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Elbow Injuries in Sports

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Outline

- o This chapter aims to identify common acute and overuse injuries of the elbow, and then discuss the application and principles of systematic assessment of musculoskeletal injuries of the elbow.
- o The chapter will further detail acute management strategies of common elbow injuries and principles of rehabilitation through to return to sport

Open vs closed chain

- An “**open kinetic chain**” exists when the foot or hand is *not* in contact with the ground or supporting surface.
- In a “**closed kinetic chain**”, the foot or hand is weight-bearing and is therefore in contact with the ground or supporting surface

Common elbow injuries/conditions

- o To fully appreciate the scope of injuries and pathologies common to the elbow joint, one needs to consider how the elbow functions in relation to upper limb kinematics

Principles of assessment

- o Assessment relies on a good applied knowledge of anatomy; a systematic and applied approach to the assessment process.
- o It is important, when assessing a client, to understand the functionality of the joint so that comparisons of dysfunction can be made

Table 18.1 Examples of acute and overuse injuries

Acute elbow injuries

Muscle lesions

Tendon ruptures

Acute rupture of the medial collateral ligament

“ pulled elbow”

Fractures/ dislocations:

- Posterior dislocation
- Supracondylar fractures
- Radial head fractures
- Olecranon fracture
- Fracture of the radius and ulna
- Stress fracture

Overuse injuries to elbow and forearm

Tennis elbow/lateral epicondylitis/extensor tendinopathy

Entrapment of the posterior interosseous nerve (PIN)/radial tunnel syndrome

Olecranon bursitis

Radio-humeral bursitis

Osteochondritis dissecans of the capitulum

Panner's disease

Golfers elbow/medial epicondylitis/flexor/pronator tendinopathy

Medial collateral ligament sprain

Ulnar nerve compression

Muscle lesions (acute or overuse)

Osteoarthritis (OA)

Key principles of subjective history taking

- o The key aspects of assessing an elbow are: “**active listening**”, ensuring we take a logical subjective history of the onset of the problem and to guide the history taking but to avoid interrupting the client’s flow of information
- o What brings you to see me today?
- o What do you think I can do to help you?
- o When did it happen?
- o “fall on an outstretched hand”, commonly abbreviated to FOOSH

- Reflective practice approach:

- The goal of reflective practice is to help practitioners to continually improve their practice by identifying what they do well and what areas need improvement (Cross 2004; Hilliard 2006).

