Elbow Injuries in Basketball

25

Kurt E. Stoll and Grant E. Garrigues

25.1 Elbow Anatomy and Biomechanics

The elbow is a modified hinged joint. Hinged motion occurs at the ulnohumeral and radiocapitellar joints, while rotational motion occurs at the radiocapitellar joint and the proximal radioulnar joint. Stability throughout full range of motion is provided by osseous, capsuloligamentous, and muscular structures. The osseous stability provided is secondary to the highly irregular and congruent distal humerus, and proximal radius and ulna [1].

The proximal articular surface of the elbow is comprised of the trochlea and capitellum. The trochlea (L. "pulley") is shaped like a pulley or spool on the distal end of the humeral shaft [1]. The medial ridge extends more distal than the lateral ridge and creates 6–8° of valgus tilt [1]. The trochlea also has a posterior tilt that prevents posterior translation [2]. The capitellum (L. "little head") is a hemispheric structure and is lateral to the trochlea [1, 2].

K. E. Stoll
Orthopaedic Department,
University of North Carolina, Chapel Hill, NC, USA
e-mail: Kurt.Stoll@unchealth.unc.edu

G. E. Garrigues (✉)
Midwest Orthopaedics at Rush,
Rush University Medical Center, Chicago, IL, USA

Co-Team Physician, Chicago Bulls (NBA),
Chicago, IL, USA
e-mail: grant.garrigues@rushortho.com

The distal articular surface of the elbow is comprised of the proximal ulna and radius. The proximal ulna is composed of the coronoid, olecranon, and the greater sigmoid notch. The coronoid plays a significant role in preventing posterior displacement, locking in the coronoid fossa in flexion [1, 3]. Fifty percent of the coronoid is needed to provide stability in extension. The greater sigmoid notch is highly congruent with the trochlea forming a primary constraint of the elbow [1, 2]. The radial head is a concave surface that articulates with the capitellum and is covered by 280° of articular cartilage [1]. The radial head also plays a significant role in valgus stability (3, 5; Fig. 25.1a).

The collateral ligaments are capsular thickenings that enhance elbow stability. The medial collateral ligament (MCL) is comprised of the anterior oblique ligament (AOL), the posterior oblique ligament (POL), and the transverse ligament [4]. The MCL provides restraint to valgus and internal rotatory loads with the AOL being the strongest of the three components [4]. The lateral collateral ligament (LCL) is composed of the lateral ulnar collateral ligament (LUCL), radial collateral ligament (RCL), annular ligament (AL), and accessory lateral collateral ligament (ALCL) [4, 5]. The LCL resists varus and external rotation stresses in conjunction with the capsule and bony architecture. Complete transection of the LCL results in posterolateral rotatory and varus instability [6].

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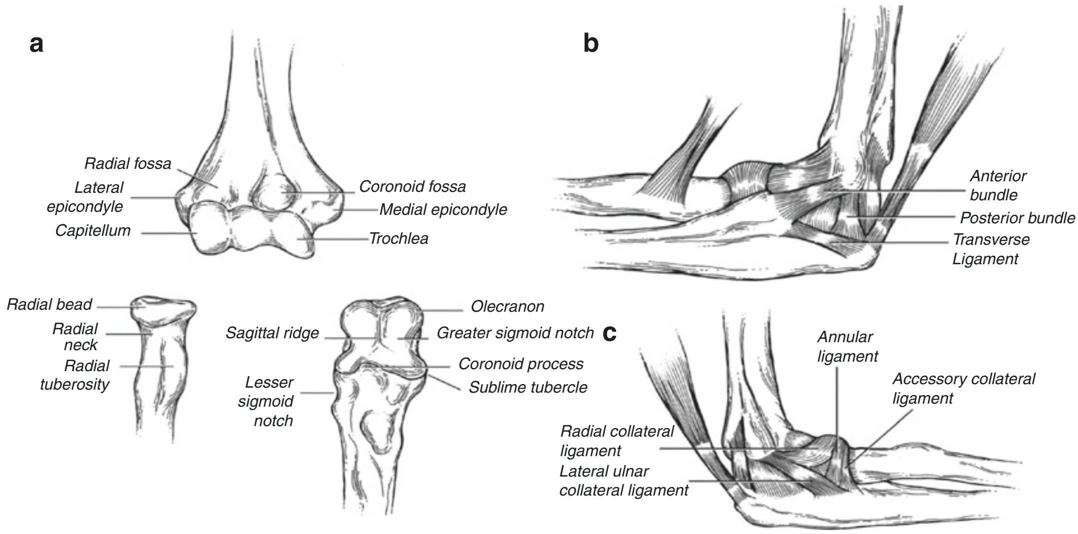

