The purpose of clinical examination is not simply to gather as much information as is possible in the time available. Often the inexperienced clinician can spend an entire examination gathering data with little evaluation of its clinical relevance. As manual therapists we provide our patients with incredibly sensitive examinations. The volume and sophistication of our examination procedures is immense. However, we may occasionally fail to grasp the problem of specificity. We must find a balance between gathering enough information to prioritize the patient’s most significant dysfunction whilst not being distracted by the less relevant dysfunctions we discover.

We are essentially searching for the patient’s ‘predominant dysfunction or fault’ in order to direct our intervention towards it. The process of ranking the importance of our findings requires that we test the hypothesis of ‘predominant dysfunction’ throughout our interaction with our patients. In short, during the examination of patients we are considering if our hypothesis will guide treatment more effectively than the next most likely hypothesis. In addition, during treatment we should be continually considering if our chosen intervention is in fact more effective than the next most likely intervention. This process of analytical assessment is not new and was advocated by Maitland (1986) and Grieve (1988, 1991) over 30 years ago.

Simply gathering huge quantities of information that is neither discriminatory nor influential in management represents a failure in our duty of care to our patients. The purpose of clinical examination is to evaluate valid information that will facilitate the prioritization of likely diagnoses and strategies of management. In other words, our duty to our patients is to ensure we are identifying their predominant dysfunction/fault and to continually ensure that we are providing the most effective management strategy at the time. Ensuring we adhere to this principle will ensure we are facilitating recovery as quickly as possible. It could be argued that the primary objective of manual therapy is to facilitate recovery as quickly as possible. On the whole, the conservative management of most musculoskeletal dysfunctions will facilitate recovery. Manual therapy’s role is in the acceleration of this process. Thus, ensuring our treatment choice is making more difference, more quickly than the next most likely choice of treatment is a crucial responsibility.
Subjective examination

During the initial consultation the therapist will begin to form an impression of the patient based on verbal and non-verbal communication. Expert clinicians form an impression regarding diagnosis, management and expectations of the patient very quickly. Mixed methods of clinical reasoning are utilized in this process as outlined in Chapter 3.

The diverse nature of musculoskeletal dysfunction rarely allows the definitive identification of definitive patterns of presentation. The clinician is frequently required to make reasoned judgements as to the predominant dysfunction from several alternatives. Some of the typical judgements required are listed below. This is by no means an exhaustive list. The process of establishing that one treatment approach is superior to another begins during the initial consultation with the patient. Early in the initial interview with a patient, the therapist should look for answers to the following questions.

Is this patient’s presentation suitable for a manual therapy approach?

• Is this patient presentation sounding like I should explore further with an assessment of biomechanical dysfunction?

• Does this patient’s presentation suggest that a more psychosocial approach may elicit effective treatment strategies?

Which patterns of presentation does this presentation match with?

• Does the presentation fit a pattern of presentation I have encountered before?

• If so, what is it that makes this patient’s presentation fit this pattern better than the next most likely pattern?

• What questions and tests do I need to use to test this hypothesis?

Does the functional fault have a directional quality?

• In what combination of positions are symptoms reproduced?

• In what combination of positions are symptoms reduced?

What is the likely source of the directional fault?

• Does the presentation have predominantly arthrogenic features?

• Does the presentation have predominantly myogenic features?

• Does the presentation have predominantly neurodynamic features?

Is this predominantly a control or impairment fault?

• Does the presentation suggest a dysfunction in control of movement?

• Does the presentation suggest a dysfunction associated with limitation (or impairment) of movement?

Is it acceptable to reproduce symptoms – are they ‘severe’?

• Is the faulty position producing severe pain?

• Is positioning in the faulty position likely to cause a latent or long-term exacerbation of symptoms?

• Is there a position that will allow examination and treatment whilst avoiding unacceptable symptom reproduction?

• Is it likely that caution needs to be taken due to a patho-anatomical reason that would make the use of combined movement theory (CMT) unwise? See the contraindications to manual therapy in the box below.

What is the predominant pain mechanism?

• Is the patient’s predominant pain mechanism: nociceptive, peripheral neurogenic, central sensitivity, autonomic or affective?