- Informed consent

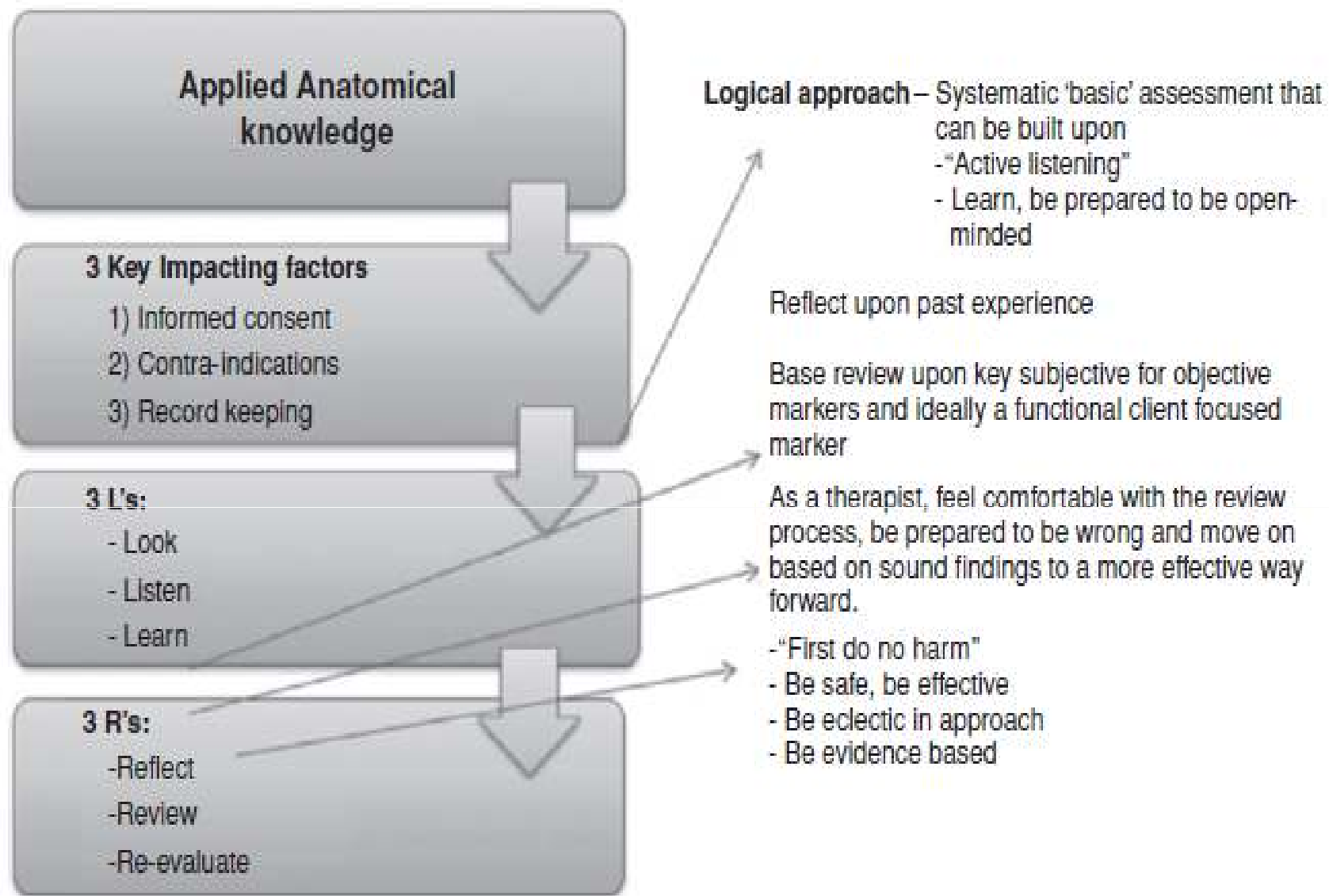
