ELBOW STABLE FRACTURES AND SIMPLE DISLOCATIONS NON-OPERATIVE GUIDELINES

The following guidelines for stable elbow fractures and simple dislocations were developed by HSS Rehabilitation and are intended to assist the clinician in structuring an appropriate criteria-based and individualized treatment plan. While based on current evidence as well as clinical pearls from experienced clinicians, they are not meant to be a substitute for clinical reasoning and decision making. These guidelines do not include treatment for complex elbow fracture-dislocations which require a specific varus-protection program.[25]

Due to the architecture of the joint and the high level of bony congruency, the elbow, which is normally quite stable, is prone to stiffness after sustaining trauma such as fracture or dislocation. In addition, stiffness can occur concomitantly in the presence of instability. A thorough understanding of the anatomy is crucial to achieving optimal outcomes. Communication with the referring provider is also critical to knowing exactly which structures are involved and which motions are safe. A simple dislocation or stable fracture can be progressed more quickly than a more complex dislocation or unstable fracture that has required surgery. Sound clinical reasoning is crucial in determining when to recognize excessive stiffness and when to progress patients to the next level of treatment.

Several factors can contribute to joint stiffness including: lack of joint reduction due to ligamentous insufficiency or fracture, muscle guarding and co-contraction, nerve entrapment (the ulnar nerve is particularly vulnerable to injury with elbow trauma), thickening/scarring of soft tissue, and heterotopic ossification. Evidence has shown that early protected motion yields the best patient outcomes.

This guideline covers principles that apply to several different diagnoses. It is important to consult with your referring provider for specific timelines, precautions, and contraindications. Timeframes are provided as suggestions, clearance to progress to the next phase must happen with approval from the referring provider.

Elbow diagnoses leading to stiffness include:

- Elbow dislocation
- Radial head/radial neck fracture
- Supracondylar/distal humerus fracture
- Olecranon fracture
- Loose body excision

Red flags which require referral back to the physician include:

- Increase in ulnar nerve symptoms including paresthesias of the small and ring finger, intrinsic muscle atrophy, and medial elbow pain
- Sudden decrease in elbow range of motion (ROM) in either direction, especially paired with increase in redness/warmth

FOLLOW REFERRING PROVIDER MODIFICATIONS AS PRESCRIBED

ELBOW FRACTURES AND SIMPLE DISLOCATIONS
NON-OPERATIVE GUIDELINES
Phase 1: Protection (Weeks 0 to 2-6)

PRECAUTIONS

- Protect in thermoplastic removable orthosis (or sling if instructed by referring provider)
    - To be worn at all times or to be removed for hygiene and/or light exercises as permitted by referring provider
- No passive range of motion (PROM) of elbow and forearm
- Observe non-weight bearing (NWB) status of involved upper extremity (UE)

SPECIAL CONSIDERATIONS

- Length of protective phase varies depending on injury severity and stability; follow referring provider recommendations for required immobilization time and earliest initiation of controlled motion
- Stable elbow fractures (e.g. non- or minimally displaced radial head fractures, and simple elbow dislocations):
    - Referring provider may clear for elbow motion within 1-3 days to minimize risk of stiffness
    - Immobilization requirements may include:
        - Posterior elbow shell orthosis
        - Sling
        - Unrestricted movement

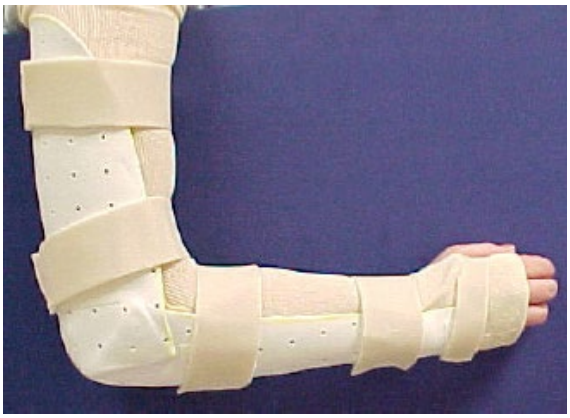
ASSESSMENT

- Quick Disabilities of the Arm, Shoulder and Hand Score (QuickDASH)
- Numeric Pain Rating Scale (NPRS)
- Assess fit of orthosis as edema fluctuates, watch for pressure areas
- Edema
    - Observation
    - Circumferential measurements
        - Proximal/distal elbow creases
        - Wrist, hand, digits
- Neurovascular
    - Screen for presence of paresthesias with particular attention to distal symptoms of ulnar nerve compression
    - Assess color, pallor, temperature of elbow and distal UE
- Measure active range of motion (AROM) as permitted by referring provider