Prior to the conduct of a physical examination using the CMT approach the patient should be informed of your plans and the risks and benefits of the approach against other approaches.

By examining the expectations of the patient the suitability of utilizing a CMT approach can be established. If the patient’s expectations of treatment are radically different to the therapist’s, a discussion of future management should ensue. A detailed biomechanical assessment of spinal dysfunction may be unwarranted if the patient is expecting and consenting only to generic advice and exercise.
Clinical point

Contraindications to spinal passive movement that takes a joint to the end of passive range or thrust techniques

**Bone**
- Any pathology that has led to significant bone weakening:
  - Tumour, e.g. metastatic deposits
  - Infection, e.g. tuberculosis
  - Metabolic, e.g. osteomalacia
  - Congenital, e.g. dysplasias
  - Iatrogenic, e.g. long-term corticosteroid medication
  - Inflammatory, e.g. severe rheumatoid arthritis
  - Traumatic, e.g. fracture

**Neurological**
- Spinal cord compression
- Cauda equina compression
- Nerve root compression with increasing neurological deficit

**Vascular**
- Aortic aneurysm
- Bleeding into joints, e.g. severe haemophilia
- Cervical artery dysfunction (Kerry et al., 2008a, 2008b)

**Relative contraindications**
- Special consideration should be given prior to the use of spinal manipulative thrust techniques in the following circumstances:
  - Adverse reactions to previous manual therapy
  - Disc herniation or prolapse
  - Inflammatory arthritides
  - Pregnancy
  - Spondylolysis
  - Spondylolisthesis
  - Osteoporosis
  - Anticoagulant or long-term corticosteroid use
  - Advanced degenerative joint disease and spondylosis
  - Psychological dependence upon spinal manipulative thrust techniques
  - Ligamentous laxity
  - Arterial calcification
  - Hypertension (diastolic >95) in cervical manual therapy

(See Gibbons & Tehan, 2001a,b; Grieve, 1991.)

Is the patient suitable for a biomechanical assessment of their movement fault?

Patient presentations suggestive of a predominant mechanical influence on symptoms are suitable for detailed biomechanical assessment and treatment.

Presentations that do not feature mechanical/movement influences on symptomology suggest that specific positions and movements may not be the predominant influences to be addressed during examination and treatment. Thus, patients who have constant symptoms, regardless of positioning, will be unlikely to benefit from management with a positional bias. Patients with central sensitization or inflammatory neurogenic pathology (‘irritable’ patients (Maitland, 1985) have no mechanical predominance.

How acceptable is it to reproduce symptoms?

Patients, seeking manual therapy, present with pain and largely judge their improvement by an amelioration of their pain. In the process of assessing the effect of testing and treatment, changes in pain are assessed. However, in cases where pain is severe, it is unacceptable to reproduce pain and inappropriate to treat an underlying mechanical dysfunction whilst reproducing pain. Thus, prior to any physical testing the therapist must be clear regarding the degree to which pain is to be reproduced during their interaction with the patient. In certain presentations it may be deemed acceptable to fully reproduce the minor discomfort the patient is seeking help for, in order to fully relieve it. However, in situations where pain is severe this is unacceptable. Using positions that can reduce the likelihood of reproducing severe pain is one of the key advantages of CMT.

Clinical relevance

If it is not acceptable to reproduce symptoms, the condition is severe. If it is acceptable it is not. Use a nominal (yes/no) approach to this decision and your clinical reasoning will be decisive and more reasonable.

What is the functional demonstration of the positional fault?

Patient presentations, suggestive of the suitability of a CMT approach, have symptoms predominantly influenced by specific positions or movements. Patients can often demonstrate these movements or positions and reproduce them in the course of replicating a functional activity. For example, patients with anterior stretch patterns of the mid cervical spine often relate symptom reproduction with activities inducing ipsilateral lateral flexion and rotation, e.g. reversing the car. The monitoring of change in the functional demonstration, during examination and treatment is a crucial monitor of treatment effectiveness. Again, the concept of a functional demonstration is a long-
established tenet of the Maitland concept (Maitland, 1986) and at the heart of CMT.

