Elbow Bursitis and Tendonitis

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Elbow Anatomy and Pathoanatomy

A hinge joint comprised of the humerus, ulna and radius. The most proximal extent of the ulna ends as the bony olecranon process. Superficial to the olecranon is the olecranon bursa, a fluid-filled sac, which reduces friction between soft tissue layers. Surrounding the bursa are the tendons of several muscle groups attaching near the joint. The lateral aspect of the joint includes the extensors (i.e. ECRB), while the medial aspect contains the flexors (i.e. FCR). The anatomy of the elbow joint allows for flexion/extension as well as slight rotation. Osseous stability is conferred via the medial and lateral ligamentous complexes. The medial complex, orulnar collateral ligament (UCL), provides valgus stability. The UCL is composed of anterior, posterior, and transverse bands, with the anterior band providing the greatest stability. The lateral (radial) collateral ligament complex provides varus and rotational stability. The annular ligament encompasses the radial head and, along with the radial collateral,assistswith varus stability.

Overuse, poor conditioning, or direct trauma to the elbow joint can lead to bursitis, inflammation and damaged tissue. This damage can cause microtearing of the muscles at their origins and can lead to a pathologic healing response termed angiofibroblastic tendinosis.

Epicondylitis

Aprocess of tendon degeneration and incomplete repair (not a true inflammation). Lateral epicondylitis (called tennis elbow) involves the extensor tendon origin and medial epicondylitis (golfer's elbow) involves the common flexor origin. It is common in tennis players and males are more frequently affected than women. Lateral epicondylitis occurs more frequently than medial epicondylitis with a ratio of between 4:1 to 7:1.

Olecranon Bursitis

Can result from trauma or repetitive activity(i.e.resting the elbow on a hard surface). Accounts for 0.01-0.1% of hospital admissions. Common in males aged 30 to 60.

Triceps Tendinitis

Occurs almost exclusively in men, usually in the 4^{th} decade of life, and especially in individuals who are subjected to repetitive extension activities (i.e.throwing athletes).

Clinical History

Medial and Lateral Epicondylitis

Although there may be a precipitating injury, more commonly, the pain is gradual in onset. Patients report weakness in grip strength and difficulty with carrying objects. Athletes, musicians, and carpenters are at particular risk. Complaints include: tenderness over the forearm flexors/extensors, painful/limited ROM at the wrist and elbow, decreased grip strength, and swelling.Pain can be exacerbated during throwing and other sporting activity

Olecranon Bursitis

Most commonly due to post-traumatic injury (direct fall on the elbow) but can also develop insidiously. Occurs in association with gout (precipitation of crystals within the bursa) and rheumatoid arthritis.

Triceps Tendinitis

Occurs from overload of the triceps insertion as a result of forceful activity required throughout the acceleration phase to the release phase of arm extension.

Differential Diagnosis

Lateral Epicondylitis

Radial tunnel and posterior interosseous nerve (PIN)syndrome- pain with resisted supination or with resisted long-finger extension; Osteochondritis dissecans of the capitellum; radiocapitellar arthrosis; cervical radiculopathy

Medial Epicondylitis

Ulnar neuropathy- Positive Tinel's sign (valgus stress on elbow producesparasethesias along ring and small fingers), elbow flexion test - maximum elbow flexion, forearm in pronation, wrist in extension; ulnar collateral ligament attenuation with instability-evaluate with passive valgus stress of elbow between 20° and 90° (milking maneuver)
Triceps Tendinitis
Posterior impingement-pain with isometric active extension short of full extension; Olecranon bursitis - direct tenderness over bursa

Physical Exam

Lateral Epicondylitis
Always examinecervical spine, followed by the full extremity. Tenderness to palpation at or just distal to lateral epicondyle, over extensor origin. Pain elicited by resisted wrist extension with the elbow in full extension and forearm in pronation or by maximal wrist extension. Compare grip strength with contralateral side. Studies indicate grip strength to be 50% of healthy arm during extension.
Medial Epicondylitis
Pain localized to the medial epicondyle or over flexor-pronator mass. Pain during resisted pronation and resisted wrist flexion are good indicators, with the former being more sensitive.
Olecranon Bursitis
Swelling andtenderness to palpation over olecranon. Palpation may reveal painless or painful erythematous swelling. Associated cellulitis may be present. Chronic bursitis can present with multiple small fluid-filled lumps. Infectious cases will manifest with pain, warmth and erythema. 50% of individuals present with fever. Erythema manifests in 63-100% of infected bursitis and in 25% of patients with non-septic bursitis.
Triceps Tendinitis
Posterior elbow discomfort at triceps insertion. May exhibit direct and/or indirect tenderness. Pain is exacerbated during forced elbow extension.

