OROFACIAL PAIN

What Did I Miss?

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Diplomate, American Board of Orofacial Pain
Diplomate, American Board of Dental Sleep Medicine
Pain is defined as an unpleasant *sensory* and *emotional* experience associated with actual or *potential* tissue damage or described in term of such damage.
Chronic Pain in the United States

- 57% suffered from chronic or recurrent pain in last year
- Small variation between age groups
- 4 of 10 chronic pain sufferers reported significant life adjustments
- 76% impacted by pain

Research America! September 4, 2003
Second-Order Neuron

- Sometimes is called a transmission neuron since it transfers the impulse on to higher centers.
- The synapse of the primary afferent and second-order neuron occurs in the dorsal horn of the spinal cord.
The spinal tract nucleus is divided into three regions:
- Subnucleus Oralis
- Subnucleus interpolaris
- Subnucleus caudalis
OROFACIAL PAIN
TMJ Disorders, Diagnosis and Clinical Management

- Afferent (Sensory) Somatic Nerves
  - Trigeminal Nerve
  - Facial Nerve
  - Glassopharyngeal Nerve
  - Vagus Nerve
  - Cervical Spinal Nerves
OROFACIAL PAIN
What Did I Miss?

- Diagnosis is also determined by how we think.
- The Dentists’ mind when making a diagnosis.
General Considerations in Managing Orofacial Pains

- Caused-Related Therapy
  - Somatic Pain
  - Neuropathic Pain
  - Pain Related to Psychologic Disorders
OROFACIAL PAIN
What Did I Miss?

- Extracranial pain disorders
  - Cranial bone including the mandible
  - Neck
  - Eyes
  - Nose and sinuses
  - Ear
  - Throat
  - Teeth and related structures
  - Tongue and salivary glands
  - Temporomandibular Joint
Categories of Common Orofacial Pain Conditions

Somatic (nociceptive pain)
- local (oral/perioral) tissue injury / inflammation

Musculoskeletal
- TMD

Neuropathic orofacial pain
- neuralgias
- deafferentation
- dysesthesia

Vascular Pain
Headache
- migraine
- Cluster
OROFACIAL PAIN
What Did I Miss?

- Masticatory muscles disorders
  - Myofascial pain
  - Myositis
  - Myospasm
  - Local myalgia-unclassified
  - Myofabrotic contacture
  - Neoplasia

Articular Disorders
- Congenital and developmental disorders
- Disc derangement disorders
- Temporomandibular dislocation
- Inflammatory disorders
- Osteoarthritis (Noninflammatory Disorders)
- Ankylosis
- Fractures
The spinal tract is divided into the subnucleus oralis, subnucleus interpolaris and subnucleus caudalis, which corresponds to the medullary dorsal horn.

- Tooth pulp afferents go to all three subnuclei
**Efferent (Motor) Somatic Nerves**
- Oculomotor, and abducent Nerves
- Trigeminal Nerve
- Facial Nerve
- Glossopharyngeal nerve
- Vagus nerve
- Accessory Nerve
- Hypoglossal Nerve
- Cervical Spinal Nerves
Pain from Deep Tissues and Referred Pain
The Skin:
The Deep Somatic (Musculoskeletal)
The Visceral
Referred Pain: is due to the accurate localization of input from peripheral nociceptors that are at a distance from the original pathological process.
OROFACIAL PAIN
TMJ Disorders, Diagnosis and Clinical Management
CLASSIFICATION OF OROFACIAL PAINS

Axis I
(Physical Conditions)

- Somatic Pain
  - Superficial Pain
  - Deep Pain
- Neuropathic Pain
  - Episodic Pain
  - Continuous Pain
CLASSIFICATION OF OROFACIAL PAINS

Axis I
(Physical Conditions)

- Somatic Pain
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  - Episodic Pain
  - Continuous Pain

- Mucogingival Pain
CLASSIFICATION OF OROFACIAL PAINS

Axis I
(Physical Conditions)
## OROFACIAL PAIN
### From Basic Science to Clinical Management

