

TMD Intro

Sources of Pain

- Extracranial, intracranial, vascular, myofascial, rheumatic/TMJ, neuropathic, psychogenic
- Any combination

Extracranial (variable pain)

- Oral and odonto, ENT, sinuses, lymph, skin
- Mx teeth referred pain projection
 - o Anteriors – frontalis
 - o Premolars – temporal
 - o Molars – TMJ
- Mn teeth referred pain projection
 - o Anterior – genu/mentalis area
 - o Posteriors – ear and SCM (anterior and lateral)

Intracranial (variable pain)

- o Causes – neoplastic, aneurysmal, abscess, hematoma/hemorrhage, edema, angioma
- o Syndromes – NF, meningitic, thalamic, phantom pain
- New pain, progressively gets worse, interrupts sleep
- Caused by exertion/positional change
- Associated with weight loss, causes fever, cranial nerve deficits, and neurologic symptoms (seizure, paralysis, vertigo, etc)
 - o Check symptom definitions with patient
 - Numbness = dull pain or loss of feeling?
 - Swelling = visible or felt
- Symptoms of brain tumor – seizures, headaches, papilloedema (optic disc swelling)

Vascular (throbbing/pulsatile pain)

- Migraines
 - o Classic – preceded by an aura, unilateral, photo and phonophobia
 - o Common – 80% of headaches, similar to classic but not preceding aura
 - o Complex – neurologic symptoms imitating stroke
- HTN – general pain decreasing with time, pulsatile feel, frontal and temporal locations
- Toxic/metabolic
- Cluster – unilateral intense pain by ocular/nasal regions, causes flushing of associated glands and comes in clusters
- Cranial arteritis – inflammation of cranial arteries
- Temporal arteritis
 - o Dull ache [can be throbbing], usually >50y/o, occlusion of the ophthalmic artery can cause blindness
 - o 3 cardinal symptoms
 1. Doesn't feel pulsatile – inflammation has progressed and the vessel wall has thickened
 2. Indurated and usually visible
 3. External pressure to temporal area replicates pain
 - o Treat with steroids immediately

Myofascial (steady ache/band)

- Myalgia
- Myofascial pain dysfunction – multiple trigger points, steady aching deep pain, can vary from moderate to lightning like excruciating pain, knots visible or felt subdural, symptoms not resolved on its own or with mild self-care
- Tension headache – from associated muscle contracture
- Contracture
- Secondary to collagen disease

Rheumatic/TMJ (pressure/ache)

- TMJ capsulitis – inflamed disc, palpable tenderness directly over joint
- TMJ derangement – disc displacement
- TMJ arthritis
 - o Polyarthritis – usually autoimmune associated, arthritis affecting ± 5 joints
 - o Septic – infection causing joint inflammation
 - o Traumatic – inflammation as part of body reaction to injury
 - o Metabolic – ex:// gout, metabolic products cause joint damage/inflammation
 - o Rheumatoid – systemic inflammation of synovial joints
- Cervical arthritis – degeneration of cervical vertebrae

Neuropathic (sharp/burning)

- o Sensory testing – using sharp vs blunt ends of the explorer and have the patient differentiate between the two qualities
- o Motor testing – shifting jaws side to side to make all border movements
- Paroxysmal (sudden outburst)
 - o Trigeminal
 - Pretrigeminal neuralgia – episodic tooth-like pain with periods of remission
 - Trigeminal neuralgia – episodic sharp, electric-like pain with periods of remission
 - For both – no obvious local causes, pain triggered by minor stimulation, normal radiograph and thermograph, positive somatic block, sympathetic block does not define disorder
 - o Occipital
 - o Glossopharyngeal/vagal – pain from swallowing
 - o Facial
 - o Nervus intermedius
 - o Eagles' syndrome – elongated stylohyoid process, can be seen in a PAN
- Continuous
 - o Post herpetic
 - o Post traumatic
 - o Post surgical
- Complex regional pain syndrome (CRPS)
 - Intense/burning sensation out of proportion to injury, gets worse over time, begins at point of injury but spreads to whole limb (and possible to bilateral limb/part of body)
 - o Type I – reflex sympathetic dystrophy – chronic nerve disorder often in extremity after minor injury
 - o Type II – causalgia – nerve damage

Psychogenic (descriptive)

- Psychological pain (especially in those with severe mental disorders)
- Conversion reaction – conversion of stressors in patient's life into neuro symptoms without a neuro cause
- Malingering – feigning injury to avoid work
- Hypochondriasis – excessive worry over serious illness
- Somatic delusion – belief that self's normal body function is grossly abnormal
- Somatization – chronic condition where physical symptoms involving multiple body parts but have no discernible physical cause
- Muchausen's syndrome – feigning illness to get attention

Differential Diagnosis of the Paroxysmal Hemicranias					
	Paroxysmal Hemicrania	Cluster	Hemicrania Continua	Trigeminal Neuralgia	SUNCT Syndrome*
Sex (F/M)	2:1	1:6	2:1	2:1	1:10
Age of Onset	6-81 yrs	20-40 yrs	11-88 yrs	50-60 yrs	30-68 yrs
Pain Quality	Stabbing/pulsatile, throbbing	Stabbing, boring	Baseline dull ache, superimposed throbbing/stabbing	Lancinating	Lancinating
Site of Maximal Pain	Orbit/temple	Orbit/temple	Orbit/temple	V1-V2	Periorbital
Attacks/Day	1-40	0-8	Varies	Varies/hundreds	Varies
Duration of Attacks	2-180 min (avg 2-28)	15-180 min (avg 20-45)	Continuous	Seconds	Seconds
Autonomic features	Yes	Yes	Yes (but less)	No	Yes
Alcohol Trigger	Yes	Sometimes	Yes	No	No

*SUNCT=short-lasting, unilateral neuralgiform headache attacks with conjunctival injection and tearing. Used with permission of the authors and publisher: Newman JC, Lipton RB. Paroxysmal hemicranias. (in) Headache (Blue Books of Practical Neurology). FJ Gooddy, SD Silberstein (Eds.), pp: 243-250, Boston, Butterworth-Heinemann, 1997.

None of these are affected by jaw movements, but they all have distinct pain that comes/goes

Headache Types

- Muscle Contracture/Tension Headache
 - Mid-level, continuous oscillating
 - Dull ache, pressure, tightness, band around head, bilateral
 - No nausea/vomiting, no sensory symptoms
 - Exception – taking too much ibuprofen will cause vomiting
- Vascular/migraine headaches
 - Sharp spikes which dissipate completely
 - Severe unilateral sudden onset of pain, throbbing, worsens with exertion
 - Sensory symptoms (patient prefers solitary)
- Mixed (vascular/muscular) headaches
 - Mid-level, continuous oscillating with sharp spikes that dissipate back to mid-level
 - Treatment to stop vascular portion first, then can use migraine medication to remove the other portions of pain
- Tumor headaches
 - Starts slowly but climbs in oscillatory pattern until reaching high level spike
- Sinus headaches
 - Chronic sinusitis doesn't usually cause chronic pain, it usually causes acute pain
- Other headaches
 - Systemic infection, hypoxia, CV disease, CO poisoning, nitrates/nitrites, ^OH, hypoglycemia, rebound headaches, post-epileptic
 - Pretty much anything and everything, from hormones to medications to missed meals and light to different types of food can cause headaches/migraines