Imaging

Lateral Epicondylitis
XR: May show calcifications in soft tissues surrounding lateral epicondyle.
MRI:Tendon degeneration and tear in ECRB; T1- and T2-weighted images demonstrate increased signal around the lateral epicondyle. May also reveal edema and thickening of the extensor origin.
Medial Epicondylitis
XR: May show calcifications around medial epicondyle; not generally utilized.
MRI: Increased signal on T1- and T2-weighted images, consistent with thickening of common flexor tendon origin. Some patients may have thinning of common flexor tendon origin with intense fluid signals in T2-weighted images.
Olecranon Bursitis
XR: Not usually indicated unless secondary to trauma, in which case, rule out olecranon fracture.
MRI: Look for abscesses or osteomyelitis
Triceps Tendinitis
XR: Look for a triceps/olecranon traction spur or loose bodies.
MRI: Rarely indicated, but may reveal inflammatory changes

Prevention

Adequate training on technique and proper equipment selection, rest from overexertion.

Non-Operative Management

Lateral Epicondylitis
Active rest, NSAIDS, Counterforce bracing (reduces load at lateral epicondyle), Cortisone injection, Platelet-rich Plasma (cytokines, such as VEGF/PDGF, may aid in tendon healing), Patient education (ensure proper techniques during athletic activity), Physical therapy: stretching, strength conditioning, deep friction massage, electrical stimulation, ultrasound, and iontophoresis.

Medial Epicondylitis

Initially: Cessation of offending activity, NSAIDs, Counterforce brace (if compressive neuropathies absent), Cortisone injection, iontophoresis, and electrical stimulation. Once pain improves, follow up with: Physical Therapy for range of motion and strength conditioning. May return to activity when symptom-free range of motion is achieved

Olecranon Bursitis

Acute aseptic bursitis resolves without medical treatment. In patients with pain and swelling, employ rest, ice, NSAIDS, analgesics, compression wrap for swelling and effusion. Aspiration of bursa and cortisone injection can afford relief, but rate of recurrence is high. In infected cases, appropriate antibiotic therapy, such as penicillinase-resistant penicillin is indicated. Some mayaspirate fluid using 18- or 20- gauge needle. If so, send for fluid analysis (cell count, Gram stain, culture and sensitivity, crystals).

Triceps Tendinitis

Rest from repetitive forceful elbow extension, NSAIDS, splint in 45° elbow flexion. Cortisone injection into tendon insertion is contraindicated. Physical therapy, including ultrasound may provide temporary relief. Conservative therapy has higher success rate in absence of olecranon traction spur.

Operative Indications

Patients who are recalcitrant to conservative treatment. For epicondylitis, recommendations are to continue a conservative course for a minimum of 6 months. Young, athletic individuals or those individuals whose occupations require repetitive activities, may elect a more aggressive approach.

Contraindications: Acute infection, Non-compliant individuals, Limited ROM.

Surgical Technique

Lateral Epicondylitis -Arthroscopic

Preop Area

Take a history and repeat physical exam in pre-op. Be aware of anesthesia plan, antibiotics. Obtain consent and mark operative site.

Positioning

Lateral or Prone, affected extremity on bolster with tourniquet

Procedure

After introducing normal saline into the elbow joint via soft spot lateral portal, a proximal anteromedial portal is created to inspect the joint. The lateral capsule is evaluated for capsular tears, synovial thickening, extension of the annular ligament, or radiocapitellar chondromalacia.

ECRB Resection

A proximal anterolateral portal is created and a shaver is introduced to resect part of the lateral capsule to reveal the common extensor tendon. The ECRB tendon lies between the common extensor tendon and the lateral capsule. Using either a shaver or monopolar radiofrequency device, ablate the tendinosis tissue with complete resection of the ECRB origin at the lateral humerus.

Final Steps

The joint is thoroughly irrigated and the portal sites are routinely closed. A soft dressing is applied.

Lateral Epicondylitis (Open)

Positioning

Supine, affected extremity on attached arm board with tourniquet placed around arm.

Procedure

A 4-cm curvilinear incision is made anteromedial to the lateral epicondyle. Subcutaneous tissues are separated until the deep fascia of the extensor tendons is exposed. The interval between ECRL and EDC is identified and split superficially to a depth of 2 to 3 mm. The ECRL is separated from underlying ECRB using scalpel dissection and retracted anteriorly. Pathologic tissue, of a dull, gray appearance, is excised. Vascular healing is promoted by drilling the lateral epicondyle using a 0.062 Kirschner wire or roughening with a rongeur. The ECRB tendon is

reattached thru a bone tunnel (create with a drill bit). The ECRL and EDC aponeurosis are reapproximated using running no. 1 absorbable suture.