<table>
<thead>
<tr>
<th>Muscle toothache</th>
<th>Neurovascular Toothache</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Non-pulsatile, more constant aching.</td>
<td>1. The pain is spontaneous, variable, and pulsatile. The toothache characterized with a remission period.</td>
</tr>
<tr>
<td>2. Not responsive to local provocation of the tooth.</td>
<td>2. The pain may follow illness, sinusitis, dental treatment, surgery, or trauma.</td>
</tr>
<tr>
<td>3. Pain increasing with function of involved muscle.</td>
<td>3. The pain very frequently is felt initially in teeth (Canine and premolars) as a toothache.</td>
</tr>
<tr>
<td>4. Local anesthesia of the tooth not affecting the toothache.</td>
<td></td>
</tr>
<tr>
<td>5. Local anesthesia of the involved muscle reducing the toothache.</td>
<td></td>
</tr>
</tbody>
</table>
# Orofacial Pain

## From Basic Science to Clinical Management

<table>
<thead>
<tr>
<th>Cardiac Toothache</th>
<th>Neuropathic Toothache</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aching pain is cyclic.</td>
<td>1. Pain is unilateral, severe, lacerating. Shock-like (paroxysmal) pain. Provoked by a trigger.</td>
</tr>
<tr>
<td>2. Pain is increased with physical activity.</td>
<td>2. Local anesthetic at the tooth will not reduce the pain unless it is also the trigger (which is very rare). Local anesthetic at the trigger will reduce the attack.</td>
</tr>
<tr>
<td>3. The toothache is associated with chest pains.</td>
<td>3. Pain is</td>
</tr>
<tr>
<td>4. The toothache is decreased with nitroglycerin.</td>
<td></td>
</tr>
</tbody>
</table>

## Neuritic Pain (neuritis)

1. Pain in a tooth or tooth site.
2. Continuous or almost continuous pain.
3. Pain persisting more than 4 months.
4. No sign of local or referred pain.
5. Equivocal results of a somatic block.

## Psychogenic Toothache

1. Multiple teeth often reported as painful with frequent changes in character and location of the pain.
2. Normal or physiologic patterns of pain not applicable.
3. Chronic pattern of pain.
5. Not identifiable as any other pain condition.
Masticatory Muscle Pain

Normal Function → An Event

Resolution → Protective Co-contraction

Perpetuating Conditions → A Chronic Myalgic Disorder

Fibromyalgia

An Acute Myalgic Disorder

Myofascial Pain → Latency

Local Muscle Soreness

Myositis

Myospasm

Superficial

Masseter

Sterno-cleido-mastoid

Temporalis

Suboccipital
Masticatory Muscles Pain
AAOP Classification

- Myofascial Pain
- Myositis
- Myositis and Dystonia
- Protective Muscle Splinting
- Contracture
- Neoplasia
- Fibromyalgia
Myofascial Pain

A regional associated with localized spots in muscles, tendon, or fascia that reproduce pain

- Pain over region, usually dull
- Localized tenderness in firm bands of muscle
- Alteration of pain with palpation, spray and stretch or trigger point injection
Myofascial Trigger Point Referral Patterns

Pain Source:
Anterior Temporalis

Site of Pain:
Maxillary Anterior Teeth
Retro-orbital Temple Frontal

Associated Signs:
Dental hypersensitivity

Travell and Simons, 1999
Wright, E., JADA 2000
Myofascial Trigger Point Referral Patterns

Pain Source:
Middle Temporalis

Site of Pain:
Maxillary bicuspids
Temple

Associated Signs:
Dental hypersensitivity
Myofascial Trigger Point Referral Patterns

Pain Source:
Posterior Temporalis

Site of Pain:
Maxillary posterior teeth
Temple

Associated Signs:
Dental hypersensitivity

Travell and Simons, 1999
Wright, E., JADA 2000
Myofascial Trigger Point Referral Patterns

Pain Source:
Posterior Temporalis

Site of Pain:
Posterior Portion of Temple

Associated Signs:
Dental hypersensitivity

Travell and Simons, 1999
Wright, E., JADA 2000
Myofascial Trigger Point Referral Patterns

Pain Source:
Superficial layer, upper portion of Masseter muscle

Pain Site:
Sinus Pain
Posterior Maxillary Teeth
Myofascial Trigger Point Referral Patterns

Pain Source:
Superficial layer, lower portion of Masseter muscle

Pain Site:
The Mandible,
Retro Orbital, Frontalis
Myofascial Trigger Point Referral Patterns

