The Temporomandibular Joint disorders
FUNCTIONAL ANATOMY

ANATOMY OF CLINICAL INTEREST

ETIOLOGY, EPIDEMIOLOGY, AND CLASSIFICATION

ASSESSMENT

GENERAL PRINCIPLES OF TREATING TEMPOROMANDIBULAR DISORDERS

SPECIFIC DISORDERS AND THEIR MANAGEMENT
The TMJ articulation is a joint that is capable of hinge-type and gliding. The articulation is formed by the mandibular condyle occupying a hollow in the temporal bone. Rotation of the condyle contributes more to normal mouth opening than translation. The capsule is lined with synovium and the joint cavity is filled with synovial fluid. The synovium is a vascular connective tissue. Distinguishing features include a covering of fibrocartilage rather than hyaline cartilage on the articulating surfaces.
- The synovial membrane consists of macrophage-like type A cells and fibroblast-like type B cells identical to those in other joints.
- Synovial fluid is a filtrate of plasma with added mucins and proteins.
- Its main constituent is hyaluronic acid.
- Decrease friction during joint compression and motion.
  - Decreases friction during joint compression and motion.
  - Weeping lubrication and boundary lubrication.
What is the temporomandibular joint?
The TMJ is where the lower jaw meets the skull.

The socket

The condyle is the round end of the lower jaw.

Jaw muscles open and close the jaw when you chew and talk.

A proper bite allows smooth and effective chewing.

Closed Jaw

The disk fits in the socket when the jaw is closed.

Ligament

The condyle fits in the socket when the jaw is closed.

Open Jaw

The disk slides forward as the jaw opens.

The condyle moves forward as the jaw opens.
**Articular disc**

- **Consist of:**
  - collagen fibers
  - cartilage-like proteoglycans
  - elastic fibers
  - Fibrocytes and fibrochondrocytes

- The disc is attached by ligaments to the lateral and medial poles of the condyle.
- The disc is thinnest in its center and thicken to form anterior and posterior bands → to help stabilize the condyle in the glenoid fossa.
- Temporalis muscle and deep masseter muscle →
  - attach on the anterolateral aspect
- Lateral pterygoid → attach on the anteromedial aspect of the disc.
Retrodiscal tissue

- Is loosely organized system of:
  - Collagen fibers
  - Fat
  - Blood and lymph vessels
  - Nerves
Temporomandibular ligaments

- Capsular ligament
- Lateral temporomandibular ligament
- Accessory ligament
  - Sphenomandibular ligament
  - Stylomandibular ligament
Muscles of mastication

- Masseter Muscles
- Medial pterigoid Muscles
- Temporalis Muscles

Mandibular movements toward the tooth contact position

Opening and protrusive muscle of the mandible

- Lateral pterigoid Muscles
The masseter and medial pterygoid muscles have their insertion.
Nerve Supply of Masticatory System

- The mandibular division of the trigeminal nerve supplies motor innervation to the muscles of mastication and the anterior belly of the digastric muscle.
- Auriculotemporal nerve supply the sensory innervation of the TMJ.
- The masseteric nerve, a branch of the maxillary division of the trigeminal nerve (V2), innervates the anteromedial capsule of the TMJ.
The external carotid artery is the main blood supply for the masticatory system structures.
Articulator covering

- Fibrocartilage
  - More freedom of movement than hyaline cartilage
TMD patients similar to headache and back pain patients (disability, psychosocial profile, pain intensity chronicity, and frequency)

- Between the ages 20-40 years
- More frequently affect women
Disc displacement

- Some anterior disc displacement may be related to lateral pterygoid muscle dysfunction

- The angle or steepness of the mandibular fossa has been considered a contributing factor in intra-articular disorder

- Adhesion occurs when hyaluronic acid and associated phospholipid are degraded
Nerve entrapment

- Compression of nerves due to decrease occlusal vertical dimension
- Medial displacement of the articular disc exposing the auriculotemporal nerve to mechanical irritation
Ear symptoms associated with TMDs

- In patients with TMD
  - Earache,
  - Tinnitus
  - Fullness
  - Loss of hearing
Etiology of TMD

- The etiology of the most common TMDs is unknown. Occlusal disharmony, muscle hyperactivity, central pain mechanisms, psychological distress, and trauma.
- Relationship between severe overbite and TMD.
- Relationship between orthodontic treatment and TMD.
Palpate the masticatory and cervical muscles

Palpate the masseter
Palpate the temporal
Palpate medial pterygoid
Palpate lateral pterygoid
Articular Disc Disorders of the TMJ

- Joint sounds
- Limitation and deviation of mandibular motion
- Pain
- Majority of cases of ADD occur without pain or dysfunction
- ADD of the TMJ does not appear to affect children below the age of 5 years
• Most common disc displacement is anterior
• Posterior disc displacement is rare
• Pain or dysfunction When accompanied by capsulitis and synovitis
Normal

