Therapeutic Management for Distal Radius Fractures: Guidelines, Pearls, and Pitfalls

Roslyn B. Evans, OTR/L, CHT

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DRF is the most common fx in human skeleton, comprising 18% of all fractures and affecting an estimated 85,000 Medicare beneficiaries each year. (Court-Brown M, 2006); (Chung et al JBJS 2009).

The treating therapist in many cases will be the first to identify developing pin track or wound infection, nerve compression or neuropraxia; sympathetic flare, impending compromise to the FPL or EPL with fx volar plating, flexor tenosynovitis from over-exercise, shoulder impingement or missed rotator cuff injury. Clinical diagnosis and clinical decision making for the management of this often complex injury will be discussed in this lecture. Practical pointers to what really happens in the clinic.

THE FIRST VISIT:

Dealing with obstacles to treatment:

Insurance Limitations: what’s going on in the front office? Medicare, Medicare advantage, Medicaid, affordable health care act, private ins, Workers Compensation, orthotic clearing houses, difficulties in obtaining authorization when primary care physicians have to approve orthopaedic orders, non-reimbursable services that are needed such as wound care and dressings, high deductibles/ high co-pays, visit limitations, Medicare patients who receive home health care (not eligible for outpatient therapy).

The patient: Anxious, often in pain, fearful about loss of independence, often poorly educated regarding their injury and come expecting for therapy to be painful, co-morbidities, home situation;...assuring the patient/the power of touch/the value of humor/ the art of therapy.

The referral: “Distal radius fracture: evaluate and treat”.......AND WE ARE SUPPOSE TO MOVE TO ICD 10 CODING THIS YEAR WITH medical CODING MATCHING THE MD????

Information or lack thereof, interaction with the physician; call for op note or clinic note!

What are you treating? Date of fracture, surgery; Fx classification, type of reduction, stabilization; complications, co-morbidity, complications.....

1. Minimally displaced fracture, or non-displaced extra-articular fx:

   orthosis/plaster cast...first visit often at 4-6 weeks presenting with a stiff hand loss tendon excursion, intrinsic tightness, shoulder impingement; home program may be sufficient for uncomplicated DRF.

2. Inter-articular fracture fragments:

   External fixation: with or without pinning; percutaneous pinning...first visit often 24 hours PO for wound care, additional support orthosis, wrist control, Munster or posterior elbow/ wrist orthosis, early motion shoulder, forearm, and digits.
3. ORIF with volar fixed angle plates with or without locking mechanisms: first visit 24 hours PO to 2 weeks PO for wound care, support orthosis, short arc motion wrist. Monitor status of FPL, EPL/FCR. (Was pronator quadratus repaired? Is plate placed too far distal?)

4. ORIF with low profile dorsal plate (fragment-specific fixation or inter-medullary nailing): as with volar plating. Monitor tendon function.

**CLINICAL EVALUATION/ early intervention:** establish a treatment plan of care

History: general health hx, age, co-morbidity (osteoporosis, diabetes mellitus, immunosuppressive disorders, OA esp basilar thumb, cardiac disorders/pacemaker, seizures); previous dx CTS, trigger digits, tendonopathies, shoulder impingement, rotator cuff injury; medications, pain, blood thinners, allergies, patient reported pain and functional levels (DASH/PRWHE), home environment, review premorbid demands of the extremity, occupation, avocation, weight bearing, use of cane or walker, etc; PQRS reporting Medicare.

With early treatment, first visit should be about pain, edema, wound care, proper splinting, controlled motion, education, HEP ex and postures. Patients with wounds, pins, external fixation best treated supine to avoid vaso-vagal episode.

**Wound:** Skin and wound care for suture line, pin tracks (a conduit for infection), prevent crust build-up with saline soaks, diluted hydrogen peroxide applied with sterile Q tip; avoid cytotoxic cleansers as iodine; written and family instruction. Goal is to prevent infection and to intervene quickly if purulent drainage or sign of infection noted with all to MD.

