



## Q: What is cell phone elbow, and what should we tell our patients?

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**A:** With prolonged cellular telephone use, people may note the onset of aching, burning, numbness, or tingling in the ulnar forearm and hand. This constellation of symptoms, termed “cell phone elbow” by the lay press, is known medically as cubital tunnel syndrome—the second most common nerve compression syndrome in the upper extremities after carpal tunnel syndrome.

In most cases, treatment consists simply of modifying the activity and avoiding activities that aggravate the symptoms. Switching hands frequently while talking on the phone or using a hands-free headset can help. Other daily activities that produce cubital tunnel syndrome include leaning on an elbow while driving or working, and sitting at a computer workstation that requires elbow flexion greater than 90 degrees. Making ergonomic adjustments to these activities is beneficial.

For patients who have nocturnal symptoms, a simple elbow pad worn anteriorly or a towel wrapped around the elbow to prevent flexion while sleeping can be very efficacious. Occasionally, anti-inflammatory injections can be given to quiet an inflamed ulnar nerve and reduce symptoms.<sup>1</sup> Surgical interventions, discussed below, are available for patients with severe, persistent symptoms.

\*Dr. Lawton discloses that he has received consulting fees from Small Bone Innovations Inc, and Innomed Inc.

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### ■ WHAT IS CUBITAL TUNNEL SYNDROME?

Cellular telephone use has increased exponentially, with 3.3 billion service contracts active worldwide—or about one for every two people on the planet. The exact incidence of cell phone elbow is not known, but anecdotal reports and our own clinical experience indicate that its incidence parallels the rise in the use of cell phones and computer workstations.

Cubital tunnel syndrome is caused by compression of the ulnar nerve as it traverses the posterior elbow, wrapping around the medial condyle of the humerus. When people hold their elbow flexed for a prolonged period, such as when speaking on the phone or sleeping at night, the ulnar nerve is placed in tension; the nerve itself can elongate 4.5 to 8 mm with elbow flexion.<sup>2</sup> Additionally, flexion of the elbow narrows the space available for the nerve<sup>2</sup> and can cause a sevenfold to 20-fold increase in the pressure within the cubital tunnel, depending on muscle contraction.<sup>3</sup> This can be compounded by compression on the nerve, either from various fascial bands surrounding the nerve or from extrinsic sources of compression, such as leaning on one’s elbow while driving or talking. This increased pressure on the nerve leads to decreased blood flow and nerve ischemia; this in turn causes increased permeability of the epineurial vessels and nerve edema, enlarging the nerve and continuing the cycle. Less frequently, cubital tunnel symptoms can be caused by the ulnar nerve subluxing in and out of its groove in the posterior elbow, leading to nerve inflammation and swelling from the repetitive friction.

‘Cell phone elbow,’ aka cubital tunnel syndrome: tingling or numbness in the ulnar forearm and hand

## ■ THE CLINICAL PRESENTATION

The clinical picture of cubital tunnel syndrome consists of numbness or paresthesias in the small and ring fingers. Dorsal ulnar hand numbness, which is not present if the ulnar nerve is compressed at Guyon's canal, helps the clinician differentiate cubital tunnel nerve compression from distal ulnar nerve compression.

If ulnar nerve compression persists, symptoms may progress to hand fatigue and weakness, including difficulty opening bottles or jars. Chronic and severe compression may lead to permanent motor deficits, including an inability to adduct the small finger (Wartenberg sign) and severe clawing of the ring and small fingers (a hand posture of metacarpophalangeal extension and flexion of the proximal and distal interphalangeal joints due to dysfunction of the ulnar-innervated intrinsic hand musculature). Patients may be unable to grasp things in a key-pinch grip, using a fingertip grip instead (Froment sign).

## ■ THE DIAGNOSIS IS USUALLY CLINICAL

The diagnosis of cubital tunnel syndrome is first and foremost a clinical one based on a thorough history, including symptoms, duration, and aggravating activities and factors.

The physical examination should include evaluation of sensibility of the hand, including the Semmes-Weinstein monofilament test and vibratory perception test, which will be affected before the Weber two-point discrimination test. Sensibility of the entire hand should be assessed to differentiate focal ulnar deficits from more widespread peripheral neuropathies.