- Pain Source:
  Deep Layer of Masseter

- Pain Site:
  Earache (Auricular), TMJ

Travell and Simons, 1999
Wright, E. , JADA 2000
Myofascial Trigger Point Referral Patterns

Travell and Simons, 1999
Wright, E., JADA 2000

Pain Sources:
Sternocleidomastoid Muscle

- Pain Site:
  - Retro Orbital
  - Vertex
  - Back of The Head
  - Throat
Myofascial Trigger Point Referral Patterns

Travell and Simons, 1999
Wright, E. , JADA 2000

Pain Sources:
Sternocleidomastoid Muscle

- Pain Site:
  Retro Orbital
  Mastoid Process
  Ear
Myofascial Trigger Point Referral Patterns

Travell and Simons, 1999
Wright, E., JADA 2000

Pain Sources:
Upper Trapezius

Pain Site
Posterior Border of the Mandible
Anterior Temple
Myofascial Trigger Point Referral Patterns

Pain Sources:
Suboccipital Muscles

Pain Site:
Peri-auricular area
Mastoid Process
Posterior Portion of Temple
Patient: Lavonne

- 56 year old Caucasian female
- Medical history significant for:
  - hairy cell leukemia (in remission)
  - low back pain (intermittent)
  - depressed mood secondary to pain
Patient: Lavonne

- **Chief pain concern:**
  - “Deep dull pain in lower right jaw; feels like upper and lower teeth are misaligned; fairly constant pain”
Patient: Lavonne

- **Aggravating factors:**
  - chewing, yawning, and talking

- **Alleviating/relieving factors:**
  - occlusal appliance therapy
  - NSAID and PT
Radiographic and clinical findings (intraoral assessment) were non-contributory to determination of a diagnosis.
Masticatory Muscle Disorders

**Symptoms:**
- Pain especially during function
- Re-producible pain on provocation
- Muscle tenderness on palpation
- Limited range of motion due to pain
- Feeling of muscle weakness
**Treatment:**

- Eliminate etiology factor(s)
- Trigger points injections, using Marcaine 0.5% w or without Kenalog
- Restrict mandibular function
- Simple muscle relaxation therapy
- Medication (anti-inflammatory, muscle relaxant)
- Physical therapy
OROFACIAL PAIN
What Did I Miss?

Factors contributing to misdiagnosis

- Dental causes of tooth pain
- Referred muscle pain
- Trigeminal neuralgia
Neuropathic Pain

- Growing problem
- Affects 1.5% general population
- 2000 U.S. Census: 286 million people
- 4,290,000 people affected in U.S.
Idiopathic Trigeminal Neuralgia

Dental treatment applied

31 of 48 patients diagnosed with ITN underwent 83 dental procedures for their pain condition.

- Extraction(s)
- Endodontics
- Dentures
- Periapical surgery
- Occlusal appliance
- Osseous surgery

Siguieria et al. OOOE Sept 2004:311-315
Trigeminal Neuralgia

Most commonly expressed in the maxillary and mandibular divisions (95%).
Idiopathic Trigeminal Neuralgia

Of 48 patients, 64.5% had an intraoral trigger zone.

Siguera et al. OOOE Sept 2004:311-315
Idiopathic Trigeminal Neuralgia

<table>
<thead>
<tr>
<th>Trigger Zone</th>
<th>Male $n=13$</th>
<th>Female $n=35$</th>
<th>Total $n=48$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alveolar mucosa</td>
<td>4</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>Face (zygoma)</td>
<td>2</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Nose</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Lips</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Jaw</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tooth</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Siguieria et al. OOOE Sept 2004:311-315
<table>
<thead>
<tr>
<th>Triggering Stimulus (n=48)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$n$</td>
<td>$n$</td>
</tr>
<tr>
<td>Chewing</td>
<td>1</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Talking</td>
<td>--</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dental Prosthesis</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Combing hair</td>
<td>--</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Swallowing</td>
<td>--</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Washing face</td>
<td>--</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Sigueria et al. OOOE Sept 2004:311-315
Trigeminal Neuralgia

1. Pharmacotherapy
   - Tegretol
   - Dilantin
   - Baclofen

2. MVD Surgery when recommended

3. Other recommended treatment
Secondary Trigeminal Neuralgia

**Prevalence**

- 5-10% after facial fractures or orthognathic surgery
- 1-5% after extraction of impacted teeth
Pain described as numb, burning and tingling.

