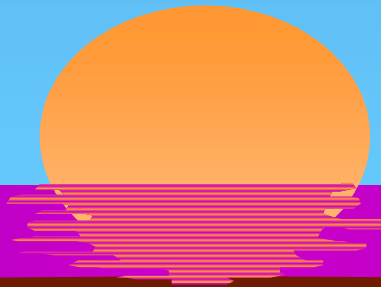


Temporomandibular Joint Disorders

March 11, 1998

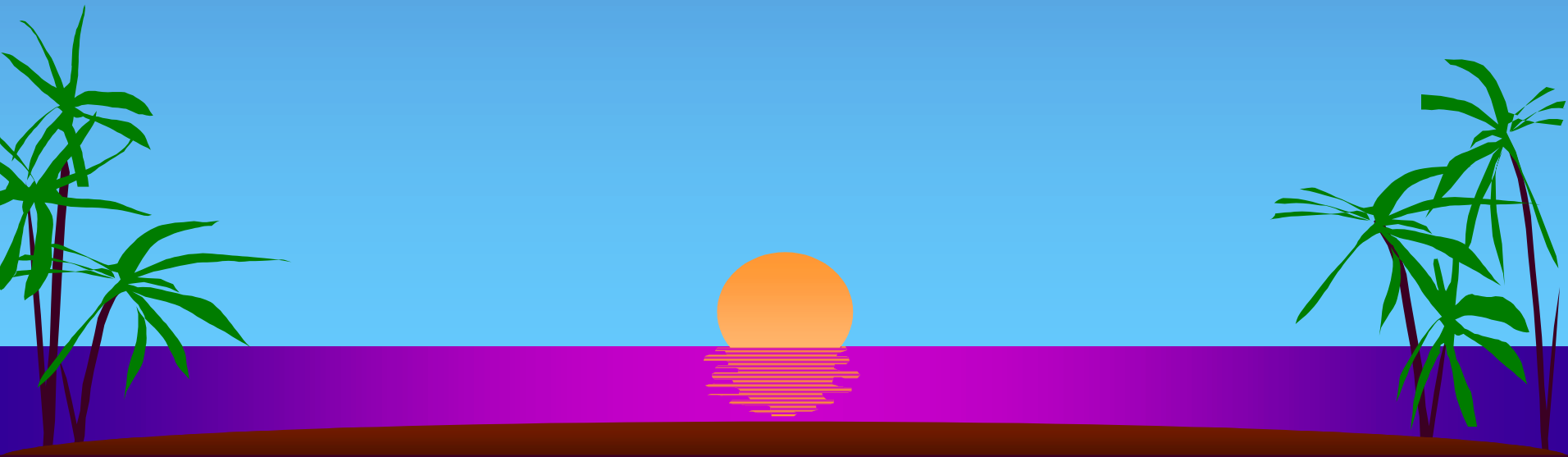
Michael E. Prater, MD

Byron J. Bailey, MD



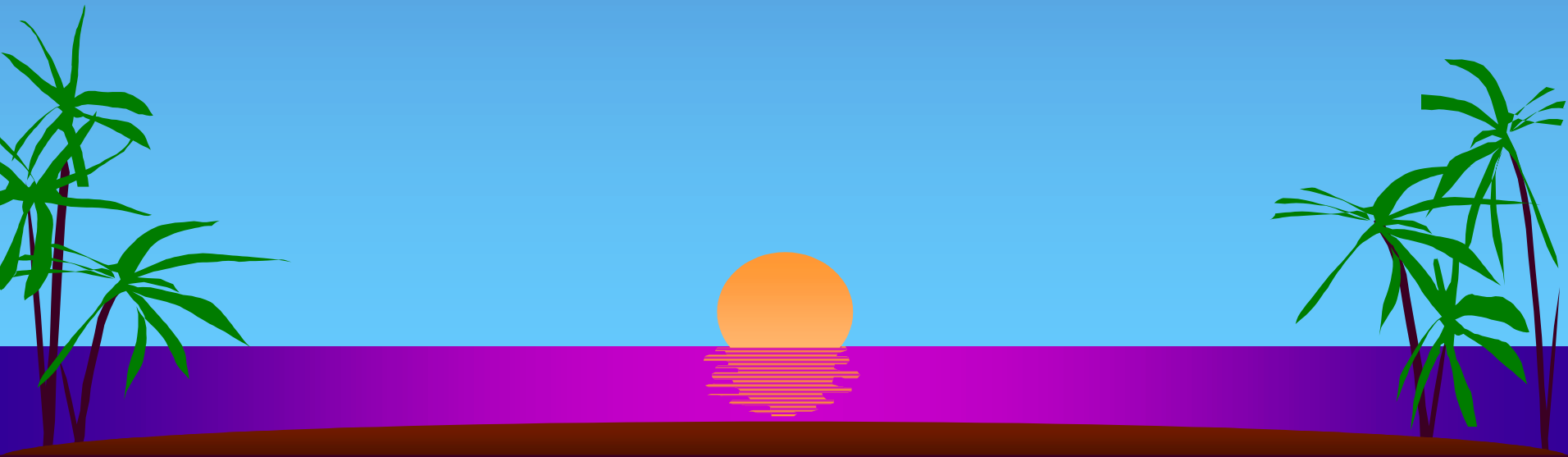
Introduction

- ▲ TMJ Syndrome an outdated concept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



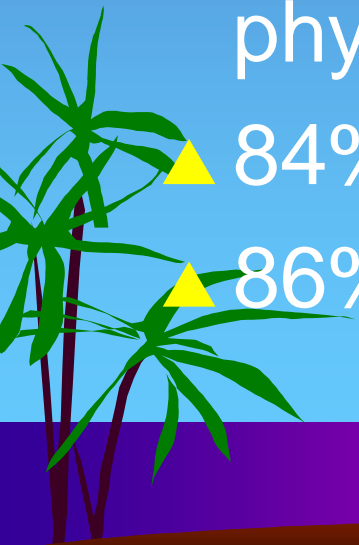
Epidemiology

