse would follow.) For a client whose pelvis is lower on the left than the right:

- the PSIS is usually lower on the left
- the gluteal fold is usually lower on the left
- the gluteal cleft usually deviates to the left
- the iliac crest is usually lower on the left
- the waist curve usually flattens on the left
- the lumbar scoliosis is usually convex on the left
- the left foot is usually anterior and everted.

If the level of the pelvis is not easily determined by observation, palpate the pelvis by placing your thumbs on the PSISs and fingers (held horizontally) on the iliac crests. Use your palpatory findings to confirm the presence (or absence) of a pelvic tilt.

2. The level of the shoulders

Look at the contour of the trapezius muscle between the neck and the acromion and compare both sides.

3. Determine the nature of the scoliosis.

The exact nature of scolioses can only be determined by diagnostic imaging. However, estimates of the shape of the curve can be ascertained from the presence of pelvic or shoulder tilt. Figure 2.7 illustrates common C-shaped and S-shaped spinal curvatures. Most thoracic scolioses are convex to the right (see Chapter 11).

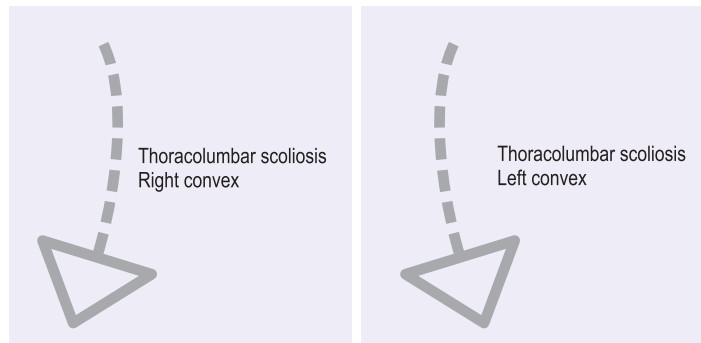
4. Any other features of the back, neck or head that stand out (e.g. hypertonic muscles mid thoracic area, asymmetrical development from sports, work, or right or left dominance, muscle wasting).

5. Any lower limb features (e.g. ankle pronation, genu valgus or varus, oedema, feet everted) (see Figure 2.8).

^fSpondylolisthesis is the anterior displacement of a vertebra in relation to the vertebra below (see Chapter 10).

^gMassage therapists can play an important role in the detection of skin cancers among their clients. See Appendix 2.2 for a useful checklist.

C-shaped scoliosis



S-shaped scoliosis

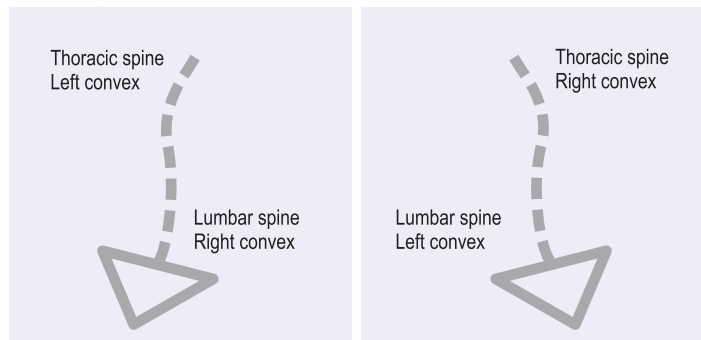


Fig. 2.7 C-shaped and S-shaped scoliosis

In the lateral view, note:

1. the relation of the body to the centre of gravity line: assess the alignment of the ear, shoulder, hips and lateral malleoli
2. the level of the pelvis (e.g. hyperlordosis, hypolordosis)
3. the shape of the kyphosis (e.g. hyperkyphosis, flattened thoracic curvature)
4. the position of the head (ear position in relation to shoulder, cervical hyper or hypolordosis)
5. the position of shoulders (rounded), arms and hands
6. any lower limb features (e.g. genu recurvatum, pes planus, pes cavus, hallux valgus, claw and hammer toes).

Method of recording

Postural observations are most easily recorded by marking diagrams of the posterior and lateral aspects of the erect body. A standardised recording system is yet to be developed for remedial massage. Only the most obvious and important findings need be recorded. These include the level of the pelvis, any major posture distortion (e.g. scoliosis, hyperlordosis), and any possible factors that could predispose to current or future symptoms. In the following section ways of recording common posture observations are presented. Figure 2.8 on p 19 shows how common posture observations of the lower limb can be recorded.

COMMON POSTURE OBSERVATIONS

In the posterior view:

Scoliosis

Scoliosis refers to a lateral curvature of the spine, observed when the client is viewed anteriorly or posteriorly. Diagnostic imaging is required to determine the exact nature and degree of spinal curvature. Postural observation enables practitioners to estimate large changes in spinal curvature and to suggest postural factors that may contribute or predispose to symptoms.

There are two major types of scoliosis:

- **Structural (idiopathic) scoliosis.** This is a curvature of the spine of unknown cause. It is relatively fixed and does not straighten on forward bending of the trunk (Adam's test) (see Figure 2.9 on p 20). It is often associated with vertebral and rib abnormalities and in severe cases can require bracing and surgery. Scoliosis screening tests in schools are designed to detect severe idiopathic scolioses that require such medical interventions. As a general rule, refer any child under 16 with a moderate or severe rib hump on forward flexion (Adam's test) who has not been previously screened by a medical practitioner, chiropractor, osteopath, physiotherapist or in a school screening program.
- **Functional scoliosis.** This is a compensatory curvature that may be associated with pelvic tilt and imbalance of muscles due to work and sport activities. This type of scoliosis usually straightens on forward bending of the trunk (i.e. Adam's test is negative). It is usually correctable with such interventions as exercise programs, remedial massage, spinal manipulation, and the use of orthotics in shoes.

Scoliosis is recorded on a posterior posture diagram by drawing three lines: i) a straight line at the level of the iliac

