TM & Shoulder Joints
Lecture Objectives

• Describe the components of TM joint.
• List the ligaments associated with TM joint and their attachment.
• Describe the type and the components of the shoulder joint.
• List the ligaments associated with the shoulder joint and their attachment.
• Describe the muscles acting on the shoulder joint according to the type and movement they perform.
• Describe the major palpable bony prominences of the shoulder joint.
Temporomandibular Joint (TMJ)

- Between mandibular fossa & articular tubercle of temporal bone and the head of mandible
Temporomandibular Joint: Innervation

- Nerve supply: auriculotemporal & masseteric branches of mandibular division of trigeminal nerve
Temporomandibular Joint: Ligaments

• Lateral temporomandibular ligament
  – Between the articular tubercle and neck of mandible

• Sphenomandibular ligament
  – Between spine of sphenoid and lingula of mandibular foramen

• Stylomandibular ligament
  – Between the styloid process of temporal bone and angle of mandible
Temporomandibular Joint (TMJ)

• Articular disc
  – Attached to the capsule and the head of mandible
  – Divide the joint into two cavities
    • Upper cavity
      – Gliding movement
    • Lower cavity
      – Hinge movement
Muscles of Mastication

- **M Masseter, temporalis & pterygoids**
- Arise from skull & insert on mandible
- Cranial nerve V (trigeminal nerve) – mandibular division
- Protracts, elevates or retracts mandible
Muscles of Mastication

(A) Masseter and temporalis

(B) Temporalis

(C) Lateral and medial pterygoid

(D) Posterior view of viscerocranium

(E) Anterolateral view with head rotated slightly to left
Lateral Pterygoid
<table>
<thead>
<tr>
<th>Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucles of Mastication</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Masseter</td>
<td>Zygomatic arch</td>
<td>Lateral surface ramus of mandible</td>
<td>Mandibular division of trigeminal nerve</td>
<td>Elevates mandible to occlude teeth</td>
</tr>
<tr>
<td>Temporalis</td>
<td>Floor of temporal fossa</td>
<td>Coronoid process of mandible</td>
<td>Mandibular division of trigeminal nerve</td>
<td>Anterior and superior fibers elevate mandible; posterior fibers retract mandible</td>
</tr>
<tr>
<td>Lateral pterygoid</td>
<td>Greater wing of sphenoid and lateral pterygoid plate</td>
<td>Neck of mandible and articular disc</td>
<td>Mandibular division of trigeminal nerve</td>
<td>Pulls neck of mandible forward</td>
</tr>
<tr>
<td>(two heads)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medial pterygoid</td>
<td>Tuberosity of maxilla and lateral pterygoid plate</td>
<td>Medial surface of angle of mandible</td>
<td>Mandibular division of trigeminal nerve</td>
<td>Elevates mandible</td>
</tr>
<tr>
<td>(two heads)</td>
<td></td>
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</tbody>
</table>
TMJ: Movements

- **Depression**
  - Lateral pterygoids, digastrics, geniohyoids and mylohyoids
- **Elevation**
  - Temporals, masseter & medial pterygoids
- **Protrusion**
  - Pterygoids
- **Retraction**
  - Temporals
- **Lateral movement**
  - Protrusion on one side and retraction on another
  - Muscles of mastication

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Sternoclavicular Joint

- Sternum and clavicle
- Double plane joint
- Articular disc
- Gliding movement of the clavicle:
  - Forward and backward in medial part
  - Elevation and depression in lateral part
- Sternoclavicular ligament
- Accessory ligament: costoclavicular ligament
- Nerve supply: supraclavicular nerve and nerve to subclavius muscle
Acromioclavicular Joint

- Acromion and clavicle
- Plane joint
- Superior and inferior acromioclavicular ligaments
- Fibrocartilaginous disc
- Accessory ligament: coracoclavicular ligament
- Gliding movement
- Nerve supply: suprascapular nerve
Shoulder Joint

- Head of humerus and glenoid cavity of scapula
- Ball and socket
  - All types of movements
- Nerve supply
  - Axillary and suprascapular
**Glenohumeral (Shoulder) Joint**

- Articular capsule from glenoid cavity to anatomical neck
- Synovial membrane
  - Long head of biceps
  - Continuation (openings)
    - Tendon sheath
    - Subscapularis bursa
- Glenoid labrum deepens socket
Shoulder Joint: Synovial Membrane

(A) Anterior view
Supporting Structures at Shoulder

• Associated ligaments strengthen joint capsule
  – Glenohumeral ligaments
    • Anteriorly
  – Coracohumeral ligament
    • Root of coracoid to greater tuberc
    • Superiorly
  – Transverse humeral ligament
    • Holds biceps tendon in place

• Accessory ligaments
  – Coracoacromial ligament
    • Subacromial bursa
Rotator Cuff Muscles

• Attach humerus to scapula
• Encircle the joint supporting the capsule
  – Weak capsule inferiorly
• Hold head of humerus in socket
Movements of Shoulder Joint

(A) Abduction

(C) Flexion

(B) Adduction

(D) Extension

(E) Lateral rotation

(F) Medial rotation

(A) & (B) Posterior views, (C) - (F) Lateral views

Coracobrachialis

Deltoid

Infraspinatus

Latissimus dorsi

Pectoralis major

Subscapularis

Supraspinatus

Teres major

Teres minor

Triceps-long head
Arterial Anastomosis around the Shoulder Joint

- **Subclavian a.**
  - Suprascapular a.
  - Superficial cervical a.
    - Deep branch
- **Axillary a.**
  - Subscapular a.
    - Circumflex scapular a.
  - Anterior circumflex humeral a.
  - Posterior circumflex humeral a.
Surface Anatomy of Upper Limb Bones

(A) Anterior
- Jugular notch
- Superior border of clavicle
- Acromioclavicular joint
- Acromion of scapula
- Greater tubercle of humerus
- Lesser tubercle of humerus
- Coracoid process of the scapula
- Lateral epicondyle of humerus
- Lateral border of distal radius
- Styloid process of radius
- Tubercle of scaphoid
- Tubercle of trapezium
- Head and styloid process of ulna
- Pisiform
- Hook of hamate
- Heads of metacarpals
- Bases, lateral aspects and heads of phalanges

(B) Posterior
- Manubrium
- Superior border of clavicle
- Acromion of scapula
- Acromial angle
- Greater tubercle of humerus
- Spine of scapula
- Medial (vertebral) border of scapula
- Inferior angle of scapula
- Olecranon
- Lateral epicondyle of humerus
- Head of radius
- Posterior border of ulna
- Lateral border of ulna
- Styloid process of radius
- Capitate
- Pisiform
- Posterior aspects of metacarpals and phalanges
- Styloid process of 3rd metacarpal

Green = palpable features of upper limb bones
Coracoid Process Palpation
Surface Anatomy of Shoulder Region

- Clavicular head of pectoralis major
- Clavicular part of deltoideus
- Deltoid groove (for cephalic vein)
- Anterior axillary fold
- Posterior axillary fold
- Sternocleidomastoid
- Jugular notch
- Infraclavicular fossa (overlying clavipectoral triangle)
- Descending (superior) part of trapezius
- Axillary fossa
- Axillary fossa
- Sternocostal head of pectoralis major
- Digitations of serratus anterior

Anterior view
Surface Anatomy of Shoulder Region
Surface Anatomy of Shoulder Region