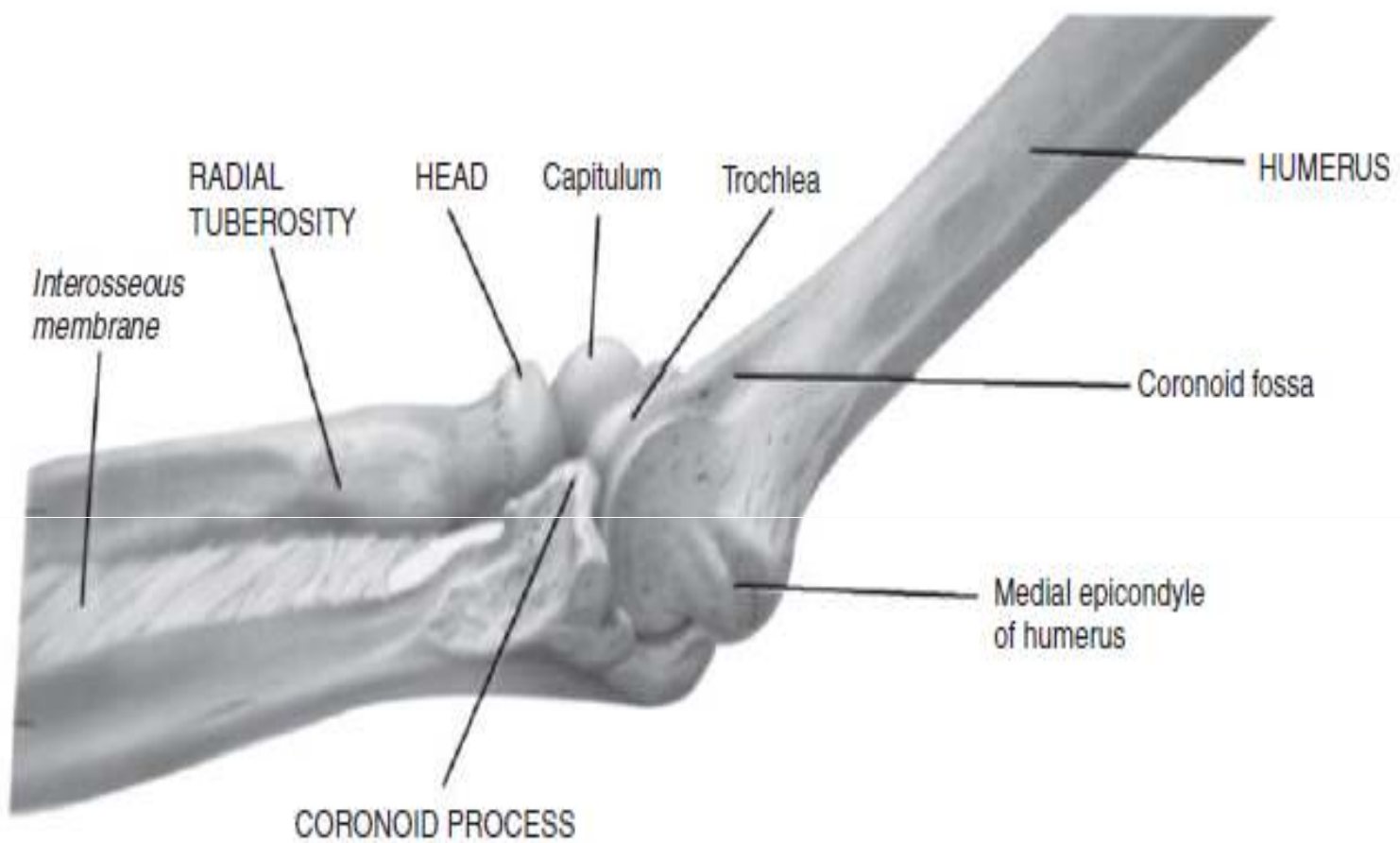