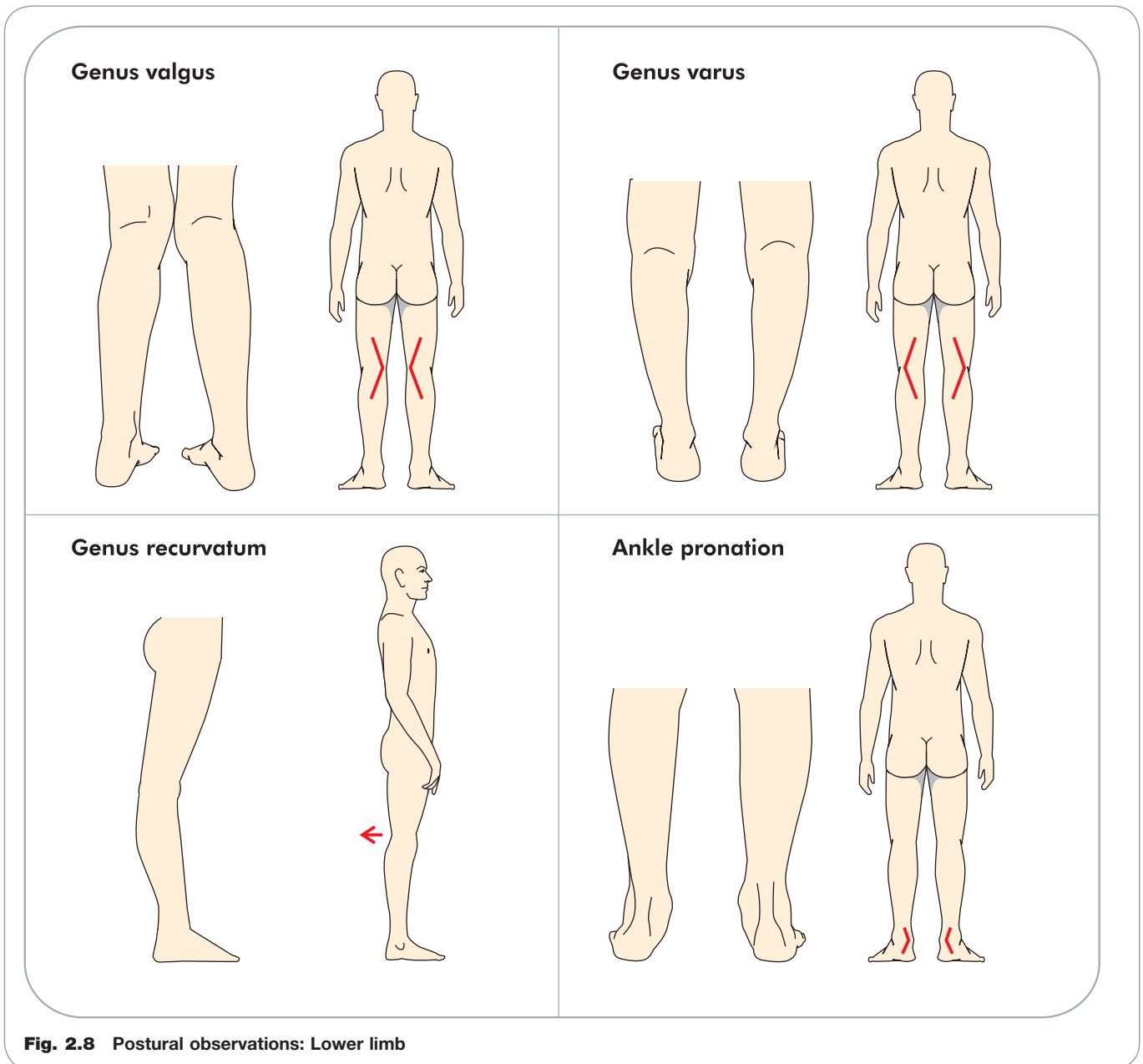


Fig. 2.8 Postural observations: Lower limb

crests angled to indicate the pelvic tilt. Try to make the angle of the straight line indicate the degree of pelvic tilt: an almost horizontal line would represent a small degree of pelvic tilt; a more diagonal line would represent a greater degree of pelvic tilt; ii) a straight line indicating the level of the shoulders; and iii) a curved line estimating the scoliosis.

In the lateral view:

Lumbar hyperlordosis

This is a commonly observed posture (see Figure 2.11). Its causes include an anteriorly tilted pelvis and muscular imbalance such as weak abdominal muscles relative to tight erector spinae muscles, and/or weak hamstring muscles relative to tight hip flexor muscles. Hyperlordosis is commonly associated with lower crossed syndrome (see Chapter 10).

Standing hyperlordosis test

Another quick test for hyperlordosis: The client removes their shoes and stands with their shoulders, buttocks and heels against a wall. Without adjusting the position, the client places one hand into the space between their waist and the wall. One flat palm in the space between the back and the wall is usual. Any more than this could indicate lumbar hyperlordosis. (Some clients can fit two fists placed one on top of the other.)

(Note: There could be other reasons for excessive space between the wall and the client's body, such as overdeveloped gluteus maximus muscles.)

Swing phase

ACCELERATION

In the acceleration phase, the knee flexes and the ankle dorsiflexes to shorten the limb to clear the ground. The forward swing of the leg is initiated by the quadriceps muscle.

MIDSWING

The hip flexors and knee extensors move the limb forward. The ankle is slightly dorsiflexed and the toes extended to clear the ground. Next, the hip extensors (especially gluteus maximus) and knee flexors (hamstrings) eccentrically contract to slow the forward motion. The hip internally rotates.

DECELERATION

The hamstrings contracting eccentrically and the quadriceps contracting concentrically stop the forward motion of the limb.¹⁵

Gait assessment: the procedure

Observe the client walking without shoes at their normal walking pace from the front, from the side and from behind. As with static postural observation, begin with general observations about the symmetry, rhythm and speed of gait.

1. GENERAL OBSERVATIONS

Note any changes in the smooth coordinated pattern of normal gait.

- Step length is the distance between the point of first contact of one foot to the point of first contact of the other foot. In a study by Latt et al¹⁶ involving 10 healthy adults (four male and six female) with ages ranging from 17 to 31 years, the average step length was 73 ± 3 cm. Step length decreases with age, fatigue, pain and pathology in the lower limb. (Note: Stride length is the distance between the first point of contact of one foot to the first point of contact with the same foot, i.e. two steps.)
- Adults walk at an average cadence of 90–120 steps per minute.^{16, 17} The rate decreases with age, fatigue, pain and if footing is uncertain (e.g. if the surface is slippery or uneven).
- The width of the base (i.e. the distance between the feet) is usually 5–10 cm in adults.¹⁸ Clients widen their base if they have cerebellar problems, decreased sensation in the soles of their feet, or if they feel dizzy or unsteady on their feet.
- In normal gait the body oscillates vertically usually no more than 5 cm with each step.¹⁷
- The pelvis makes a figure-eight movement, alternately shifting laterally over the weight-bearing limb in stance phase and then rotating forward approximately 40° in swing phase.¹⁴

2. IDENTIFY THE PHASE OF GAIT THAT IS DISRUPTED AND THE PARTS AFFECTED

A useful strategy for identifying gait disturbances that arise from local musculoskeletal problems is to locate the phase of gait that is affected. Common problems arising in each phase and possible causes are listed in Table 2.4 on p 25.

Stance phase

Most gait problems are apparent in stance phase. Clients who experience pain in stance phase when the single weight-bearing limb is loaded with the entire body weight may shorten the normal duration of the phase or adopt an antalgic gait (e.g. walking on the ball of the foot). Footwear as a source of pain should always be considered when symptoms occur in stance phase.

Heel strike

Pain from a heel spur, bruise or retrocalcaneal bursitis may cause the client to hop onto the foot to avoid heel strike. Normal knee extension may be prevented by a joint fused in flexion or weak quadriceps muscles. In the latter case, the client may push their knee into extension with their hand. If the hip extensors are weak, the client may increase their lumbar lordosis to compensate.¹⁹ Weak hip adductors may result in abnormal rotation of the pelvis and lower limb.

Foot flat

Weak or non-functioning dorsiflexors (tibialis anterior, extensor digitorum longus, extensor hallucis longus) may cause the foot to slap down after heel strike. If the ankle joint is fused, the client may not reach foot flat until midstance.

Midstance

The foot supports the entire body weight and the hip and knee move into extension. Degenerative joint disease, pes planus or plantar fasciitis may cause pain in the weight-bearing ankle or foot. Painful calluses may develop over the metatarsal heads, often as a result of fallen transverse arches of the foot. If gluteus medius is weak, the pelvis drops on the non-weight-bearing side (gluteus medius or Trendelenburg or abductor gait). Weak quadriceps may cause excessive knee flexion.

Push off

If gluteus maximus is weak the client may thrust their trunk backwards to maintain hip extension (gluteus maximus or hip extensor gait). If the knee extensors are weak the knee may buckle. Weak gastrocnemius, soleus or flexor hallucis longus may lead to flat-footed (calcaneal) gait. Degenerative joint disease or hallux rigidus may interrupt normal push off which requires extension of the metatarsophalangeal joint. Clients with hallux rigidus push off from the lateral aspect of their foot. Calluses on the metatarsal heads and corns can also cause pain during push off.

