

POSTERIOR INTEROSSEOUS NERVE PARALYSIS CAUSED BY FIBROUS BAND COMPRESSION AT THE SUPINATOR MUSCLE

A Report of Four Cases

HENNING OVERGAARD NIELSEN

Department of Orthopaedic Surgery, The Central Hospital, Holstebro, Denmark.

Four cases are reported of paralysis of the posterior interosseous nerve, caused by compression of the nerve between the Arcade of Frohse and the two heads of the supinator muscle. All four cases were treated by decompression with excellent results.

Key words: nerve compression; posterior interosseous nerve

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Isolated weakness of the muscles innervated by the posterior interosseous nerve (PIN) is rare (Mulholland 1966, Goldman et al. 1969, Barton 1973). Clinically, the patient is unable to extend the fingers at the metacarpophalangeal joints; the wrist can dorsiflex, but does so in a dorso-radial direction, since there is normal function of the extensor carpi radialis longus muscles, but weakness of the extensor carpi ulnaris muscles. There is no sensory deficit (Spinner & Spencer 1974).

CASE REPORTS

Case 1. A 20-year-old woman. Five years previously the patient had been examined and treated for weakness of the right serratus anterior muscle. The present examination showed no sequelae.

Over a period of 2 months there had been progressive drop fingers in the left hand, at first with pain around the elbow, which had now disappeared. There was no history of trauma, apart from the stress of repeated pronation and supination movements in connection with her performance as a "go-go" dancer. General physical

examination showed weakness or complete paralysis of the muscles innervated by the PIN. There were no other pathological findings or any sensory deficit, and a roentgenogram of the left elbow was normal.

At operation the PIN was found to be thickened proximal to its entrapment at the supinator muscle. A fibrous band was found at the entrance to the muscle, which was otherwise normal. The band was divided. There were no post-operative complications. The patient had progressive return of function, and 5 months after operation there was only slight weakness of the abductor pollicis longus muscle and of the extensor to the index finger. Six years later the findings were quite normal.

Case 2. A 23-year-old woman who was employed as a clerk. With no known history of trauma, the patient developed pain around the lateral aspect of the left elbow, and on examination 14 days later there was weakness of extension of the wrist and fingers. She was seen 4 months later and there was now weakness or complete paralysis of the muscles innervated by the PIN. There was no sensibility deficit. Roentgenograms of the left elbow were normal.

At operation the PIN was found to be compressed at the entrance to the supinator muscle. Proximal in the muscle there was a tight fibrous band, but the muscle was otherwise normal. The fibrous band was divided. There were no

postoperative complications. Four months later findings were completely normal, as was the case on examination 3 years later.

Case 3. A 53-year-old labourer who previously suffered from renal colic, but was otherwise healthy. He had sustained minor injuries to the left arm and elbow, probably acquired while inebriated. With no obvious history of trauma the patient was suddenly unable to extend the fingers. On examination 6 weeks later there was paralysis of the muscles innervated by the PIN. There was normal function of the muscles innervated by the radial nerve. There was no sensory deficit. Roentgenogram of the elbow was normal.

Operation revealed two fibrous arched bands at the point of entry of the nerve into the supinator muscle, and on pronation it was clear that the nerve was compressed at this point. The muscle was otherwise normal. The nerve was decompressed by cutting the fibrous band. Postoperatively there were no complications. On examination 1 year later there was only moderate weakness when the patient tried to extend the middle finger, otherwise no weakness was found.

Case 4. A 61-year-old lumberjack, previously healthy. One and a half years previously the patient experienced minor trauma to the right elbow with pain in the fingers, disappearing in the course of 2 to 3 weeks. Six months later the patient was suddenly unable to extend the three ulnar fingers. On examination in the department complete paralysis of the muscles innervated by

the PIN was found but there was no sensory deficit. Roentgenogram of the elbow was normal.

On operation the nerve was found to be compressed at the entrance to the supinator muscle, where there was a fibrous band between the two heads of the muscle. The band was divided. Postoperatively there were no complications.

When seen 3 months later findings were quite normal. Five years later there was still normal function of the PIN.

DISCUSSION

Peripheral paralysis of the radial nerve is most often traumatic in origin (Barton 1973). Where there is no history of trauma the cause is often compression by a tumour (Capener 1966, Bowen & Stone 1966, Sharrard 1966, Richmond 1973).