Fig. 25.1 (**a**) Osseous anatomy of the elbow. (**b**) Medial collateral ligament complex. (**c**) Lateral collateral ligament complex (Adapted and permission granted from *Bryce CD, Armstrong AD. Anatomy and biomechanics of the elbow. Orthop Clin North Am. 2008;39(2):141-54, v*)

The muscles that cross the elbow control motion and compress the bony architecture, acting as dynamic stabilizers [2, 4]. The medial flexors of the elbow resist valgus force. Conversely, the lateral extensor muscles resist varus force. The distal biceps tendon crosses the elbow anteriorly and inserts at the posterior/ulnar aspect of the radial tuberosity [7]. The brachialis muscle crosses the elbow and has two heads, the superficial and deep heads. Both heads insert on the ulnar tuberosity, with the deep head inserting proximal to the superficial head [8]. The triceps crosses the elbow posteriorly and inserts on the olecranon. The tendon expands distally and its size correlates with the size of the olecranon [9].

There have been 150 bursae identified in the body, and the olecranon bursa is one of the best known [10]. The olecranon bursa is situated between the olecranon and the skin, and is formed in response to pressure, acting as a lubricating structure for the olecranon [10].

Three major nerves cross the elbow joint. The median nerve crosses anteriorly, medial to the brachial artery and is covered by the bicipital aponeurosis. The nerve then goes deep between the two heads of the pronator teres. The radial nerve emerges between the brachialis and brachioradialis, and it divides at the radiohumeral joint. The ulnar nerve crosses the elbow in the groove posterior to the medial epicondyle, entering the forearm between the two heads of the flexor carpi ulnaris (FCU). The brachial artery runs on the lateral side of the median nerve in the cubital fossa and then divides into the radial and ulnar arteries [11].

25.2 General Evaluation of the Elbow

25.2.1 Physical Exam of Elbow

A physical exam of the elbow should be performed prior to participation. A thorough physical exam of the elbow, with a fully exposed limb and contralateral limb, is necessary for guiding and interpreting further studies and establishing a proper diagnosis.

The elbow exam begins with inspection. The overall alignment of bilateral elbows should be noted. Due to the bony anatomy, the elbow is aligned in 11–16° of valgus. This angle is referred to as the "carrying angle" and is defined by the long axes of the extended forearm and arm [12, 13]. A decrease in valgus alignment of the elbow can result from prior trauma, such as a pediatric supracondylar humerus fracture [14], and can be detrimental to the overall functioning of the limb.

Next, musculature is examined for atrophy or hypertrophy, providing clues to the chronicity of the injury. The skin is then examined for ecchymosis, rashes, nodules, and prior surgical incisions. A joint effusion can be observed if the soft spot (border of the olecranon, radial head, and lateral epicondyle) is distended [13, 15].

The bony and soft tissue structures should be palpated. Begin by palpating the epicondyles for tenderness. The olecranon and radial head are subcutaneous bony structures that are also easily palpated. The distal biceps tendon is palpated as it courses over the anterior elbow. Disruption of the normal contour of the distal biceps tendon and asymmetric proximal migration of the musculotendinous junction with respect to the antecubital flexion crease may be a sign of a partial or full tendon rupture. Tenderness over the posterior aspect of the medial epicondyle may indicate ulnar neuritis, and tenderness in the soft spot may indicate joint irritation secondary to synovitis, plica, or osteochondritis dissecans of the capitellum [15].