Differential Diagnoses

- Sensitivity – true positive, minimum 70%
- Specificity – true negative, minimum 95%

Normal

- 40mm opening, 7mm lateral movement that is symmetric
- No pain, disc intermediate zone between condyle and articular eminence

Arthralgia/arthritis (synovitis/capsulitis)

- Testing
 - o Causes BOTH pain in face/jaw/temple/ear, and pain changed with function
 - o Pain on palpation of lateral condyle pole, **OR** maximum range of motion results in familiar joint pain
 - o Good sensitivity and specificity (0.91/0.96)
 - o MRI – bright from fluid effusion
- Possible Symptoms
 - o Dull ache, stiff/sore, tight feeling
 - o TMJ pain from clenching, function, provocation tests
 - o Limited range of motion
 - o Fluctuant swelling (from effusion) blocks ipsilateral posterior occlusion
 - o Ear pain

TMJ Disc Displacement w/ Reduction

- Testing
 - o Intermediate zone of disc anterior to condyle (11:30 position) when closed, normal when open
 - o In the last month, any noises with jaw movement **AND** any of the following
 - o Reciprocal clicking during ≥ 1 of 3 jaw opening/closing repetitions, **OR**
 - o Clicking on jaw during ≥ 1 of 3 opening/closing repetitions, clicking ≥ 1 of 3 excursive movements, and maximum opening (without regard to pain) ≥ 40 mm
 - o Sensitivity 0.33, specificity 0.94
 - o MRI – disc displacement that may limit jaw opening
 - o CT – slight osseous remodeling
- Possible Symptoms
 - o Episodic momentary catching/locking during mouth opening (<40 mm), self reduces with voluntary mandibular positioning
 - o Associated TMJ pain variable and uncommon
 - o 30% of people do not have noise during movement, but still have disc displacement with reduction

TMJ Disc Displacement w/o Reduction

- Testing
 - o Disc anterior to condyle
 - o Jaw lock/catch, limited opening <40 mm **AND** severe enough to interfere with eating ability
 - o Sensitivity 0.80, specificity 0.97
- Possible Symptoms
 - o History of clicking, popping, etc that ceased with locking/limited opening
 - o Pain at rest and during function
 - o Deflection of jaw to side with limited opening, ipsilateral hyperocclusion

TMJ Disc Displacement w/o Reduction w/o Limited Opening

- Testing
 - o Same as for disc displacement without reduction, **AND** opening >40mm
 - o Disc is further displaced anteriorly
 - o Sensitivity 0.54, specificity 0.79

Disc Displacement with Intermittent Locking

- Testing
 - o Any noises in joint movement **AND** sporadic joint locking, even momentarily
 - Wakes up with difficulty opening, but can move jaw around to gain back normal opening
 - o Examination is SAME as for disc displacement with reduction
 - o Internal derangement – mechanical problems/disc problems (a subset of disc displacement)
 - Clicking/popping for >1year w/o pain does not require treatment
 - Most damage done in the first year
- Significant deviation (>2mm) often associated with TMJ noise
- Episodic momentary locking during opening, self reduces with voluntary mandibular movement

Disc Displacement Summary

- Highly prevalent of disc displacement with reduction
- Low potential for progression
- Few have pain/locking symptoms, unless progressive
- Many progressive disorders respond favorably to treatment

Degenerative Joint Disease

- Testing
 - o Joint noises present **AND**
 - o Crepitus with palpation during function **OR** patient reports crunching, grinding, or grating noises during exam
- Malocclusions possible, especially anterior open bite with only 2nd molar occlusion
- Sensitivity 0.52, specificity 0.86
- Imaging shows trabecular bone (may have blood filled cysts), osteophytes, other bone remodeling

Myalgia

- Testing
 - o History of pain confirmed during exam
 - o Palpation resulting in familiar pain, **OR** opening results in familiar pain
 - o Sensitivity 0.84, specificity 0.95
- Possible symptoms
 - o Dull ache, pressure, soreness, stiffness, muscle fatigue

Myofascial Pain with Referral

- When palpating, ask – is there pain? Is this your pain? Does it hurt anywhere else?
 - o Palpation of trigger points in taut muscle/fascia provokes pain complaint/alteration, displaying pattern of pain referral
 - o Greater than 50% reduction of pain with vapocoolant spray or local anesthetic injection of trigger point, followed by stretching

- Testing
 - History same as myalgia, **AND** report of pain beyond borders of examined muscle
 - Sensitivity 0.85, specificity 0.98
- Possible Symptoms
 - Sensation of acute malocclusion not verified clinically
 - Ear pain, toothache, tension type headache
 - Decreased mouth opening, but passive stretching of tissue increases opening to normal
 - Hyperalgesia in region of referred pain

Headache Attributed to TMD

- Pain-related TMD demonstrated by clinically based diagnostic criteria
 - (arthralgia, myofascial pain, etc)
- History of headache in temporal area changed with jaw movement/function, **AND**
- Report of familiar headache with palpation of temporalis muscle, **or** range of motion
- Headache is not better accounted for by another headache diagnosis
- Sensitivity 0.89, specificity 0.86

Muscle Contracture

- Turns into scar tissue, seen in cancer survivors (radiation treatment)

Muscle Splinting

- When a joint is injured, all muscles associated with that joint will splint/brace that joint to protect it

Fibromyalgia

- Self-report – wide spread pain
 - Pain on left and right side of body, pain above and below waist and axial-skeletal pain (cervical spine, anterior chest, thoracic spine, low back)
- Examination
 - Pain in 11 of 18 tender-point sites on digital palpation

Adjunctive Tests

- Elicited pain must duplicate patient's pain, or be familiar
- Passive stretch
- Mobilization
- Orthopedic tests
 - Joint play tests
 - Compression
 - Distraction
 - Translation
 - Static and dynamic tests
- Tongue blade/cotton roll tests
 - Unilateral placement
 - Bilateral placement
- Clench test

Medical Management

- Goals
 - Short term
 - Palliative – decreasing pain, increasing function
 - Protective – prevent/minimize reoccurrence
 - Therapeutic – encourage healing
 - Long term
 - Maintain control over symptoms
 - If symptoms recur, provides patient with home based management strategies
- 4 components
 - Education
 - Self-care
 - Medications
 - Jaw exercise

Education

- Review anatomy and normal jaw function
 - TMD is a musculoskeletal (medical) condition
- Explanation of pain source (muscle and/or joint), and TMJ related mechanical conditions (ex:// noise, pain, locking/limited movement, etc)
 - Disc displacement usually with reduction, low potential for progression, few symptoms of pain or locking, most without reduction or osteoarthritis respond well to medical management
- Role of contributing factors, how to address them
- Non-life threatening nature of TMD
- Use of optimistic counseling and prognosis when warranted (relieves anxiety, motivates patients)

Self-Care

- Provides patient with strategies to independently manage condition
- Easy to implement, inexpensive, effective at reducing TMD pain and improving jaw function
- Facilitates good DDS/patient rapport and compliance
- Provides time for self-resolution of symptoms
- Should be implemented before initiating other therapies (ex:// splints)
- Allows clinical to assess patient compliance
 - Ice/heat treat
 - Pain free diet with bilateral chewing (soft diets and unilateral chewing are contraindicated)
 - Tongue up, teeth apart, jaws relaxed
 - Avoid caffeine/stimulants (cause clenching)
 - ID and control parafunctional habits, uncontrolled mouth opening
 - Avoid resting hand on jaw, maintain sleep position on back
 - Use OTC analgesics [if indicated], intake calcium
- Review verbally and written instructions with patient
- Maintain and reinforce through phases of treatment if additional treatment is required