- ▲ 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



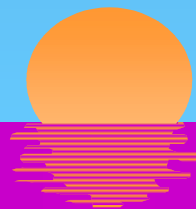
Epidemiology, Continued

- ▲ 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

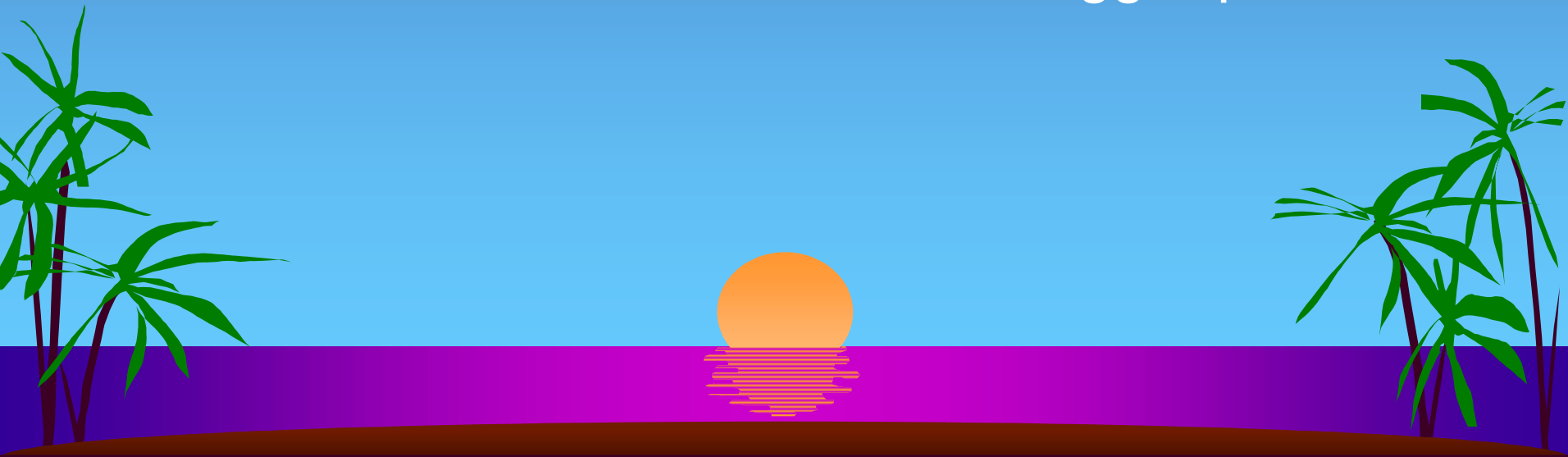
- ▲ Innervation via trigeminal nerve
- ▲ Ophthalmic (V1), maxillary (V2) and mandibular (V3)
- ▲ Cell bodies in trigeminal ganglia
- ▲ Motor to muscles of mastication
- ▲ Sensory to muscles and joint capsule