**What is the region of the spine that is likely to be faulty?**

The biomechanical interpretation of patient presentation can allow the therapist to judge the location of regions of dysfunction. Careful questioning can elicit functional activities that influence specific regions of the spine. For example, the influence of breathing on thoracic movement can provide valuable inference towards spinal or rib dysfunctions.

**What is the predominant hypothesis for the source and mechanism of symptom production and the next most likely hypothesis that will be tested against it?**

It is crucial to form hypotheses regarding the underlying source and mechanism of symptom production as you recognize presentation patterns. As a pattern of presentation begins to emerge the use of follow-up questions will establish a good fit with this pattern. Having identified a match with a recognizable pattern, the manual therapist should test the assumption that this hypothesis is predominant by comparing the match with the next most likely pattern. For example, having established that a patient’s presentation matched an ‘arthrogenic’ presentation, one would expect the presentation to be less well matched with a ‘myogenic’ presentation. In order to facilitate this process it can be useful to develop a library of ‘stock’ questions and tests for common presentations.

The use of these strategies will facilitate the therapist’s reasoning regarding the appropriateness of using CMT, the most likely hypotheses for aetiology of symptoms, the extent and direction of movements to be included in the examination and most importantly the starting positions in which assessment and treatment will be undertaken.

**Physical examination**

The objective examination will follow the subjective examination and is conducted in light of the considerations and clinical reasoning process outlined in this book. The object of the physical examination is not to form a long list of impairments with little evidence of their relative contribution to the patient’s dysfunction. The physical examination should allow the hypotheses, generated following the subjective examination, to be tested. Thus, the examination should be structured to allow this process to occur. In order to assess the influence of the testing procedures themselves on a patient’s dysfunction the physical examination should be split into components.

The order in which components of the examination are conducted will be guided by the subjective examination. A clinician may hypothesize that the predominant mechanism of symptom production is related to a restriction in articular mobility rather than, e.g. a restriction in overlying muscle mobility. In this case, the examination would be structured to examine the articular system, assess its influence on the fault, and then assess the muscular influence and reassess that system’s influence on the fault. In this way, in addition to gathering information from each component of the examination the relative influence of the components can be evaluated.

Each component begins with an assessment of movement fault (using the patient’s functional demonstration), testing procedures and a subsequent reassessment of functional demonstration. See Figure 4.2.

**Observation**

Observation of static posture can give valuable insight into the likely mechanical presentation of symptoms with movement. A number of static features will help in the interpretation of active movement. A deep skin crease may suggest hypermobility at the level whilst flat sections with reduced muscle bulk may suggest hypomobility. Defined muscle borders may indicate hypertonicity whilst unilateral atrophy may indicate local neuropraxia or trophic change. See Figure 4.3.

**Functional demonstration**

The functional demonstration is the term given to the combination of plane movements that the patient has identified to take them into their most aggravating position. This position identifies the movement fault, whilst the quality, range and speed of movement from neutral into this position and return, should be analyzed in depth. The combination of physiological movements that constitute the functional demonstration will provide invaluable information about the starting position that should be adopted for passive movement assessment and treatment. In addition, the three-dimensional components of this position will identify the movements...
List your hypotheses for the nature of the condition.

Which two hypotheses will you test against each other in the initial physical examination?

Is the nature of the condition severe?

Is the nature of the condition irritable?

To what point are you allowing movement to occur?

What is your functional demonstration/re-test marker?

What is the primary pain mechanism of this patient’s condition?

To what extent will you perform a neurological exam?

What is the weighting of the following components of the problem?

Likely first treatment:

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrogenic</td>
<td></td>
</tr>
<tr>
<td>Myogenic</td>
<td></td>
</tr>
<tr>
<td>Neurogenic</td>
<td></td>
</tr>
<tr>
<td>Inflammagenic</td>
<td></td>
</tr>
<tr>
<td>Psychogenic</td>
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<tr>
<td>Sociogenic</td>
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<td>Pathogenic</td>
<td></td>
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<tr>
<td>Viscerogenic</td>
<td></td>
</tr>
<tr>
<td>Osteogenic</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.1 • Clinical reasoning form.
that should be examined in isolation. Change in the range of movement and pain experienced in the functional demonstration position will most accurately reflect overall improvement in the patient’s impairment.