Medications

- Usually short term improvement, may be used for long term treatment
- Combined with self-care instructions, can have massive (up to 70%) TMD symptom decrease
- Analgesics/anti-inflammatories
 - NSAIDs (take with food) – mild/moderate pain
 - Propionic acid – ibuprofen, naproxen
 - Acetic acid – diclofenac
 - Salicylates – aspirin
 - Contraindications – GI, kidney, liver problems, anticoagulants
 - Acetaminophen – Tylenol
 - Contraindications – liver problems
 - Steroids – severe pain
 - Methylprednisolone
 - Contraindications – infections, endocrine and cardiorenal and ophthalmic problems
- Muscle relaxants (sedatives) – short term use (3 weeks) only
 - Cyclobenzaprine
 - Clonazepam
 - Diazepam
 - Indications – muscle spasm/pain/tension, stress, sleep disturbance
 - Side effects – drowsiness, dizziness, orthostatic HTN, CNS depression
 - Contraindications – CV problems, MAO inhibitors, CNS depressants, hyperthyroidism
- Antidepressants
 - Amitriptyline
 - Nortriptyline
 - Indications – sleep disturbance, depression, chronic pain, neuropathic pain, headaches
 - Side effects – xerostomia, constipation, weight gain, orthostatic HTN
 - Contraindications – same as muscle relaxants
- Nutritional supplements
 - Glucosamine and chondroitin (best in combination)
 - Beneficial for joint pain and osteoarthritis, few side effects
 - Avoid if allergic to sea foods
 - Magnesium (can combine with calcium)
 - Beneficial for headaches, MFP
- Local anesthesia (can be used in combination)
 - Lidocaine patches, gels, injections
 - Capsaicin – active ingredient in chili peppers, good for arthritis and neuropathic pain

TMD Pharmacotherapy

<u>Problem list:</u>	<u>Medications:</u>
Severe TMD pain esp TMJ inflammation:	Medrol dose pack
Mild / moderate TMD pain:	Acetaminophen, ibuprofen, naproxen or aspirin
Severe pain:	Opioid and opioid combinations *
Muscle pain, bruxism, sleep:	Cyclobenzaprine (10 mg hs)
Muscle pain, bruxism, sleep, anxiety:	Benzodiazepines
Long term for TMD pain, sleep, TTH headaches, and fibromyalgia:	Amitriptyline (10-50 mg hs) Nortriptyline (10-50 mg hs)

* Rarely indicated

Jaw Exercises

- Rotation
- Relaxation
- Stretching
- Self-mobilization
- Strengthening
- Other

Treatment Sequencing

- Medical management – 45% of patients only need this
- Rehab
- Surgery – no major clinical difference in outcomes between rehab and surgery

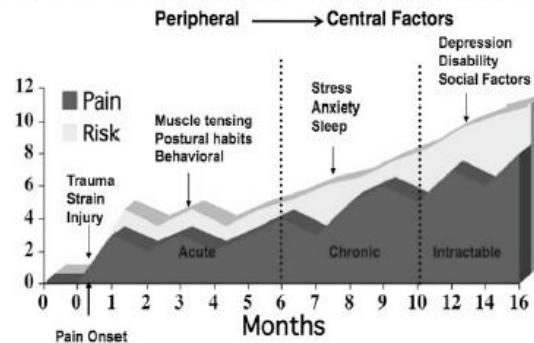
Factors that Predict Treatment Failure

- Psychosocial factors, uncontrolled habits
- Non-restorative sleep
- Prior treatment failure
- Chronicity
- Systemic conditions (rheumatoid arthritis, etc)
- Widespread pain

Axis II Assessment

- Pain related disability/interference
 - o Graded chronic pain scale
 - Characteristic pain intensity – average /10
 - Disability score – interference with daily activities, recreational activities, and ability to work
 - Low disability – Grade 1 = <5/10, Grade 2 = >5/10
 - High disability – Grade 3 = moderately limiting, Grade 4 = severely limiting
- Psychological status/distress (PHQ4) – NOT ON EXAM
- Oral habits checklist
 - o Bruxism while sleeping: <1night/month, 1-3 nights/month, 1-3 nights/week, 4-7nights/week
 - Frequency = none, little, some, most, all
 - o High force = clench, grind
 - o Low force = touch teeth together, tighten jaw, hold jaw rigid
 - o Pushing = jut jaw forward or laterally, press tongue, tongue between teeth
 - o Play = bite lips/cheek/tongue, hold objects between teeth, lean on jaw with hand, cradle phone
- Jaw functional limitation scale
- Areas of pain

Biopsychosocial Model: Impact of Pain



Biopsychosocial Model of Pain

<p>ASSESSMENT USING the BIOPSYCHOSOCIAL MODEL OF PAIN</p> <p>BIO</p> <p>DC for Pain-Related TMD (≥ 3 months)</p> <p>Infrequent: (<1 day/month)</p> <p>Epidemic: (≥1 but <15/month)</p> <p>Chronic: (≥15 days/month)</p> <p>→ CHRONIC</p> <p>INTENSITY OF PAIN (SEVERE: >7/10)</p> <p>→ SENSITIZATION</p> <p>Disc Displacement/ DJD</p> <p>→ MECHANICAL</p> <p>LOCATION OF PAIN</p> <p>Local/Regional</p> <p>→ WIDESPREAD</p> <p>PSYCHO</p> <p>PSYCHOLOGICAL STATUS</p> <p>→ DISTRESS</p> <p>SOCIAL</p> <p>INTERFERENCE in LIFE</p> <p>→ COMPLEX</p>	<p>Biopsychosocial Model for TMD Pain</p> <p>AXIS I - BIOLOGICAL</p> <p>Myofascial pain and arthralgia</p> <p>TMD/DJ</p> <p>Pain Sensitivity</p> <p>Pain-Relevant Genotypes</p> <p>AXIS II - PSYCHOSOCIAL</p> <p>Persistent oral habits</p> <p>Interference with daily activities</p> <p>Anxiety/depression</p> <p>Widespread pain</p>	<p>Axis II Summary</p> <p>Self-report instruments predict patient outcome better than physical diagnosis</p> <p>GCPS good screener for complexity and interferences in patient's life</p> <p>PHQ4 good screener for psychological distress</p> <p>Instruments good for triaging patients to appropriate care</p> <p>Self-report instrument to assess oral habits and jaw functional limitations</p> <p>Gold standard: sending patient for psychological consult</p>
--	---	--

- If medical management fails, then do complete assessment to delineate diagnosis/create list of relevant factors and implement appropriate treatment plan OR refer to specialist

Epidemiology

- Prevalence – proportion of persons with particular disease within a population at a given time/time period
- Incidence – proportion of new cases of particular disease commencing within a given time period

Orofacial Pain Frequency by Population %

- Pain at location – 15%
- Morning pain – 10%
- Pain during clinical exam – 33-54%
- Self-report pain on movement – 12-19%
- Self-report pain at joint – 31%
- Tenderness at TMJ on palpation – 56%
- Muscle tenderness – 97%