Swing phase

Acceleration

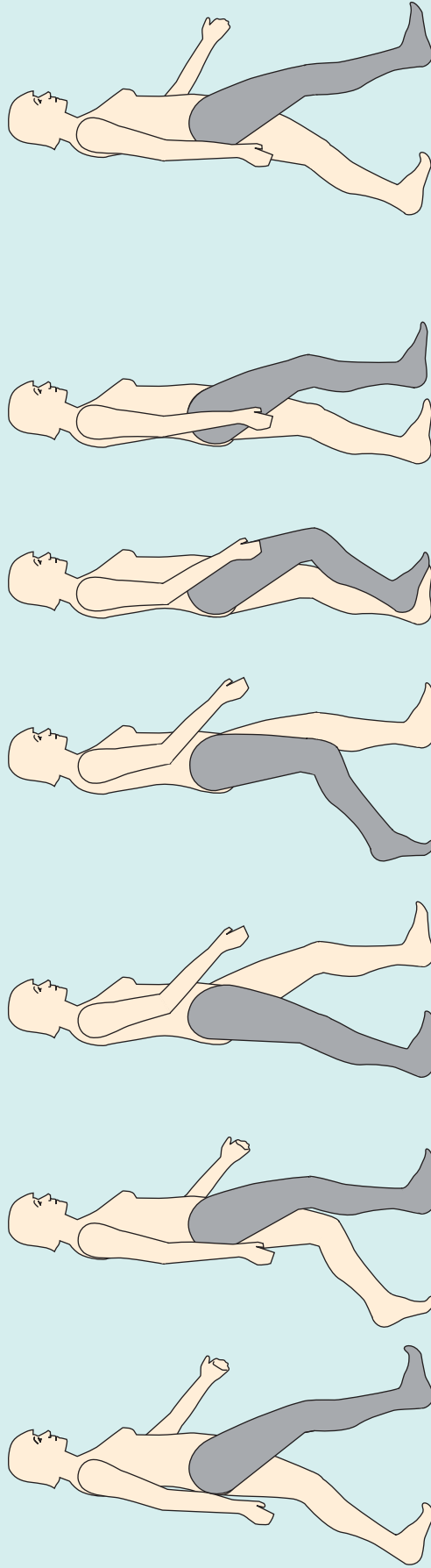
In the acceleration phase the ankle dorsiflexors help shorten the lower limb so it can clear the ground. Weak ankle dorsiflexors may cause foot drop. The hip flexes and medially rotates as the knee flexes to a maximum of 65° to shorten the leg. If the quadriceps muscles are weak the leg is swung forward with an exaggerated anterior pelvic rotation.

Midswing

If ankle dorsiflexors are weak in mid swing, the client may flex the hip excessively to bend the knee to avoid scraping the toe on the ground (steppage gait).

Table 2.3 Phases of gait

Phases of gait



Stance phase

Swing phase

Heel strike	Foot flat	Midstance	Push off	Acceleration	Mid swing	Deceleration
The foot makes first contact with the ground and the limb decelerates. A closed kinetic chain for the lower limb is initiated.	Foot adapts to surface and takes the weight of the body. The pelvis is stabilised. Trunk is carried forward by momentum.	The knee remains stabilised. Momentum continues to carry the body forward.	The body is accelerated into forward motion.	The lower limb is shortened and swung forward. The innominate moves anteriorly.	The foot clears the ground. On the weight-bearing side the innominate moves posteriorly; the sacrum tilts laterally towards the side of loading.	Decelerate the limb, and prepare for first contact with the ground.
Major muscle groups						
Concentric Ankle dorsiflexors Eccentric Hip extensors Tibialis anterior	Concentric Knee extensors Ankle plantar flexors Isometric Hip abductors Eccentric Hip extensors Quadriceps Tibialis anterior	Isometric Ankle plantar flexors Hip abductors Eccentric Plantar flexors	Concentric Ankle plantar flexors Eccentric Toe flexors	Concentric Hip flexors Knee flexors Ankle dorsiflexors	Concentric Hip flexors Ankle dorsiflexors Eccentric Hip extensors	Concentric Quadriceps Ankle dorsiflexors Eccentric Knee flexors Hip extensors

Table 2.4 Common gait problems**Stance Phase**

Antalgic gait (often minimising the duration of stance phase)	Any condition causing pain, especially in the weight-bearing limb or lower back (e.g. shoe problems, DJD ankle, knee, hip, lumbar disc herniation)
Avoiding heel strike (e.g. hopping onto flat foot)	Heel spurs, bruise, bursitis
Drop foot gait	Weak tibialis anterior
Trendelenburg gait The pelvis drops and the trunk lurches to the unaffected side to maintain balance	Weak gluteus medius
Hip extensor gait Immediately after heel strike, the hip is thrust forward and the trunk thrown into extension	Weak gluteus maximus
Back knee gait to lock the knees into extension, pushing knee into extension with hand	Weak quadriceps
Unstable knee which may suddenly buckle into flexion	Dislocating knee cap, torn menisci, torn collateral ligaments
Walking on the balls of the feet	Gastrocnemius/soleus shortening or tear; heel or foot pain (antalgic gait)
Flat foot gait, no forceful toe-off	Weak gastrocnemius/soleus; hallux rigidus

Swing Phase

Steppage gait (lifting knee high)	Weak dorsiflexors
Abnormal hip rotation in acceleration	Weak quadriceps
Heavy heel strike	Weak hamstrings

Deceleration

If the hamstrings are weak heel strike can be excessively hard and the knee may hyperextend (back knee gait).

Findings from gait analysis should be correlated with findings from other assessments, particularly length and strength tests for specific muscles which are detailed in Chapters 10–20 and assessment of the sacroiliac joints, and hip, knee, ankle and foot regions (Chapters 10, 18, 19 and 20 respectively). Further assessments such as muscle firing patterns (see Fritz et al¹⁴) and neuromuscular treatments like muscle energy techniques (see Chaitow²⁰) are beyond the scope of this book but will be of interest to remedial massage therapists who use advanced soft tissue techniques.

FUNCTIONAL TESTS

As part of their assessment procedures, remedial massage therapists use a range of functional tests. These include active and passive range of motion, resisted muscle tests and other tests of functional limitation (e.g. tests for the strength of specific muscles, muscle length tests and other special tests including straight leg raising, Valsalva, Adam's test), and less commonly vital signs (blood pressure, temperature, pulse rate). Active, passive and resisted tests are usually performed before more specific tests.

Although functional tests are widely used by physical therapists including physiotherapists, chiropractors and osteopaths, several studies have found that many tests lack validity and reliability. The Australian Acute Musculoskeletal Pain

Guidelines Group⁷ has urged practitioners to interpret clinical signs elicited during physical assessment cautiously. 'Eyeballing' a client's active range of motion (i.e. measuring by eye without the use of a goniometer or other measuring tool) is particularly unreliable in clinical practice. Many functional tests have not been fully researched; however, increasingly, information about their diagnostic accuracy is becoming available. Measures of sensitivity (the probability of a positive test among clients with the condition) and specificity (the probability of a negative test among clients who don't have the condition) are available for some tests, however such measures are really only useful when they are very high ($\geq 95\%$) to help rule a condition in or out.¹⁵

Likelihood ratios (LRs) are another measure of the usefulness of diagnostic tests. LRs greater than 1 indicate an increased probability that a condition is present. LRs of 10 or more usually rule in a condition. LRs less than 1 indicate a decreased probability that a condition is present. LRs of 0.1 or less usually rule out a condition.²¹ Figure 2.17 summarises common measures used to rate the diagnostic accuracy of functional tests.

The decision to perform diagnostic tests is based on client history and other findings that indicate the likelihood of a condition and also whether it is important to have a definitive diagnosis. Remember that in many cases it is not possible or necessary to have a definitive diagnosis of the cause of acute musculoskeletal pain to have effective management of the condition.⁷ Where diagnostic tests are appropriate, tests with the highest diagnostic accuracy are preferred. However,

Measuring the diagnostic accuracy of functional tests

Validity	Degree to which a test measures what it is intended to measure
Reliability	Degree of consistency with which an instrument or rater measures a particular attribute (expressed as a percentage or decimal e.g. 80% or 0.8)
Sensitivity	Ability of a test to detect people who actually have a condition (usually recorded as a percentage: sensitivity $\geq 95\%$ rules in a condition)
Specificity	Ability of a test to correctly identify people who do not have a condition (usually recorded as a percentage: specificity $\geq 95\%$ rules out a condition)
Likelihood ratios	LR >1 increased probability that a condition is present (the higher the number the better: LR >10 rules in the condition) LR < 1 decreased probability that a condition is present (the lower the number the better: LR ≤ 0.1 rules out the condition)

Fig. 2.17 Measuring the diagnostic accuracy of functional tests

even results of functional tests with good ratings for diagnostic accuracy are best interpreted as indicators of possible conditions, such as hamstring strain, tennis elbow or degenerative joint disease and used to guide treatment planning (see Table 2.6 on page 27). Physical testing demonstrates clients' functional limitations and suggests the types of tissues involved, the range of treatment options likely to benefit clients, and guides the application of techniques (e.g. depth and duration).

