Temporomandibular Joint Disorders

March 11, 1998
Michael E. Prater, MD
Byron J. Bailey, MD
Introduction

▲ TMJ Syndrome an outdated concept
▲ Should be able to distinguish between muscular disorders and joint disorders
▲ Must rule out joint pathology
Economics

$30 Billion lost productivity
550 million work days per year
Epidemiology

▲ 10 million people treated for “TMJ” at any one time
▲ 50% of population has Sx
▲ 1/5 require some treatment
▲ 1/10 of those treated will need surgery
Epidemiology, Continued

- Avg age onset 18-26
- Females 5:1
- 50% have progressive Sx
- 50% accommodate by functioning within physiologic limits
- 84% not treated improve
- 86% treated improve
Anatomy

- Innervation via trigeminal nerve
- Ophthalmic (V1), maxillary (V2) and mandibular (V3)
- Cell bodies in trigeminal ganglia
- Motor to muscles of mastication
- Sensory to muscles and joint capsule
Anatomy, Continued

Referred pain
- headache, sinus pain, otalgia, dental pain and neck pain
- Due to innervation of dura mater, sinuses, TM and EAC, alveolus and “trigger points”
Anatomy, Continued

▲ Trigger Points
- Defn: hard, painful bands of muscle, tendons or ligaments
  - “Active” trigger points alters the areas of pain
  - “Latent” trigger points have only local hypersensitivity
  - Local anesthetics, saline or acupuncture offer relief of symptoms
Muscles of mastication
- temporalis, masseter, lateral pterygoids, medial pterygoids are major muscles
- suprathyroid strap muscles are minor contributors

Innervated by trigeminal nerve
lateral pterygoid is primary abductor
Temporomandibular Joint

- consists of mandible suspended from temporal bone via ligaments and muscles, including stylomandibular and sphenomandibular ligaments
- a true synovial joint capable of gliding, hinging, sliding and slight rotation
- mandible and temporal bone separated by meniscus (disc)
Anatomy of TMJ Continued

▲ Condylar process of mandible articulates with glenoid fossa of temporal bone
  – anterior: anterior eminance of TMJ
  – posterior: EAC
  – lateral: zygomatic arch
  – medial: styloid process
Condylar process, continued
- lined by fibrous tissues, primarily hyaline cartilage
- this is the primary growth center of the mandible
  - damage leads to facial maldevelopment, including both the mandible and the maxilla
Anatomy of TMJ, Continued

- Coronoid process
  - insertion for portions of temporalis and masseter
  - incisura mandibularis, or sigmoid notch
    ♦ masseteric aa
Meniscus (disc)
- synovial fluid above and below disc
- “shock absorber”
- internal derangement in 50% of all people
  - anteriorly and medially most common
  - jaw “pops”
- held in place by medial and lateral capsular ligaments and retrodisc pad
Diseases and Disorders of the TMJ

▲ The TMJ is susceptible to all conditions that affect other joints
  – ankylosis, arthritis, trauma, dislocations, developmental anomalies and neoplasms

▲ Psychosocial factors are extremely controversial
  – Somatoform disorder, drug seeking, malingering, “need” for illness
Muscular Disorders (Myofascial Pain Disorders) are the most common cause of TMJ pain

High psychosocial component?
- many patient with “high stress level”
- poor habits including gum chewing, bruxism, hard candy chewing
- poor dentition
Disorders-Myofascial, Continued

MPD, continued
- unilateral dull, aching pain
- worse with use (gum, candy, bruxism)
- associated HA’s, otalgia, T/HL, burning tongue
Six categories

- **Myositis**
  - acute inflammation with pain, edema and decreased ROM. Usually secondary to overuse, but infection or trauma seen
  - TX: rest, NSAIDs, Abx as needed

- **Muscle Spasm**
  - acute contraction from overuse, overstreching
  - Tx: rest, NSAIDs, massage, heat, relaxants
Myofascial Pain Disorder, Cont.

– **Contracture**
  - end stage of untreated muscle spasm
  - due to fibrosis of muscle and connective tissue
  - Tx: NSAIDs, massage, vigorous physical therapy, occasional surgical release of scar tissue

– **Hysterical trismus**
  - decreased ROM
  - psychosocial etiology
  - more common in females
Myofascial Pain Disorder, Cont.

- **Fibromyalgia**
  - diffuse, systemic process with firm, painful bands (trigger points)
  - usually seen in weight bearing muscles
  - often associated sleep disturbance
  - more common in females
  - Diagnostic criteria
    - trigger points
    - known path of pain for trigger points
    - reproducible
Myofascial Pain Disorder, Cont.