Sociodemographic Influence of TMD Prevalence

- Age
 - o TMD is most relevant between 25-45y/o
 - Adolescents have same prevalence as adults
 - o Older adults have less TMD pain, but more DJD/Mn movement limitations
- Gender
 - o Women 3x more likely to have TMD than men
 - o 9x more likely for severe TMD – disc displacement without reduction
- Socioeconomics
 - o Slight correlation, but not as strong as other dental factors

Incidence of TMD in General Population

- TMD pain – 3% per year
- Joint noises – only moderate reliability in testing
- Limited mouth opening/limited Mn movement – <1%

Prevalence of TMD diagnoses

- Rarely population based
- Pain – “myofascial pain” (~5%) more frequent than other TMD pain diagnoses (arthralgia, osteoarthritis)
- Joint noises (~10%) – clicking/crepitus, disc displacement with reduction is frequent
- Limited Mn movement (<1%) is very rare

Incidence of TMD Diagnoses

- Rarely population based

Frequency of TMD

- Definition and reliability of TMD influences prevalence and incidence study results figures lots
- Prevalence of TMD pain in adults = 10% (age and gender influences, less so socioeconomic)
- Incidence of TMD pain = 3% per year
- Demand for TMD treatment = 3% per year
- Treatment need = higher than treatment provided

Terminology

- Descriptive epidemiology – used in decision analysis
 - o Prevalence and incidence (risk)
- Analytical epidemiology – used in causation/prevention of TMD, assessment of prognoses and treatment
 - o Risk ratio/odds ratio – risk of outcome in group with specific risk factor vs risk of outcome in group without said risk factor

Etiology

Interaction between biomechanical and psychosocial factors

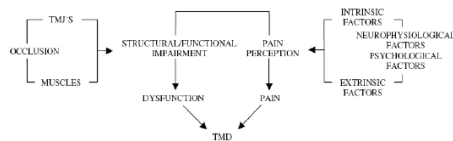
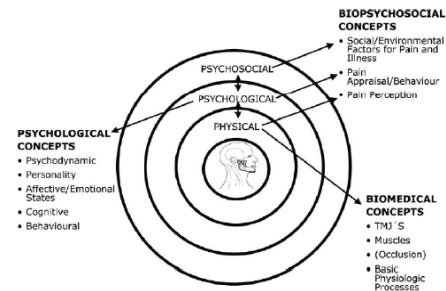


Fig. 2. Cardinal features of temporomandibular pain and dysfunction.



Traditional Views	Dynamic Model (added factors on another axis)	
Anatomic factors <ul style="list-style-type: none"> - Occlusion - General joint hypermobility - Joint morphology Neuromuscular factors <ul style="list-style-type: none"> - Bruxism - Trauma Psychosocial factors <ul style="list-style-type: none"> - Depression - Other/widespread pains 	<ul style="list-style-type: none"> - Time - Predisposition - Initiation - Maintenance of TMD 	Dynamic TMD models
Occlusal Factors		
Dynamic Factors <ul style="list-style-type: none"> - Unilateral contacts in RCP - RPC-ICP differences (length, asymmetry) - Guidance in horizontal jaw movements (canines vs group function, balancing contacts) 		Static Occlusion <ul style="list-style-type: none"> - Cross bite - Loss of posterior bite - Overbite and Overjet - Midline Deviation - Number of occlusal contacts

- Controversy over occlusal therapy, currently should NOT permanently alter patient's occlusion for TMD

Risk Factors in TMD

		Anatomy (joint)		Bruxism				
Occlusion	Trauma	Local (morphology)	General (laxity)	Chronic	Acute	Psychosocial	Genetic	Hormonal
+ (minimal)	++	? (-)	? (+)	-	+	++	+	+

Summary

- TMD is Multi-factorial
- Usually expressed as a relative risk (risk ratio/odds ratio)
- Behavioral and psychosocial risk factors are more important than anatomic and morphological risk factors
- Importance of occlusion does NOT justify irreversible alteration of occlusion to treat TMD

Psychological Factors

DSM IV TR – a multiaxial system

- Axis I – clinical disorders, including:
 - Depression – associated with chronic pain (30-54% of CP patients)
 - Lifetime risk – 10-25% XX, 5-12% XY
 - 3x higher risk for 1^o relatives, 15% depressed people suicide
 - Genetic link between ^OH and depression in population subset
 - 3 hypotheses (no reason couldn't be combo of all 3)
 - Antecedent hypothesis – depression precedes CP
 - Consequence hypothesis – CP causes depression
 - Scar hypothesis – depression before CP predisposes patient to depression after CP
 - 5 of – **depressed mood every day, diminished interest in everything**, loss of appetite, insomnia/hypersomnia, psychomotor agitation/retardation, fatigue, worthlessness or excessive guilt, inattention, recurrent thoughts of death
 - Anxiety – associated with acute pain
 - Problem magnification (for manipulative power) – look for signs instead of symptoms
 - Decreased pain threshold/tolerance
 - Restlessness, easily fatigued, attention deficit, irritability, muscle tension, **sleep disturbance**
 - Somatoform disorders
 - Substance-related disorders
 - Schizophrenia, other psychotic disorders
- Axis II – personality disorders, mental retardation
 - Consistent pattern of behavior deviating from expected norm, with significant distress/impairment on social, occupational, or other important areas of functioning. Has at least 2 of:
 - Cognition – perception, interpreting self/people/events, etc
 - Affectivity – range, intensity, lability, emotional response
 - Interpersonal functioning
 - **Impulse control** (Cluster B types)
 - Cluster A – the weird
 - Cluster B – the wild (common in CP patients) – no assessment of consequences, very impulsive
 - Predisposed to iatrogenic opiate/benzo addiction, symptom magnification (inherently manipulative of others), chronic pain, psychiatric comorbidity with depression and anxiety, angry/dependent parasitic relationships with self as victim, mild paranoia and seeing pervasive malice in all others (including health care provider) towards self
 - Cluster C – the worried
- Axis III – medical disorders
 - TMD, fibromyalgia, IBS
 - Autoimmune diseases
 - Cardiovascular diseases
- Axis IV – psychosocial and environmental problems
 - Problems with primary support group – family/marital
 - Occupational, housing, financial, legal problems
- Axis V – global assessment of functioning
 - Clinician's judgment of individual's overall level of function, from 10-100 (higher = better)

Treatments

- Axis I – depression and anxiety
 - o Mild/moderate – CBT (cognitive behavioral therapy)
 - o Moderate/severe – pharmacologic and psychotherapeutic (CBT) intervention
- Axis II – personality disorder
 - o Long term psychotherapeutics – traditional CBT is ineffective
 - Without appropriate treatment, will make health care worker relationship source of personal distress = poor treatment outcome
- Psychotherapeutic Treatment Options
 - o CBT = short term
 - o Biofeedback = short term
 - o Hypnosis = short and long term – depends on form of therapy it is combined with
 - o Insight oriented psychotherapy – long term
 - o Interpersonal psychotherapy – long term
- Application
 - o Ability to form differential diagnosis of personality aids in controlling patient behavior for complex patients due to personality instead of dental problems

Case Examples

- Angry Patient
 - o Personality disorder, comorbid with: ^OH, drug addiction, bipolar
 - o Caution – opiates
 - o Patient requires structure and consistency, building trust over first few encounters will make it easier; patient's anger likely to dissipate
- Non-Compliant Patient
 - o Personality disorder, drug/^OH abuse, OR depression
 - o Treatment is etiology dependent, customize approach based on differential diagnosis
- Anxious Patient
 - o General anxiety, phobic to dental procedures, etc
 - o Patient requires structure, consistency, nurturing and confident approach
 - Some patients prefer to have all information provided, some prefer no information and that the dentist just does the job without informing them of extraneous details

Physical Therapy Treatment

Why PT for TMD?

