NECK ACHE AND SHOULDER PAIN

Ian Macnab, M.B., ChB., F.R.C.S.C.

Former Chief, Division of Orthopaedic Surgery
The Wellesley Hospital
Emeritus Professor of Surgery
University of Toronto
Toronto, Ontario, Canada

John McCulloch, M.D., F.R.C.S.C.

Professor of Orthopaedics
Northeastern Ohio Universities
College of Medicine
Rootstown, Ohio

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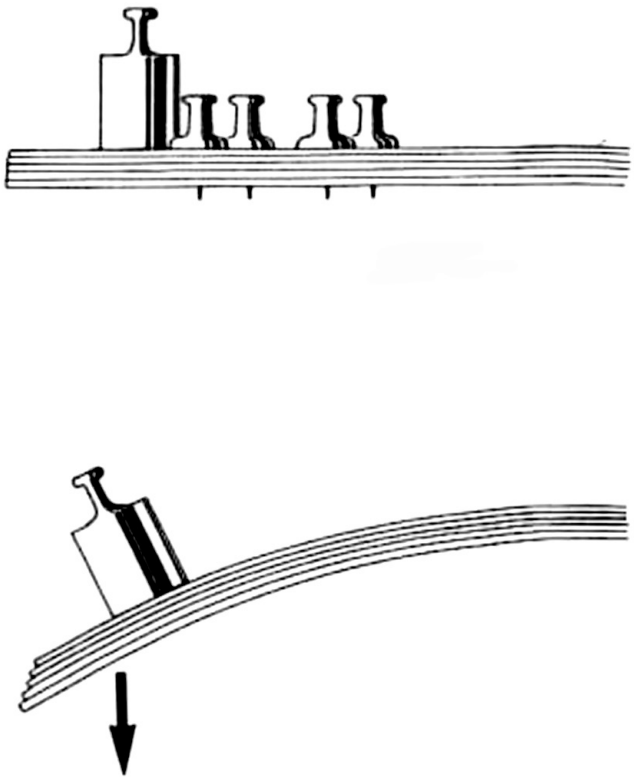

Figure 13.12. Sheaves of paper bonded together by pins driven through can support a weight. When pins are removed the sheaves of paper glide and bend under the load.

coracoacromial ligament. At times, osteophytes on the inferior surface of the acromioclavicular joint impinge on the rotator cuff. This observation by Neer has reduced almost all rotator cuff decompressive procedures to the anterior undersurface of the coracoacromial joint.

Single traumatic episodes, such as a fall in a middle-aged worker or a dislocation in an older patient, may rupture the supraspinatus tendon. These are infrequent injuries mentioned only for completeness. The bulk of rotator cuff tendinitis and tears relates to a combination of repeated microtrauma to a tendon with established vascular impairment.

Overuse Syndrome

Neer and Welsh (13) initially described the repetitive microtrauma of the competitive athlete, who performs repetitive tasks at near maximum tolerance. This usually involves overhead motion, with the best North American example being baseball pitchers. Repetitive microtrauma also occurs in racket sports and swimming. The work of mechanics, plumbers, and carpenters may include a lot of forced overhead activity, which also traumatizes the rotator cuff. The early phases of microtrauma in the overuse syndrome are associated with pain (see Chapter 19).

Neurological Considerations

The nerve supply of the rotator cuff has been studied (16). Although nerve fibrils could be constantly demonstrated in the subscapularis, the infraspinatus, and the teres minor, such nerve fibers were only found in healthy, normal supraspinatus tendons (Fig. 13.13) and were never found in specimens showing