Final Steps
Subcutaneous tissues and skin are routinely closed. A posterior splint is applied with the elbow in 90^{o} of flexion.

Medial Epicondylitis (Open)
Positioning and Prep
Same as lateral
Procedure
A curvilinear incision is made starting 2 cm proximal and extending 3-4 cm distal to the medial epicondyle. The incision should follow the epicondylar groove (posterior to the epicondyle)in order to avoid iatrogenic injury to the medial antebrachial cutaneous nerve and allow access to ulnar nerve. Dissect to reveal flexor carpi ulnaris and then proceed anterolaterally to expose common flexor origin. A longitudinal incision is made in the common flexor origin starting at the medial epicondyle and extending distally 4 cm. The incision is situated between the pronator teres and FCR. In an elliptical fashion, any dull, gray abnormal tissue is identified and excised. Using a 0.062 K-wire, multiple holes are drilled into the cortical bone distal to the medial epicondyle to stimulate healing. The elliptical tendon defect is closed with no. 1 absorbable suture, followed by subcutaneous closure.
Final Steps
Skin is closed with a running subcutaneous stitch with 3-0 absorbable suture. A posterior splint is applied with the elbow in 90^{o} of flexion.

Olecranon Bursitis (Arthroscopic)
Indicated only if NO olecranon spur, otherwise open treatment is recommended.
Positioning
Lateral or semilateral with beanbag, allow arm to rest across chest for posterior exposure. Tourniquet
Procedure
Dual portals are utilized to fully visualize bursa, which is completely excised.Care is taken with the instruments in the medial aspect of the bursa as the ulnar nerve courses medial to bursal extension.
Final Steps
Following excision, portal sites are left open and compression dressing is applied.

Olecranon Bursitis (Open)
Indicated when spur is to be removed or if bursa access is limited.
Positioning
Lateral or semilateral with beanbag or bump underneath trunk, allowing arm to rest across chest for posterior exposure to elbow. Tourniquet.
Procedure
Longitudinal incision medial to midline is utilized. Bursal tissue is completely excised. Subcutaneous dissection is limited around bursa to avoid possible disruption of blood supply of skin.
Final Steps
Incision routinely closed, elbow immobilized at 45 degrees of flexion in splint with compressive dressing.

Triceps Tendonitis
Positioning
Prone, affected extremity on attached arm board with tourniquet.
Procedure
After routine prep and draping, 4-5 cm longitudinal incision is made approximately 1.5 cm lateral to the olecranon, starting 2 cm distal to the tip and extending 2-3 cm proximally. Subcutaneous dissection may reveal olecranon bursitis, which is excised. Extensor mechanism is then exposed and the mid-axis of the olecranon is identified. Exposure of subperiosteal triceps spur is gained via a longitudinal incision over midpoint of olecranon spur. Using a No. 64 beaver blade, the exposure is extended medially and laterally. After adequate exposure of the spur, the triceps insertion onto the remaining spur is dissected off the spur and the olecranon. After complete spur

exposure, a rongeur is utilized to remove the spur and a portion of the posterior olecranon tip. May use 1 or 2 corkscrew suture anchors, placed symmetrically in the defect and a locking suture is placed through the triceps, passing the suture back through to the defect site. The knot is tied off at the tendon-bone interface to minimize prominence. An epitendinous triceps repair is then carried out via a buried, running 4-0 Mersilene suture to cover the prior knots and complete the repair.

Final Steps

Wound is thoroughly irrigated and subcutaneous closure is carried out. A splint with the elbow at 45°flexion is applied.

Postoperative Rehab and Expectations

Lateral Epicondylitis

Patients remain in splint for 1 week to allow wound healing. Afterwards, patients are encouraged to rehab by working on PROM and AROMat the elbow and wrist, stretching and strengthening as tolerated.Typically, return to light activities is permitted after 2 weeks and to sports after 6 weeks.

Medial Epicondylitis

Posterior splint is removed 1 week post-surgery, at which point physical therapy for range of motion of elbow and wrist are started. Strength conditioning is started 4 to 6 weeks post-surgery with a counterforce brace worn for therapy and activities of daily living. Patient is cleared without restrictions at 4 to 5 months post-op.

Olecranon Bursitis

Compressive dressing and splint are utilized for 1-2 weeks. Routine activity resumed afterwards.

Triceps Tendinitis

Splint/cast is utilized for 3 weeks, followed by 3 weeks of passive range of motion rehab. Active range of motion therapy is started 6 weeks post-op and continued with strengthening at 3 months. Full recovery is typically achieved by 6 months.

Most important: Explain to the patient that the rehabilitation process is long and difficult. Stress the importance of compliance with restrictions to achieve successful results.

Further Reading

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