- Musculoskeletal/neuromuscular problems – joint and muscle and trigeminal nucleus
- Dysfunction may have postural/cervical component as contributing factor
- Functional limitation includes loss of jaw mobility, painful/restricted oral hygiene, chewing, talking, and dental treatment
- PT goals – pain free functional mobility eating/speech/dental treatment, restored coordination and strength

TMJ

- Ginglymoarthrodial joint – condylar rotation and translation/gliding
- Synovial joint
- Fibrocartilage lines the joint interface
- 3 joints in harmony – occlusion, right and left TMJ

DDS Referrals

- Diagnosis
- Contributing factors
- Diagnostic test results
- Pertinent MHx, contraindications
- Goals
- Evaluation and treatment

PT Evaluation

- Joint inflammation
- Hypermobility – subluxation, disc displacement with reduction, intermittent locking with disc displacement
 - o Subluxation treatments
 - Education (limit opening, self-mobilization to unlock)
 - Joint protection
 - Therapeutic exercises/activities
 - Isometric strengthening at varying opening stages
 - o Disc Displacement with Reduction Treatments
 - Education
 - Joint protection
 - Therapeutic exercises/activities
- Hypomobility
 - Myofascial pain, post-operative pain
 - Muscle spasm, lateral pterygoid spasm, contracture
 - Disc displacement without reduction
 - Fibrous ankylosis
- o Treatment
 - Education
 - Therapeutic exercises/activities
 - Modalities – ultrasound, electrical stimulation, heat vs cold
 - Manual therapy
 - Neuromuscular reeducation

PT Treatments

- Restore rest position of the jaw, jaw-joint protection
- Eliminate parafunctional habits – bruxism, tongue thrusting, etc
- Stretching exercises, self-care, ice and heat treatments
 - o Mn stretching – active stretching, passive stretch with fingers/knuckles, tongue depressors between molars, active assistive stretch
- Therapeutic exercises/activities
 - o Posture, Ergonomics, Sleep position
 - o Body mechanics, Fitness screening
- Ultrasound and other Treatment modalities
 - o Ultrasound – thermal vs non-thermal effects
 - o Electrical stimulation
 - o Heat vs cold
- Manual therapy – promotes joint dynamics and restoration of joint arthrokinematics
 - o Soft tissue and joint mobilization
 - o Functional rehab
- Iontophoresis – drug therapy, electrical stimulation, ion transfer through pH change in skin
 - o DDS must write prescription for medications – corticosteroids (sometimes with lidocaine)

Rocabado's 6x6 exercises

- o 6 exercises, 6x each, 6x/day
- o To promote good head over neck posture, proper rest position for jaw, diaphragmatic breathing
- TATU – teeth apart, tongue up (resting position in mouth)
 - o Proprioceptive tongue up (N position), teeth slightly apart, nasal diaphragmatic breathing
- Shoulder girdle retraction
 - o Strengthens scapular adductors, pectoralis muscles through agonist contraction
 - o Establishes stability of head/neck/shoulder complex, gives ideal postural position
- Stabilized head over neck flexion
 - o Hands touching base of neck, gently bow/nod while maintaining neutral erect cervical spine
 - o Promotes flexion of upper cervical vertebrae (relieves mechanical compression) and elongates posterior soft tissue in suboccipital region
- Axial Neck Extensions
 - o Gently tuck chin (elongate cervical spine) to flex occiput in upper cervical spine while extending lower cervical spine
 - o Promotes/improve relationship of head over neck
- TMJ rotation
 - o Gently open mouth through partial range while palpating TMJs
 - No translation, no clicking
 - o Promotes initial stage of incisal opening
- Rhythmic stabilization
 - o Gently resist each movement while keeping jaw in proper rest position
 - o Promotes Mn proprioceptive control, reeducates neuromuscular system and reciprocal inhibition
- Isokinetic Exercise
 - o Light resistance to movement of jaw in direction of partial opening and bilateral lateral movements
 - o Help reduce joint noises by coordinating muscles of mastication or by disc deformation

PT Beyond TMD

- Evaluate/treat cervical dysfunction
- Postural, trunk strengthening, upper extremity, aerobic conditioning exercises
- Oral habit reversal

Treatment Outcome Goals

- Joint protection, pain control
- TMJ RoM = 40mm IO, 8/8mm bilateral excursion
- Functional mobility for eating, talking, hygiene, treatment
- Proper head/neck/posture 80% of the time
- TATU posture 80% of the time
- Independence with home exercise programs, self-care

Splints and Occlusal Adjustments

Principles

- Occlusal stability – full coverage [of one arch] with part time use decreases potential of tooth movement
- Jaw Position Stability – part time use of passive appliance reduces potential for jaw positional change

Appliances

- Flat plane occlusal splint (stabilization appliance)
 - o Most commonly used
 - o Can be either arch (Mx or Mn)
 - o Calibrated to CR (greater repeatability), or closure from postural jaw rest position (if guided CR aggravates pain, or if there are mechanical symptoms)
 - Flat plane is best for retaining same jaw position – inclines cause jaw shifts
- Occlusal Design
 - o Intercuspal occlusion – opposing centric cusps and canines contact flat occlusal surface
 - o Excursive guidance – shallow anterior guidance, shallow canine guidance for excursive

	Mx Guard	Mn Guard
Advantages	Occlusal stability Facilitates adjustment of excursive guidance	Esthetics, speech Easier to use full time (compliance)
Disadvantages	Esthetics, speech Difficult with irregular occlusal planes Poor with increased OJ or anterior open bite	Difficult to adjust for excursive guidance Difficult with irregular occlusal plane Poor occlusal stability, especially if Mx anteriors are perio involved

Applications

- o Application/treatments are diagnosis dependent
- o What makes the pain worse? – signature of TMD is pain with function
- Sleep bruxism, day time clenching
- Myalgia and myofascial pain
- TMJ disc displacement with or without reduction
- TMJ arthralgia or osteoarthritis
- TMD ear pain
- Tension headaches
- Dental pain from bruxism (reversible pulpitis, periradicular pain)

Research

- Evidence for stabilization appliances for TMD is good, but not overwhelming
 - Bruxism and behavior, tooth wear
 - Alters occlusal relationship and jaw position
 - Non-specific effects
 - Placebo/nocebo effect
 - Pygmalion effect
 - Hawthorne effect – temporary behavior change due to environmental condition, typically response is an improvement
- 2008 Cochrane – not enough evidence to prove occlusal splints reduce bruxism – does decrease tooth wear
- 2008 Study – 3mm stabilization appliance, MRI shows change on condylar position and new distribution and contact areas in TMJ
- 2009 Cochrane – no evidence for or against stabilization splints for treating TMD
- 2010 Systematic Review – hard stabilization appliance gives improved pain control, soft and non-occluding splints show some effect but have greater side effects than no treatment
 - Soft mouth guards – good for pediatrics, cheaper, simple fabrication, less hygienic (increased porosity), reduced durability, comfort variability depending on patient
 - Recent evidence shows soft guards may be as effective as hard guards for myalgia and TMD