Normal elbow ROM is 145° of flexion, 0° of extension, 75° of pronation, and 85° of supination [15, 16]. Intra-articular pathology, pain, and soft-tissue constraints can limit normal ROM following injury. Crepitus, pain, and mechanical symptoms should be noted during attempted ROM [13, 15]. If there is a limit in full ROM, it should be determined if there is a soft endpoint, suggesting a joint effusion, soft tissue swelling, or capsular tightness [15]; or a firm endpoint that suggests a bony block or loose body. Strength testing should be performed and compared to the other limb.

There are several special tests used about the elbow to provide clues to the underlying pathology. These tests will be described below under the specific injury.

25.2.2 Imaging Evaluation of the Elbow

Following a thorough history and physical exam, a decision should be made as to whether radiographs are needed. Radiographs provide information regarding osseous structure, joint relationship, and overall alignment [17]. The standard views include an AP and lateral. Oblique views may be obtained to supplement the standard views. The use of MRI is limited in acute injury but is the modality of choice when evaluating soft tissue structures [17]. Ultrasound may be used for evaluating tendon injuries, elbow joint effusions, and intra-articular loose bodies. CT is used to further define osseous anatomy following radiographs.

25.3 Common Basketball-Related Injuries

25.3.1 Elbow Instability

General: The elbow is the second most common joint to suffer dislocation, with an incidence of 5–6 per 100,000 people yearly [18, 19]. Forty-five percent of all elbow dislocations are sports-related, with an estimated 1435 dislocations related to basketball in the United States over a 5-year period [19]. Due to the osseous, capsuloligamentous, and muscular anatomy, the elbow is an inherently stable joint. Ninety percent of dislocations occur posteriorly or posterolaterally, as a result of a fall on an outstretched hand with an extended elbow and a fully supinated forearm [20, 21]. Posteromedial dislocations are rare, also occur after a fall onto an outstretched hand, with the elbow extended and are associated with more severe soft-tissue injuries. There is often a missed anteromedial coronoid facet fracture [20]. A fall onto the hand with the elbow extended results in an axial load through the elbow as the hand impacts the floor. As the body-weight continues to ground with the hand planted, this typically results in external rotation and valgus stress at the ulnohumeral joint [21, 22]. While more recent research has shown that the injury pattern is more variable [23], classically the mechanism begins disrupting what has been called "The Circle of Horii" [24]. Injury begins with disruption of the LCL, moves to the anterior capsule, and finally to the MCL, resulting in a complete dislocation. Although rare in the basketball population, isolated MCL injuries can occur leading to valgus instability.

Initial Assessment and Management: An elbow dislocation may occur in isolation or in conjunction with other injuries of the limb. Therefore, a thorough exam of the shoulder, forearm, and wrist should be done. A dislocated elbow will typically show evident deformity, and the forearm will be in varus and supination [22]. A careful neurovascular exam should be performed. Standard radiographs should be obtained to determine if the dislocation is simple or complex (with associated fracture). After a dislocation is confirmed, a reduction maneuver is required. This is best performed with adequate analgesia which may require conscious sedation in an emergency department in some cases [24]. Reduction is performed by correcting any medial or lateral displacement of the olecranon, followed by flexing the elbow and supinating the forearm while applying longitudinal traction [22, 24]. Following reduction, a repeat clinical examination should be performed, especially a thorough neurovascular exam. The elbow should be taken through a full ROM. The point at which instability first occurs should be noted as should the arc of stable ROM. The elbow should be immobilized. At time of clinic follow-up, varus and valgus instability should be assessed along with posterolateral (PL) instability. PL instability is assessed with the lateral pivot shift test (Fig. 25.2). If elbow instability is thought to be secondary to MCL injury, valgus stress should be applied at 30° of elbow flexion and laxity compared to the uninjured elbow; the "milking maneuver" may also be performed to help identify injury. Radiographs should be repeated to confirm reduction, reevaluate for a complex injury, and ensure there are no loose bodies or other structures entrapped in the joint and blocking concentric reduction. Uncommonly, typically with a very high-energy injury, the elbow may not be able to be reduced by closed reduction and an open reduction must be performed. After radiographs confirm reduction, an MRI arthrogram can assess for LCL and MCL pathology.

