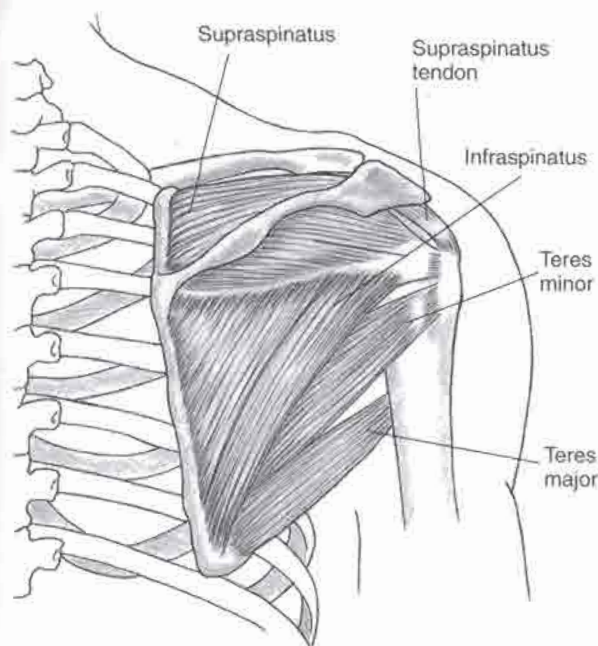

Figure 15.2 The posterior muscles of the rotator cuff are important stabilizers of the glenohumeral joint.

Their tendons reinforce the capsule of the glenohumeral joint and make a significant contribution to its dynamic stability (Fig. 15.2). They act to maintain optimum relationships of the articular surfaces of the glenohumeral joint when other more powerful muscles act on the joint.

Supraspinatus

The supraspinatus is deep to the upper fibres of trapezius. It arises in, and fills, the medial two-thirds of the supraspinous fossa, created by the scapula spine on the posterior aspect of the scapula. Its tendon passes under the coracoacromial arch and inserts onto the superior surface of the greater tubercle of the humerus. The supraspinatus abducts the arm and pulls the head of the humerus into the glenoid fossa. The supraspinatus is the principal muscle that resists carrying weights when the arm is hanging by the side. The supraspinatus is active during the mid-phase of the arm swing during walking but not at the limits of swing.

Infraspinatus

The infraspinatus arises from the medial two-thirds of, and fills, the infraspinous fossa. Its fibres converge on a tendon, which passes across the posterior aspect of the shoulder joint inserting into the middle facet of the greater tubercle of the humerus. The infraspinatus acts to externally rotate the arm. It is an important stabilizing muscle in abduction, flexion and throwing movements.

Teres minor

The teres minor is a relatively narrow muscle arising from the lateral border of the scapula and runs upward and laterally, inserting onto the lowest facet of the greater tubercle of the humerus. Its functions are closely related to the infraspinatus.

Subscapularis

The subscapularis arises from the anterior surface of the scapula filling the subscapular fossa. It crosses the front of the shoulder, joining the capsule inserting onto the lesser tubercle and the joint capsule on the front of the humerus. It acts to internally rotate and adduct the arm. It is active during the forward swing of walking and during early abduction.

Long head of biceps

The long head of the biceps is often regarded as part of the rotator cuff due to its intimate association with the joint capsule. It has some stabilizing function, assisting in maintaining humeral head position. It originates within the capsule of the shoulder joint as a long narrow tendon running from the supraglenoid tubercle and continuous with the glenoid labrum. It arches over the humeral head and descends in the intertubercular sulcus, where it is enveloped in a synovial sheath and retained by the transverse humeral ligament. Below this it joins the main belly of biceps muscle. The long head of biceps contributes to flexion of the shoulder and, if the

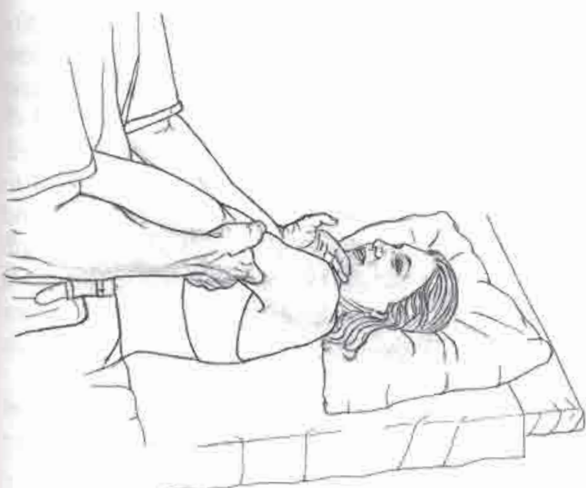

Figure 8.3 Mobilization of the glenohumeral joint.