- Screen AROM proximal/distal segments of affected UE
    - Screen for guarding and postural compensatory movement patterns
- Functional status
    - Observation and interview
        - Pre-injury level of function
        - Interference of injury in activities of daily living (ADL)/instrumental activities of daily living (IADL), work, leisure
    - Patient goals

TREATMENT RECOMMENDATIONS

- Patient education
    - Nature of the condition and expectations for course of treatment
    - Protective orthosis wearing schedule and care
    - Management of pain and edema
    - Activity modifications
    - Movement strategies for performing ADL/IADL while observing precautions
    - Light hand use
    - Home exercise program (HEP) for hand, wrist, shoulder, scapular mechanics, and elbow if permitted
- Orthotic fabrication
    - Posterior elbow orthosis most commonly in 90° elbow flexion, neutral forearm rotation, wrist included for comfort (photo below)
    - Olecranon fractures may require immobilization in greater degree of extension to minimize pull on triceps insertion



Posterior Elbow Orthosis

- Soft tissue mobilization to all musculature around elbow: flexors and extensors of elbow, wrist and forearm
    - Triceps adherence and posterior capsule thickening can prevent elbow flexion
    - Anterior capsule and elbow musculature can prevent elbow extension
- AROM of shoulder, scapulae, wrist, and digits
- Gentle AROM of elbow/forearm within stable ranges if permitted

- Edema management
    - Compression
    - Elevation
    - Elastic therapeutic taping
    - Ice

CRITERIA FOR ADVANCEMENT

- Radiographic indication of sufficient stability determined by referring provider is required to allow advancement to elbow/forearm active assisted range of motion (AAROM) and PROM
- If excessively stiff may need to progress sooner- communication with referring provider is crucial

EMPHASIZE

- Protect healing structures
- Control edema and pain
- Promote stability
- Maintain and promote ROM of uninvolved joints

ELBOW FRACTURES AND SIMPLE DISLOCATIONS
NON-OPERATIVE GUIDELINES
Phase 2: Mobilization (Weeks 3-8)

PRECAUTIONS

- Continue elbow orthosis for protection as needed until discontinued by referring provider
- Avoid sharp increase in pain during exercises
- Observe ROM precautions, weightbearing status and lifting limitations per referring provider instructions

SPECIAL CONSIDERATIONS

- Phase 2 may start earlier with referring provider clearance
- Distal humeral and olecranon fractures: referring provider may initially limit active elbow extension and passive elbow flexion
- Use caution with prolonged elbow flexion to avoid irritating ulnar nerve

ASSESSMENT

- QuickDASH
- NPRS
- Edema: observation and measurements
- Neurovascular symptoms:
    - Screen for ulnar nerve symptoms including vague medial elbow pain and/or paresthesias to digits 4 and 5
    - Assess sensation/hypersensitivity
- ROM
    - Measure AROM/PROM elbow and forearm
    - Screen ROM proximal/distal UE, with attention to shoulder and posture
- Qualities of elbow stiffness
    - Muscle length: muscle tightness/shortening
    - Muscle inhibition, co-contraction
    - Assess end feel
        - Extra-articular – capsular/ligamentous/tendinous tightness
        - Intra-articular – loose bodies, loss of joint congruency, heterotopic ossification (HO)
- Assess for need for static-progressive orthosis to increase ROM
    - Rarely initiated before 6 weeks post injury
    - Requires referring provider's approval
- Functional status: observation and interview

TREATMENT RECOMMENDATIONS

- Patient education
    - Protective or progressive orthosis: wearing schedule and care of orthosis
    - Pain management: heat, ice
    - Management of stiffness
    - Use of affected arm in light ADL/IADL
    - Progress HEP
- Functional/ADL training
- Soft tissue mobilization to all musculature around elbow: flexors and extensors of elbow, wrist and forearm
    - Triceps adherence and posterior capsule thickening can prevent elbow flexion
    - Anterior capsule and elbow musculature can prevent elbow extension
- PROM elbow and forearm
    - Use of moist heat to increase tissue extensibility (consider positioning at end range flexion or extension)
    - Watch for guarding/co-contraction and sharp increase in pain
    - Low load prolonged positioning
    - Gentle muscle energy techniques
- AROM/AAROM elbow, forearm, shoulder, wrist, digits
    - Minimize compensatory strategies
    - Assess and address scapular mechanics
- Therapeutic exercises and activities to promote functional elbow ROM
- Proprioceptive neuromuscular facilitation techniques (e.g., contract-relax)
- Increase joint proprioception with gentle isometrics
- Joint mobilizations when cleared by referring provider (e.g., ulnohumeral joint, proximal radioulnar joint, radiohumeral joint)
- Edema management
    - Compression garments
    - Manual edema mobilization
    - Elastic therapeutic tape
    - Thermal modalities (heat, ice)
- Reduce co-contraction (most common in biceps brachii)
    - Breathing techniques
    - Biofeedback device
    - Visualization
    - Bilateral arm movements