Motor function can be evaluated by asking the patient to hold the fingers abducted, testing key-pinch grip, or asking the patient to cross the middle finger over the index finger. This crossed-finger test is quite reliable, as it is difficult to "fake out" with other muscles.<sup>4</sup>

The examination should also evaluate the cervical spine and vascularity. Provocative maneuvers can be performed to elicit symptoms, including the Hoffman-Tinel test (tapping the ulnar nerve in its groove at the posterior medial elbow, eliciting electric shocks or tingling radiating into the small finger). The equivalent of the Phalen maneuver for carpal

tunnel syndrome can be performed by having the patient sit with the elbow fully flexed for 30 seconds to see if symptoms are reproduced; this may be positive in 10% of normal individuals.<sup>5</sup> One can combine elbow flexion with compression over the proximal ulnar nerve; this maneuver has good sensitivity and specificity.<sup>6</sup> Early in the disease, these provocative maneuvers may be the only examination findings, since sensation and motor function are usually normal.

Ruling out other entities that can cause numbness in the distribution of the medial hand and forearm is also important. These entities include cervical spine conditions such as herniated disk impinging on the C8 nerve root, or a space-occupying lesion of the cervical spine such as a tumor or syrinx.

The neck should be examined for loss of motion. Also, a Spurling test of the cervical spine checks for foraminal nerve impingement: with the patient seated, the clinician extends the patient's neck and rotates it toward the involved side, then presses down on the top of the patient's head and asks if this reproduces or worsens the symptoms in the patient's arm. Hyperreflexia of the upper extremities or the presence of a Hoffman sign should alert the clinician to a more central process. In unclear cases or in patients with known cervical disease, electromyography should be able to differentiate ulnar neuropathy from a C8 nerve-root impingement or confirm the presence of both conditions (a so-called "double crush" phenomenon).

Other less common entities that can present with hand tingling include an apical lung tumor compressing the lower brachial plexus, thoracic outlet syndrome, or peripheral neuropathy (diabetes, vitamin B<sub>12</sub> deficiency, hypothyroidism, alcoholism). Other conditions that can cause medial-sided elbow pain include elbow instability or medial epicondylitis (golfer's elbow); however, these are not associated with numbness or tingling by themselves.

## ■ DIAGNOSTIC TESTS

Advanced diagnostic studies may help in certain cases, although they are not essential if the diagnosis is obvious on clinical examination.

**Switching hands while on the phone and avoiding elbow flexion may prevent or resolve symptoms**

Imaging studies may include plain radiography to look for osteophytes or bone fragments, which may impinge on the ulnar nerve, particularly in an arthritic or previously traumatized elbow. Magnetic resonance imaging is only indicated if a space-occupying lesion is suspected. Electrodiagnostic studies may help when findings are equivocal, when the site of compression is unclear, or when coexisting conditions such as diabetes or cervical spine disease make the diagnosis unclear. Nerve conduction studies may be unreliable early in cubital tunnel syndrome, as nondiseased nerve fibers may be tested, creating a false-negative result. Performing the study with the patient's elbow flexed may increase the sensitivity of the test. Electromyography generally does not become positive until later in the disease, when more profound changes have occurred.

#### ■ TREATMENT OF CELL PHONE ELBOW

As mentioned, changing how one uses a cell phone often helps, as does avoiding activities that require the elbow to remain flexed more than 90 degrees for extended periods. But when nonoperative means fail to reduce symptoms, surgery may be warranted.

Operative interventions include simple decompression or transposing the nerve from its usual course around the posterior elbow to

a path anterior to the elbow, thus decreasing the tension on the nerve. This can be done either subcutaneously or by embedding the nerve in or under the muscles of the forearm.

In patients with coexisting medial epicondylitis or a subluxing nerve, the medial epicondyle can be excised. Techniques for minimally invasive or endoscopic ulnar nerve decompression have been recently introduced, but the long-term results with these are not yet known.

Overall, treatment for persistent paresthesias is successful even when patients present late, but those who present early have a better chance of full sensory and motor recovery. ■

#### ■ REFERENCES

1. **Pechan J, Kredba J.** Treatment of cubital tunnel syndrome by means of local administration of cortisonoids. *Acta Univ Carol [Med] (Praha)* 1980; 26:125–133.
2. **Apfelberg DB, Larson SJ.** Dynamic anatomy of the ulnar nerve at the elbow. *Plast Reconstr Surg* 1973; 51:79–81.
3. **Werner CO, Ohlin P, Elmqvist D.** Pressures recorded in ulnar neuropathy. *Acta Orthop Scand* 1985; 56:404–406.
4. **Earle AS, Vlastou C.** Crossed fingers and other tests of ulnar nerve motor function. *J Hand Surg [Am]* 1980; 5:560–565.
5. **Rayann GM, Jensen C, Duke J.** Elbow flexion test in the normal population. *J Hand Surg [Am]* 1992; 17:86–89.
6. **Novak CB, Lee GW, Mackinnon SE, Lay L.** Provocative testing for cubital tunnel syndrome. *J Hand Surg [Am]* 1994; 19:817–820.

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