Active movements

Active movements should be carefully controlled by the therapist. It is important that the patient moves to a point in range that is appropriate for their severity and nature. Simply asking a patient to extend their back will not give adequate guidance about how acceptable it is to reproduce their pain. A patient with very severe pain may be eager to please the therapist and extend beyond the onset of pain causing an exacerbation, or alternatively, may be fearful of...
movement and not move to the point that reproduces symptoms. Variability on interpretation of incomplete commands will lead to difficulties with the reliability of testing. Thus, clear commands regarding how far to move in relation to reproduction of symptoms should be included in the commands. A decision about how acceptable it is to reproduce symptoms will need to have been made prior to undertaking this section of the examination.

**Degree of symptom reproduction deemed acceptable**

Having agreed on this the therapist must use clear commands to instruct the movement conducted:

- If the agreed degree of symptom reproduction is nil, then at the completion of a combination of movements, the therapist’s command should state clearly ‘stop before the pain starts’.
- If the agreed degree of symptom reproduction is full, then at the completion of a combination of movements, the therapist’s command should be ‘move as far as you possibly can’.
- If the agreed degree of symptom reproduction is partial then at the completion of a combination of movements, the therapist’s command should be ‘stop when the pain starts’.

Good control of symptom reproduction will enable the combination of movements needed to fully assess the patient’s movement dysfunction. Disregard of this important control will lead to situations where the patient’s symptoms are exacerbated or under-evaluated.

**Clinical point**

If the patient has severe pain at rest the examination will be aimed at finding the movement and position that most reduces pain and it will typically involve finding starting positions for assessment and treatment in the quadrant opposite to the dysfunctional quadrant.

**Prime movement and prime combination**

Whilst observing active movements, particular attention should be paid to ensuring that the patient moves areas of the spine that are impaired. Very often a patient will have developed hypermobility above a hypomobile section of the spine. The patient can find it difficult to move the hypomobile segments as they move at areas presenting the least resistance to movement and move only at the hyper-mobile segments. This can lead to a situation where symptoms are not reproduced as the symptomatic levels are not being tested, during the test movement. False negatives can occur unless this error in clinical reasoning is considered. Consequently, it is important to guide patients to move at regions you consider likely to be symptomatic during active movement testing. See Figures 4.4, 4.5 and 4.6.

The active movement examination is structured to examine the movements most relevant for the patient’s impairment. The functional demonstration will have provided the examiner with evidence that certain movements are more important in reproducing the dysfunction than others. The functional demonstration position will justify a detailed examination of the three movements that constitute it. The next stage in examining the biomechanical features of the impairment is to examine each of the three components of the position to establish which

---

**Figure 4.4** Active movement of the lumbar spine. Here, movement of the stiff L4/L5, L5/S1 segment is facilitated by fixing the sacrum with one hand whilst guiding movement to the low lumbar spine. IN: Standing, bed edge support, lumbar extension; DID: active right lateral flexion, range assessment. Note the wide stance required to ensure balance.
two movements are the most important, and within these two movements, which is of primary importance or 'prime movement'.

The primary movement has an importance within CMT in both the classification of syndromes and in selection of starting positions for treatment. The movement itself is defined as being the movement that either reproduces the patient’s signs and/or symptoms most completely (when it is appropriate to do so) or most completely relieves symptoms when the condition is too severe to reproduce symptoms.

Having established the prime movement in one plane it should be explored by repeating the movement when combined with another movement, in another plane, which will move one side of the motion segment in the same direction.

In a simplified model of spinal biomechanics extension, ipsilateral rotation and ipsilateral lateral flexion will cause the superior joint facet to move down the inferior segment’s joint facet (see Fig. 4.7). Flexion, contralateral flexion and contralateral rotation will cause the superior facet to move up the inferior segment’s joint facet. For example, right rotation is the patient’s prime movement, reproducing right-sided neck pain. Exploring this movement by examining right rotation in extension and extension in right rotation will elicit which combination is the primary combination. The prime combination will closely resemble the patient’s functional demonstration.