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



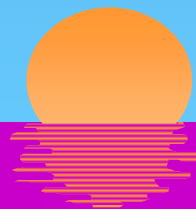
Anatomy, Continued

▲ Muscles of mastication

- temporalis, masseter, lateral pterygoids, medial pterygoids are major muscles
- suprahyoid strap muscles are minor contributors

▲ Innervated by trigeminal nerve

▲ lateral pterygoid is primary abductor



Anatomy, Continued

▲ 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



Anatomy of TMJ, Continued

- ▲ 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



Anatomy of TMJ, Continued

▲ 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



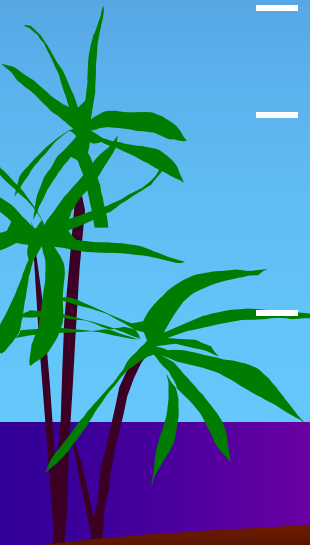
Diseases and Disorders of the TMJ

- ▲ 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



Disorders of TMJ, Continued

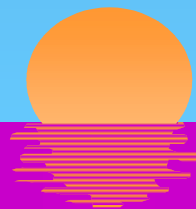
- ▲ Muscular Disorders (*Myofascial Pain Disorders*) are the most common cause of TMJ pain
- ▲ High psychosocial component?
 - many patient with “high stress level”
 - poor habits including gum chewing, bruxism, hard candy chewing
 - poor dentition



Disorders-Myofascial, Continued

▲ MPD, continued

- unilateral dull, aching pain
- worse with use (gum, candy, bruxism)
- associated HA's, otalgia, T/HL, burning tongue



Myofascial Pain Disorder, Cont.

▲ 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, overstretching
- ◆ 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*

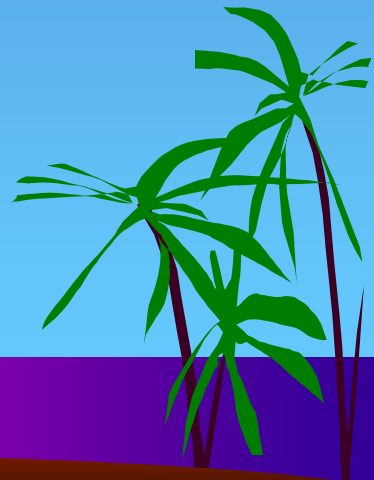
- ◆ decreased ROM
- ◆ psychosocial etiology
- ◆ more common in females



