

In addition to the joints, there are also many groups of muscles. The function of these groups of muscles is to ensure the widest possible range of movement and to support the shoulder region as a whole. The most important group is composed of the stabilizer muscles which include the biceps brachii, the deltoid, the supraspinous, the infraspinous, the teres minor and the subscapular. These latter four muscles, together with various tendons, form a rotator cuff around the gleno-humeral joint. The function of the rotator cuff is to provide a kind of "protective sleeve" which reinforces the joint capsule and allows full mobility of the gleno-humeral joint, simultaneously preventing its migration. The stabilizing function is thus an essential feature of the rotator cuff.

Injury to the rotator cuff may be the result of an acute traumatic event or of a chronic event such as the serious consequence of a periarthritis of the shoulder joint, the generic and old term used to indicate all degenerative-inflammatory processes affecting the subacromio-coracoid area. Although the pathogenesis is multi-factor in nature, the various noxae share common predisposing and determining factors, the former being vascular deficiencies which compromise regular circulation of the blood and the latter including the formation of osteophytes, stress of mechanical apparatus, repetitious stress and subacromial contact, with consequent wear and tear of the parts.

Impairment of joints and tendon-muscle complexes provokes alteration of afferent nerve impulses and may trigger a symptomatology similar to that generated by injury to the central nervous system. This is probably due to the activation of reflex mechanisms at medullar level. Such mechanisms are caused not only by a reduction in the recruitment of motor units – and thus hypotonia and atrophy of some muscle groups – but also by anomalous irradiation which leads to involvement of the same motor unit on every occasion, regardless of the movement the patient wishes to make. The consequence is the setting up of a vicious circle in which a state of permanent contracture and consequent hypoxia are responsible for fibroblast proliferation and a retraction of the muscles and tendons. The pain, analgetic contracture and gradual decrease in function associated with this process eventually lead the patient to modify his or her movements by activating new kinetic chains which not only reduce the scope of the movement, but also lessen the time necessary for its performance in virtue of

the knowledge of alternative motor patterns. These alternative patterns are adopted both to compensate for the patient's inability to perform fundamental everyday movements and as an analgetic defence against pain. Once the problem has been diagnosed, it is up to the physiotherapist – an active player in the rehabilitation programme – to recognize the movements which cause the patient pain and alter the sequence with which he or she performs them until such a time as the patient regains full use of his or her joints.

Injury to the rotator cuff may be treated according to two therapeutic methodologies: one conservative; the other surgical. The choice of approach depends on the type of injury, the age of the patient and the activities in which the patient engages during his or her work and free time (sports). The conservative approach is adopted when the tear is incomplete, although the literature of reference also provides examples of conservative treatment of complete tears. Nevertheless, it must be pointed out that, in the case of complete tears, the surgical approach generally leads to quicker recovery of function. The rehabilitation programme must commence at the same time as therapy of the traumatology in question and must take the type of injury, the patient's morphological biotype and the therapy chosen into account.

Once the acute stage has terminated, the rehabilitation programme should be divided into objectives whose aim is to re-establish a correct scapular-humeral rhythm and avoid rigidity.

Treatment of hyperalgesic forms should involve the use of analgetic and anti-inflammatory drugs, a period of rest and immobilization in a Desault type bandage. This should be followed by cycles of analgetic electro- (iontophoresis and TENS), laser and cryo-therapy in such a way as to relieve the patient of as much pain as possible and consequently improve his or her willingness to proceed with therapy. Providing the patient with correct information during the period of immobilization will also raise his or her awareness of the injury suffered and consequently stimulate active cooperation. Patients should be encouraged to perform simple isometric contractions autonomously in such a way as to maintain muscular activity and prevent deterioration of the kinetic chain resulting from the reduction of afferent nerve impulses.

Rehabilitation should then focus on recovery of the range of motion of the joint. Recovery should commence with passive mobility of the shoulder