Compression not caused by a tumour is reported to be caused by an accessory lateral head of the triceps muscle (Lotem et al. 1971). In rheumatoid arthritis which involves the elbow there is a risk of compression of the PIN (Popelka & Vainio 1974). In resistant cases of tennis elbow Roles & Maudsley (1972) found, in 36 cases, that the radial nerve may be

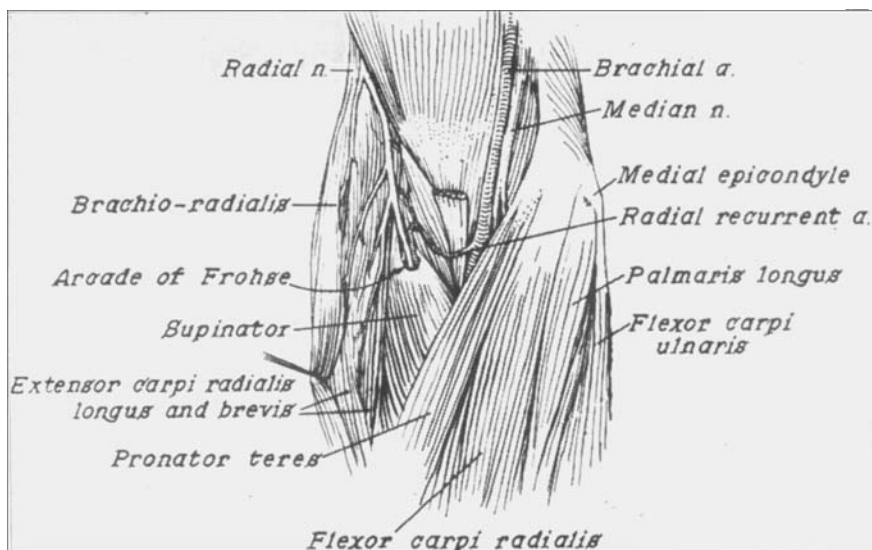


Figure 1. Shows the arcade of Frohse between the two heads of the supinator muscle, where the posterior interosseous nerve can be compressed (after Spinner 1968).

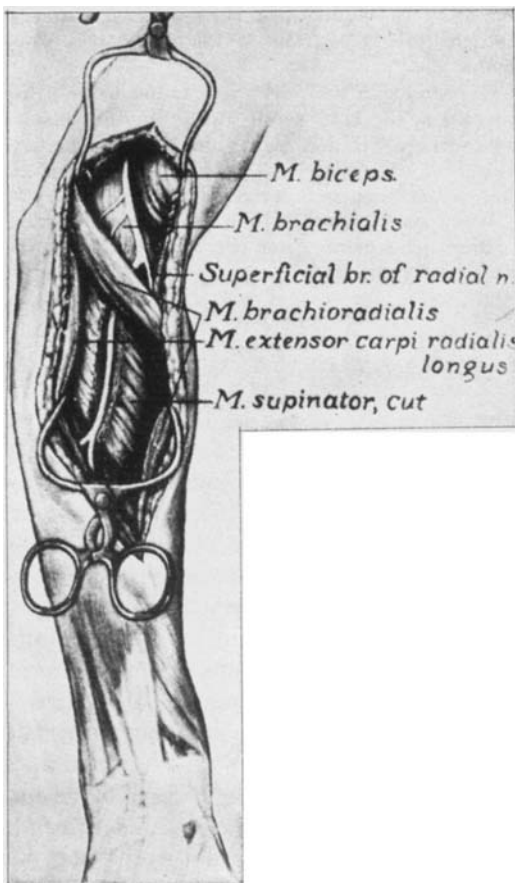


Figure 2. Shows the course through the supinator muscle of the posterior interosseous nerve, after an antero-lateral incision and free dissection (after Mayer & Mayfield 1947).

compressed in its course from the elbow and down to the supinator muscle by adhesions to the tissues overlying the radial head, by a more medially situated origin of the extensor carpi radialis brevis muscle than is usually described, or by a fibrous edge in the superficial layer of the supinator muscle.

Spinner (1968) reported one case which like our four cases was caused by compression of the nerve at the entrance to the supinator muscle, between the two heads of the muscle and the fibrous band lying between them (the Arcade of Frohse) (Figure 1). If there is severe narrowing here the nerve may be com-

pressed, especially with continued pronation and supination movements.

In cases with a sudden development of paralysis of the PIN, like our cases 3 and 4, one must first think of causes such as "Saturday evening palsy" or previous injection around the lateral epicondyle of the humerus.

It is agreed that in PIN paralysis of unknown cause, surgical exploration is indicated, since the nerve may be compressed by a tumour which cannot always be detected by physical examination (Barton 1973). Furthermore, cases like the present four will often be cured by decompression.

Exploration was done by an antero-lateral incision with free dissection of the nerve as shown in Figure 2 (after Mayer & Mayfields 1947).

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Correspondence to: Henning Overgaard Nielsen, Herluf Trollesgade 7 B, st. v., DK-8000 Aarhus C, Denmark.