Figure 18.1 Clinical problem solving: systematic, applied reasoning model.

- Assessment is a dynamic process and it is important that we do not jump to hasty conclusions without:
 - First Gathering Sufficient Evidence
 - Reviewing it, in the light of previous Experience
 - Pattern Recognition
 - Clarifying with the client any areas of Confusion
- It is absolutely essential to have a good knowledge of applied anatomy of the joint and supporting soft tissues as well as a working knowledge of “referred pain”



(a) Medial view in relation to humerus



Figure 18.3 Bony landmarks – frontal view. A = Trochlea; B = Capitulum; C = Medial epicondyle; D = lateral supracondylar ridge; E = Radial head; F = Radial neck G = coronoid process. Harris, P.F., Ranson, C. (2008)



Figure 18.4 Bony landmarks – posterior view. A = Subcutaneous surface of olecranon; B = Lateral epicondyle of humerus; C = Medial epicondyle; D = Site of triceps tendon attachment; E = Olecranon fossa. Harris,

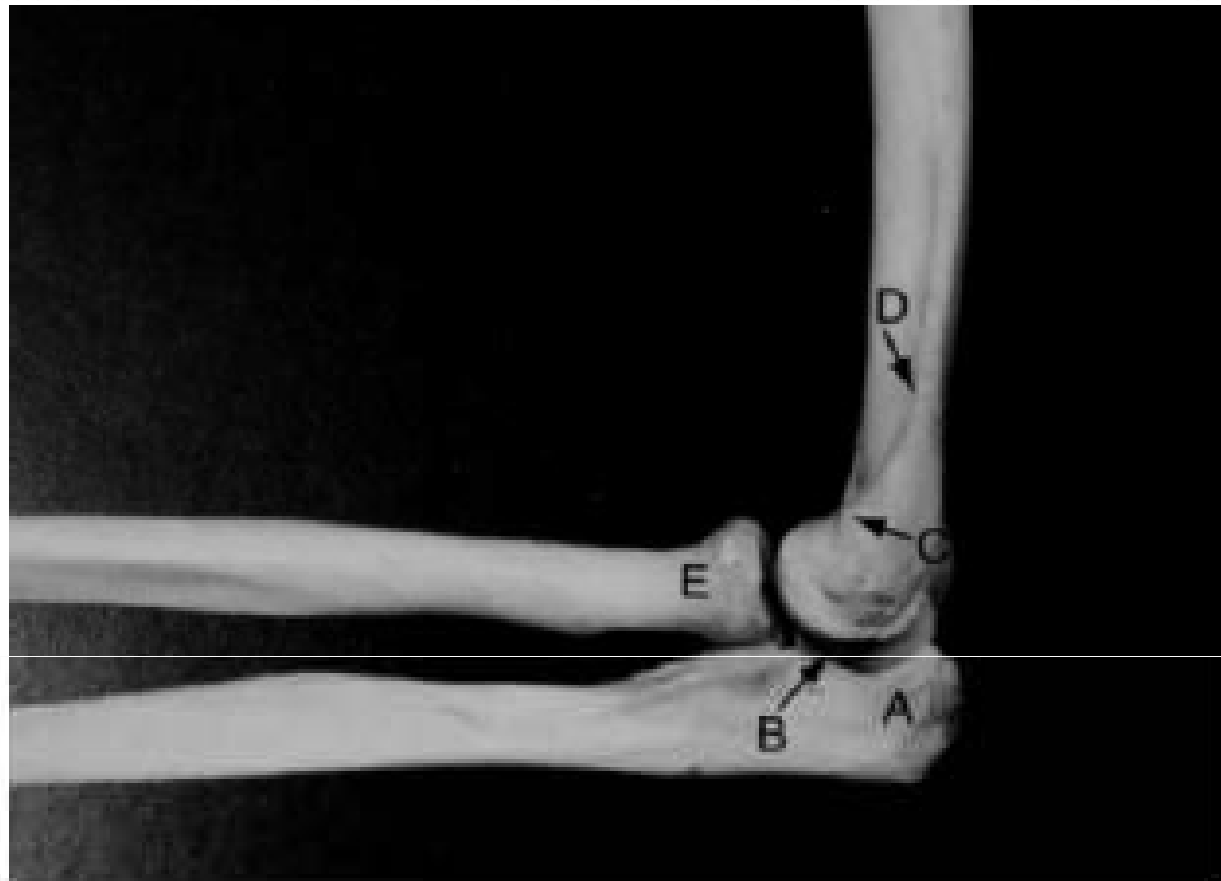


Figure 18.5 Bony landmarks – lateral view. A = Olecranon; B = Trochlea notch; C = Lateral epicondyle; D = Lateral Supracondylar ridge; E = Radial neck.

