Simple Elbow Dislocation

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KEYWORDS

• Elbow • Instability • Dislocation • Medial collateral ligament • Lateral collateral ligament

KEY POINTS

- Most simple elbow dislocations may be treated nonoperatively.
- The three primary static stabilizers of the elbow are the ulnohumeral articulation, the anterior bundle of the medial collateral ligament, and the lateral collateral ligament complex.
- The extent of soft tissue injury following a simple elbow dislocation can vary and one must be vigilant about assessing postreduction radiographs to ensure congruent reduction of the elbow.
- Forearm rotation affects the stability of the elbow.
- Any muscle that crosses the elbow joint provides compressive stability to the elbow, and therefore rehabilitation programs should stress active range of motion programs.

ELBOW STABILITY

The elbow's stability is provided by static and dynamic constraints. The static constraints include the bony architecture and the capsuloligamentous structures. The dynamic stabilizers, which are muscles that cross the elbow joint, provide a compressive stability to the elbow during active muscular contraction. A "fortress of elbow stability" has been previously described that highlights the importance of the primary and secondary stabilizers of the elbow (**Fig. 1**).[1] The three primary stabilizers of the elbow include (1) the ulnohumeral articulation, (2) the anterior bundle of the medial collateral ligament (MCL), and (3) the lateral collateral ligament (LCL) complex.

Practically, if these three primary elbow structures are intact, then for the most part the elbow is stable. The important secondary stabilizers of the elbow are the radial humeral articulation, the common flexor pronator tendon, and the common extensor tendon. In a simple elbow dislocation, there is not bony disruption of the ulnohumeral articulation; however, there is disruption of the LCL complex and possibly the anterior bundle of the MCL. It is generally accepted that the LCL complex is universally disrupted with any elbow dislocation; however, less agreed on is the degree of involvement of the medial soft tissues. Some authors believe that the MCL is disrupted 100% of the time,[2] whereas others have reported that there is a sequential disruption of the soft tissues starting laterally and then eventually progressing to the medial side depending on the magnitude of the elbow dislocation.[3] The important point is that each of these soft tissue stabilizers play an important role about the elbow and that radiographic analysis and clinical examination can help to determine the degree of involvement to dictate the treatment plan. The question is, if two out of the three primary stabilizers are involved with a simple elbow dislocation, then why can the elbow still remain reduced? This is because the ulnohumeral articulation has a highly constrained bony anatomy and there are compressive forces generated by the muscles that cross the elbow joint during active motion of the elbow.[4–6]

MECHANISM OF INJURY

The classic mechanism for injury is a fall on an outstretched arm. The classic mechanism proposed for a typical posterolateral elbow dislocation is an elbow that has been loaded axially in a valgus