Appliances

- Mn orthopedic positioning appliance
 - Active Occlusal design
 - Anterior reverse incline guides jaw into pre-determined position
 - Posterior cuspal imprints to maintain position
 - Incisal edge-to-edge position eliminates TMJ disc displacement click, with increased joint comfort
 - Application
 - Early 1980s – full time use to recapture disc position and heal joint
 - Current – use to attempt altering joint load, very good for intermittent closed lock
 - Contraindications
 - Pain aggravated by protrusive jaw position
 - Mechanical joint symptoms
 - Disadvantages
 - Bulky/difficult to wear
 - Transient occlusal wear in mornings, usually lasts <2h
 - 10% patients have occlusal change/damage
- Occlusal Therapy
 - Occlusal adjustment – evidence does NOT show benefit of occlusal adjustment
 - Restorative dental treatment
 - Orthodontic treatment
 - Surgical orthodontics/orthognathic treatment
- For TMD to be result of occlusal feature, a clear temporal and clinical link must be made between an acute occlusal change and onset of TMD symptoms

Headaches and Neurovascular Disorders

Headaches

- Any pain from above the eyes to top on the neck and around the ears (frontalis to occipital, and temporal)
- Trigeminal nerve branches for facial pain, odonto pain, and some headaches
- 10% of the general population has TMD, but ¾ of TMD patients have headaches

Diagnosing

- Dental – dental diagnostic evaluation
- Musculoskeletal – TMJ and masticatory system
- Neurologic – head/neck neurologic evaluation

Primary Headaches – Migraines

- o Usually 25-55y/o, more common than arthritis or diabetes
- o Costs \$14B to treat annually, 7% is from direct health care costs
- o 89% headaches are severely painful, 56% migraineurs get ≥ 3 headaches/month
- Symptoms
 - o 2 of: unilateral, pulsatile, moderate/severe intensity, aggravated by activity
 - o 1 of: nausea/vomiting, photo/phonophobia
- Pathophysiology
 - o Brain is a visceral organ with its own pain signaling via CN V
 - o CN V system stimulated by neural/chemical trigger gives cascade resulting in migraine
 - This is why normal arterial pulse perceived as pain during migraine
 - Throbbing is synchronized with the heart
 - Complex neural network explains apparent unrelated triggers for migraines
 - Neurogenic inflammation – antidromal release of inflammatory mediators
- Central Sensitization – lowers pain stimulation threshold
 - o Nociceptive neurons in dorsal horn of spinal column become sensitized to pain from damage/inflammation to peripheral neurons
 - o In humans with migraines, allodynia of CN V₁ is seen – clinically, 2/3 patients have allodynia outside of area of perceived pain
- Diagnosis
 - o Dental exam and imaging
 - o MRI with or without contrast (rule out cranial lesion)
 - True head pain can be from intracranial bleeding, infection, chemical exposure/withdrawal, CSF leakage
- Treatment
 - o Symptomatic – NSAIDs, opioids, triptans, ergotamines
 - o Prophylactic – beta blockers, calcium channel blockers, antidepressants, anticonvulsants
 - o Rescue – ER injectable opiates
- Dental Applications
 - o Muscle/skin tenderness common in people with migraines
 - o More tender during pain phases
 - o Migraineurs feel more pain, can trigger headaches

Primary Headaches – Tension Type

- More common than migraines
 - o Lasts 30min to 1weeks, no nausea/vomit, either/neither (but not both) photo or phonophobia
 - o 2 of: bilateral, nonpulsatile pressing/tightening quality, mild/moderate intensity, no aggravated by routine activity
 - o 38% USA population has TTHA, 2% have chronic TTHA
- New RDC/TMD diagnostic guidelines specific to 89%, sensitive to 87%
 - o Jaw function can affect temporal region headaches
 - o Temporalis muscle palpation/jaw movement can provoke headaches
- Average years since migraine onset = 17.5
- Average years since TMD onset = 6
- Treatment
 - o Symptomatic – NSAIDs, opioids
 - o Prophylactic – anticonvulsant, antidepressant, muscle relaxant, botox

Primary Headaches – Others

- o Cluster headaches, paroxysmal hemicranias, hemicranias continua, SUNCT/SUNA
- CN V autonomic cephalgias (TACs) have ipsilateral autonomic symptoms (ptosis, tearing, nasal congestion, facial redness, swelling)

Red Flags/Cautions!

- Sudden onset
- No precipitating factors
- No apparent etiology
- Systemic complaints
- Neurologic deficits (2+)
- History of cancer

Treatments

- Non-pharmacologic
 - o Stress reduction/coping strategies
 - o Cognitive therapy
 - o Biofeedback
 - o ID and avoidance of triggers (habits, posture, sleep, stress, etc)
 - o Acupuncture/acupressure

Key Points

- Not all headache disorders have an odonto factor involved
- Dental exams/treatments may irritate CN V somatosensory system – can trigger headache
- Primary headache disorder may, rarely, present as a toothache
- DDS should ID neurovascular and headache symptoms and comorbid TMD, preliminary diagnosis, and provide clinical analysis/decisions
- Emphasize clinical questioning of symptoms beyond just the oral cavity
- Prefer to appropriate

Neuropathic Pains

- Must have all the following
 - o Presents in neuroanatomically defined area
 - o History of a relevant disease/lesion in nervous system
 - o Partial/complete sensory loss in part/all of painful area
 - o Confirmation of lesion/disease by a specific clinical test
- Heterogenous group of pain entities
 - o Neuralgias
 - o Neuritis
 - o Neuroma
 - o Neuropathy

Trigeminal Neuralgia

- Clinical Testing
 - o Intense painful stabbing lasting seconds/minutes, with pain free intervals
 - Latent or refractory periods
 - May have burning pain sensation lasting several minutes after paroxysms
 - o Often in Mx or Mn regions, does NOT cross midline
 - o Pain does NOT wake patient from sleep
 - o Initiation of pain from light touch, NOT painful stimuli
 - o Trigger zone (intra or **perioral**)
 - o No other objective clinical findings
- Epidemiology
 - o Females 2x more likely than males
 - o 56% right sided
 - o Risk factors – MS (20x), aging (highest at 80y/o)
 - o If young person has these symptoms, look for tumor impinging nerve or MS (or other factors)
- Points of Interest
 - o LA to affecting A β fibers stops attacks
 - o Exacerbation and remission periods (after pain, pain sensitivity is less for a refractory period)
 - o Over time, increasing frequency, duration, and severity of pain
 - o 65% of patients received dental treatment for pain
 - o Pretrigeminal neuralgia – dull achy **continuous** pain (aura) precedes full neuralgia days/weeks/years
 - o Surgical intervention provides short term relief, but recurs within 3-6 weeks
- Diagnostics
 - o Brain MRI with gad to rule out intracranial lesion and look for nerve root impingement
 - o Multiple sclerosis workup, especially if young and pain presents bilaterally
 - o LA to trigger zone stops ability to initiate pain
 - o Lab tests to evaluate CN V and effects of medications