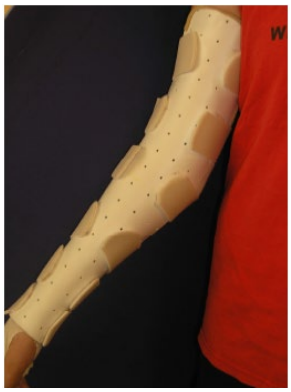
- Orthoses
    - Protective orthosis
        - Usually wean at or by week 6; consult with referring provider
    - Static progressive orthoses
        - Initiate when sufficient tissue healing has occurred to withstand prolonged forces required to increase motion and cleared by referring provider
        - Apply prolonged low load vs. strong force
        - Patient may adjust splint as tolerated to increase motion as tissue relaxes
        - Designs and recommended wearing schedules:
            - Flexion: 30 minutes at a time, 3-5x daily to avoid irritation of ulnar nerve
                - Custom: Come along flexion orthosis (photo below), flexion cuff
                - Patient education is essential on development of ulnar nerve symptoms
                - If development of ulnar nerve symptoms occurs, discontinuation of splint or shorter interval schedule may be necessary

                - Prefabricated options (JAS, Dynasplint)
            - Extension: up to 8 hours at a time while sleeping to achieve low-load prolonged stretch
                - Custom: turnbuckle extension (lacking more than 45 degrees or greater), serial static extension (lacking fewer than 45 degrees)

                Turnbuckle Extension Orthosis


Serial Static Extension Orthosis

- Supination/pronation: 30-45 minutes at a time, 3-5x daily
    - Custom and prefabricated options are available

CRITERIA FOR ADVANCEMENT

- Sufficient bone and soft tissue healing for participation in unrestricted activity per referring provider
- Near full ROM

EMPHASIZE

- Increase ROM
- Enhance function
- Limit stiffness

ELBOW FRACTURES AND SIMPLE DISLOCATIONS
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Phase 3: Strengthening (Weeks 9-12)

PRECAUTIONS

- Avoid using forceful stretching or other high loads to address stiffness

CONSIDERATIONS

- May use supportive garments during sports/activities as desired
- Static progressive splints may be required for up to 1 year to maximize motion- educate patient on orthosis program
- Slow and gradual progression back into higher level activities

ASSESSMENT

- QuickDASH
- NPRS
- Neurovascular symptoms:
    - Screen for ulnar nerve symptoms including vague medial elbow pain and/or paresthesias to digits 4 and 5
    - Assess sensation/hypersensitivity
- Measure AROM/PROM of elbow and forearm
- Screen proximal and distal ROM, with attention to postural adaptations and compensatory movement patterns
- Qualities of elbow stiffness
    - Muscle length: muscle tightness/shortening
    - Muscle inhibition, co-contraction
    - Assess end feel
        - Extra-articular – capsular/ligamentous/tendinous tightness
        - Intra-articular – loose bodies, loss of joint congruency, heterotopic ossification (HO)
- Strength testing: manual muscle testing (MMT), dynamometer grip testing
- Functional status: observation and interview
- Assess need for or progress current static progressive orthosis program to increase end-range motion
    - Fit
    - Frequency of use

TREATMENT RECOMMENDATIONS

- Functional/ADL training
- Work conditioning
- Postural reeducation as needed
- Continue manual therapy techniques to achieve increase in ROM
- Continue PROM/AAROM/AROM and stretching of affected joints
- Progressive resistive exercises
    - Isolate triceps to increase extension
    - Strengthen biceps, brachialis, brachioradialis to increase flexion
    - Proximal/distal UE strengthening
- Weightbearing activities
- Continue use of static progressive orthoses up to 1 year to maximize ROM
    - Patient may require additional visits to adjust extension and flexion orthoses to accommodate ROM progress or signs of wear
- Endurance exercises (e.g., arm bike)

CRITERIA FOR DISCHARGE

- Functional performance uninterrupted by elbow ROM
- Elbow and forearm AROM maximized and within functional limits
- Sufficient strength for return to previous activities
- Independent in HEP and use of static progressive orthoses to manage stiffness
- Recommend for surgical consultation if:
    - Stiffness persists for 6 months despite therapy and use of static progressive orthosis
    - Functional performance continues to be significantly interrupted by ROM limitations

EMPHASIZE

- Maximize function and return to fitness and sport
- Limit stiffness and maximize ROM
- Increase strength and endurance

ELBOW FRACTURES AND SIMPLE DISLOCATIONS NON-OPERATIVE GUIDELINES

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Created: 8/2019; Revised: 9/2023