The primary combination holds a crucial place in CMT as it is the starting position where passive movement assessment is conducted. By positioning the spine in the position of dysfunction the addition of passive movements will be more influential in reproducing symptoms and more likely to alter movement dysfunction than if conducted in a neutral position. Passive movement conducted in neutral will rarely be sufficient to reproduce symptoms adequately. When performed in a position related to dysfunction, the application of passive movement or muscle contraction will provide valuable information on, not only the quality and control of movement, but also the effect of the test on the dysfunction.

Finding the primary combination is the process by which the clinician can be sure that passive movement testing will be the most informative and that treatment in this position will have the quickest effect on dysfunction. A two-dimensional equivalent would be the need to assess and treat a patient with a 10° loss of elbow extension at this...
position, not at 90° of elbow flexion (the equivalent of assessing in neutral).

**Muscle assessment**

The assessment of muscular influences on the spinal dysfunction should involve an assessment of muscular activity (tone) in the primary combination starting position. The degree and location of hypertonicity can be readily palpated in local, deep paraspinal muscles and the overlaying, superficial, musculature (see Figs 4.8 and 4.9). At this point an assessment for trigger points (Travell & Simmons, 1998) can be conducted, followed by an assessment of extensibility (Chaitow, 2006) of the superficial phasic muscles that have a tendency to become hypertonic in the presence of spinal pain. See Table 4.1.

During this process, hypertonic muscles are passively lengthened either locally, globally or both and a temporary reflexogenic reduction in muscular activity can be induced. Consequently, these tests are effectively mini-treatments of the muscular system.

The effect of this mini-treatment on the patient’s functional demonstration can be immediately assessed. In this way the relative contribution of the myogenic system can be assessed against the arthrogenic system by mini-treating first one system and then another. See Figures 4.10 and 4.11.

**Passive movement and mini-treatments**

Having established the optimal position to induce passive movement at the motion segments moving dysfunctionally, an assessment is made to determine which passive movement will be the most effective.

### Table 4.1 Listing the musculature that becomes over or under-active in common spinal pain syndromes (Chaitow, 2006)

<table>
<thead>
<tr>
<th>Short/facilitated/over recruited</th>
<th>Long/inhibited/under recruited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occipital extensors</td>
<td>Upper cervical flexors (rectus capitis anterior)</td>
</tr>
<tr>
<td>Sternoclavomastoid</td>
<td>Deep cervical flexors (longus colli)</td>
</tr>
<tr>
<td>Scalenes</td>
<td>Low cervical extensors (iliocostalis)</td>
</tr>
<tr>
<td>Upper trapezius</td>
<td>Lower/middle fibres of trapezius</td>
</tr>
<tr>
<td>Levator scapulae</td>
<td>Subscapularis</td>
</tr>
<tr>
<td>Rhomboids</td>
<td>Serratus anterior</td>
</tr>
<tr>
<td>Pectoralis minor</td>
<td></td>
</tr>
<tr>
<td>Pectoralis major</td>
<td></td>
</tr>
<tr>
<td>Latissimus dorsi</td>
<td></td>
</tr>
<tr>
<td>Iliopsoas</td>
<td>Gluteal muscles</td>
</tr>
<tr>
<td>Tensor fascia latae</td>
<td>Abdominal muscles</td>
</tr>
<tr>
<td>Quadratus lumborum</td>
<td></td>
</tr>
</tbody>
</table>
Mini-treatment requires a degree of skill to perform. Whilst the treatment is of a short duration, in order to fit into the assessment process without becoming too time consuming, it must be enough of a ‘dose’ of treatment to evoke a change in muscle activity and/or joint mobility. Thus, the examiner needs the palpatory skill to be able to tell when these features have subtly changed. With practice the skilled manual therapist can be as confident in discriminating this change in mobility as they have in their ability to discriminate between a normal or hypomobile joint on initial assessment.

If we really are striving to provide treatment that is the most efficacious option we must prove that the specific treatment we are proposing is indeed more effective at reducing the dysfunction than the next most likely option. Testing one treatment against another is something we do whilst treating patients, however, the incorporation of this principle during the assessment process is of particular importance with the CMT approach.