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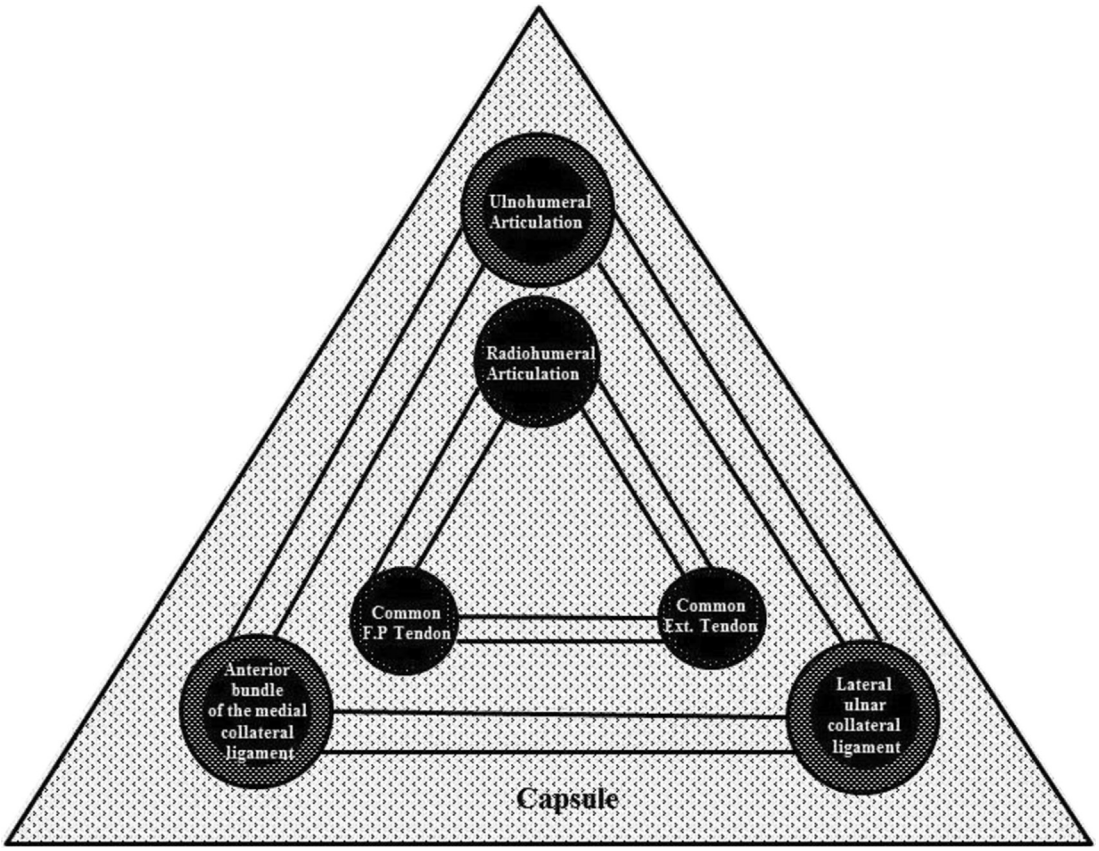

Fig. 1. The elbow has three primary restraints: the ulnohumeral articulation, the anterior bundle of the medial collateral ligament, and the lateral collateral ligament complex. The secondary constraints are the radiocapitellar joint, the common flexor, and extensor tendons. (*Adapted from* O'Driscoll SW, Jupiter JB, King GJ, et al. The unstable elbow. Instr Course Lect 2001;50:91; with permission.)

position with the forearm supinated.[3] It is believed that the soft tissues are disrupted in a circular fashion from lateral to medial with this mechanism.[7] Other mechanisms for elbow dislocation have been described[8] that are important for clinicians to appreciate because the degree of soft tissue disruption can be mechanism dependant, which may require a change in treatment protocol. The bottom line is that not all simple elbow dislocations are treated alike and understanding the principles of treatment is important.

CASE EXAMPLES

Case #1

Fig. 2 shows a posterolateral dislocation of an elbow in a 17-year-old man. He was involved in a skateboarding injury and landed on his outstretched arm. His postreduction lateral film is shown in Fig. 3, which shows incongruence of the elbow joint and gapping at the ulnohumeral articulation. The forearm was positioned in supination when this radiograph was taken. The elbow is appropriately positioned close to 90°, which takes advantage of the high congruency of the ulnohumeral joint. Therefore, the persistent joint incongruity could be because the forearm is not rotationally reduced or something is interposed between the bones not allowing for full reduction, which could be bone, cartilage, muscle, or nerve, such as the ulnar nerve. The forearm may be simply repositioned to see if one is dealing with a rotationally unstable elbow. There is the option of positioning the forearm in pronation, neutral, or supination. Because the LCL complex is universally torn in elbow dislocations, typically the choice is between forearm pronation or neutral positioning. If repositioning the forearm does not provide stability to the elbow, the next consideration is to investigate further for an interposed fragment. Physical examination of the neurovascular structures and possibly an MRI or a computed tomography scan to look for any type of bone or cartilage lesion that is preventing the reduction of