

Example case study with hand therapist's edits in red on slide #4

problem This man broke his right humerus as a child, and other than the mild change in appearance, it never bothered him. Now 20 years later, he notes numbness and weakness in his right hand.



DISCUSSION POINTS

How do you describe his deformity? What is the primary pathophysiology regarding his nerve symptoms? If left untreated, what is the condition's natural history?

If this injury involves non-bony connective tissue, is it loose or dense?

How does this condition impact occupational performance?

What is that healing timeline of this tissue?

What are the acute-care goals?

How does patient's occupational profile affect goal setting?

What are key points to look for (or ask for) in the doctor's prescription to enable the therapist to treat the patient optimally?

Would an orthotic be appropriate? If so, what is the rationale for it?

Are there wound care implications?

When should strengthening exercises begin?

What are the key components of therapist's note back to the doctor?

What is the format of the note to ensure appropriate communication?

When should the therapist contact the doctor for feedback?

discussion

The patient probably had a supracondylar fracture of the humerus—a relatively common injury when a child falls on the outstretched hand. A fracture malunion ensued, leading to the present cubitus valgus (the forearm deviates *out* from the long axis of the limb) deformity. The ulnar nerve is in close proximity to the injury and sometimes becomes palsied 10-30 years later, presumably as fibrosis gradually compresses it and the valgus deformity stretches it. This is known as tardy ulnar palsy.

Here it is quite advanced since wasting of all the ulnar-innervated intrinsic muscles. An ulnar nerve decompression and anterior transposition is in order, which should at least halt progression of the palsy. Ulnar nerve function may gradually improve after surgery over many months, but caution is in order.

The cubitus valgus deformity is solely cosmetic. The elbow has full, painless range of motion, it is stable and fully functional.



Tardy Ulnar Nerve Palsy – (First Case Study listed)

DISCUSSION POINTS **Need embellishment from hand therapists**

What is the primary pathophysiology? Tardy ulnar palsy, advanced. If left untreated, what is the condition's natural history? Paresthesias in the ulnar nerve distribution gradually lead to complete numbness in the small finger and medial border of the ring finger. Weakness followed by wasting is noted in the interosseous muscles, hypothenar muscles, lumbricals to the ring and small fingers, and adductor pollicis.

If this injury involves non-bony connective tissue, is it loose or dense? Rather dense connective tissue covers the ulnar nerve at the cubital tunnel and can compress the nerve even without a cubitus valgus deformity. The ancient supracondylar fracture with ensuing scarring with the addition here of a cubitus valgus deformity likely contribute.

How does this condition impact occupational performance? Numbness in the small finger would make keyboard activities difficult. Weakness in the ulnar intrinsic muscles would make small object manipulation difficult. Grip and pinch strengths would be diminished.

What is that healing timeline of this tissue? Chronic compression of the ulnar nerve at the elbow recovers slowly if at all. At the advanced stage seen in this patient, night splinting in elbow extension would not help. Anterior transposition of the ulnar nerve decompresses it and allows the ulnar nerve to run a slightly shorter course across the elbow. Over many months, sensation may gradually improve but not likely ever return to normal. Notable motor recovery in the ulnar intrinsics is unlikely. If the patient notes marked functional disability from the palsy, tendon transfers could be considered

Important to remember in this case that the ulnar nerve involves both motor and sensory function as noted above.

What are the acute-care goals? Following ulnar nerve transposition surgery: wound care, maintenance/prompt recovery of full elbow and forearm ROM, maintenance of all ADL's. **Pt education regarding need to protect hand due to lack of sensation.** Aids for ADL may facilitate use of zippers, buttons, bottle caps, other small object manipulation.

How does patient's occupational profile affect goal setting? **Is this the patient's dominant hand? What role would it ideally play in work or ADL's. Does their work typically involve fine or gross motor skills and what motions or tasks? Both grip and fine motor skills will be affected, as will sensory function, even after decompression (anterior transposition) and as regeneration/recovery occurs if this is possible.** If, instead, a tendon transfer has been performed the patient will need reeducation in how to perform activities using the alternative muscle groups. Simulate work tasks when possible or ADL tasks that are difficult during therapy or in HEP. If a tendon transfer is to be performed, pre op strengthening could be beneficial, if that is an option.