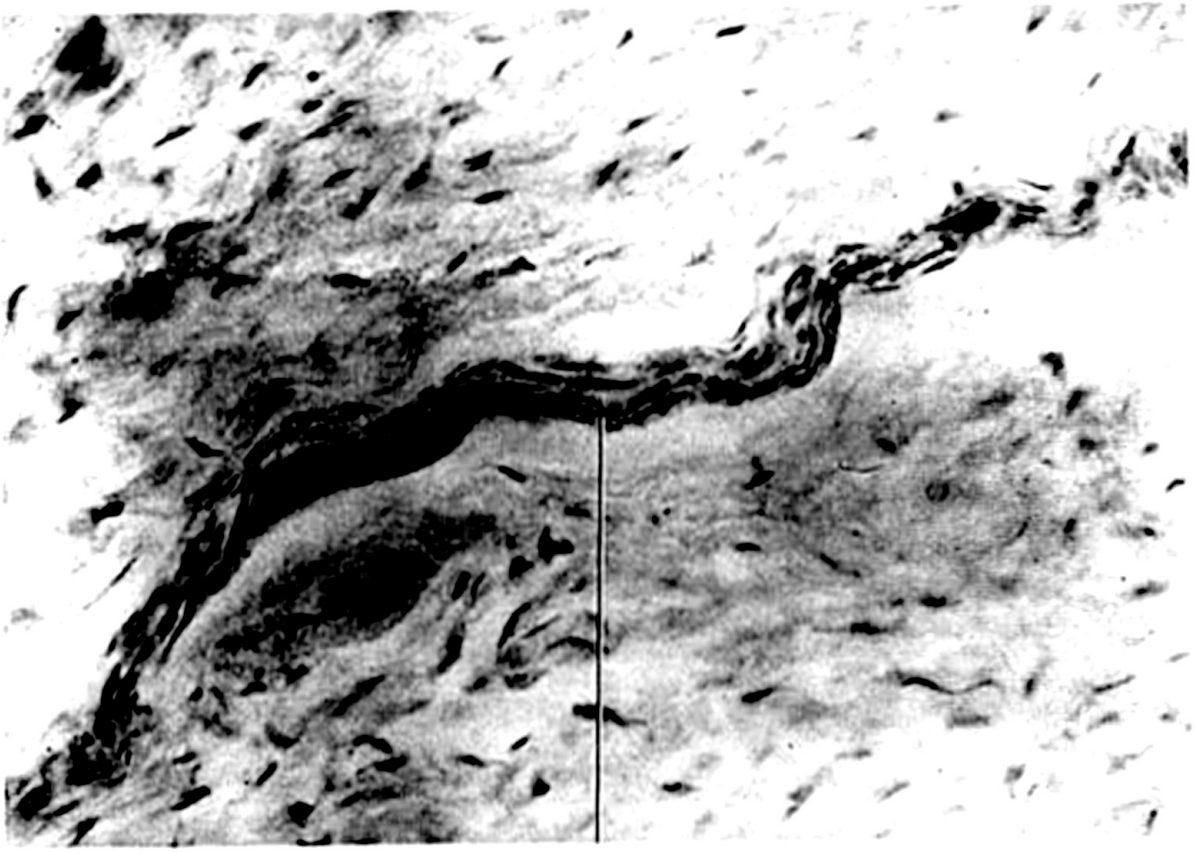

Figure 13.13. Nerve fibrils found in healthy supraspinatus tendons.

marked degenerative changes with extensive avascularity. It is possible that interference with the blood supply in this area—of sufficient degree to cause collagen breakdown—also caused degeneration of the nerve fibrils, particularly in view of their higher oxygen demand.

The loss of nerve supply to the degenerative avascular area of the supraspinatus tendon brings in the possibility of another interesting mechanism in the production of rotator cuff tears. Because of the loss of nerve fibers, the tendon loses proprioceptive feedback and therefore has little muscular protection against sudden adduction forces. This feedback mechanism is important in the protection of all tendons in the body.

Summary

The interrelationship of these various anatomical, physiological, pathological, and mechanical factors account for the remarkable frequency of tendinitis and ruptures of the supraspinatus tendon, when compared with other tendons in the body.

Under such circumstances, marked degeneration caused by avascularity of the supraspinatus tendon could be painless. However, the other tendons comprising the rotator cuff maintain their blood supply, and when a diffuse capsulitis occurs, they have the potential of invoking a painful response.

It is noteworthy that, when nerve fibers were demonstrated in the supraspinatus tendon, they lay mostly in the superficial layers of the tendon and in the floor of the subacromial bursa. It is possible, therefore, that although surface