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

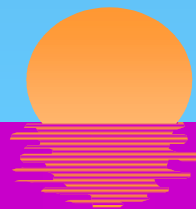
- autoimmune characterized with gradual muscle and joint pain, tightening of skin
- limited jaw expansion with pain may be initial presentation



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



Joint Disorders, Continued

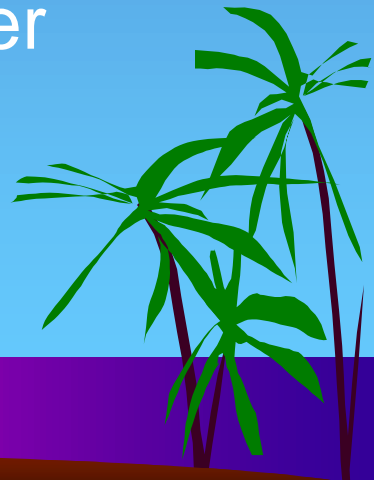
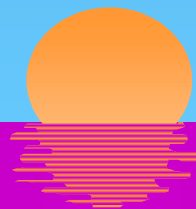
- ▲ Cardinal features are jaw popping (clicking) and pain
 - 50% of the population has a jaw pop, which usually occurs with opening (between 10-20 mm)
 - may elicit a history of “lock” jaw
 - advanced disorders may *not* present with a jaw click, but a history can usually be found



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

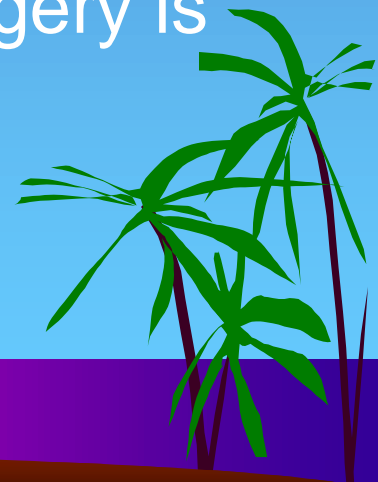
- similar to myofascial disorders: NSAIDs, anxiolytics/relaxers, “oral” hygiene and appliances if necessary for four weeks
- progression of symptoms may require surgical intervention
 - ◆ main goal is lysis of adhesion and repositioning of disc
 - ◆ open vs arthroscopic



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

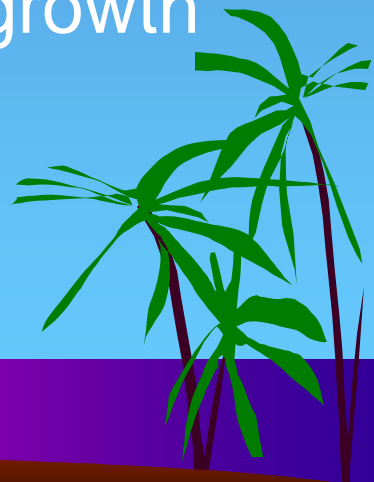
- ▲ Fairly rare
- ▲ Important to identify
 - absence of growth plates leads to severe deformities
- ▲ condylar agenesis, condylar hypoplasia, condylar hyperplasia and hemifacial microsomia most common



Congenital Anomalies, Cont.

▲ 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



Congenital Anomalies, Cont

▲ Condylar hypoplasia

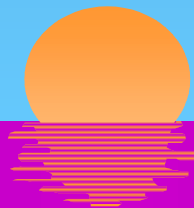
- usually developmental secondary to trauma or infection
- most common facial deformity is shortening of mandible
 - ◆ jaw deviates towards affected side
- Tx for child: costochondral graft
- Tx for adult: shorten normal side of lengthen involved side



