

COMPRESSION NEURITIS OF THE ULNAR NERVE AT THE ELBOW

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MECHANISM

The existence of a common compression mechanism has recently replaced the concept accepted in the past that ulnar neuritis of the elbow was a frictional or traction neuritis. It was thought that the nerve was irritated during movement against a roughened arthritic joint or stretched around a prominent medial epicondyle by a gradually increasing cubitus valgus deformity. A transverse fibrous band bridging the two heads of the flexor carpi ulnaris muscle forms the unyielding roof of a fibrous arch or tunnel through which the nerve passes over the capsular floor of the elbow joint (Fig. 1). The band tightens during flexion of the elbow and the capsular floor can also bulge into the tunnel. Any form of arthritis particularly osteoarthritis of the elbow or the enlarged margin of the medial epicondyle occurring as a result of cubitus valgus deformity, can elevate the tunnel floor to cause compression of the nerve superficially against the transverse compression

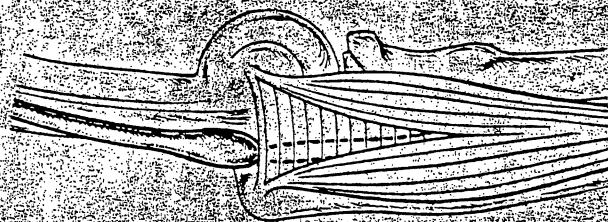


Fig. 1 Fascial band bridging two heads of flexor carpi ulnaris muscle compressing ulnar nerve with proximal pseudoneuroma.

band. Interference with the venous and lymphatic circulation affects nerve conduction in the compressed segment of the nerve. Intraneural oedema with secondary intraneural fibrosis may subsequently occur in the nerve lying in the postcondylar groove above the compression band, and later dense extraneural adhesions may bind the nerve firmly into this groove. The nerve may at first feel softer but as the oedema and fibrosis develops it becomes stiffer and thickened as compared with the normal nerve.

CLINICAL TYPES

Two types of conduction block of the ulnar nerve by this compression mechanism can be identified and have important prognostic differences.

1. *The acute or chronic compression lesion.* Slow compression of the nerve over many years has led to marked thickening of the nerve in the postcondylar groove forming the so-called "pseudoneuroma" with physical narrowing of the nerve at the compression site under the band and although many nerve fibres have suffered degenerative changes, a sufficiently adequate circulation is preserved to maintain the circulation to enough nerve fibres to prevent denervation of the hand and arm muscles. The occurrence of a minor injury can then trigger off the development of ulnar neuritis which within a few weeks or months may become of severe degree with marked intrinsic muscle wasting of the hand and clawing of the fingers. Surgical decompression of this type of lesion of true classical "tardy ulnar palsy" may be followed by incomplete recovery owing to the irreversible degenerative changes which are present in the nerve. Although the clinical changes

of ulnar neuritis in the hand have been present probably only for a few weeks or months the pathological damage to the nerve has existed for many years.

2. *The acute on normal ulnar nerve lesion.* These are often cases of the "cubital tunnel" syndrome where the elbow joint is clinically and radiologically normal, but it is thought that minor critical compression of the nerve occurs either because the fibrous arch is tight or the capsular floor bulges more than normal. The exciting cause of the neuritis may again be a minor injury, a ganglion, a period of immobilisation of the elbow in flexion, or the so-called "sleep palsy" in which it is thought that the elbow is pressed against the mattress during a period of illness in bed. Some of these cases will recover spontaneously within a period of a few months and most cases of the cubital tunnel syndrome never develop severe intrinsic muscle wasting or clawing of the fingers. In the presence of a normal elbow joint the cubital tunnel syndrome may be confused with compression at the level of the wrist and three signs are helpful in confirming the diagnosis:—

- (a) Slight thickening or hardening of the nerve in the post-condylar groove may be present when critically compared with the nerve on the normal side.
- (b) The ulnar nerve on the affected side is locally tender at the site of compression beneath the fibrous arch.
- (c) The dorsal cutaneous branch of the ulnar nerve would not be affected in compression at wrist level.

In most cases of the cubital tunnel syndrome the ulnar nerve is apparently normal or only slightly enlarged and decompression is followed by full function. Not all cases of tingling in the little and ring fingers should be regarded as due to some form of ulnar neuritis; particularly in women the carpal tunnel syndrome may be responsible for these symptoms affecting the ulnar two or three fingers, and no such case in women should be treated by surgical decompression of the ulnar nerve at the elbow in the absence of localising signs.

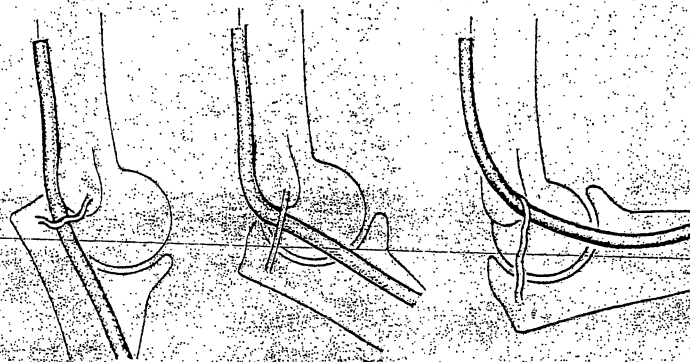


Fig. 2a

Fig. 2b

Fig. 2c

Fig. 2a, 2b Normal ulnar nerve flexes loosely around epicondyle as band tightens in flexion.

Fig. 2c Normal laxity of nerve slipping loosely around epicondyle.