Assessing for the suitability of manipulative thrust techniques

Local movement impairment, specific to one or two spinal segments, can present with hypomobility in the contralateral side glide that accompanies ipsilateral lateral flexion and rotation. Acute muscle spasm or long-standing movement impairment can lead to a perceptible change in the passive range of contralateral side glide during ipsilateral lateral flexion. When visualizing the quality of resistance to passive movement the movement diagram, developed by Maitland (1986) is useful. When passively inducing lateral flexion at one spinal segment a perception of the profile of resistance to movement can be drawn. Profiles of resistance that are short in range represent a ‘crisp’ end feel, whilst a long range of resistance profile will feel ‘bouncy’. Finally a movement that has no range of resistance and comes to a complete stop immediately resistance is felt, will feel ‘solid’. See Figure 4.12. Segments that do not have this ‘crisp’ profile do not generally cavitate in response to a high velocity thrust.

Thus, unless the therapist assesses lateral flexion and its associated contralateral side glide the rationale for choosing a manipulation technique over a mobilization technique is less clear. The assessment of accessory glides does not afford the information to make this judgement. The assessment of...
segmental lateral flexion can be conducted in combined starting positions in order to fully examine for the presence of this ‘crisp’ profile of resistance. See Figures 4.12, 4.13, 4.14, 4.15 and 4.16.

In the following case studies there are two worked examples of the practical application of CMT approach during initial assessment, with one example from the cervical spine and one from the lumbar spine.
CERVICAL SPINE CASE STUDY

INITIAL INTERVIEW

Symptomology

A 22-year-old female sought treatment for pain in the right cervical spine and right shoulder. The pain was located in the lower cervical spine and referred into the right shoulder across the right supra-scapula fossa (Fig. 4.17). The pain was not radicular in quality but severe (8/10). There was no suggestion of an upper motor neuron lesion and no indication of other red flags. There were no features suggestive of segmental cervical instability or shoulder derangement. There was no history of cervical locking, catching or weakness. There was no headache.

Relevant history

Symptoms developed over a 6-day period following a mild, rear shunt whiplash injury, a week previously.

Behaviour of symptoms

Pain was reproduced with low cervical flexion and left lateral flexion. Sitting with the neck in this position reproduced symptoms within 2 minutes. The symptoms were eased immediately, by positioning the lower cervical spine in extension and right lateral flexion. No latent pain was exhibited.

Diurnal pattern

There was no stiffness in the cervical spine in the morning. Shoulder pain developed in the evening. Sleep was not disturbed.

Special questions

The patient’s general health was good. There was no weight loss, no dizziness, no dysphagia, no dysarthria, no diplopia, no raised blood pressure, and no symptoms of cervical artery dysfunction. Radiographs of the cervical spine were normal. The patient was not currently taking any anticoagulant or steroid therapy and had received no benefit from anti-inflammatory medication. There was no history of locking, clunking or giving way of the shoulder, with no history of trauma.

See the completed planning sheet in Figure 4.18.
**List your hypotheses for the nature of the condition.**

1. Posterior facet capsule sprain
2. Posterior paraspinal strain
3. Posterior annular disc sprain

**Which two hypotheses will you test against each other in the initial physical examination?**

Primary .......... Articular predominance
Secondary .......... Myogenic predominance

**Is the nature of the condition severe?**

Yes ☑ No

**Is the nature of the condition irritable?**

Yes ☑ No

**To what point are you allowing movement to occur?**

Before pain ☑
To pain ☑
To limit ☑

**What is the functional demonstration/primary re-test marker?**

Flexion contralateral, lateral flexion quadrant

**What is the primary pain mechanism of this patient’s condition?**

- Nociceptive ☑
- Peripheral neurogenic ☑
- Central ☑
- Autonomic ☑
- Affective ☑

**To what extent will you perform a neurological exam?**

- None required ☑
- Local peripheral ☑
- Lower motor neuron, upper motor neuron, limbs ☑
- Lower motor neuron, upper motor neuron, limbs and cranial ☑