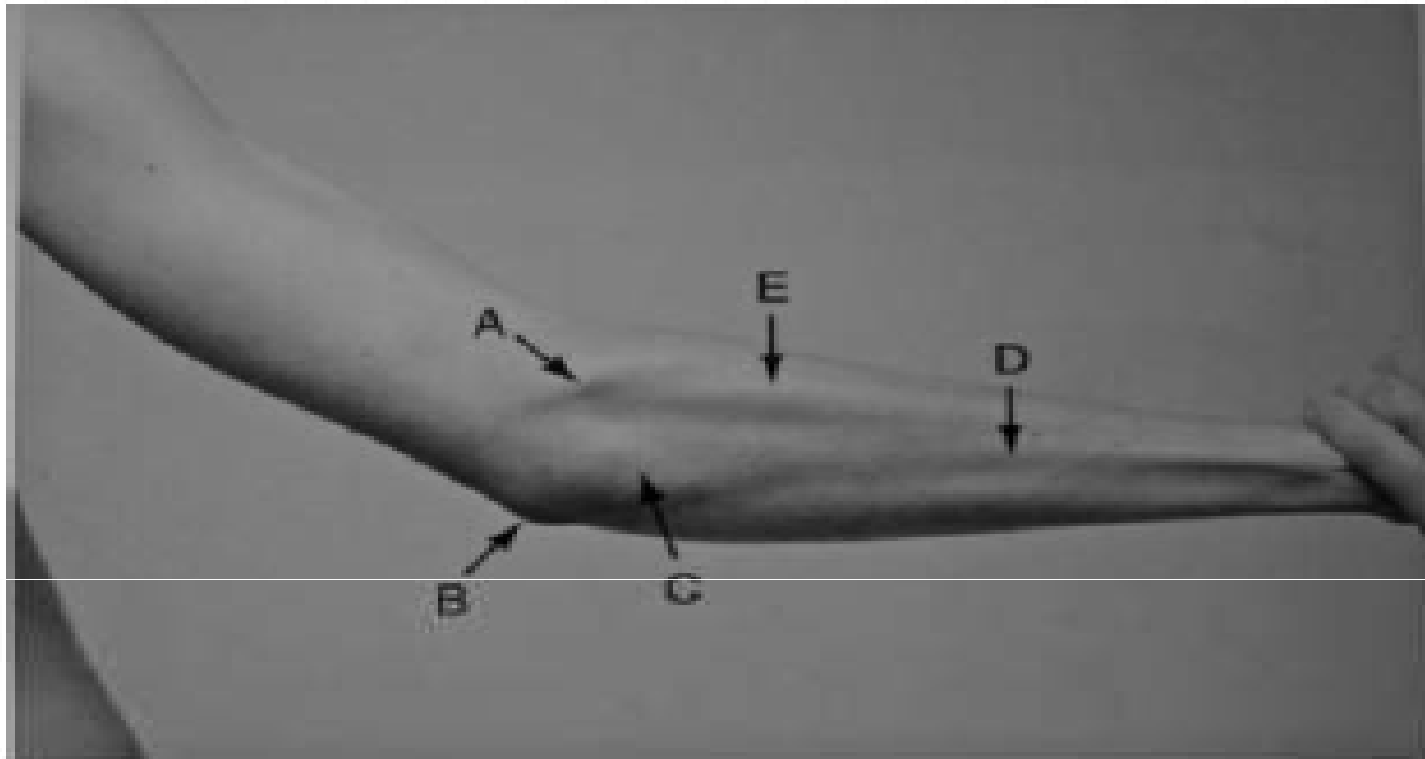


Figure 18.7 Anatomical landmarks – posterior view.
A = Lateral epicondyle with common extensor tendon;
B = medial epicondyle; C = Subcutaneous surface of olecranon; D = posterior subcutaneous border of Ulna;
E = Extensor Carpi Ulnaris.