- Treatments
 - Psychological (benefits all)
 - Stress reduction and coping strategies (decreased ANS)
 - Manage co-morbid depression/anxiety – conversation and medications (decreased ANS)
 - Biofeedback (decreased ANS)
 - Non-pharmacological
 - Acupuncture and acupressure
 - Pharmacotherapy (first line)
 - Anticonvulsants – carbamazepine, oxycarbazepine, baclofen, gabapentin, topiramate
 - Tricyclic antidepressants – amitriptyline, nortriptyline
 - Substance P depletion – capsaicin
 - Surgical (significant risk and sensory loss)
 - CN V decompression – artery, vein, tumor, bone compressing CN V
 - Dorsal root entry zone lesioning – tractotomy
 - Rhizotomy – ethanol, glycerol, balloon, cryo and radio frequency ablation
 - Peripheral neurotomy/neurectomy
 - Gamma-knife (radiology)
 - Prognosis – “fair to good”
 - Systemic health, age, ability to take pharmacotherapy, surgical procedures attempted
 - Can get neuralgia in any CN – for dentists, think about CNs that cross trigeminal nucleus
 - Neuralgias ONLY occur in the head region

Neuritis

- Injury – chemical, thermal, mechanical, infection (viral)
- Symptoms – constant dull aching burning tingling
 - Sensory aberrations
- Treatment – remove irritant, provide corticosteroids
- Post-Herpetic
 - Gabapentin and pregabalin
 - Duloxetine and venlafaxine
 - Tricyclic antidepressants
 - Sympathetic blockade

Neuroma

- Proliferative mass of disorganized neural tissue
- Caused from traumatic/surgical event
 - Mental foramen, lower lip and tongue region
- Usually onset 10 days after trauma
- Tinel’s sign – lightly tapping over nerve to elicit a sensation of tingling or “pins and needles”
- Zone of anesthesia
- Treatment
 - Medications – local anesthetics, corticosteroids, capsaicin
 - Surgical – excision

Neuropathy

- Deafferentation (definitively heterogenous)
 - Destruction/injuring sensory nerve fibers – sensory loss
 - Phantom limb pain, anesthesia dolorosa
 - Very common in dentistry – extractions and root canal therapy
 - Persistent dentoalveolar pain disorder – PDPD (0.5 – 1.6% following RCT)
 - Peripheral
 - Neuroma
 - Change in Na⁺ channels
 - Expression of adrenergic receptors
 - Central
 - Sprouting in spinal cord
 - Glial cell activation
 - Loss of inhibition
- Diagnostic Testing
 - Diagnosis by exclusion
 - Dental exam and image
 - Brain MRI with contrast to exclude intracranial lesion (nerve root impingement, etc)
 - Look at demyelinating disorders (multiple sclerosis, autoimmune, etc)
 - Rule out osteomyelitis of the jaw – bone scanning
 - 30% get persistent pain
 - 10% are SEVERELY affected
- Treatment
 - Psychological (benefits all)
 - Stress reduction and coping strategies (decreased ANS)
 - Manage co-morbid depression/anxiety – conversation and medications (decreased ANS)
 - Biofeedback (decreased ANS)
 - Non-pharmacological
 - Acupuncture and acupressure
 - Pharmacotherapy (main treatment)
 - Anticonvulsants, TCA, substance P depletion
 - α_1 antagonists, α_2 agonists
 - Clonidine, tizanidine
 - Opioids
 - Morphine, oxycodone
 - NSAIDs
 - Ibuprofen, COX-2 specifics
 - NMDA antagonists/cannabinoids
 - Ketamine
 - Surgical (significant risks and sensory loss)
 - Nervectomy for peripheral neuroma, decompression for nerve impingement
 - Other surgeries have very few research trials

- Prognosis – poor to fair
 - o Depending on unknown factors, 50% patients improve
 - o Factors – comorbid psychological stress (ANS), time (longer = worse), patient compliance, ability to tolerate pharmacotherapy, number of procedures (extent of injury), habits and lifestyle

Summary

- Treatment approaches vary widely, so does prognosis – distinguishing between them is vital
- Persistent pain when peripheral nerves are damaged
 - o More nerves damaged/cut = greater chance of causing persistent pain
 - o 1/3 of patients with persistent pain are severely affected
- Frequency of PDPD after root canal therapy
 - o Non-odontogenic pain = 3.4%
 - o Estimate from published research = 1.6%
 - o Emerging data from Minnesota = 0.5%

Burning Mouth Syndrome

Definition

- Burning pain in the tongue or other oral mucus membrane associated with normal signs and lab findings lasting at least 4-6 months
- Cranial neuralgias and central causes of facial pain
- Intraoral burning sensation for which no medical or dental cause can be found
- Other names – glossodynia, glossopyrosis, stomatopyrosis, stomatodynia, oral dysesthesia

Symptomatic Triad and No Signs

- Oral mucosa pain
 - o Quality – burning, scalded, on fire, numbed, spontaneous
 - o Intensity – 5-8/10, constant with fluctuations, progressive throughout the day
 - o Location – bilateral tongue, palate, labial mucosa, doesn't comply with peripheral nerve distribution
- Dysgeusia (altered taste perception)
 - o Affects 70% of patients
 - o Neurosensory testing – chorda timpani hypofunction
 - o Changes in CNS or PNS
- Xerostomia
 - o Affects 46-67% of patients
 - o Decreased salivary function that is not always objectively demonstrated
 - o Changes in salivary composition

Epidemiology

- Prevalence = 0.7-1.8%
- Affects females more (7:1 – 16:1)
- Increases with age (38-78 y/o)
- Duration – average 2-7 years

Differential Diagnoses

- Migratory glossitis (geographic tongue) – not painful, but similar symptoms to BMS
- Atrophic papilla – caused from iron deficiency or anemia

Clinical Assessment

- Patient MHx
- Physical examination
- Lab testing – CBC with differential and metabolic panel, deficiency in B12/folate/iron/zinc
- Clinical testing
 - o Unilateral peripheral nerve block (lidocaine)
 - With a lingual block, pain should go away bilaterally
 - Does not always happen. If pain increase, may be BMS subgroup (central pain)

Diagnosis

- Purely clinical – based on patient’s description of typical symptoms and exclusion of local and systemic factors that might give rise to burning pain sensations
- Diagnostic Criteria
 - o Pain in mouth present daily and persisting most of day
 - o Oral mucosa is of normal appearance
 - o Local and systemic diseases have been excluded
- Onset
 - o Spontaneous in 50% of patients
 - o Previous illness, previous dental procedures
 - o Medication use
 - o Traumatic life stressors
- Primary BMS – essential, idiopathic
- Secondary BMS – from an underlying clinical abnormality: local or systemic factors

Local Factors	Systemic Factors
<ul style="list-style-type: none"> - Mechanical irritation – poorly fitting dentures, parafunctional habits, tongue thrusting - Allergic contact stomatitis - Hyposalivation - Infections 	<ul style="list-style-type: none"> - Nutritional deficiencies - Endocrinopathies – diabetes, thyroiditis, hormonal deficiencies/imbances - Autoimmune disorders – Sjogren’s syndrome - Medications – antiglycemic and antihypertensives - Esophageal reflux - Depression, anxiety, somatoform disorder

