

RADIAL TUNNEL SYNDROME

I. BACKGROUND

Radial Tunnel Syndrome involves compression of the radial nerve in the proximal forearm. In the region of the proximal forearm, the radial nerve splits into the posterior interosseous nerve branch (the main trunk) and the sensory branch of the radial nerve (the minor trunk) in the proximal forearm. Compression can occur either before or after this split off of the sensory branch of the radial nerve has occurred. Multiple sites of potential entrapment of the radial nerve include: the origin of the extensor carpi radialis brevis origin; the fibrous bands overlying the radial head; the radial recurrent arterial fan; and the arcades of Frohse, at the entrance to the supinator muscle. The condition has multiple causes, including: space-occupying lesions, such as tumors; local edema or inflammation; overuse of the hand and wrist through repetitive movements causing the nerve to be compressed; blunt trauma to the proximal forearm with secondary bleeding; and idiopathic onset. The condition can occur at any age, but is generally seen in younger individuals, most commonly in women aged 30-50. Early radial tunnel symptoms can mimic early lateral epicondylitis occasionally causing these two entities to be confused.

Radial Tunnel is a rare condition, estimated to be 30-100 fold less common than carpal tunnel syndrome. As a result, it is infrequently encountered by most practitioners. With failure to respond to non-operative treatment, the patient should be referred to a surgeon who has had experience in the treatment of radial tunnel syndrome.

II. DIAGNOSTIC CRITERIA

A. Pertinent Historical and Physical Findings

Patients generally complain of a deep-seated aching or tightness in the proximal forearm, over the mobile wad of Henry muscle mass (brachioradialis, extensor carpi radialis brevis and longus). Patients can occasionally experience paresthesia and numbness and tingling in the distribution of the sensory branch of the radial nerve (the dorsal first web space of the hand including the back of the thumb and back of index finger).

Patients frequently have symptoms after significant repetitive or power grip use of the involved upper extremity. Burning or pain can also be associated with the condition, and should be related to the proximal forearm, specifically over the mobile wad of Henry muscle mass. Strength in the hand is generally not reduced. Patients can have pain with resisted wrist extension or resisted extension of the middle finger, with pain being noted in the proximal forearm during these maneuvers. A Tinel's sign is rarely seen over the nerve itself.

Patients most commonly have a positive radial tunnel compression test (involving the examiner rolling the fingers over the radial nerve region in the proximal forearm, eliciting pain and tenderness in the area palpated). Occasionally, distal radiation of symptoms along the sensory branch of the radial nerve distribution will occur during

this test. Increasing pain with resisted supination of the forearm or resisted middle finger extension are other confirmatory findings

B. Appropriate Diagnostic Tests and Examinations

1. Radiographs of the forearm
2. Electromyogram and nerve conduction studies.
3. Trial injection of Xylocaine around the radial nerve to see if

symptoms resolve.

4. MRI scan of the forearm

C. Supporting Evidence

EMG/nerve conduction tests can be helpful if positive, but are most frequently negative in this particular condition, and can be difficult to obtain. The nerve conduction velocity component is rarely positive, and diagnosis is generally made on the electromyographic component, showing changes in the muscle innervated by the posterior interosseous nerve.

MRI may show denervation, edema, or atrophy in muscles innervated by the posterior interosseous nerve, but sensitivity is approximately 50% for these findings.

III. TREATMENT

A. Outpatient Treatment

1. Nonoperative treatment – treatment time is generally limited to three to six weeks, though can be prolonged as long as any improvement is noted

a. Indications

- 1) Mild to moderate symptoms
- 2) Persistent symptoms after significant repetitive

activities (supination of the forearm with/without wrist extension) of the affected upper extremity

b. Treatment Options

- 1) Neutral position wrist splint for periodic daytime use
- 2) Steroid injection
- 3) Nonsteroidal anti-inflammatory medications
- 4) Activity modification

c. Rehabilitation

- 1) Modification of activities, particularly any that can be identified as causing pain or increased symptoms
- 2) Ultrasound over the mobile wad of Henry

2. Ambulatory Surgery

a. Indications

- 1) Failure to respond to nonoperative treatment
- 2) Loss of wrist or finger extensors, or significant weakness in this distribution
- 3) Progressive or unchanged symptoms

- b. Treatment Options
 - 1) Neurolysis of the radial and posterior interosseous nerves under regional or general anesthesia
- c. Rehabilitation
 - 1) Range of motion and strengthening exercises of the fingers, wrist, and elbow

B. Estimated Duration of Care

- 1. Nonoperative treatment – maximum medical improvement
- 2. Operative treatment – six to eight weeks following surgery but actual return depends on the degree of radial nerve injury prior to release and can take 4-6 months to be optimal

PROTOCOL HISTORY:

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