Onset immediately following implant placement.
Following implant removal, patient continues to experience:

- burning pain
- intermittent shooting, lancinating pain
Secondary Trigeminal Neuralgia

**Treatment**

1. microsurgery
2. graft-repair reanastomosis
3. pharmacotherapy
   - Tegretol
   - Dilantin
   - Baclofen
OROFACIAL PAIN
What Did I Miss?

Factors contributing to misdiagnosis

- Dental causes of tooth pain
- Referred muscle pain
- Trigeminal neuralgia
- Continuous neuropathic pain
Neuropathic Orofacial Pain

- Permanent changes in the area where that nerve was first injured
- The changes can result in continued pain, despite the normal healing
- The nervous system can undergo changes both in the peripheral portion and even in the central portion, (Plasticity)
- Pain may provoked, by it self, light touch, hot, cold stimulation triggers it. (Allodynia, Hyperalgesia)
Neuropathic Orofacial Pain

- Paroxysmal Pain
- General nagging pain
- Dull to sharp pain
- Stabbing, shock-line pain
Neuropathic Orofacial Pain

- Chronic pain arises from the brain and cranial nerves of the head, face and neck.
- It is not from a psychological origin, it has physical origins.
- Can be managed effectively when properly diagnosed.
Patient: Florence

- 57 year old Caucasian female
- Medical history significant for:
  - Muscles aches, chronic fatigue, irritability, insomnia, dry mouth
  - Ovarian cysts, removed spleen
  - She is on Imitrex, Salagen, Penicillin, Tylenol III, Vicodin, Melatonin, Motrin, Ambien, Alprazilam and Trimethobenzamide.
  - Depressed mood due to pain
Chief pain concern:

- Pain in all the upper front teeth after teeth bleaching. Pain in the upper gum, multiple root canal treatments”
- She had veneers after teeth bleaching on the upper front six teeth.
Patient: Florence
Patient: Florence

Treatment: TCA, NSAID, Anticonvulsant, Medication, add PT.
Pain Pathways
Neuropathic pain

Pharmacotherapeutic Considerations

- Sharp, stabbing, lancinating
  - Anticonvulsants
  - Tricyclic antidepressants
  - Gabapentin (Neurontin)

- Burning
  - Tricyclic antidepressants
  - Gabapentin (Neurontin)
  - Local anesthetics
  - Steroids

- Tingling, numb
  - Antispasmodics
  - Gabapentin (Neurontin)
  - Steroids

Pain Quality:
- Neurogenic pain
OROFACIAL PAIN
What Did I Miss?

Factors contributing to misdiagnosis

- Dental causes of tooth pain
- Referred muscle pain
- Trigeminal neuralgia
- Continuous Neuropathic pain
- Headache pain
Headache And Dental Pain
Anatomy of Neurovascular Pain
Cluster Headache

- Predominantly affects men
- May be triggered by sleep
- On average 6.6 years from initial expression to diagnosis
Cluster Headache

Associated Features

*Incidence of jaw/tooth pain*

- toothache 53%
- jaw pain 47%

*Brook RI. Oral Medicine, 1978:46:511*
OROFACIAL PAIN
What Did I Miss?

Factors contributing to misdiagnosis

- Presentation/location similar to toothache
- Referred muscle pain
- Trigeminal neuralgia
- Continuous Neuropathic pain
- Headache pain
- Cardiac toothache
Cardiac Toothache

- Angina pectoris or acute myocardial infarction, refer pain to the shoulder, arm, the jaw and to the teeth.
- Associated with chest pain, but occasionally, it is not
- Tooth ache increases with exercises and decreased with medication specific for the heart (nitroglycerin)
- Treatment is directed to the underlying heart problem, after dental evaluation.
OROFACIAL PAIN

What Did I Miss?