Congenital Anomalies, Cont

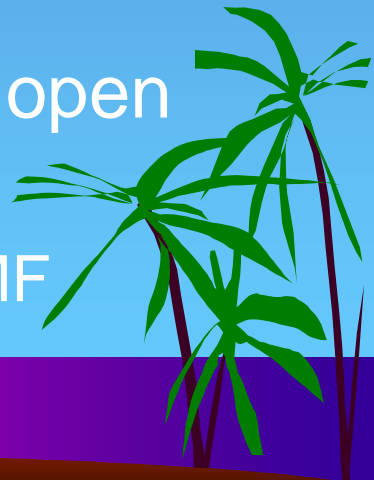
▲ Condylar Hyperplasia

- an idiopathic, progressive overgrowth of mandible
 - ◆ deviation of jaw *away* from affected side
- presents in 2nd decade
- Treat by condylectomy



Traumatic Injuries

- ▲ 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



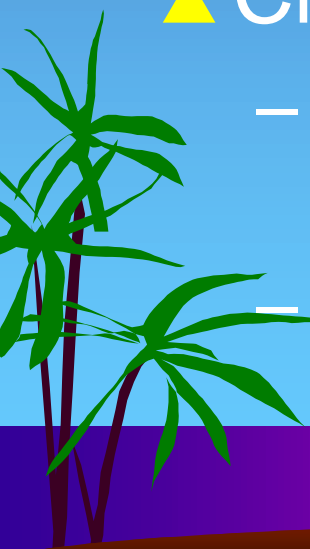
Dislocation of the TMJ

▲ Acute dislocation

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

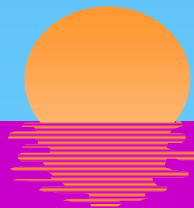
▲ Chronic dislocation

- usually secondary to abnormally lax tendons
- Tx: sclerosing agents, capsulorrhaphy, myotomy of lateral pterygoid



Ankylosis of the TMJ

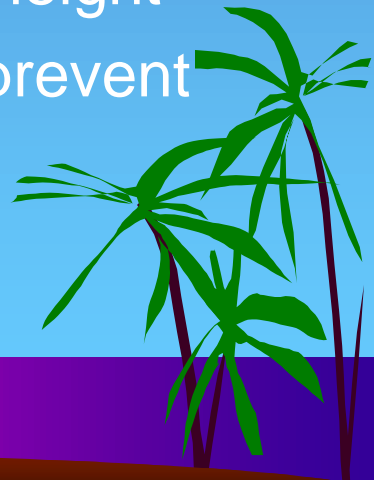
- ▲ Defn: the obliteration of the joint space with abnormal bony morphology
 - etiologies include prolonged MMF, infection, trauma, DJD
- ▲ False ankylosis: an extracapsular condition from an abnormally large coronoid process, zygomatic arch or scar tissue



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

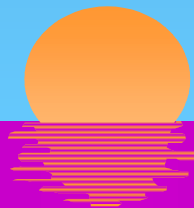
- ▲ The most frequent pathologic change of the TMJ
- ▲ Most are asymptomatic
- ▲ Rheumatoid arthritis
 - usually seen in other joints prior to TMJ
 - when present, both joints usually affected
 - early radiographic changes include joint space narrowing *without* bony changes



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



Arthritis of the TMJ, Continued

▲ 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



Arthritis of the TMJ, Continued

▲ Deenerative 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

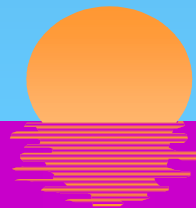
- recommended for minimal pathology
- disc is usually repositioned posteriorly
- articular eminance may need to be shaved
- 90% of patients have improvement
- arthroscopic versus open



Surgery of the TMJ, Continued

▲ 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



Surgery of TMJ, Continued

- ▲ Meniscectomy 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

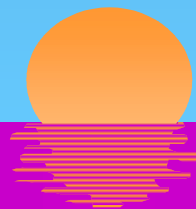
- preserve the disc through high condylotomy or condylectomy
- preserve disc space
- widen disc by “decompression”



Surgery of TMJ, Continued

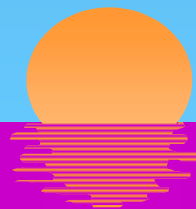
▲ Arthroscopy

- 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



Radiology

- ▲ 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