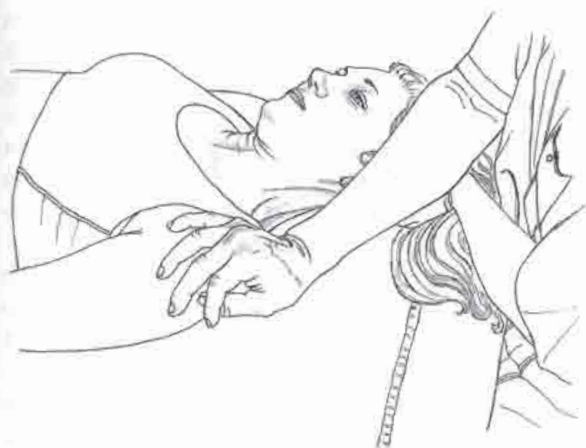

Figure 8.4 Muscle energy technique to increase cervical sidebending.

further gain to be made. This is a very effective way of improving mobility using minimal operator force while making the patient aware of the importance of the contraction–relaxation cycle of muscles. Care must be taken not to use large forces at the limit of joint mobility when the proprioceptors are engaged.

MET has the ability to relax the involved muscle, to 'turn down' the overactive proprioception in and around the muscle and to allow an increase in joint mobility.

Manipulation

Manipulation involves taking a joint to its physiological limit of motion and providing a quick movement or thrust. This is usually described as 'high velocity and low amplitude'. The thrust is designed to create a separation of the articular joint surfaces. The sudden change in pressure usually causes an audible pop, thought to be due to vaporization of the fluid on the joint surfaces. The efficacy of manipulation for different conditions, notably low back pain, will be discussed in Sections 2 and 3.

In skilled hands manipulation can be an excellent tool for providing an immediate improvement in joint function. An effective manipulation provides an immediate improvement in joint function, increase in joint mobility and reduction of pain. This is reasonably consistent and measurable. There are a number of theories how manipulation works. The most persuasive of these involve neurological inhibition of nociception and inhibition of reflex muscle contraction. For a good review of the subject see Katavich (1998).

Manipulation has in the past been quite controversial and has tended to be the domain of alternative medicine. The osteopathic and chiropractic professions have built large professions on the back of skilled teaching and application of these techniques. Not for nothing was the term 'million dollar roll' coined for the treatment of LBP. However, as evidence of the efficacy of manipulation grows, the alternative medical practitioners have become more acceptable to mainstream medicine, now tending to be called 'complementary medicine', and manipulation is being increasingly used in traditional medical and paramedical circles. Manipulation works effectively in a good proportion of spinal problems and it can work quite dramatically. It is very nice to have a treatment technique at your disposal that can make a patient arise from the treatment couch and exclaim with genuine surprise how much better they feel. It is a skilled technique requiring good teaching, good coordination, a sensitive touch and careful administration. The consensus of evidence is that it is particularly effective for acute back pain, reducing the period of morbidity and the

9

Epidemiology of low back pain

Low back pain (LBP) is a major problem, and now ranks as the most common medical complaint in developed economies. Despite the profusion of highly skilled therapists and increasing funds for therapy, despite new and sophisticated methods of imaging and despite a gradual reduction in the amount of heavy manual work, the reported incidence of injury and the time off work associated with back pain increased dramatically between 1970 and 1990. Most developed economies increased their expenditure on low back pain disability ten-fold in that period.

Why, in these days of many labour-saving devices and the best resources of modern medicine, are more and more people suffering the effects of LBP? Perhaps today's rapidly changing society is contributing various factors to the problem:

- Social attitude – the provision of generous *benefits may encourage disability behaviour* by back pain sufferers. The medical model perspective often encourages pathological labels for an essentially normal process.
- Changes in work practice – although there is less manual work, people spend more time in constrained and sitting postures, performing repetitive and monotonous tasks.
- Psychosocial – modern work practices can lead to increased stress and boredom and these have been associated with increased incidence of back injury claims. It can be difficult to diffuse stress with the reduced socialization and reduced activity levels of the modern workplace.