Primary BMS

- Taste and sensory system interactions
 - o Lingual nerve and chorda timpani (CN V and CN VII)
 - CN V – motor and sensory, sensory branches mediate both non-painful and painful sensations (have neural fibers for both)
 - Any painful sensations in tongue are mediated by CN V
 - Damage to chorda timpani may affect CN V and cause it to fire, causing pain sensation
 - o Damage to taste, causing disinhibition of sensory input leading to burning symptoms
- BMS neuropathic pain disorder
 - o Altered sensory thresholds to heat upon QST (quantitative sensory testing)
 - o Damage to chorda timpani (decreased taste sensation/ability)
 - o Altered blink reflex suggesting defect within descending dopaminergic inhibitory system
 - o Hypofunction of dopaminergic system within basal ganglia (PET test)
 - o Significant loss of epithelial density of small diameter fibers in tongue mucosa (biopsy screening)
 - o Less activation of brain to painful hot stimuli (fMRI screening)
- Clinical Goals
 - o Determine if damage is nociceptive or neuropathic (non-neural structures or neural structures)
 - o Can a specific diagnosis be made with confidence that is the cause of pain?
 - o Determine if condition is self-limiting or progressive
 - o Can evidence based treatment be delivered?
 - o Is it possible to meet patient expectations?

Treatment

- Primary BMS (most likely neurologic pain)
 - Pain can affect the autonomic system, and thereby be upregulated
 - May be possible to treat pain by down regulating the autonomic system
 - Goal of reducing pain by 50% (or more) is considered a good treatment result
- Behavioural interventions
 - Cognitive behavioral therapy – biopsychosocial pain model, multifactorial nature of pain
- Topical medications
 - Clonazepam – 1mg chewable tablet
 - Most evidence to support this (is a benzodiazepine, so also treats anxiety)
 - Lidocaine – 2% gel
 - Capsaicin – 0.02% rinse
 - Active substance in peppers, it depletes nerve endings and nociceptors in periphery where applied (causes initial burning, then depletes nerve endings)
- Systemic medications
 - TCAs – nortriptyline, amitriptyline
 - Benzodiazepines – clonazepam (is this treating condition, or anxiety? Unknown)
 - Anticonvulsants – gabapentin
 - Antioxidants – α -lipoic acid (ALA)
 - Combination – gabapentin and ALA
- Secondary BMS
 - Take away underlying cause – treating underlying cause should remove symptoms
 - Irritation, infection, hematologic disorder, candidiasis, medication side effects, objective xerostomia, contact allergies, parafunctional habits, etc
 - With some drugs (diabetic drugs, antiHTNs), it may be impossible to ask patient to stop taking drug

Summary

- Greater prevalence in females, especially post-menopausal
- ID of cause and risk factors may help ID effective treatment strategies
 - Could also treat symptoms to underlying neurological mechanisms
- Increasing evidence suggesting alterations in PNS or CNS, specific to taste or nociceptive pathways

Poor Prognosis

Grouping Factors

- Difficulty obtaining diagnosis
- Difficulty obtaining pain control
- Mental health, personality disorders, psychopathology (management issues)
- Non-dental etiologies underlying symptom of pain (things not to miss...)
- Pain-related conditions and health factors affecting somatosensory system

Prognosis

- Forecast of the course of a disease or patient's response to treatment of the disease

Difficulty with Diagnosis/Treatment

- Communication issues
 - o Cultural and social norms
 - o Language
- Comorbid presentation of disorders
 - o Other pain conditions
 - o General health conditions
 - o Psychopathology
- Patient Factors
 - o Non-compliant patients
 - o Unresponsive to treatments
 - o Passive, dependent, hostile, etc
 - o Self-destructive
- Wrong diagnosis – this is not a difficulty with diagnosis, but it makes treatment extremely difficult

Factors

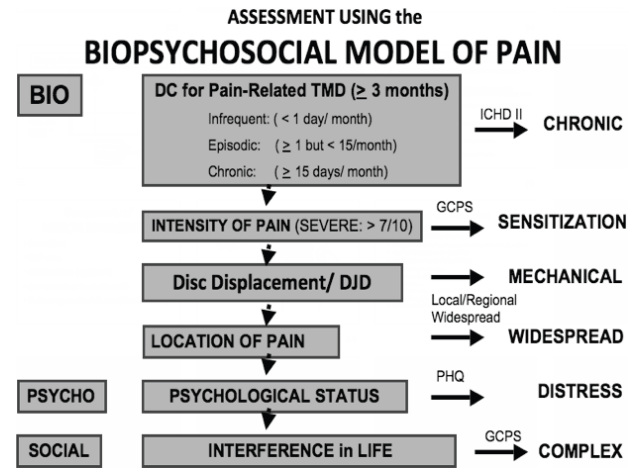
- Mental health – “colors” everything the patient presents, from what they say to what they think is important to how they engage and comply with treatments and general decision making
- Non-dental etiologies – central and peripheral pathologies
 - o Pain history – first and worse headache, short term duration that continues to get worse, any association with numbness, tingling, weakness
 - o MHx – diagnosis with cancer, possibly 2nd primary or metastasis
 - o Review of Systems – non-specific systemic symptoms (night sweats, nausea, cognitive impairment) and local symptoms (difficulty swallowing, voice changes)
 - o Physical examination – redness, warmth, swelling
 - o Cranial nerve exam – +1 other sign (loss of sensory or muscle function)
- Pain and health conditions
 - o Level of certainty of diagnosis
 - o Level of evidence related to current understanding of entity
 - o Knowledge of underlying pathophysiology
 - o Patient’s personal priorities
 - o Pain-related conditions (duration, width of spread, etc)
 - Poor sleep quality – factors that influence sleep quality include presence of pain, past pain experiences, anxiety, relevance of pain, concomitant depression, mood disturbances, age
 - o Intrinsic capacity to change/heal/adapt
 - o Co-morbid psychosocial conditions (engagement, compliance, etc)
 - o Communication between practitioners
- Secondary Gain
 - o Condition where patient is rewarded for having a pain problem – disability payments, excused from undesirable work/chores
 - Not commonly observed clinically, but if present patient may not report improvement from any therapy

Identifying General Predictors of Outcome

- Objective – to ID which general prognostic factors (pain intensity, levels of disability, psychological factors) are most strongly associated with outcome from musculoskeletal pain, regardless of pain location
- Methods – data from prospective observational cohort of primary care patients with acute and chronic non-spinal musculoskeletal pain
- Results – generic factors predicted outcome over different time periods and for both acute and chronic musculoskeletal pain
 - o Most consistent predictors of poor outcome were having same complaint in previous year, lower level of education, lower scores on the Short Form 36 vitality subscale, using pain medication at baseline, and being bothered by complaint more often in the past 3 months

Biopsychosocial Model of Pain

- Pain = unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage
- Pain is better described as multidimensional or multifactorial experience encompassing sensory, affective (emotional), motivational and cognitive dimensions
- To determine the level of complexity of the patient's clinical presentation and to decide whether additional resources outside the scope of dental practice should be included in treatment planning
- Ongoing behavioral issues may prevent use of coping skills for symptom management



Summary

- Obtaining correct diagnosis critical for success, for *several* reasons
- Number and severity of comorbid disorders impacts treatment prognosis
- Mental health and psychosocial conditions affect overall management in multiple profound ways
- Communication is **key**