Active range of motion (AROM) tests

LOCATING THE REGION

Active tests require the client to move the body through ranges of motion. Muscles are activated and joints move so active movements are not specific to the types of tissues involved. They are useful in locating regions of the body that are likely sources of symptoms. For example, active range of motion tests of a client with posterior thigh pain will help determine if the lumbar spine, hip or knee regions are likely sources of pain and guide the choice of further assessments and treatment options.

SAFE PRACTICE

Safe practice is based on assessing functional limitations and making realistic interpretations of verbal and non-verbal information from clients. AROM testing has an important safety function. It precedes all other functional assessments. Observing clients' active movements helps practitioners determine appropriate pressure, speed and range for passive range of motion (PROM) and other tests. For example, if a client reports pain at 30° active lumbar flexion, all further assessment and treatment procedures must take this into account. In this case, bilateral knee to chest stretches of the erector spinae muscles are likely to reproduce painful lumbar flexion and should be avoided. As a general rule, observe clients and watch them move before making any physical contact.

SEE	MOVE	TOUCH ²²
<i>Observation</i>	<i>AROM</i>	<i>PROM</i>

Regularly ask clients for feedback and always be alert to non-verbal cues about discomfort or pain.

**Passive and resisted tests:
Determining tissue types**

Active, passive and resisted tests are used initially to help determine the types of tissues that are injured. They also guide decisions about the need for more specific testing. The results of all functional testing are general guides only (see Table 2.6) and must be interpreted in the light of other assessment findings and of individual responses.

Active tests indicate the region of the body which is a likely source of symptoms. Next passive range of motion (PROM) and resisted range of motion (RROM) tests are carried out to help identify the likely types of tissue involved.

PASSIVE RANGE OF MOTION TESTS (PROM)

PROM tests are performed by the therapist, who moves the joint or body part through its range of motion. Pain and other symptoms reproduced during PROM testing may be related to inert structures including articulating cartilage, joint capsules or ligaments. Muscles are not actively recruited during PROM testing. However, they are passively stretched and RROM and palpation may be required to help differentiate the involvement of contractile or inert tissue. PROM tests help detect ligament laxity, joint hypermobility or hypomobility, crepitus and end-feel (the practitioner's interpretation of the feeling of the available movement in the client's tissues at the end of their range of motion). For example, compare the soft end-feel of elbow flexion when muscles are brought together, the hard (bony) end-feel of elbow extension when the olecranon fossa restricts the movement of the ulna, the muscular end-feel of a fully stretched hamstring muscle, and the boggy end-feel when movement is restricted by oedema. Some remedial massage techniques, such as passive joint articulation, are

performed near the end of normal physiological range to stretch joint capsules and other tissues around the joint, to prevent the formation of scar tissue and to improve mobility. Stretching beyond the normal physiological limit may result in tissue damage. Sensitivity to tissue tightening near the limits of normal physiological movement is important for safe practice. Remedial massage therapists are strongly urged to observe AROM before PROM and other assessment and treatment procedures (See-Move-Touch) to determine broad parameters of clients' comfortable movement ranges. Crepitus is sometimes heard and felt and, when related to joint movement, can indicate cartilage wear in the joint space.

Many texts describe capsular patterns of joint limitations in clients with degenerative joint disease or joint inflammation (see Table 2.5). They are included here because they are commonly reported in clinical practice. However, the concept of capsular pattern does not appear to be supported by research evidence.^{23, 24}

RESISTED RANGE OF MOTION TESTS (RROM)

RROM tests are used to test contractile tissue in specific ranges of motion. Position the client's body region or joint (usually in mid-range) and instruct them to hold the position against your resistance. Resistance normally lasts for 3–5 seconds. RROM tests help locate muscle groups according to their actions. For example, performing an RROM test of knee extension tests the integrity of the knee extensor muscles as a group but will not differentiate between the rectus femoris, vastus medialis, intermedialis or lateralis muscles. Further testing, such as resisted tests for specific muscles and palpation, are required to help identify individual muscles.

Tests for specific muscles

Resisted tests and length tests for specific muscles are of particular interest to remedial massage therapists who often focus their treatments on assessing and treating muscle imbalances (e.g. relationships between agonists and antagonists, patterns of kinetic dysfunction, muscle tightness or weakness, impacts on postural alignment, and compensatory patterns). Muscle imbalances have been associated with the development of almost all musculoskeletal pain and dysfunction. Muscles can be classified as mobilisers and stabilisers.

Mobilisers tend to be superficial, span two joints and contain fast twitch fibres for power rather than endurance. Stabilisers, on the other hand, are usually deep, cross one joint and are made up of slow twitch fibres for endurance; they contribute to habitual postures. Mobilisers tend to become short and tight and can inhibit the action of stabilisers that may have become weak and long. Commonly shortened muscles include upper trapezius, pectoralis major, sternocleidomastoid, erector spinae, quadratus lumborum, iliopsoas, hamstring muscles

Table 2.5 Capsular patterns

Joint	Limitation of range of motion
Cervical spine	Lateral flexion = rotation > extension
Thoracic spine	Lateral flexion = rotation > extension
Lumbar spine	Lateral flexion = rotation > extension
Shoulder	Lateral rotation > abduction > medial rotation
Elbow	Flexion > extension
Wrist	Flexion = extension
Metacarpophalangeal	Flexion > extension
Distal interphalangeal	Flexion > extension
Proximal interphalangeal	Flexion > extension
Hip	Flexion, abduction, medial rotation > extension
Knee	Flexion > extension
Ankle	Plantarflexion > dorsiflexion
Subtalar	Inversion > eversion
2nd–5th metatarsophalangeal	Flexion > extension
1st metatarsophalangeal	Extension > flexion

Table 2.6 Direction of treatment following active, passive and resisted range of motion tests

Type of test	Indications	Implications for treatment
Active range of motion (AROM)	Helps locate musculoskeletal region that is the likely source of symptom, e.g. helps determine if symptoms in the upper limb emanate from the cervical spine or shoulder joint	Long-term management usually involves treatment of the source of symptoms. Client education about the likely source of symptoms
Passive range of motion (PROM)	Inert tissue (e.g. the articulation itself, ligaments, joint capsule, bursae) (Note: muscles are also passively stretched during PROM testing)	Treatment focuses on inert structures: Swedish massage, thermotherapy, passive joint articulation, myofascial release, range of motion exercises for joint mobility, joint stabilisation, etc
Resisted range of motion (RROM)	Contractile tissue (e.g. major muscles performing a movement tested as a group) Normally followed by specific muscle testing to isolate involved muscle(s)	Treatment focuses on muscle function: Swedish massage, thermotherapy, deep transverse friction, trigger point therapy, soft tissue releasing techniques, muscle stretching and strengthening

and hip adductors. Shortened hamstrings, adductors and hip flexors are often associated with weakened and lengthened transversalis abdominis and posterior gluteal muscles.

Specific muscle testing to identify correctable abnormalities of muscle strength and length may be prompted by (1) postural observation (e.g. hyperlordotic posture may prompt testing bilateral iliopsoas muscles for shortness), or (2) resisted muscle testing (RROM) in an initial screening that suggests contractile tissue as a source of symptoms.

RESISTED TESTS FOR SPECIFIC MUSCLES

Resisted tests are used by many healthcare professionals to test muscle strength, and grading systems, such as the one described in the box below, have been developed. However, in remedial massage, resisted tests for specific muscles are more commonly used to locate possible lesions in specific muscles. Grading muscle strength is often restricted to bilateral comparisons or judgments based on clinical experience.

A typical grading system rates muscle strength on a scale from 5 to 0:

- 5 Normal strength: movement is possible against maximum resistance by the examiner
- 4 Good: movement is possible against gravity and some resistance by the examiner
- 3 Fair: movement is possible against gravity but not against resistance by the examiner
- 2 Poor: movement is possible when gravity is eliminated (i.e. testing joint in its horizontal plane)
- 1 Trace: muscle tightens but no movement
- 0 Zero: no contraction

In the following example, resisted testing is used to isolate the specific muscles that are likely sources of the presenting symptoms in a client with shoulder pain.