What are key points to look for (or ask for) in the doctor's prescription to enable the therapist to treat the patient optimally? **What specific procedure was performed: tendon transfer or anterior transposition of the ulnar nerve? What are the precautions or restrictions and timing regarding exercises and strengthening? What specifically does the physician want to begin immediately ie: AROM, AAROM, PROM? What is their expectation for recovery of motor and sensory function of the ulnar nerve if a transposition was performed?**

Would an orthotic be appropriate? If so, what is the rationale for it? **Orthotic protection as per physician which is removed for AROM exercises. Generally expect to begin static elbow splint in 90 elbow flexion applied to be worn at night about 2 weeks after bulky dressing is removed. Wear at night and between exercises. Also a wrist immobilization splint according to Dr's orders at approx 15 wrist extension. Splints may be discontinued around 6 weeks according to physician's direction. Assuming there is still a claw deformity, pt will need dynamic splinting or orthosis to allow function and position 4th and 5th digits in MP flexion due to non functioning intrinsics. It is possible thumb may need to be positioned for better opposition**

Are there wound care implications? Observe for wound infection. Sutures out at 10-14 days.

When healing is complete begin scar massage to assist with desensitization, prevent adhesions and assist in soft tissue mobilization. May need to perform other desensitization activities.

(If there is any expected return of sensory function or any question about what may return, documenting with Semmes Weinstein monofilaments testing will provide information about progress of sensory function or lack of progress.)

When should strengthening exercises begin? These won't be helpful in severe ulnar nerve compression where the ulnar muscles are denervated. Strengthening of the median-innervated muscles can begin immediately . **Consider what median nerve innervated muscle groups can help to compensate for loss of muscles innervated by ulnar nerve.**

What are the key components of therapist's note back to the doctor? **Note should include initial results compared to progress pt has made since last visit to Dr. Highlight improvements or plateaus in key areas where patient had deficits ,as well as improvements in functional use of hand.**

What is the format of the note to ensure appropriate communication? **Fax notes to physician ,or direct phone communication with the physician if possible /necessary, or send progress note via patient with appropriate information highlighted .**

When should the therapist contact the doctor for feedback? **Contact physician if there is sign of infection, excess pain, if there are deformities noted, unusual sensory changes or other concerning symptoms. Contact if there are questions regarding how quickly to progress from AROM to PROM, strengthening, etc.**

Supplementary material for case study on tardy ulnar palsy



This man's "carrying angle" is 30 degrees compared to a normal of 5-8 degrees for men and slightly more for women. This is another pathological cubitus valgus deformity, caused by a chronic, anteriorly dislocated radial head. Since the elbow has not had its usual radiocapitellar buttress for decades, the cubitus valgus increases. In face of no pain, full joint and nerve function, and full motion, no treatment is necessary.

By contrast, the image on the right depicts cubitus varus deformity, again from a childhood malunited supracondylar humerus fracture. This deformity is strictly cosmetic and does not lead to tardy ulnar palsy.

To remember valgus = out, varus = in (*valgus* has more letters than *varus*, *out* has more letters than *in*)

Supplementary material for case study on tardy ulnar palsy

This elderly woman sustained a supracondylar fracture several years ago and developed a painful nonunion and marked cubitus valgus deformity. She has a functional arc of e/f, probably through her nonunion site (dotted line) rather than through her elbow joint. **X791903**

Efforts at fixing the nonunion will be futile because 1) the articular fragment of the humerus is likely devoid of a blood supply and 2) rigid fixation of such a small fragment attached to a long lever arm is problematic. Particularly in elderly patients, a total elbow replacement is durable, corrects the cubitus valgus deformity, relieves pain, and preserves functional motion.