- **Collagen vascular disorders**
  - **SLE**
    - autoimmune, butterfly rash, fever, rheumatoid arthritis
    - Dx with high ESR, positive ANA and a false-positive VDRL
  - **Scleroderma**
    - autoimmune characterized with gradual muscle and joint pain, tightening of skin
    - limited jaw expansion with pain may be initial presentation
Myofascial Pain Syndrome, Cont

- **Sjogren’s Syndrome**
  - autoimmune
  - xerostomia, xerophthalmia with keratitis
  - sometimes see muscle and joint pain, including the TMJ
  - diagnose with minor salivary gland biopsy
Myofascial Pain Syndrome, Cont

▲ Treatment is divided into four phases
  – Phase I (four weeks, 50% will improve)
    ♦ educate the patient about muscle fatigue
    ♦ explain referred pain
    ♦ “oral” hygiene: no gum chewing, candy chewing, jaw clenching
    ♦ soft diet
    ♦ NSAIDs (usually ibuprofen)
    ♦ muscle relaxants (benzos)
Myofascial Pain Disorder, Cont.

- Phase II (four weeks-25% more improve)
  - Continue NSAIDs, benzos
  - add bite appliance (splint)
    - decrease effects of bruxism
    - “splints” the muscles of mastication
    - improves occlusion while wearing, allowing more natural jaw position
      - usually worn at night, may be worn during day
      - once relief obtained, d/c meds first. If remains asymptomatic, d/c splints.
      - may continue with prn splinting
Myofascial Pain Disorders, Cont.

– Phase III: (four weeks-15% improved)
  ◆ continue NSAIDs, bite appliance
  ◆ add either ultrasonic therapy, electrogalvanic stimulation or biofeedback
    – no one modality superior

– Phase IV: TMJ Center
  ◆ multidisciplinary approach utilizing psychological counseling, medications, trigger point injections and physical therapy
Joint Disorders

▲ Joint Disorders are the second most common cause of temporomandibular pain

▲ Include internal derangements, degenerative joint disease, developmental anomalies, trauma, arthritis, ankylosis and neoplasms
Cardinal features are jaw popping (clicking) and pain
- 50% of the population has a jaw pop, which usually occurs with opening (between 10-20 mm)
- may elicit a history of “lock” jaw
- advanced disorders may not present with a jaw click, but a history can usually be found
Joint Disorders, Continued

▲ Internal Derangement
  – the most common joint disorder
  – involves the abnormal repositioning of the disc
  – disc location is usually anteromedial
  – four types of derangements (see other screen)
Internal Derangement Types

▲ Type IA
  - popping over the joint without associated pain (50% of normal subjects)

▲ Type IB
  - popping over the joint with pain
  - due to chronic stretching of capsular ligaments and tendons
Internal Derangement Types, Continued

▲ Type II
- similar to type IB, but a history of “lock jaw” can be elicited
  ◆ closed lock vs open lock

▲ Type III
- a persistent lock, usually closed
- No click on PE!
Tx of Internal Derangements

▲ Type I and II
- similar to myofascial disorders: NSAIDs, anxiolytics/relaxers, “oral” hygiene and appliances if necessary for four weeks
- progression of symptoms may require surgical intervention
  - main goal is lysis of adhesion and repositioning of disc
  - open vs arthroscopic
Tx of Internal Derangements

▲ Type III

– usually requires general anesthesia to mobilize jaw
– aggressive medical and physical therapy is initiated, including a bite appliance
– if no improvement after 3 weeks, surgery is indicated to lyse adhesions and/or reposition disc
Congenital Anomalies

▲ Fairly rare
▲ Important to identify
  – absence of growth plates leads to severe deformities
▲ condylar agenesis, condylar hypoplasia, condylar hyperplasia and hemifacial microsomia most common
Condylar agenesis

- the absence of all or portions of condylar process, coronoid process, ramus or mandible
- other first and second arch anomalies seen
- early treatment maximizes condylar growth
  - a costocondral graft may help with facial development
Condylar hypoplasia

- usually developmental secondary to trauma or infection
- most common facial deformity is shortening of mandible
  - jaw deviates towards affected side
- Tx for child: costochondral graft
- Tx for adult: shorten normal side of lengthen involved side
Condylar Hyperplasia
- an idiopathic, progressive overgrowth of mandible
  - deviation of jaw away from affected side
- presents in 2nd decade
- Treat by condylectomy
Fractures of the condyle and subcondyle are common