**What is the weighting of the following components of the problem?**

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrogenic</td>
<td>50</td>
</tr>
<tr>
<td>Myogenic</td>
<td>40</td>
</tr>
<tr>
<td>Neurogenic</td>
<td>1</td>
</tr>
<tr>
<td>Inflammagenic</td>
<td>2</td>
</tr>
<tr>
<td>Psychogenic</td>
<td>1</td>
</tr>
<tr>
<td>Sociogenic</td>
<td>1</td>
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<tr>
<td>Pathogenic</td>
<td>1</td>
</tr>
<tr>
<td>Viscerogenic</td>
<td>1</td>
</tr>
<tr>
<td>Osteogenic</td>
<td>3</td>
</tr>
</tbody>
</table>

**Likely first treatment:**

In: Extension, right lateral flexion quadrant
Will: Anterior capsular stretch, large amplitude movement, in resistance (Grade III)

**Comments/cautions:**

Pain relief approach, progressing to a stretch of the tissues driving the nociceptive pattern of presentation

---

*Figure 4.18 • Objective examination plan for the cervical spine.*
PHYSICAL EXAMINATION

Observation
There was no atrophy of the cervical musculature. There was an increase in muscle tone of the right sternocleidomastoid, upper fibres of trapezius and levator scapula and right scalenes.

Active movement
Pain was reproduced earliest in range with left lateral flexion. Restriction to flexion was apparent at the C5/C6 level. Pain was reproduced further into range with flexion than with left lateral flexion. Restriction to movement was most obvious in the mid cervical region. See Figure 4.19.

Figure 4.19 • Box diagram showing the prime combination for the patient.

Functional demonstration
Flexion, left lat flex

First hypothesis
Posterior facet capsule sprain

Observation
Postural positioning malalignment

Active movement
Prime movement
Prime combination

Passive movement
Starting position
Palpation

The technique that alters movement and muscle tone most with mini-treatment is the initial treatment choice

Figure 4.20 • Flow chart of differential examination for the cervical spine.
Passive physiological intervertebral movement (PPIVMS)

Due to the severity, the examination was undertaken in right lateral flexion and extension (posterior structures off stretch) to establish the movement that most reduced pain and dysfunction. Right lateral flexion induced the greatest increase in movement and reduction in muscle tone.

A short passive treatment, using this right lateral flexion of C5 on C6 reduced the pain produced by the functional demonstration by 10%.

Passive accessory intervertebral movement (PAIVMS)

Due to the severity, examination was undertaken in right lateral flexion and extension (posterior structures off stretch) to establish the movement that most reduced pain and dysfunction. Anterior pressure (AP) on C5 induced the greatest increase in movement and reduction in muscle tone (greater than induced by AP movement of C4 or C6).

A short passive treatment, using this accessory movement reduced the pain produced by the functional demonstration by 40%.

Muscular assessment

In right lateral flexion and extension due to severity of pain, palpation of musculature revealed hypertonicity of deep paraspinals (C4 to C6) and hypertonicity of the region’s phasic muscles. No trigger points were detected.

Palpation and length assessment of the levator scapulae, scalenes, upper fibres of trapezius and sternocleidomastoid did not alter the functional demonstration.

See Figure 4.20.

LUMBAR SPINE CASE STUDY

INITIAL INTERVIEW

Symptomology

A 45-year-old male sought treatment for pain in the right back and buttock (Fig. 4.21). The pain was not radicular in quality and not severe (4/10). There was no suggestion of an upper motor neuron lesion and no indication of other red flags. There were no features suggestive of segmental lumbar instability or disc derangement. There was no history of lumbar locking, catching or weakness and there was no cauda equina syndrome.

Relevant history

Symptoms developed over a 6-month-period with no history of trauma.

Behaviour of symptoms

Pain was reproduced with low lumbar extension and right lateral flexion (whilst arching his back to put on his coat). Standing reproduced symptoms within 20 minutes. Walking reproduced symptoms in 30 minutes. The symptoms were eased, immediately, by positioning the back in flexion, either by sitting or leaning over in standing. Pain was also eased by crossing the right leg over the left, in sitting. No latent pain was exhibited. Pain was also experienced whilst turning over in bed.