Treatment Options: Following reduction, the majority of simple elbow dislocations may be treated nonoperatively. For simple, stable dislocations, early active mobilization starting 2 days after the injury has been shown to be a safe and effective treatment, with improved functional

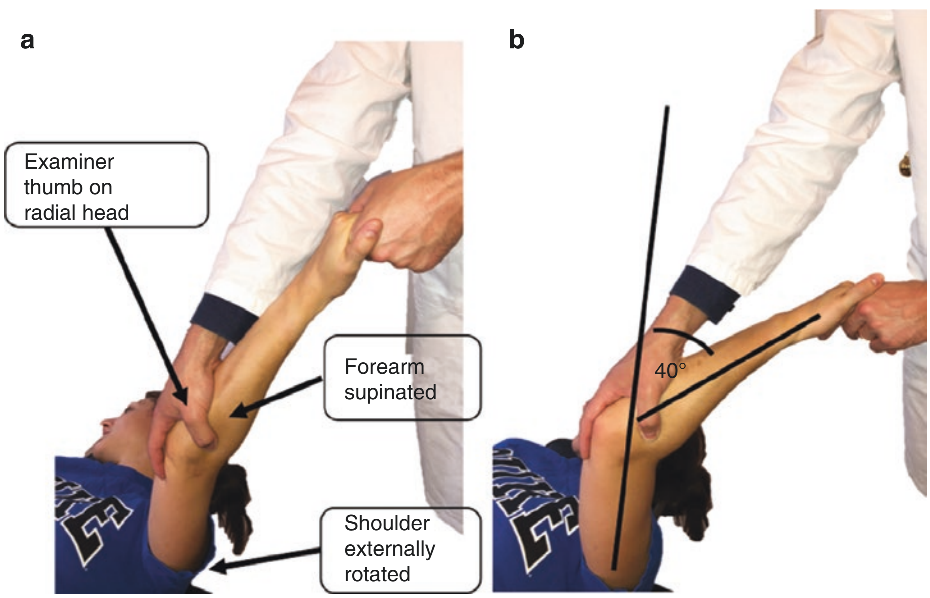

Fig. 25.2 Lateral pivot shift test: The patient is supine on an examination table. (**a**) The elbow is brought overhead and fully extended. The examiner's opposite side hand is brought over the dorsum of the forearm and thumb rests over the radial head. The other hand grasps the patient's hand and supinates the forearm and externally rotates the shoulder. The elbow is brought from full extension to flexion. While the elbow is being ranged, a valgus stress is applied. The test is abnormal if the patient experiences pain and/or apprehension and/or if there is a palpable dislocation and reduction of the radial head. (**b**) Reduction of the radial head is usually felt beyond 40° of flexion

outcomes compared to 3 weeks of immobilization [25]. Surgical repair should be considered if the elbow requires more than 45° of flexion to remain reduced [24]. Initial treatment for isolated MCL injuries is typically 6 weeks of rest and physical therapy. If nonoperative treatment fails, MCL reconstruction, the so-called Tommy John Surgery, is indicated.

Rehabilitation: Following the initial immobilization period, an overhead motion protocol has been developed with excellent results [26]. The rehabilitation protocol consists of ROM at the elbow in an overhead and stable position. The athlete performs the exercise in a supine position, shoulder flexed to 90°, adducted to the side and in neutral rotation; this position minimizes varus force and stress on the LCL complex. The athlete then moves through pronation/supination and flexion/extension as tolerated. This phase continues for 3 weeks and then ROM in the upright position begins for an additional 3 weeks. Finally, 6 weeks after injury, strength and endurance exercises begin as well as resumption of normal activities.

Elbow Instability

- The elbow is the second most commonly dislocated joint.
- There are approximately 287 basketball-related dislocations annually in the United States of America. Global numbers are not known.
- 90% of dislocations occur posteriorly or posterolaterally
- Injury pattern typically follows "the circle of Horii": LCL → anterior capsule → MCL → complete dislocation.
- Surgical repair should be considered if the elbow requires more than 45° of flexion to remain reduced.