- unilateral fracture involves deviation of jaw towards affected side with or without open bite
  - Tx: MMF with early mobilization
  - bilateral fracture usually has anterior open bite
    - often requires ORIF of one side with MMF
Dislocation of the TMJ

▲ Acute dislocation
- new onset Type III derangement, surgery of the mouth
- treatment is reduction under anesthesia

▲ Chronic dislocation
- usually secondary to abnormally lax tendons
- Tx: sclerosing agents, capsulorraphy, myotomy of lateral pterygoid
Ankylosis of the TMJ

▲ Defn: the obliteration of the joint space with abnormal bony morphology
   – etiologies include prolonged MMF, infection, trauma, DJD

▲ False ankylosis: an extracapsular condition from an abnormally large coronoid process, zygomatic arch or scar tissue
Ankylosis of the TMJ, Continued

▲ Treatment

– Child: a costochondral graft to help establish a growth plate
– Adult: prosthetic replacement
  ◆ the new joint should be established at highest point on ramus for maximal mandibular height
  ◆ an interpositional material is needed to prevent fusion
  ◆ PT must be aggressive and long term
Arthritis of the TMJ

▲ The most frequent pathologic change of the TMJ
▲ Most are asymptomatic
▲ Rheumatoid arthritis
   – usually seen in other joints prior to TMJ
   – when present, both joints usually affected
   – early radiographic changes include joint space narrowing *without* bony changes
Arthritis of the TMJ, Continued

Rheumatoid Arthritis, Continued

- late radiographic changes may involve complete obliteration of space with bony involvement and even ankylosis
- end stage disease results in anterior open bite
- Juvenile RA may progress to destruction of the growth plate, requiring costochondral graft
Arthritis of the TMJ, Continued

▲ Rheumatoid Arthritis, continued
  – Treatment
    ♦ NSAIDs, penicillamine, gold
    ♦ Surgery limited to severe JRA and ankylosis

▲ Degenerative Arthritis
  – “wear and tear” of the joints
  – most asymptomatic
Degenerative Arthritis, Continued

- Primary Degenerative arthritis
  - “wear and tear” - usually in older people
  - asymptomatic or mild symptoms
- Secondary Degenerative arthritis
  - due to trauma, infection and bruxism
  - symptoms severe
  - radiographic findings include osteophytes and erosion of the condylar surface
Dejenerative Arthritis, continued

- Treatment is initially similar to myofascial disorders, including NSAIDs, benzos and “oral” hygiene. Bite appliance may be necessary
- After 3-6 months, surgery is considered
  - lysis of adhesions, osteophyte removal
  - condylar shave. Resorption of the condyle is a known complication
Neoplasms of the TMJ

- Uncommon
- Usually benign
  - chondromas, osteomas, osteochondromas
  - fibrous dysplasia, giant cell reparative granuloma and chondroblastoma rare
- Malignant tumors such as fibrosarcoma and chondrosarcoma very rare
- Radioresistant
Surgery of the TMJ

▲ Less than 1% of people with TMJ symptoms will require surgery
▲ Five requirements for surgery:
  – joint pathology
  – pathology causes symptoms
  – symptoms prevent normal function
  – medical management has failed
  – contributory factors are controlled
Surgery of the TMJ, Continued

▲ Disc Repair
- recommended for minimal pathology
- disc is usually repositioned posteriorly
- articular eminence may need to be shaved
- 90% of patients have improvement
- arthroscopic versus open
Menisectomy

- recommended when severe changes in disc occur
- a temporary implant may be used
- scar tissue forms new “disc”
- 85% improvement
- bony changes of disc space a known complication
Menisectomy with implantation

- disc removal with permanent interpositional implant
- silastic most common
- proplast also used
- temporalis fascial graft and auricular cartilage can be used
- animal models show FB reaction
Surgery of the TMJ, Continued

▲ Bone Reduction
- preserve the disc through high condylotomy or condylectomy
- preserve disc space
- widen disc by “decompression”
Surgery of TMJ, Continued

Arthroscopy
- diagnostic as well as therapeutic
- adhesions and loose bodies the most common indication
- may be used for minor disc procedures
Complications of TMJ Surgery

- Bleeding, infection, adhesions, pain, degenerative disease, infection
- Depression
  - emphasizes the psychosocial component
MRI is best technique for joint space pathology
CT is best technique for bony pathology
Plain films with arthrography sometimes useful, although largely replaced by MRI and CT
Arthroscopy is also diagnostic