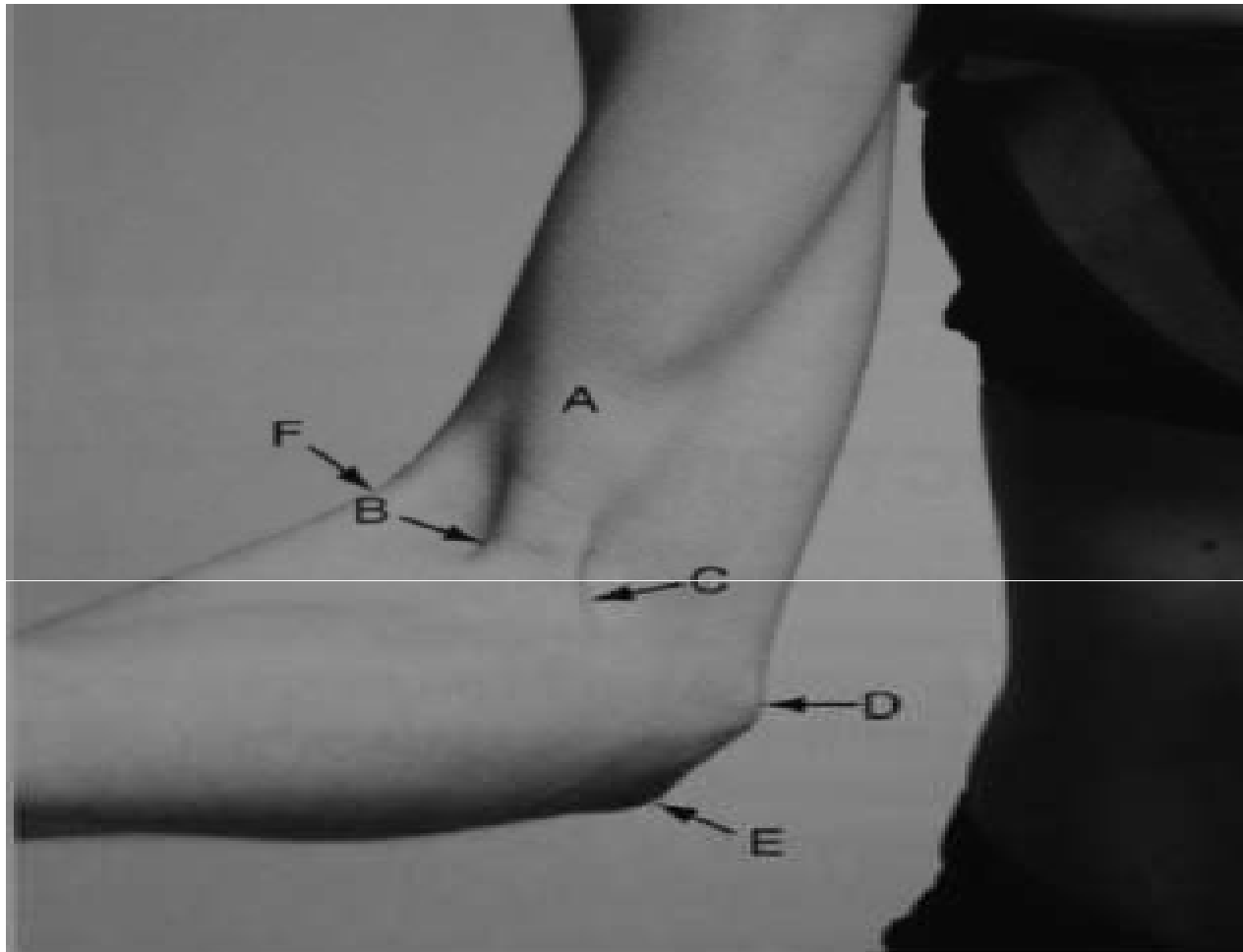


Figure 18.6 Anatomical landmarks – anterior view.
A = Biceps brachii; B = Biceps tendon; C = biceps aponeurosis (passing medially over common flexor tendon); D = Medial epicondyle; E = Olecranon tip; F = Brachioradialis.

Key principles of objective Examination

- **Observation**
- **Inspection:** *bony deformity, colour changes, muscle wasting or swelling.*
- **Palpation for:** *heat, swelling and synovial thickening*
- **Examination by application of selective tension**

Table 18.2 Applying selective tension

Active	Passive	Resisted
<p>Active movements assess the range of movement, the pain experienced by the client, strength in the client's muscle groups and it shows the willingness of the client to move and quality of that movement. The elbow is not an "emotional" joint, i.e. the reported signs and symptoms are normally specific and can be localised easily by the client. Unlike the cervical spine or shoulder that may have a more complex subjective history. Normal active movement of the elbow joint is:</p> <ul style="list-style-type: none">• elbow flexion: 0–150 degrees• elbow extension: 0–10 degrees of hyperextension	<p>Passive movements test the inert structures, e.g. joint capsules and ligaments. Passive movements test pain, range and "end-feel". There are three normal "end-feels" to passive movement testing:</p> <ul style="list-style-type: none">• hard (bone to bone as in end of range elbow extension)• soft (approximation of soft tissue as in end of range elbow flexion)• elastic (it is the "elastic" resistance felt at end of range as in full elevation of the shoulder)	<p>Resisted movement tests are used in order to test the contractile structures e.g. muscle, tendon. This is the minimum that would be appropriate depending on the experience and the clinical reasoning of the clinician.</p>