25.3.2 Elbow Fractures

General: Fractures about the elbow may involve the distal humerus, radial head, and/or the proximal ulna. Stability of the elbow and the status of the soft tissues are a critical consideration when treating elbow fractures. Standard AP and lateral radiographs should be obtained. A CT scan often is needed to evaluate the complexity of the injury and to evaluate the integrity of the coronoid and the anteromedial facet, an important stabilizer to prevent posteromedial rotatory instability [27].

Initial Assessment and Management: Elbow fractures in the athlete often are the result of a high-energy mechanism with a fall onto an outstretched arm. Initial evaluation should include a thorough exam of the skin and neurovascular structures. Radiographs should be obtained immediately to evaluate the extent of the injury and the presence of an associated dislocation. Fractures of the distal humerus may be difficult to interpret initially. A radiograph with gentle traction may help the treating surgeon to understand the fracture pattern [28]. Fractures of the radial head that are displaced greater than 2 mm often are associated with ligamentous injury and thus the stability of the elbow may be compromised [29]. A radiocapitellar view of the elbow may be obtained to further evaluate the radial head. This is done by positioning the beam 45° cephalad during a lateral radiograph. Fractures of the proximal ulna can involve the olecranon and coronoid process. Both olecranon and coronoid fractures may be associated with concomitant fractures and/or dislocations. As in fractures of the radial head, associated instability must be considered as this guides surgical and postoperative treatments.

Treatment Options: Generally, the treatment of elbow fractures is to both obtain an anatomic reduction of the articular surface to lower the risk of post-traumatic osteoarthritis and also create a stable construct to allow early ROM, to prevent long-term stiffness. A notable exception is a nondisplaced radial head fracture or small displaced radial head fractures with no block to motion. These injuries can be managed in a sling with active mobilization as early as possible [29] and return of function typically 6 weeks from injury [28].

Rehabilitation: Postoperative ROM is determined by the stability of the elbow found intraoperatively. Furthermore, the length of immobilization depends on the severity of the fracture. In general, there is a period of immobilization followed by gentle passive and assisted active ROM. Oftentimes, a hinged elbow brace is worn for added stability during ROM exercises. After this, strengthening exercises can begin.

25.3.3 Elbow Tendon Injuries

25.3.3.1 Biceps Tendon Injury

General: The incidence of distal biceps tendon rupture is 1.2 per 100,000 people in the general population [30]. Ruptures are more common in the dominant extremity and the risk is increased with smoking [30]. The use of anabolic steroids increases the risk of bilateral rupture [31]. Ruptures can be classified as partial or complete and also as acute (less than 4 weeks) or chronic. The mechanism is usually an unexpected, eccentric loading of the biceps, with the elbow flexed at 90°, resulting in the tendon avulsing from the radial tuberosity [32].

Initial Assessment and Management: Athletes will typically describe a feeling of a sudden, painful tearing sensation over the front of the elbow [32]. On exam, there typically will be ecchymoses and swelling in the antecubital fossa. A complete tear of the tendon commonly results in proximal migration of the muscle belly from the antecubital crease. This is accompanied by tenderness in the antecubital fossa and an inability to palpate the tendon in the antecubital fossa, indicating a complete rupture. Weakness will be typically demonstrated in supination and, to a lesser extent, with elbow flexion [32]. Special maneuvers include the “hook test,” which involves the examiner using his or her index finger to hook the lateral side of the distal biceps tendon while the athlete actively supinates the elbow [33]. A “biceps squeeze test” has also been validated. This test involves squeezing the biceps muscle belly and observing for passive supination [34]. Radiographs should be obtained to evaluate for other pathology and are usually normal; however, avulsion injuries of the radial tuberosity can be demonstrated [32]. MRI, especially in the FABS (flexion, abduction, supination) position [35], can help delineate between partial and complete ruptures in the setting of an inconclusive physical exam.