**Edema:** Measure girth comparisons wrist, DPC, digits; volumetrics could be used in later phases, but is really too time consuming and awkward/and of what value? Manage with HVGS and cold compresses, retrograde massage, fluid flushing ex to drain lymphatics, instruction in proper elevation; compression gloves, coban wraps where indicated.

**Inflammation:** Assess inflammatory issues in synovial regions visually and with light stress to tendons; ie tendons in first dorsal compartment, within carpal tunnel and at A1 level; alter tendon forces as appropriate, especially with patients referred at the 4-6 week mark. Unload tendons as appropriate with additions to orthotic such as opponens or lumbrical block component.

**Pain, sympathetic sx:** Visual Analogue Scales (VAS)...establish source of pain: tight PO dressing, improperly fitting cast or splint, wound issues/ impending infection, sx of median nerve compression in CT with elevated carpal tunnel pressures or excessive traction with external fixator; hardware impingement DRSN, DUSN; sympathetic sx, missed injury, as UCL thumb, PIP D/L, or basilar thumb OA, or patient perceived pain with anxiety and low pain threshold. Treat with alterations in orthotic, edema control, notify MD with suspected early CRPS for appropriate pharmacologic intervention, or if hardware is cause of nerve pain. Address psychological as well as physical manifestations/ vitamin C with some evidence.

**Nerve:** Semmes Weinstein testing for sensibility, note complaints of paresthesia, burning pain, note extrinsic/intrinsic motor function. Monitor sensation each vs. Pts may need CTR with significant sx; notify MD if acute CT is suspected.
Range of motion: PROM, assessing joint, capsular status; AROM assessing tendon function (with volar or dorsal plating note pain or crepitus with FPL, EPL); note excursion ECD, FDS, FDP, tendons first dorsal (APL, EBP), FPL, EPL, FCR, ECU. With external fixation note pain Index extrinsic extensors, EIP, EDC from possible hardware impingement. Shoulder, elbow, forearm and wrist (with early motion); digits and thumb. With first web tightness and basilar joint pain in the older patient include thumb kinetic chain in orthotic and minimize stress to CMC with exercise. For index finger avoid composite stretch with other digits, rather work MP and PIP in isolation. At 2 week and later mark address intrinsic tightness stretch, first web. Forearm rotation only to tolerance in early phase. Evaluate shoulder with quick screen for rotator cuff pathology, capsular tightness and prevent/address with scapular exercises by second visit. In later phases move joints with light axial traction and avoid heavy compressive passive forces.

Custom orthotics: Address need for additional stabilization and pain issues related to forearm rotation, basilar thumb pain, tendon inflammation with custom wrist control, with or without ulnlar block or thumb component; ulnar gutter, posterior elbow/wrist; digital traction as needed by week 2.

Use of sling: minimize use; for public outings. Slings encourage patients protected positon of shoulder adduction and internal rotation; hyper flexion of elbow not helpful either as it increases tension ulnar cubital tunnel.

Patient-rated Self-Report Measures/Questionnaires: the DASH helps to establish G codes current function and projected function) along with clinical assessment and objective measures for Medicare required reporting. Patient Rated Wrist Evaluation: PRWHE (more responsive than the DASH or SF 36 for wrist fractures) CHECK OUT THE REAL DEAL PANEL ON DRF THIS AFTERNOON WITH VALDEZ, KARAGIANNOPOULOS, MACDERMID, BEDNAR!

Home Exercise Instruction: instruction for edema control, sleeping postures, controlled exercise, wound care instruction by 2nd or 3rd vs....keep it simple/structured.

MANAGEMENT FRACTURE HEALING PHASE:

Treatments should include light progressive exercise as tolerated, constant reevaluation of systems to monitor and address issues related to edema, pain, sympathetic sx, sensory changes, nerve compression, developing tendon inflammation from over exercise; early signs of compromise to tendon systems esp FPL, EPL, FCR from hardware impingement; loss of shoulder motion.