▼ The client would be tested for shoulder range of motion (AROM, PROM, RROM). AROM tests help identify the region of the body that is the likely source of symptoms. If active shoulder abduction reproduces the pain, the injury is likely to be related to the shoulder joint or associated muscles (and not referred from the cervical spine, for example). PROM and RROM tests are required to help determine the likely tissues involved. If PROM tests do not reproduce the pain (i.e. inert structures are probably not involved) but RROM testing for shoulder abduction does, then contractile tissue is implicated. The client's injury is probably related to the shoulder abductor muscles. Further resisted testing is required to discriminate between the two abductor muscles (deltoid and supraspinatus muscles) (see Figure 2.18).

Isolating the injured muscle(s) enables practitioners to develop targeted treatment plans which are likely to produce faster and better outcomes for clients. Resisted tests for muscles implicated in commonly occurring conditions are detailed in Chapters 10–20. (For further information see Kendall McCreary et al²⁵ and Hislop and Montgomery²⁶.)

MUSCLE LENGTH TESTS

Muscle length and flexibility both refer to the ability of a muscle to be lengthened to the end of its range of motion.²⁷ There are many reasons why muscles become shortened, including maintaining postures for excessively long periods



Fig. 2.18 Differentiating (a) middle deltoid and (b) supraspinatus strains

(e.g. hip flexors may become shortened after prolonged periods of sitting), adaptive responses to other conditions (e.g. the presence of a trigger point, scoliosis or a leg length discrepancy) and ageing. When a shortened muscle is identified, muscle-stretching techniques are usually applied to restore its normal length. Stretching can be performed as part of consultation and/or prescribed as home exercises. For example, the length of the hamstring muscles can be assessed by straight leg raising when the client is supine. Shortness is assessed by comparison to population norms (normal hamstring length permits approximately 65–80° straight leg raising) and/or by bilateral comparison. A range of stretching techniques can be applied to the posterior thigh after Swedish massage or heat application has warmed the area (see Chapter 5). Length tests of some of the major muscles of the body are included in Table 2.7.

Positioning the client

- Muscle should be placed in the fully elongated position.
- As far as possible isolate the muscle across one joint.
- Bony landmarks used to measure should be palpable and in proper alignment.

Table 2.7 Length tests of major muscles^{27, 28}**Muscle – upper extremity** **Length test**

Levator scapulae

The client lies supine. The practitioner stabilises the client's shoulder with one hand and flexes, sidebends and rotates the occiput to the opposite side.



Upper trapezius

The client lies supine. The practitioner stabilises the client's shoulder with one hand. With the other the occiput is laterally flexed to the opposite side and rotated to the side of testing.



Latissimus dorsi

The client lies supine and fully flexes the extended arm. Observe the distance between the extended arm and the table.



Pectoralis major

The client lies supine with hand behind head. Observe the distance between the elbow and the table.



Pectoralis major – sternal (lower) portion

The client lies supine and abducts the extended arm to about 135°. The arm is allowed to fall into maximum horizontal abduction.



Pectoralis major – clavicular (upper portion)

As above except that the arm is abducted to 90°.



- Movement should not be blocked by external supports or pillows.
- Client must be able to assume the position.

Stabilisation of proximal bony segment of the associated joint

- Required to isolate intended motion.
- Avoids the client substituting another muscle to perform the motion.

End-feel

- Bony (e.g. elbow extension).
- Capsular (e.g. medial hip rotation).
- Muscular (e.g. knee extension with hip flexion).
- Soft tissue (e.g. knee flexion).

Special (orthopaedic) tests

A range of special (orthopaedic) tests can be used by remedial massage therapists to help identify specific conditions. Remember that findings from special tests should be interpreted cautiously, especially where the specificity or sensitivity of the tests are less than 95%, or where likelihood ratios (LR) are in the range $0.1 \geq LR \geq 10$.

Some commonly used special tests with measures of diagnostic accuracy are listed in Table 2.8. Details of relevant tests will be discussed in Chapters 10–20.

PALPATION

Palpation is considered by many to be the most important assessment tool of massage therapists. Palpatory assessment continues throughout the treatment as an inherent function of manual therapy. Beginning students can rapidly learn to detect differences in muscle tone as they massage. With practice, palpation can be used to identify specific tissues (see Table 2.9) and to assess tissues for pathological states and stages of healing using the following indicators:

- Temperature: use the dorsum of the hand just above or lightly touching the skin to identify changes in temperature (e.g. increased temperature in acute inflammation, decreased temperature in impaired circulation).
- Changes in normal tissue (e.g. fibrotic cords in muscles, hard pea-shaped painful trigger points, muscle flaccidity, micro-tears in musculotendinous junctions and muscle bellies).
- Presence of oedema (e.g. sponginess of tissues in acute inflammation, pitting and non-pittingⁱ).

The chiropractic, osteopathic and physiotherapy literature contains a number of studies on the efficacy of palpation. One annotated bibliography found only slight interexaminer reliability and moderate intraexaminer reliability for palpation.³⁰ Inter- and intraexaminer discrepancies were also found in a small study in which two physiotherapists identified 12 anatomical landmarks that enabled measurement of eight joint

angles.³¹ Joensen et al³², on the other hand, found strong agreements between palpation for tendon hypertrophy. As with many other aspects of massage assessment practices, further research is needed to confirm the efficacy of palpation as an assessment strategy for remedial massage practice.

Palpatory findings must also be recorded on clients' files. There have been several attempts at categorising palpatory findings but none has been widely taken up. Recording the tissue type and any abnormal temperature, tissue quality or water content is usually sufficient (e.g. fibrotic left upper trapezius, hot swollen right lateral ankle joint, trigger point right supraspinatus muscle).

LEGAL AND ETHICAL REQUIREMENTS FOR REMEDIAL MASSAGE ASSESSMENT

Issues of privacy, confidentiality, child protection and the safe and efficient use of equipment and resources are of paramount importance in all aspects of remedial massage practice, including assessment. Remedial massage assessments must be recorded accurately and in a well-organised manner so as to be easily interpreted by others. Lack of standard abbreviations of key terms and recordings of remedial massage assessments confounds the transparency of record keeping. SOAP^j and other similar charting methods are useful guides for massage therapists, however they often lack the capacity for recording the range of assessments commonly used in remedial massage practice. Practice management software can often be used to record assessments, copies of X-ray and CT scans and other medical reports and correspondence.

Figure 2.19 is an extract from a sample client assessment form which accommodates commonly used remedial massage assessments.

Another simple method for recording trunk ranges of motion involves drawing a star diagram to represent cervical, thoracic or lumbar motion as if observed from above (see Figure 2.20). Each line represents normal ROM for the movement. Restrictions in ranges of motion are indicated by drawing dashes, and pain is indicated by recording P on the lines of the star diagram. The closer to the centre of the star, the more marked the restriction or the earlier the onset of pain.

KEY MESSAGES

Remedial massage assessments determine the suitability of clients for remedial massage through screening for red flags. Those deemed suitable for remedial massage undergo further assessments to identify potential sources of symptoms, to understand clients' perceptions of their own functional impairments and to develop effective therapy plans.

For safe practice, all assessments should adhere to the following principles:

1. See-Move-Touch; that is, clients should be observed and perform active range of motion tests first before any physical contact is made with clients.
2. Assessments should be performed slowly and carefully especially when using tests that can reproduce symptoms.

ⁱPitting oedema results when a swollen area is pressed and an indentation persists after the pressure is released. This is the most common form of oedema. It is caused by any form of pressure (e.g. from tight socks). In non-pitting oedema pressure applied to a swollen area does not create a persistent indentation. Non-pitting oedema occurs in disorders of the lymphatic system (e.g. lymphoedema after lymph-node surgery or congenitally). It is usually observed in the arms or legs. It can also be associated with hyperthyroidism.