Treatment Options: Nonoperative management consists of immobilization followed by physical therapy. In the athlete, this management is typically reserved for partial ruptures. Nonoperative treatment has an increased risk for activity-related pain and loss of supination strength [36, 37]. For complete ruptures in athletes, anatomic reattachment is indicated in order to allow for return of flexion and supination strength [32].

Rehabilitation: Postoperatively the elbow is immobilized in 90° of flexion and supination for 1 week. Early motion is important to prevent stiffness. After 1 week, the athlete is transitioned to a hinged elbow brace with an extension block which is progressively extended. Strenuous lifting and unrestricted activities are limited for a total of 5 months [32].

25.3.3.2 Triceps Tendon Injury

General: Triceps tendon ruptures are rare and account for only 0.8% of tendon ruptures [38, 39]. The disruption usually occurs as an avulsion from the tendon insertion and less commonly an intramuscular tear occurs [39]. The loss of extension strength from a triceps tendon injury can be devastating to the basketball player [37].

Initial Assessment and Management: History usually involves an elbow extension activity with a sudden, eccentric triceps contraction, such as a fall on an outstretched hand [39]. The provider should inquire about steroid use or metabolic disorders as these can weaken tendons [40]. Acute injuries present with swelling, ecchymosis, and tenderness over the olecranon. There will be weakness in elbow extension on exam. Interestingly, complete tears may have preservation of elbow extension due to an intact lateral tendon expansion [37]. Diagnosis on exam can be difficult given the degree of swelling that often is associated with acute injury [39]. Radiographs should be obtained to evaluate for bony avulsion or associated injuries, and, as described in distal biceps tendon injuries, MRI can aid in determining partial versus complete ruptures.

Treatment Options: Nonoperative treatment can be considered in tears involving less than

50% of the tendon although biomechanical studies have shown a 40% loss of strength with only 2 cm of gapping of the tendon [41]. Therefore, in the athlete, repair of partial and complete tears is indicated in order to regain the strength needed to participate at pre-injury levels [37, 39]. Primary repair should be performed within 3 weeks of injury as after 3 weeks, reconstruction of the tendon will be likely needed [39]. Following repair or reconstruction, 4/5–5/5 strength can be expected as can recovery of 99% of endurance compared to the uninjured arm [39].

Rehabilitation: Nonoperative treatment typically includes immobilizing the elbow in 30° of extension for 4 weeks, followed by ROM exercises for another 4 weeks. Finally, at 8 weeks after the injury, strengthening exercises can commence. This course is not commonly chosen in elite basketball players [37]. Surgical treatment is more commonly performed for full-thickness tears. Following repair, the elbow is immobilized in 30° of flexion for 2 weeks, then ROM exercises are started. Return to sport is permitted after 4–6 months following surgical treatment [37].

Elbow Tendon Injuries

- Biceps tendon ruptures are more common in the dominant extremity.
- Anabolic steroids increase the risk of bilateral distal biceps tendon ruptures.
- A hook test and biceps squeeze test can be diagnostic clues to complete biceps tendon rupture.
- Triceps tendon ruptures are rare and account for only 0.8% of tendon ruptures.

25.3.4 Lateral and Medial Epicondylitis

General: Lateral and medial epicondylitis result from overuse activity, particularly repetitive wrist extension and flexion, respectively [42]. Obesity and tobacco use have been implicated as risk factors as well [42]. The extensor carpi radialis brevis (ECRB) tendon is the most commonly affected tendon in lateral epicondylitis, but the extensor digitorum communis (EDC) may also be involved [43, 44]. In medial epicondylitis, the flexor-pronator origin is involved [44]. Interestingly, the pathology is the result of microtrauma and degeneration rather than inflammation [44] as the name implies.