Diurnal pattern

There was less than 30 minutes of stiffness in the back in the morning. Buttock pain developed in the evening. Sleep was not disturbed.

Special questions

His general health was good. There was no weight loss, no night sweats or fever, no constant night pain (worse than during the day), no raised blood pressure, no symptoms of vascular stenosis or peripheral vascular disease. No history of cancer. The patient was not currently taking any anticoagulant or steroid therapy and had received no benefit from anti-inflammatory medication.

See the completed planning sheet in Figure 4.22.
List your hypotheses for the nature of the condition.

1. Superior facet capsule source
2. Sacro-iliac joint source
3. Anterior paraspinal muscle source

Which two hypotheses will you test against each other in the initial physical examination?

Primary ............................................. Lumbar articular drive (75%)
Secondary ........................................ Sacro-iliac articular drive (25%)

Is the nature of the condition severe?
Yes  □  No  □  ✓

Is the nature of the condition irritable?
Yes  □  No  □  ✓

To what point are you allowing movement to occur?
Before pain  □
To pain  □
To limit  □  ✓

What is the functional demonstration/primary re-test marker?
Extension, ipsilateral lateral flexion quadrant

What is the primary pain mechanism of this patient’s condition?
Nociceptive  □  ✓
Peripheral neurogenic  □
Central  □
Autonomic  □
Affective  □

To what extent will you perform a neurological exam?
None required  □
Local peripheral  □
Lower motor neuron, upper motor neuron, limbs  □  ✓
Lower motor neuron, upper motor neuron, limbs and cranial  □

What is the weighting of the following components of the problem?

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrogenic</td>
<td>70</td>
</tr>
<tr>
<td>Myogenic</td>
<td>20</td>
</tr>
<tr>
<td>Neurogenic</td>
<td>1</td>
</tr>
<tr>
<td>Inflammagenic</td>
<td>4</td>
</tr>
<tr>
<td>Psychogenic</td>
<td>1</td>
</tr>
<tr>
<td>Sociogenic</td>
<td>1</td>
</tr>
<tr>
<td>Pathogenic</td>
<td>1</td>
</tr>
<tr>
<td>Viscerogenic</td>
<td>1</td>
</tr>
<tr>
<td>Osteogenic</td>
<td>1</td>
</tr>
</tbody>
</table>

Likely first treatment:
In: Extension, right lateral flexion quadrant
Will: Superior capsular stretch, large amplitude movement, in resistance (Grade III)

Comments/cautions:
Pain relieving mobilization, combined with a stretch of the tissues driving the nociceptive pattern of presentation
PHYSICAL EXAMINATION

Observation
There was no atrophy of the lumbar musculature. There was an increase in muscle tone of the right erector spinae, quadratus lumborum and piriformis.

Active movement
Pain was reproduced earliest in range with right lateral flexion. Restriction to extension was apparent at the L4/L5 level. Pain was reproduced further into range with extension than with right lateral flexion. See Figure 4.23.

Passive physiological intervertebral movement (PPIVMS)
Right lateral flexion, in extension of L4 on L5, induced the greatest increase in movement and reduction in muscle tone, when compared with movement at L3/L4 and L6/S1.

A short passive treatment, using this right lateral flexion of L4 on L5 reduced the pain produced by the functional demonstration by 50%.

Passive accessory intervertebral movement (PAIIVMS)
In right lateral flexion and extension, posterior pressure (unilateral posterior-anterior angled caudad) on L4 induced the greatest increase in movement and reduction in muscle tone, when compared to the same accessory movement applied to L5 or L6.

A short passive treatment, using this accessory movement reduced the pain produced by the functional demonstration by 20%.

Passive movement of the sacroiliac joint (SIJ)
In right lateral flexion and extension PA pressure on the right apex of the sacrum (encouraging nutation) reproduced symptoms and was the most restricted sacral glide, when compared to the response of moving the other three corners of the sacrum.

A short passive treatment, using this passive movement reduced the pain produced by the functional demonstration by 10%.

See Figure 4.24.
References