(Loudon 2008)

The possible responses to resisted muscle testing are:

Normal response strong and painfree

Contractile lesion strong and painful

Neurological weakness weak but painfree

Partial rupture (or suspected more serious pathology, e.g. fracture or tumour) weak and painful

Claudication/provocation of an overuseinjury painful on repetition

Psychological component/serious pathology "juddering"/exaggerated response

Table 18.3 Society of Orthopaedic Medicine's suggested order of selective tension tests for the elbow

Passive	Resisted
Elbow flexion (normally a "soft" end-feel)	Elbow flexion
Elbow extension (normally a "hard" end-feel)	Elbow extension
Pronation of the superior radioulnar joint (normally an "elastic" end-feel)	Pronation
Supination of the superior radioulnar joint (normally an "elastic" end-feel)	Supination

o To be continued....

Elbow and radioulnar joints

- o Provocative tests for epicondylitis*
- o These are:*
 - o Resisted wrist extension for tennis elbow*
 - o Resisted wrist flexion for golfers elbow*

Acute elbow injuries

- *Muscle lesions*

- *Tendon ruptures:*

- Acute avulsions of triceps or biceps are rare.
- Triceps tends to be affected more commonly with excessive deceleration force as in a fall.
- Biceps tendon is more associated with weight lifting activities.
- Acute ruptures of either require surgical repair

o Pulled elbow

o Fractures/dislocations

- o* It is essential that fractures of the elbow region are diagnosed early and managed appropriately as the complication rate is higher.
- o* Unstable/displaced fractures should be promptly referred for surgical Orthopaedic intervention.
- o* However, when the articular or cortical surface has less than 2mm of vertical or horizontal displacement, the fracture may be regarded as stable and as such treated conservatively

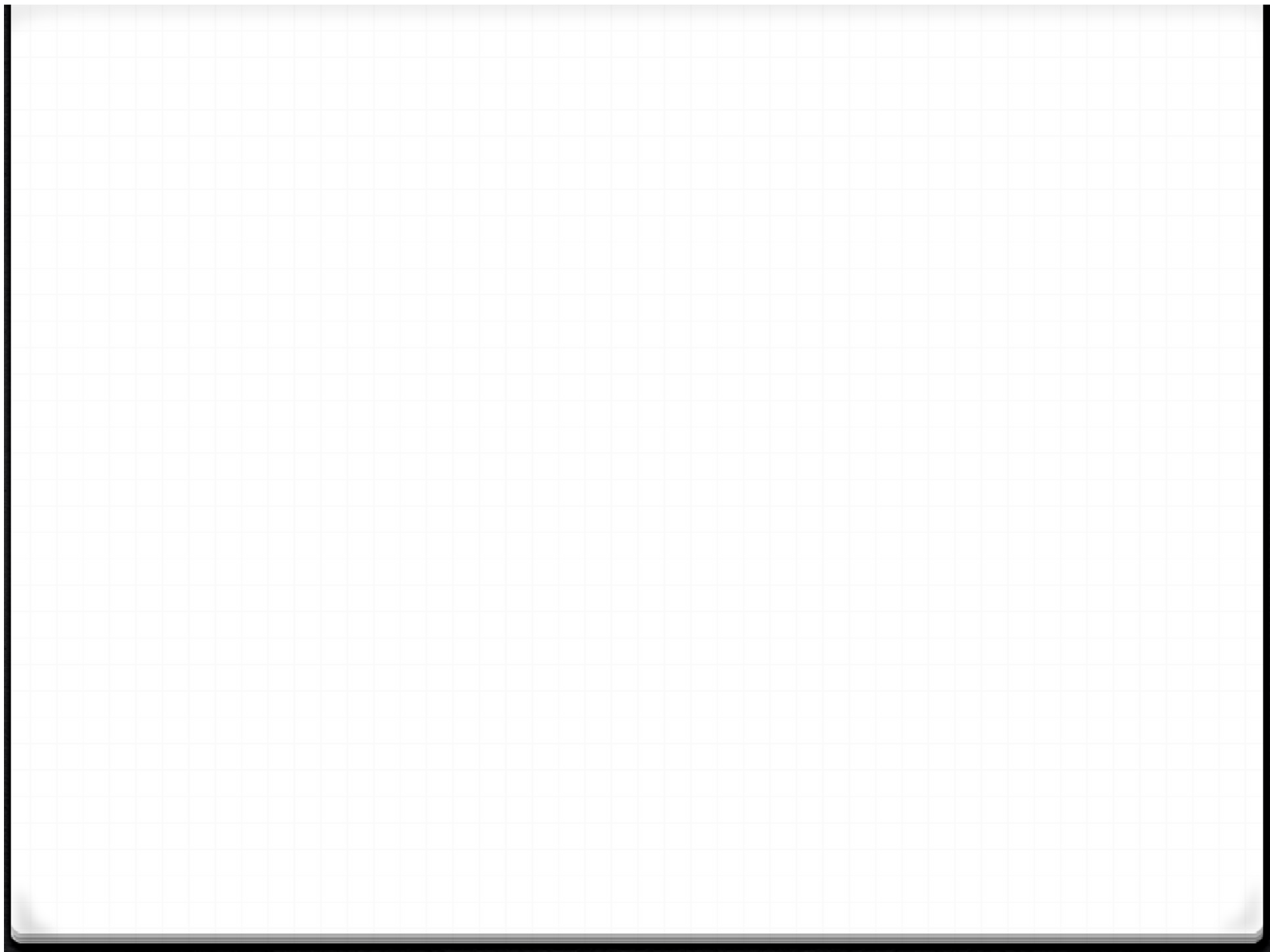
- Myositis ossificans/Heterotopic ossification
- Posterior dislocation:
 - Impairment of the vascular supply to the forearm is a major complication.
 - The assessment of pulses distal to the dislocation is essential
- Supracondylar fractures
- Radial head fracture
- Olecranon fractures
- Fracture of the radius and ulna
- Stress fracture