Initial Assessment and Management: The diagnosis of lateral and medial epicondylitis is primarily made clinically. Athletes will commonly complain of an achy or burning sensation over the lateral or medial aspect of their elbow. The pain is made worse with activities that involve resisted wrist extension (lateral epicondylitis) or flexion (medial epicondylitis), and grip weakness is a common complaint [42]. The elbow commonly appears normal, but there will be tenderness along the lateral or medial epicondyle. In lateral epicondylitis, the pain often is reproduced with resisted long finger and wrist extension. Further imaging is often not required, but if the diagnosis is in question, plain radiographs may be obtained, and they are generally normal. Classically, ultrasound will show hypoechoic swelling of the tendon origin [45] and MRI will demonstrate an intratendinous signal [46].

Treatment Options: Ninety percent of athletes will have resolution of their symptoms following nonoperative management [42] although there is no established appropriate treatment protocol [47]. Activity modification, physical therapy, and using forearm support bands (the tennis elbow strap) are the first lines of treatment [37]. Therapy should involve eccentric exercises and stretching. Avoidance of lifting activities with the palm down (e.g., reverse curls) is paramount. Other modalities include deep massage with or without the use of ultrasound [37]. The use of a corticosteroid injection is controversial, and there is no evidence that shows improved outcomes when compared to less invasive methods. Interestingly, a randomized controlled trial comparing injections with physical therapy showed a 69% success rate with injection and 91% with therapy [48]. After failed nonoperative treatment, surgery may be considered. Surgery involves excision of the affected portion of the tendon. Interestingly, when surgery was compared to a sham procedure, both provided relief of symptoms and surgery showed no additional benefit [49].

Rehabilitation: Following surgery, a wrist splint is worn for 2 weeks and physical therapy starts 4 weeks after surgery. Return to weight lifting or sports is allowed 3 months after surgery [37].

Lateral and Medial Epicondylitis

- Overuse injuries that commonly involve the ECRB and flexor mass.
- 90% of athletes will have resolution of their symptoms following nonoperative management.
- The use of a corticosteroid injection is controversial, and there is no evidence that shows improved outcomes.

25.3.5 Olecranon Bursitis (Non-Infectious and Infectious)

General: Bursae (L. "sac") are fluid-filled sacs that allow smooth gliding of musculoskeletal structures over one another during motion. The olecranon bursa is a superficial bursa. It forms between the ages of 7 and 10 years and protects the posterior elbow. Olecranon bursitis is an abnormal increase in the volume of fluid. If this fluid becomes infected, it is referred to as infectious olecranon bursitis [50]. The incidence of olecranon bursitis is low and is estimated between 0.01% and 0.1% of hospital admissions [10]. However, it is reportedly common among basketball players, although the incidence is unknown. The etiology is most commonly from repetitive trauma or repetitive pressure to the posterior elbow, but it can present from a single fall onto the elbow [37, 50].

Initial Assessment and Management: History of recent falls onto the elbow or repetitive pressure over the elbow should be elucidated. The athlete will often complain of fullness over the back of his or her elbow. On physical exam, the fullness can be observed and palpated [37]. It is important to rule out an infectious joint by checking for pain with small-arc elbow ROM including pain with pronation and supination. In olecranon bursitis, pain is localized over the olecranon and ROM of the elbow is preserved. Distinguishing between olecranon bursitis and infectious olecranon bursitis can be difficult (Fig. 25.3). Both can present with erythema over the posterior elbow. However, systemic signs of infection can be helpful in diagnosing infectious olecranon bursitis. The gold standard for diagnosing infectious olecranon bursitis is a positive culture [10]. Radiographs should be obtained to rule out a fracture, especially with a history of trauma. Transillumination or ultrasound can be helpful in more chronic cases to identify loculations [10].

Treatment Options: Olecranon bursitis is an inflammatory process and should be treated as such. Avoiding inciting activities (such as resting elbow on a table or armrest), taking anti-inflammatory medications, and compression are the mainstay treatments. Aspiration can be performed to decompress the bursa. In patients with very thin skin, it may be helpful to approach the bursa from proximally to create a longer skin bridge and avoid chronic drainage. A study found that inserting a 16-gauge angiocatheter with a surrounding dressing for 3 days resulted in fewer recurrences when compared to a single

Fig. 25.3 Septic olecranon bursitis: 45-year-old female with chronic olecranon bursitis with 2 weeks of worsening posterior elbow pain and staphylococcus aureus positive cultures from aspiration

aspiration [51]. If nonoperative modalities fail, excision of the bursa is the surgical treatment of choice.