Exercise in pain-free range, applying axial traction in combination with digital and wrist motions when appropriate. Avoid repetitive composite fisting as this elevates pressures in the carpal tunnel and will contribute to inflammatory issues with extrinsic tendons. Reestablish extensibility in intrinsics, excursion all tendon systems. Avoid stress to DRUJ, TFCC with ulnar sided wrist pain with suspected malalignment.

Be alert to missed injuries: UCL thumb, PIP D/L, rotator cuff; and to developing issues with CTS, triggering digits, DeQuervain’s, FCR or ECU tendonitis.
MANAGEMENT WITH FRACTURE HEALING:

Realistic long term goals: focus on advancement to HEP: consider age, presence of osteoporosis, functional motion, strength, endurance, return to premorbid function, whether low or high physical demands for strength, ability to weight bear, apply load with torque, endurance. Be alert to submaximal effort injury compensation, legal or work injury. Patients can be expected to improve with regards to ROM and grip strength over 12 months, do not expect to take patient to full recovery in this age of “limited care”.

Monitor progress with grip, pinch strength testing, ROM progression, function of wrist extensors and tolerance for supination with light loads. “Push off test” for weight bearing with complete fx healing and if no ulnar sided wrist pain. Continue to manage inflammation if present and sensory reading, status of FPL, EPL and adjust treatment as needed.

Adjust applied forces for strengthening with respect to outcomes of fracture stabilization pain levels, continued inflammation and patient demands for function.

DRF with restoration of anatomy and successful reduction will require minimal therapy. Complications of delayed union, mal-union, issues such as volar or dorsal displacement, radial shortening, inter-articular involvement, DRUJ mal-alignment/subluxation, ulnocarpal impaction, TFCC injury, capsular adhesion, tendon inflammation, pain or CRPS will require therapist supervision.

Be especially alert to ulnar sided wrist pain, gaining ROM for supination best gained with therapist light axial traction to wrist in combination with supination and strengthening with isometric technique. Dorsal angulation of the distal radius of 20 degrees is disruptive of DRUJ function; radial shortening relative to the ulna causes higher force transmission across the ulnar carpus, TFCC and ulnar head leading to TFCC degeneration and ulnocarpal abutment syndrome and eventually degenerative changes in the ulnocarpal articulation. (Ferreira 2014). Be alert to synovitis ulnar wrist, tendonitis ECU

Other exercise tips: Strengthen wrist extensors with EDC excluded to overcome maladaptive patterns of use (extending wrist through EDC activation). Strengthen the extrinsic flexors with isometric grip using a 2-3” dowel instead of putty which only encourages lumbrical incursion into the carpal canal and can contribute to median nerve compression and synovitis flexor tendons; Isometric technique for intrinsic strengthening and intrinsic stretch to recapture full digital flexion. Minimize thumb strengthening in patients with basilar thumb OA or with signs of irritation FPL, EPL from possible hardware impingement. Scapular balancing and peri-scapular strengthening from early treatment to prevent impingement issues. Loss of joint extensibility or tendon adhesion can be addressed with static progressive and or dynamic orthotics which apply low load progressive stress to supplement exercise programs.

THE BIGGEST ISSUE THAT I SEE, AND I DO TREAT PATIENTS FROM MANY DIFFERENT FACILITIES AROUND THE COUNTRY IN THE WINTER, IS THAT PTS ARE GIVEN EXERCISES THAT STRESS INFLAMMED TISSUES AND THAT THE THERAPIST, (OFTEN CHT’S) MISS ISSUES RELATED TO FLEXOR SYNOVITIS, ECU TENDONITIS, AND ELEVATED CT PRESSURES...BEWARE GENERIC EX PROGRAMS THAT INCREASE CT PRESSURES AND STRESS THE ULNAR WRIST. Patients can be expected to improve for at least a year with regards to ROM and grip strength following DRF (Rob et al JHS 2014)
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