Overuse injuries to elbow and forearm

- *Tennis elbow/lateral epicondylitis/extensor tendinopathy*
 - *MWM*
 - *Orthotics*

- o The pathological process is a degeneration of the ECRB tendon at the extensor origin of the lateral epicondyle.
- o The mechanism of injury is multi-factorial.
- o The key contributing factors being:
 - o Overuse
 - o A heavy racquet or too small grip
 - o Recent change of racquet or too tight a grip between shots
 - o Muscle imbalance and loss of flexibility
 - o Poor blood supply of the 1–2 cm of the distal attachment of ECRB
 - o Repeated excessive loading leading to degenerative changes in the tendon

- *Olecranon bursitis/“student’s elbow”*
- *Radio-humeral bursitis*
- *Osteochondritis dissecans of the capitulum*
- *Panner’s disease:*
 - Fragmentation of the entire ossific centre of the capitulum bone
- *Golfer’s elbow/medial epicondylitis/ flexor/pronator Tendinopathy*



o Medial collateral ligament (MCL) sprain

o Ulnar nerve compression

o Muscle lesions:

o Minor muscle tears commonly occur in muscles bellies around the elbow.

o Acute lesions have been dealt with earlier.

o In “overtraining/overuse” situations muscles may be subjected to delayed onset muscle soreness, commonly referred to as DOMS.

o Osteoarthritis (OA) of the elbow

Acute treatment

- *Cryotherapy*
- *Ultrasound*
- *Corticosteroids*
- *Graded transverse friction massage (TFM)*
- *Kinetic chains and appropriate graded exercise*
- *Grade A (pain-free) mobilisation:* A grade A mobilisation is an active, passive or active/ assisted movement performed within the client's *pain-free* range of movement.

Factors relating to return to sport

- Understanding the Pathomechanics of injury
- Understanding of the relationship of the healing process to exercise intensity
- Multi disciplinary team approach and establishing agreed short- or long-term goals
- Restoration of muscular strength, endurance, power and neuromuscular control
- Therapeutic versus conditioning exercise

Thanks