Rehabilitation: The athlete should be informed that resolution of olecranon bursitis can take up to 3 months, and compliance with compression and anti-inflammatory medications is mandatory. Following surgical excision, a splint is worn for 2 weeks followed by a compressive wrap. Return to basketball is typically allowed 6 weeks after surgery [37].

Olecranon Bursitis

- Commonly seen in basketball players although the incidence is low, estimated between 0.01 and 0.1% in the general population.
- Distinguishing between olecranon bursitis and infectious olecranon bursitis can be difficult, and labs, vital signs, and an aspiration can aid in differentiating between the two.

25.3.6 Neuropathies at the Elbow

General: Compressive neuropathies about the elbow may be the cause of pain and weakness in the basketball player [52]. The nerves that may be affected in neuropathies at the elbow include the ulnar, median, and radial nerves.

Initial Assessment and Management: Athletes with compressive neuropathy about the elbow will present with vague pain around their elbow, paresthesia, and weakness depending on the nerve involved and the location of compression. Electrophysiologic testing can be used to help confirm the diagnosis and determine the extent of nerve damage. MRI may be used to assess the soft tissue anatomy surrounding the nerve in question.

The ulnar nerve pierces the intermuscular septum when the nerve travels from the anterior to the posterior compartment at the mid-arm. In about 70% of individuals, the nerve travels through the arcade of Struthers at the intermuscular septum, where compression can occur [52]. The nerve then descends through the cubital tunnel, deep to the Osborne ligament, and then enters the forearm between the two heads of the FCU muscle. Compression of the ulnar nerve at the elbow results in paresthesia of the ring and small fingers. Often the symptoms are provoked with prolonged elbow flexion, such as talking on a cell phone or while curled up during sleep [52]. Chronic compression may result in atrophy of the intrinsic muscles of the hand. A positive Tinel sign at the cubital tunnel and/or prolonged elbow flexion may help confirm the diagnosis. Furthermore, the ulnar nerve may subluxate or dislocate over the medial epicondyle, which may cause a friction injury and predispose to ulnar neuropathy [53].

The median nerve travels in the antecubital fossa, medial to the brachial artery. Prior to reaching the antecubital fossa, it passes under the ligament of Struthers, which is a band of connective tissue attached to a supracondylar process and the distal humerus, found in 1% of the population. Distal to the antecubital fossa, it goes deep to the bicipital aponeuroses and then passes between the two heads of the pronator teres. Athletes typically present with pain in the proximal, anterior forearm [37]. Paresthesia in the median nerve distribution can be noted. Median neuropathy results in weak pronation, weak flexion, and thenar atrophy [52].

The radial nerve enters the radial tunnel at the radiocapitellar joint. Then, the posterior interosseous nerve (PIN) branches off and enters the supinator muscle and dives under the arcade of Frohse [52]. Compression of the radial nerve can be divided into radial tunnel syndrome and PIN syndrome. Radial tunnel syndrome results in lateral elbow pain that can be mistaken for lateral epicondylitis. In radial tunnel syndrome, there is no associated motor weakness. In contrast, PIN syndrome is a motor neuropathy that results in muscle weakness [52].

Treatment Options: For compressive neuropathies, 3–6 months of nonoperative treatment should be pursued. This may consist of activity modification, anti-inflammatory medications, splinting, and/or injections [37]. If nonoperative treatment fails or motor symptoms arise, surgical decompression is indicated.

Rehabilitation: Following surgical decompression mobilization should begin within 1 week to avoid elbow stiffness.

25.4 Conclusion

An understanding of the complex elbow anatomy is necessary to properly diagnose and treat basketball-related elbow injuries. Proper diagnosis begins with a thorough history and physical exam and is aided by further studies as needed. Treatment ranges from activity modification and physical therapy to complex fracture and instability procedures. The goals of treatment are to have full and painless range of motion that allows for return to play.

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