^jSOAP charting encourages therapists to record subjective (S) and objective (O) assessments, assessment or analysis (A) and their therapy plan (P).³⁴

Table 2.8 Special tests commonly used by remedial massage therapists (see Chapters 10–20 for specific regional orthopaedic tests)

Adam's test	Test to discriminate idiopathic and functional scoliosis
Anterior draw (knee)	Test for integrity of anterior cruciate ligament of the knee (SN 18–95, SP 86–100, LR+ 1.8–8.3, LR– 0.1–0.5)
Anterior draw (ankle)	Test for anterior talofibular instability (SN 78–95, SP 74–84, LR+ 3.1, LR– 0.29)
Apley's test	Test for meniscal tear in the knee (R 0.95, SN 13–16, SP 86–100, LR+ 0.8–5.9, LR– 0.63–1.1)
Cervical compression test	Test for pressure on a nerve root (increased peripheral pain), joint damage or ligament strain (increased local pain)
Cervical distraction	Pressure on a nerve root relieved by distraction. Increased local pain suggests muscle, ligament or joint capsule damage (R 0.82, SN 40–50, SP 80–100, LR+ 4.4; LR– 0.62)
Drop arm test	Useful to rule in rotator cuff tear (R 0.28–0.66, SN 8–27, SP 88–100, LR+ 2.6–5 LR– 0.83–0.94)
Elbow extension test	Useful to rule out bony or joint injury (SN 97, SP 69, LR+ 3.1, LR– 0.04) ²⁹
Elevated arm stress test (Roo's test)	Test for thoracic outlet syndrome (SN 82, SP 100)
Empty can test	Pain or weakness suggests supraspinatus damage (SN 44–89, SP 50–90, LR+ 1.8–4.2, LR– 0.22–0.63)
Finkelstein's test	Test for tenosynovitis of the abductor pollicis longus and extensor pollicis brevis (SN 81, SP 50, LR+ 1.6, LR– 0.38)
Iliac compression test	Test for sacroiliac lesion
Impingement test	Test for shoulder impingement syndrome: shoulder impingement suggested if pain during active flexion; supraspinatus impingement suggested if pain when shoulder internally rotated; biceps long head implicated if pain when shoulder externally rotated.
Kemp's/quadrant test	Leg pain suggests nerve root compression or radiculopathy; low back pain suggests local sprain/strain or facet syndrome
Morton's test	Test for Morton's neuroma, metatarsal joint arthritis, fracture of the metatarsal heads or metatarsalgia
Painful arc	Test for impingement syndrome, rotator cuff or AC pathology (SN 33–98, SP 10–81, LR+ 1.1–3.9, LR– 0.2–0.82)
Patella apprehension test	Test for dislocation or subluxation of the patella (SN 7–37, SP 86–100, LR+ 0.9–2.3, LR– 0.8–1.0)
Patellofemoral grind test	Test for patellofemoral syndrome, DJD, osteochondritis of the patella, patella fracture (SN 29–49, SP 67–75, LR+ 0.9–1.9, LR– 0.7–1.1)
Patrick's/FABERE test	Test for hip joint pathology, DJD, sprain/strain, fracture, tight hip adductors (SN 88)
Phalen's test	Test for carpal tunnel syndrome (compression of median nerve) (R 0.79, SN 10–88, SP 33–100, LR+ 0.7–41.5, LR– 0.1–1)
Posterior draw (knee)	Test for the integrity of the posterior cruciate ligament (SN 22–100, SP 99, LR+ 90, LR– 0.1)
Posterior draw (ankle)	Test for the integrity of the posterior ankle ligaments
PSIS asymmetry	Test for sacroiliac lesion, anatomical variation (R 0.7, SN 69)
Shoulder (anterior) apprehension test	Test for anterior glenohumeral instability (SN 53, SP 99, LR+ 53, LR– 0.47)

Table 2.8 Special tests commonly used by remedial massage therapists—cont'd

SI compression test	Test for SI sprain, fracture, joint dysfunction (R 0.64–0.79, SN 25–69, SP 63–100, LR+ 1.6–2.2, LR– 0.4–0.63)
SI distraction test	Test for anterior SI or pubic symphysis sprain, pelvic fracture (R 0.36–0.94, SN 11–60, SP 74–100, LR+ 1.1–3.2, LR– 0.5–0.98)
Sign of the buttock	Test to distinguish whether pain on straight leg raising arises from SI joint dysfunction, bursitis, gluteal muscle strain or from lumbar spine pathology, nerve root pressure or hamstring tension
Slump test	Leg symptoms suggest nerve root tension, radiculopathy, disc herniation. Local lumbosacral pain suggests lumbosacral sprain or strain (SN 83, SP 55, LR+ 1.8, LR– 0.3)
Straight leg raising	Test to distinguish sciatic nerve impingement, disc herniation, piriformis syndrome from SI/ lumbar strain or sprain (R 0.92, SN 78–98, SP 11–64, LR+ 1.03–2.2, LR– 0.05–0.86)
Thomas test	Test for hip contracture, tight hip flexors (R 0.91)
Tinel's sign	Test for neuropathy Tinel's sign at elbow (SN 70, SP 98, LR+ 35, LR– 0.31) Tinel's sign at wrist (R 0.5–0.8, SN 23–97, SP 53–100, LR+ 0.7–11, LR– 0.03–1.0)
Trendelenburg test	Test for gluteus medius weakness or paralysis, Legg-Calve-Perthes disease, poliomyelitis, hip dislocation, fracture (R 0.68, SN 73, SP 77, LR+ 3.15, LR– 0.36)
Valgus/varus elbow stress test	Test for medial/lateral collateral ligament sprain
Valgus/varus stress test (knee)	Test for medial/lateral collateral ligament sprain (R 0.16, SN 86–100, SP 100)
Valsalva	Test for space occupying lesion, disc herniation, IVF encroachment (R 0.69, SN 22, SP 94, LR+ 3.67, LR– 0.82)
Yergason's test	Test for biceps brachii tendonitis or strain, glenoid labrum pathology, torn transverse humeral ligament (SN 9–50, SP 79–93, LR+ 1.3–3.0, LR– 0.72–0.94)

(R) = reliability, (SN) = sensitivity, (SP) = specificity, (LR) = likelihood ratios
Adapted from Visniak¹⁵

Table 2.9 Palpating tissue layers

Epidermis	Place dorsum of hands lightly on the skin and compare the temperature of different parts of the body. Slide hand over the skin and note the dryness/moistness and texture of the skin. Slide fingers over the skin so that it wrinkles and note any resistance between the epidermis and the underlying tissue.
Muscle	Muscle tissue feels firmer than subcutaneous tissue. Postural muscles often palpate as tight bundles of fibres. Fibrotic tissue feels ropey.
Tendons	Tendons feel like thin firm movable cords.
Ligaments	Ligaments feel like flat bands of tissue, less mobile and elastic than tendons.
Joint capsules	Not palpable unless thickened. Articular disorders are often associated with joint line tenderness.
Peripheral nerves	Peripheral nerves feel like small threads, thinner and less elastic than tendons, often fairly mobile.
Lymph glands	Small soft rubbery nodes, rarely bigger than 0.5 cm.
Blood vessels	Superficial blood vessels feel like soft tubes, pulses are often detected.

Adapted from Chaitow³³

Thoracic

AROM	Flexion	Extension	R lat flexion	L lat flexion	R rotation	L rotation
PROM	Flexion	Extension	R lat flexion	L lat flexion	R rotation	L rotation
RROM	Flexion	Extension	R lat flexion	L lat flexion	R rotation	L rotation
Specific muscle tests						
Special tests	Adam's test		Deep breathing		Elevated arm stress test	

Shoulder

AROM	Flexion		Extension		Abduction		Horiz adduc		Med rot		Lat rot	
	L	R	L	R	L	R	L	R	L	R	L	R
PROM	L	R	L	R	L	R	L	R	L	R	L	R
RROM	L	R	L	R	L	R	L	R	L	R	L	R
Specific muscle tests												
Special tests	Apley's scratch L R				Impingement L R				Apprehension L R			
	Drop arm L R				Yergason's L R				Empty can test L R			

Elbow

AROM	Flexion		Extension		Supination		Pronation					
	L	R	L	R	L	R	L	R				
PROM	L	R	L	R	L	R	L	R				
RROM	L	R	L	R	L	R	L	R				
Specific muscle tests												
Special tests	Valgus stress L R				Varus stress L R				Extension test L R			
	Resisted wrist flexion L R						Resisted wrist extension L R					

Wrist

AROM	Flexion		Extension		Abduction		Adduction		Supination		Pronation	
	L	R	L	R	L	R	L	R	L	R	L	R
PROM	L	R	L	R	L	R	L	R	L	R	L	R
RROM	L	R	L	R	L	R	L	R	L	R	L	R
Specific muscle tests												
Special tests	Phalen's test L R				Tinel's test L R				Finkelstein's test L R			