Disc

Muscle

Normal

Disc

Muscle

Abnormal

Disc and Muscle Displacement

Temporomandibular Joint Normal Closed Position

Temporomandibular Joint Normal Open Position

Temporomandibular Joint Dysfunctioning Open Position
Etiology

- unknown
- Direct trauma to the joint
- Chronic low-grade microtrauma (Bruxism, Clenching)
- Laxity of joint
- Indirect trauma
  - Cervical flexion extension
  - Malocclusion
- Anatomy of the joint,........
Clinical manifestations

- Anterior disc displacement with reduction
  - Elongation or tearing of the restraining ligaments
  - Alteration in the form of the disc
- Clicking or popping joint (during both opening and closing) reciprocal click
- Pain
- Loss of function
- Intermittent locking
Anterior disc displacement without reduction (closed lock)

- After trauma or long-term nocturnal bruxism
  - Pain directly over the joint
  - Limited lateral movement to the side away from the affected joint
  - Mandible will deviate toward the affected side
  - Disc will deform and max mouth opening will gradually improve
posterior disc displacement

- A sudden inability to bring the upper and lower teeth together in max occlusion
- Pain in the affected joint
- Limited lateral movement to the affected side
- No Limited of mouth opening
Most symptoms resolve over time without treatment or with minimal conservation.

For symptomatic ADD:
- Splint therapy
- Physical therapy
- Anti-inflammatory drugs
- Arthrocentesis
- Arthroplasty, .......
Temporomandibular joint arthritis

- Degenerative joint disease (DJD)
- Osteoarthritis
- Osteoarthrosis
- Degenerative arthritis
**Primary DJD**
- Genetic factors: important role
- Asymptomatic
- Above the age of 50 years

**Secondary DJD**
- Trauma
- Congenital dysplasia
- Metabolic disease
Risk factors

- **Gender** → estrogen receptors on TMJ
- **Diet**: hard or chewy foods → ↑ loads on the TMJ
- **Genetics**
- **Psychological stress** → parafunctional activities (bruxism or clenching)
Clinical manifestations

- Pain directly over the affected condyle
- Limitation of mandibular opening
- Crepitus
- Feeling of stiffness after a period of inactivity
Radiographic finding

- Narrowing of the joint space
- Irregular joint space
- Flattening of the articular surfaces
- Osteophyte formation
- Presence of subchondral cyst
Rheumatoid arthritis

- Affected periarticular tissue and secondarily bone
- Vasculitis of synovial membrane $\rightarrow$ chronic inflammation $\rightarrow$ granulation tissue
- The TMJ involved bilaterally
- Pain: the early acute phase
- Morning stiffness
- Joint sounds
- Tenderness and swelling over the joint area
- Anterior open bite are commonly in juvenile idiopathic arthritis
- In radiography: Narrowing of the joint space
- Destructive lesions of the condyle
- Erosions of the condyle and glenoid fossa
Anti-inflammatory drugs + therapy For the systemic disease

Flat-plane occlusal appliance

Intra-articular steroid

Orthognatic surgery
Seronegative spondyloarthropathies

- Rheumatoid factor → negative
- Include:
  - Ankylosing Spondylitis
  - Psoriatic arthritis
  - reiter's syndrom
- Joint Pain with function
- Limitation of mandibular opening
- erosions of the condyle
Ankylosing Spondylitis

- Involved spine
  - inflammation → new bone formation →
    - fuse, reduction mobility
- TMJ was Involved: 15%-20% →
  - Limitation of mandibular opening
  - Pain
  - crepitus
Connective tissue disease

- Systemic lupus
- Systemic sclerosis
- Diseases with Crystal deposits in joint
  - Gout
Treatment

- Therapy for the systemic disease
- Physiotherapy
- Oral appliance therapy
- NSAID
- Intra-articular steroid
Synovial chondromatosis

- Uncommon benign
- Multiple cartilaginous nodules
  - Slow progressive swelling in the pretragus
  - Pain
  - Limitation of mandibular movement
- Mistaken for a chondrosarcoma
- Intracranial extension → facial nerve paralysis
Infection may result:

- Bloodborn bacterial (gonococci)
- Extention of infection from adjacent sites
  - Middle ear, maxillary molars, parotid gland
Clinical manifestations

- Trismus
- Deviation of the mandible to the affected side
- Severe pain on movement
- Inability to occlude the teeth
- Redness and swelling over the involved joint
- Large cervical lymph nodes
sequelae

- Osteomyelitis of the temporal
- Brain abscess
- Ankylosis

**Treatment:**
- Surgical drainage
- Joint irrigation
- Antibiotics (4-6 weeks)
Developmental defects

- Hyoperplasia (coronoid process, condyle)
- Hypoplasia
- Agenesis
- Bifid condyle
- Facial asymmetry
Dislocation

- Result eating or yawning and less commonly trauma
- Contrast subluxation cannot return to its normal position without assistance
- Subluxation is variation of normal function
**ankylosis**

- Most common cause: trauma
- Prolonged immobilization following condylar fracture
- Treatment: gap arthroplasty
broxism

- Occlusal appliances
- SSRIs
- Buspiron
- Botulinum toxin