RECURRENT SUBLUXATION OF THE ULNAR NERVE

Variation in the fascial structures confining the ulnar nerve in the postcondylar groove and particularly laxity of the fibrous arch may allow the ulnar nerve to subluxate normally around the medial epicondyle without the presence of ulnar neuritis. Normally the soft nerve flexes and moves around the epicondyle as the elbow bends, the transverse band sliding loosely over the nerve (Fig. 2a 2b). If the nerve and fascial band is very lax, subluxation of the nerve over the epicondyle can occur without damage to the nerve and is present in about ten per cent of normal elbows usually bilaterally (Fig. 2c).

When compression of the nerve has occurred (Fig. 3a) the enlarged segment in the postcondylar groove may be adherent to the groove, in which case flexion of the elbow causes the band to be dragged tightly along the nerve to elongate the compressed area (Fig. 3b).

In some patients however, the compressed area is drawn forward by the band as the elbow flexes to pull the nerve out of the groove and cause it to slip around the epicondyle creating the so-called recurrent dislocation of the ulnar nerve (Fig. 3c, 3d). This condition however, is an effect and not a cause of ulnar neuritis. Free movement of the nerve around the epicondyle does not itself appear to interfere with normal function of the nerve or lead to frictional neuritis.

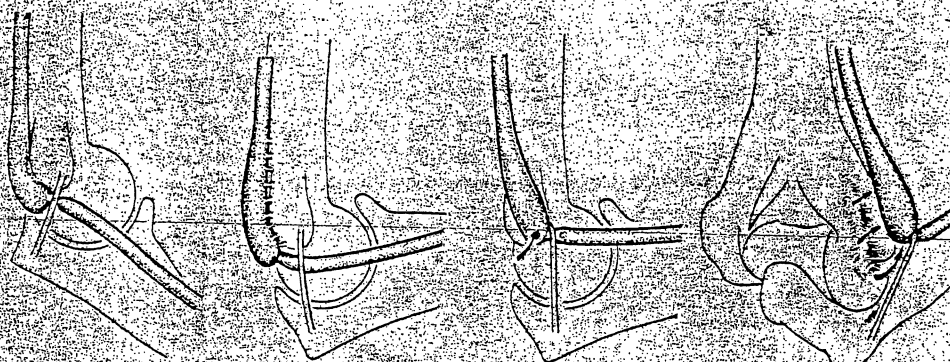


Fig. 3a

Fig. 3b

Fig. 3c

Fig. 3d

- Fig. 3a Stiffened segment of nerve in compression neuritis flexes less easily around epicondyle.
 Fig. 3b Adherent nerve with band having "milking" effect on nerve.
 Fig. 3c, 3d Recurrent dislocation of ulnar nerve, stiffened segment being pulled forward out of groove by compression band.

TREATMENT

Simple decompression of the ulnar nerve by division of the constricting band should form the basis of surgical treatment of compression neuritis of the ulnar nerve of the elbow, and is an entirely satisfactory substitute for the more extensive procedure of anterior transposition of the ulnar nerve. There can be no merit in the extensive mobilisation of as much as six inches in length of the ulnar nerve and division of local segmental vessels in a nerve already affected by a partial vascular block. Even in the most severe degree of cubitus valgus, the ulnar nerve never appears to be stretched or under tension and the extensive mobilisation of the nerve from an adherent bed in the postcondylar groove does not appear to offer advantages.

Experience in the past however, has shown that simple division or excision of the band bridging the proximal edge of the aponeurosis between the two heads of

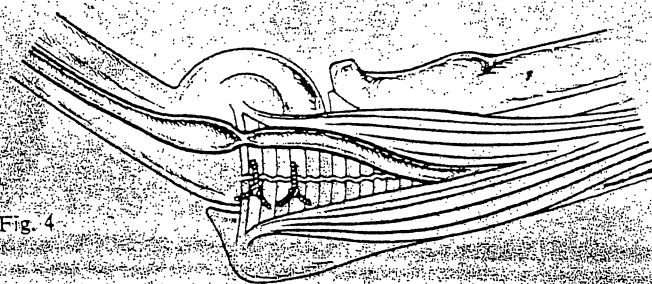


Fig. 4

Fig. 4 Author's operation for ulnar neuritis. After division, the fascial band and aponeurosis sutured beneath nerve, leaving the nerve in subcutaneous tissue.

the flexor carpi ulnaris muscle has occasionally resulted in spontaneous regeneration of the band, and further compression of the nerve has become evident within a period of two or three years, in two cases. In the last few years, therefore, the operation has been modified to prevent this complication of recurrence by mobilising the constricted segment of the nerve for a length of about one and a half inches and suturing the divided fibrous band beneath the nerve with one or two fine catgut sutures. The nerve then lies superficial to the band, entirely in the subcutaneous fatty tissue which itself should be closed before the skin is sutured (Fig 4). After this procedure the nerve can be felt subcutaneously after the operation and within a few months the thickened neuroma becomes softer as recovery of the circulation in the nerve develops, and conduction is restored. The patient can assist recovery by massaging the nerve and no harm ensues if the nerve subluxates around the medial epicondyle in this subcutaneous position. This minor procedure of decompression of the ulnar nerve should be carried out in all early cases of ulnar neuritis which can be treated at a time when full recovery can be confidently anticipated and when neither the patient nor the surgeon would have considered the more major operation of anterior transposition of the nerve to be justifiable.

SUMMARY

Most cases of compression of the ulnar nerve at the elbow are due to pressure by a transverse band between the heads of the flexor carpi ulnaris.

Two forms can be recognised: Acute on chronic compression lesions, and acute on normal ulnar nerve lesions.

Compression can also occur in cases of recurrent subluxation of the nerve.

Treatment is by decompression of the nerve by division of the band. Recurrence should be prevented by suturing the band together beneath the nerve.

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