Fig. 2.19, cont'd

Lumbar

AROM	Flexion	Extension	R lat flexion	L lat flexion	R rotation	L rotation
PROM	Flexion	Extension	R lat flexion	L lat flexion	R rotation	L rotation
RROM	Flexion	Extension	R lat flexion	L lat flexion	R rotation	L rotation
Specific muscle tests						
Special tests	Kemp's test L R		Valsalva		SLR L R	
	Centralisation peripheralisation		Patrick's test L R		SI compression L R	
	SI distraction L R		Short leg L R			

Hip

AROM	Flexion		Extension		Abduction		Adduction		Med rot		Lat rot	
	L	R	L	R	L	R	L	R	L	R	L	R
PROM	L	R	L	R	L	R	L	R	L	R	L	R
RROM	L	R	L	R	L	R	L	R	L	R	L	R
Specific muscle tests												
Special tests	Patrick's test L R				Thomas test L R				Trendelenburg L R			
	Ober's test L R											

Knee

AROM	Flexion		Extension		Med rot		Lat rot		
	L	R	L	R	L	R	L	R	
PROM	L	R	L	R	L	R	L	R	
RROM	L	R	L	R	L	R	L	R	
Specific muscle tests									
Special tests	Patellofemoral grind L R				Patella apprehension L R			Valgus stress test L R	
	Varus stress test L R				Anterior draw L R			Posterior draw L R	
	Apley's compression L R								

Fig. 2.19, cont'd

Ankle and foot

AROM	Flexion		Extension		Inversion		Eversion	
	L	R	L	R	L	R	L	R
PROM	L	R	L	R	L	R	L	R
RROM	L	R	L	R	L	R	L	R
Specific muscle tests								
Special tests	Anterior draw L R				Posterior draw L R		Lat stability L R	
	Morton's test L R							

Fig. 2.19, cont'd

Star diagram

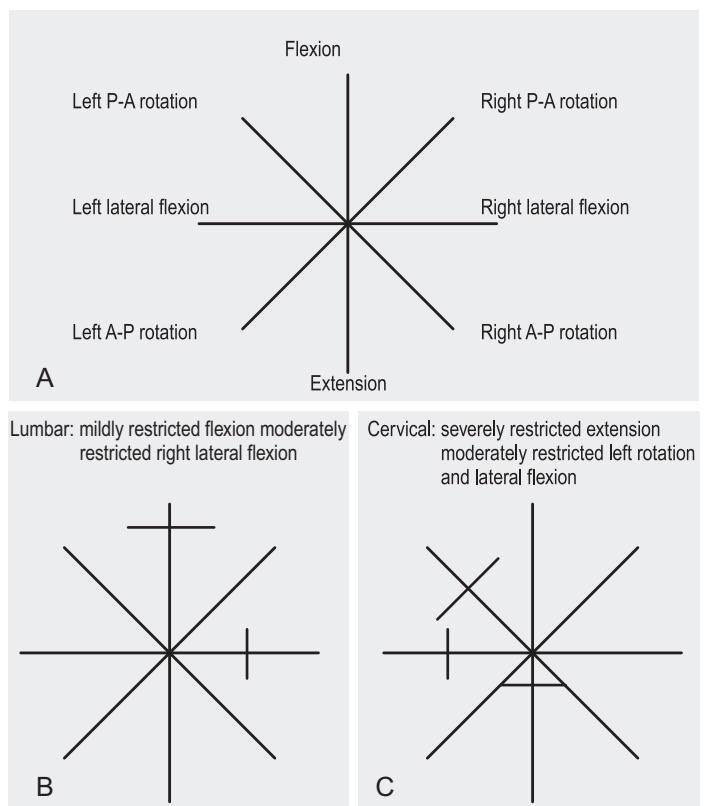


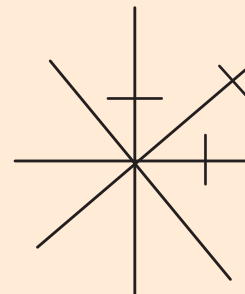
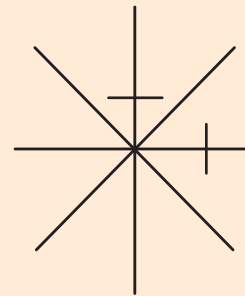
Fig. 2.20 Recording trunk ranges of motion: the star diagram

Remedial massage assessments include:

- Case history
 - Identify red and yellow flags
 - Is the client's condition mild, moderate or severe?
- Outcome measures
 - Monitor progress towards treatment goals
- Postural observation
 - Look for underlying predisposing factors to presenting symptoms
- Gait assessment
 - Observe disturbances of symmetry, rate and rhythm of normal gait
- Functional tests
 - Active range of motion (AROM)
 - to locate source of lesion
 - Passive range of motion (PROM)
 - Resisted tests (RROM)
 - Specific muscle tests (where appropriate)
 - Resisted tests and length tests for specific muscles
 - Special (orthopaedic) tests
- Palpation
 - Identify tissues involved, stage of healing

Review questions

- Complete the following sentences with a word or phrase:
 - Red flags are _____
 - A common cause of increased kyphosis of the cervicothoracic spine is _____
 - Passive range of motion tests are used to test _____
 - A dermatome is _____
 - _____ test is used to discriminate between idiopathic and functional scoliosis.
- What would you do if a client came to your clinic for assessment and treatment of pain in the upper thoracic spine, bilateral shoulders and hands, and with a history of night sweats?
- Circle the correct answer:
A client is observed to have a mild scoliosis with the right iliac crest lower than the left. It is likely that:
 - the right gluteal fold is lower/higher on the right
 - the gluteal cleft deviates to the left/right
 - the left PSIS is lower/higher than the right PSIS
 - the right foot is anterior/posterior to the left foot
 - the left/right knee is slightly flexed
 - the waist curve on the right appears to increase/decrease
- Indicate True or False for each of the following statements.
 - Using the principle of See-Move-Touch, passive tests are conducted before active tests. True/False
 - The centre of gravity passes anterior to the lateral malleolus in the ideally aligned erect posture. True/False
 - Referred pain is sharp and poorly localised. True/False
 - The inferior angle of the scapula is approximately at the level of T5 spinous process. True/False
- What type of tissue is implicated if active shoulder flexion is positive and resisted shoulder flexion is positive but passive shoulder flexion is not?
What further testing, if any, is required?
- What type of tissue is implicated if active hip abduction is positive and passive hip abduction is positive but resisted hip abduction is not?
What further testing, if any, is required?
- How would you interpret the following assessment findings for the lumbar spine: active right lateral flexion positive, resisted right lateral flexion positive, and passive right lateral flexion positive?
What further testing, if any, is required?
- Describe a test for the length of the hamstring muscle.
- What type of tissue is suggested by the following palpatory findings:
 - Soft, rubbery, pea-shaped, less than 0.5 cm diameter
 - Tight cord
 - Small threads
 - Small pulsing tubes
- Name a possible cause for the following observations of gait:
 - steppage gait
 - heavy heel strike
 - back knee gait
 - excessive hip rotation in acceleration phase
- What are the implications for practice of using a functional test with a sensitivity of 95%?
- How would you interpret the lumbar ranges of motion indicated by the following star diagram?



APPENDIX 2.1

Skin cancer

In Australia 70–80% of all skin cancers are basal cell carcinomas, 15–20% are squamous cell carcinomas and less than 5% are melanomas.³⁵

Basal cell carcinomas usually occur in people over 40 years of age, although they may occur in younger people. They are slow growing and present as either small, raised pearly tumours with small blood vessels on the surface or a red plaque. The latter is more common on the trunk.

Squamous cell carcinomas may develop as a slowly enlarging, scaly nodule or an ulcerated sore with raised, rolled edges or a red, scaly plaque.

Malignant melanoma is a malignant change in the pigment cells of the skin. It can develop in normal skin as a flat, coloured spot or appear as a change in an existing pigmented

lesion such as a mole. They can appear anywhere on the body. In the early stages, a melanoma is a flat, coloured spot.

Encourage clients to seek medical attention for pigmented lesions which are either new or changing, especially if their size, colour or shape is changing.

The following checklist may be useful:³⁶

- Asymmetry – one half of the lesion is dissimilar to the other
- Border irregularity – lack of distinct edge, spread of pigmentation into apparently normal skin
- Colour change – red, white, blue, sudden darkening, particularly shades of brown or black
- Changes in surface – scaliness, erosion, bleeding, oozing, crusting
- Diameter enlarging

Seborrhoeic keratoses are raised, pigmented lesions which are common benign tumours occurring in people over 40

years old. **Solar keratoses** are scaly lesions which may come and go. They occur on the sun-exposed areas of the body and are seen in 40–50% of people over 40 years old. These lesions are often confused with melanomas. However, their

presence indicates that a person has had sufficient sun exposure to be at high risk of having either a basal cell or squamous cell carcinoma somewhere on the sun-exposed areas of their body.

What to look for

Any mole or freckle that has:

1. changed colour. Melanomas often develop a blue or black colour. Sometimes areas may become lighter and many different colours such as reds, greys, blues may be found.
2. changed shape or increased in size. The change in shape is usually from an oval or round mole to an irregular 'coastline' appearance. The increase in size can be overall or simply an elevation above surrounding skin. React quickly to a flat mole that becomes elevated, especially if the elevation is dark or a different colour from the original mole.
3. an irregular border. Most harmless moles have smooth, regular borders. Melanomas often have irregular borders.
4. become itchy or bleeds. A mole that bleeds without any significant injury should be examined by a doctor. Itch may be an important symptom but only if there are other changes.
5. appeared recently from normal-looking skin, especially if it is dark or is rapidly growing.

Any pigmented lesion that looks different from the others on an individual's skin should be examined closely and biopsied if diagnosis is uncertain. (Most moles or pigmented spots on an individual resemble each other – show a family resemblance.)

Clinical features suggestive of malignancy

- size greater than 6 mm
- irregular shape
- variation in colour within the mole
- noticeable increase in size over 3–18 months
- unexplained inflammation in and around the mole (redness and/or tenderness around a mole for longer than two months is suspicious)
- bleeding and itching (repeated bleeding with minor injury is unusual)

REFERENCES

1. Chow R. Complementary medicine: impact on medical practice. *Curr Ther* 2000;41(7):76–9.
2. Grace S, Vemulpad S, Beirman R. Training in and use of diagnostic techniques among CAM practitioners: an Australian study. *J Altern Complement Med* 2006;12(7):695–700.
3. Ernst E. The safety of massage therapy. *Rheumatology* 2003;42:1101–6.
4. Anderson T, Ogles B, Patterson C, et al. Therapist effects: facilitative interpersonal skills as a predictor of therapist success. *J Clin Psychol* 2009;65(7):755–68.
5. Weiss L, Blustein J. Faithful patients: the effect of long-term physician-patient relationships on the costs and use of health care by older Americans. *Am J Public Health* 1996;86(12):1742–7.
6. New Zealand Guidelines Group. New Zealand acute low back pain guide. Online. Available: www.nzgg.org.nz/guidelines/0072/acc1038_col.pdf; 2004.
7. Australian Acute Musculoskeletal Pain Guidelines Group. Evidence-based management of acute musculoskeletal pain: a guide for clinicians. Bowden Hills, Qld: Australian Academic Press; 2004.
8. WorkCover NSW. Training manual for providers of remedial massage therapy to injured workers. Gosford: WorkCover NSW; 2010.
9. Weir M. Complementary Medicine: ethics and law. Ashgrove: Prometheus Publications; 2000.
10. WorkCover NSW. Delivering Physical Treatment to Injured Workers – using evidence-based practice and treatment outcomes. Sydney: WorkCover NSW; 2005.
11. Bayar K, Bayar B, Yakut E, et al. Reliability and construct validity of the Oswestry Low Back Pain Disability Questionnaire in the elderly with low back pain. *The Pain Clinic* 2003;15(1):55–9.
12. Harcourt B, Wijesinha M, Harcourt G. Subjective and Objective Numerical Outcome Measure Assessment. A combined outcome measure tool: findings on a study of reliability. *J Manipulative Physiol Ther* 2003;26(8):481–92.
13. Beirman R. Handbook of clinical diagnosis. Sydney: R. Beirman; 2003.
14. Fritz S, Chaitow L, Hymel GM. Clinical massage in the healthcare setting. St Louis, MI: Mosby Elsevier; 2008.
15. Vizniak N. Physical assessment. Burnaby, B.C.: Professional Health Systems; 2008.
16. Latt M, Menz H, Fung V, et al. Walking speed, cadence and step length are selected to optimize the stability of head and pelvic accelerations. *Exp Brain Res* 2008;184:201–9.
17. Hoppenfeld S. Physical examination of the spine and extremities. 2nd edn. Upper Saddle River, NJ: Prentice Hall; 2010.
18. Magee D. Orthopedic Physical Assessment. 5th edn. Philadelphia: Saunders; 2008.
19. Rattray F, Ludwig L. Clinical massage therapy: Understanding, assessing and treating over 70 conditions. Elora, Ont: Talus; 2000.
20. Chaitow L. Muscle energy techniques. 2nd edn. Edinburgh: Churchill Livingstone; 2001.
21. McGee S. Simplifying likelihood ratios. *J Gen Intern Med* 2002;17(8):646–9.
22. Esposito S, Phillipson S. Spinal adjusting technique: The chiropractic art. Sydney: Well-Adjusted Publishing; 2005.
23. Klassbo M, Harms-Ringdahl K, Larsson G, et al. Examination of passive ROM and capsular patterns in the hip. *Physiother Res Int (Research Support, Non-U.S. Gov't)* 2003;8(1):1–12.
24. Bijl D, Dekker J, van Baar ME, et al. Validity of Cyriax's concept capsular pattern for the diagnosis of osteoarthritis of hip and/or knee. *Scand J Rheumatol (Clinical Trial Randomized Controlled Trial Research Support, Non-U.S. Gov't)* 1998;27(5):347–51.
25. Kendall McCreary E, Provance P, McIntyre Rodgers M, et al. Muscles, testing and function, with posture and pain. 5th edn. Philadelphia, PA: Lippincott Williams and Wilkins; 2005.
26. Hislop H, Montgomery J. Daniels and Worthingham's muscle testing: Techniques of manual examination. 8th edn. Oxford: Saunders Elsevier; 2007.
27. Reese N, Bandy W. Joint range of motion and muscle length testing. Philadelphia: W.B. Saunders; 2002.
28. Reiman M, Manske R. Functional testing in human performance. Champaign, IL: Human Kinetics; 2009.
29. Cleland J, Koppenhaver S. Netter's orthopaedic clinical examination: an evidence-based approach. 2nd edn. Philadelphia: Saunders; 2011.
30. Haneline M, Cooperstein R, Young M, et al. An annotated bibliography of spinal motion palpation reliability studies. *J Can Chiropr Assoc* 2009;53(1):40–58.
31. Moriguchi C, Carnaz L, Silva L, et al. Reliability of intra- and inter-rater palpation discrepancy and estimation of its effects on joint angle measurements. *J Can Chiropr Assoc* 2009;53(1):40–58.
32. Joensen J, Coupe C, Bjordal J. Increased palpation tenderness and muscle strength deficit in the prediction of tendon hypertrophy in symptomatic unilateral shoulder tendinopathy: an ultrasonographic study. *Physiotherapy* 2009;95:83–93.
33. Chaitow L. Palpatory literacy: they complete instruction manual for the hands on therapist. London: Thorsons Element; 1991.
34. Fritz S. Mosby's Fundamentals of Therapeutic Massage. 4th edn. St Louis, MI: Mosby Elsevier; 2009.
35. Australian Cancer Council. Cancer types 2009: Online. Available from: www.cancer.org.au.
36. Berwick M, Begg C, Fine J, et al. Screening for cutaneous melanoma by skin self-examination. *J Natl Canc Inst* 1996;88(1):17–23.

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<http://www.pennchiro.org/files/clinical/doctor/Oswestry.pdf>