Factors contributing to misdiagnosis

- Presentation/location similar to toothache
- Referred muscle pain
- Trigeminal neuralgia
- Continuous Neuropathic pain
- Headache pain
- Cardiac toothache
- Sinus/nasal toothache
Sinus/Nasal Toothache

- Problems in the maxillary sinuses/paranasal mucosa
- Several upper teeth, dull pain, aching or throbbing.
- Associated with pressure below the eyes and worsen by bending down, applying pressure in the sinuses, coughing, sneezing.
- Chewing, cold, percussion, worsen the pain.
- History of upper respiratory infection, nasal congestion, or sinus problem.
- Local nerve block, will block the tooth pain.
Sinus/Nasal Toothache
OROFACIAL PAIN
What Did I Miss

Factors contributing to misdiagnosis

- Presentation/location similar to toothache
- Referred muscle pain
- Trigeminal neuralgia
- Continuous Neuropathic pain
- Headache pain
- Cardiac toothache
- Sinus/nasal toothache
- Salivary gland dysfunction
Slivery Gland Dysfunction

- Associated teeth pain with salivary gland dysfunction through different mechanism.
- Compromising the health of the teeth and supporting structures by the absence of the salvia.
- Comprehensive evaluation of the salivary glands is needed.
Factors contributing to misdiagnosis

- Presentation/location similar to toothache
- Referred muscle pain
- Trigeminal neuralgia
- Continuous Neuropathic pain
- Headache pain
- Cardiac toothache
- Sinus/nasal toothache
- Salivary gland dysfunction
- Neoplasias and other lesions in the head
Neoplasias and other lesions in the head

- Some tumors, aneurisms, and intracranial disorders.
- Associated with other nerve nerve dysfunctioning symptoms or systemic symptoms, (weight loss, fatigue)
- Proper imaging of the face, jaw and head is important
Case Report

- CC: jaw pain, ear pain, headaches and pain when chewing.
Case Report

- **HPI:** Pain is in the right jaw that began a week after receiving his partials back in February. The pain is shooting and is severe especially after chewing his first few bites of his food, the jaw becomes sore. He experiences shooting pain after his first sip of cold beer, then the pain becomes soreness-like and tender.

- These symptoms apply to the ear pain and headaches also. The symptoms are also present at most times.

- The headaches are mostly present in the right side and may last for an hour to hour and half.
Case Report

- **MEDICATIONS:** Aspirin, Hydrochlorothiazide, Cozaar, Atenolol, Niacin, Lipitor, Prilosec, Fish oil.

- **SOCIAL HISTORY:** Patient is a 67-year-old widowed Caucasian male with 4 grown children. He is retired. He eats poorly, consumes 3-4 caffeinated beverages per day and drinks alcohol on occasion. Patient smokes more than a pack of cigarettes a day and does not use recreational drugs.
Case Report

- **MEDICAL HISTORY**: Mr. K. H. reported a history of tonsillectomy, high blood pressure, hearing impairment, frequent cough, sinus problems, poor circulation, cold hands and feet and scarlet fever.

- **VITALS**: BP 119/62, Pulse 58bpm, O²Sa 99%
  
  Temp 97.9F.

- **CLINICAL EXAMINATION**: A lump under the base of the tongue, right side
OROFACIAL PAIN
what Did I Miss?

What Is Your Impression?
Neoplasias and other lesions in the head
OROFACIAL PAIN
What Did I Miss?

Factors contributing to misdiagnosis

- Presentation/location similar to toothache
- Referred muscle pain
- Trigeminal neuralgia
- Continuous Neuropathic pain
- Headache pain
- Cardiac toothache
- Sinus/nasal toothache
- Salivary gland dysfunction
- Neoplasias and other lesions in the head
- Psychological disturbances
# General Considerations in Managing Orofacial Pains

## Therapeutic Modalities for Managing Orofacial Pain Disorders

### I. Pharmacologic therapy

#### A. Analgesic agent

1. Non-narcotic agents
2. Narcotic agents
3. Adjunctive analgesics

#### B. Anesthetic agents

1. Topical anesthetic
2. Injectable local anesthetic

#### C. Anti-inflammatory agents

#### D. Muscle relaxant

#### E. Antidepressants

#### F. Anti-anxiety agents

#### G. Vasoactive agents

#### H. Norepinephrine blockers

#### I. Antimicrobial agents

#### J. Antiviral agents

#### K. Antihistamine agents

#### L. Anticonvulsive agents

### M. Neurolytic agents

### N. Dietary considerations

### II. Physical therapy

#### A. Modalities

1. Sensory stimulation
2. Ultrasound
3. Electrogalvanic stimulation (ESG)

### III. Botulinum Toxin (Neurotoxin)

#### I. Type A

#### II. Type B
Trigeminal Neuralgia

The importance of a team approach to care can not be overstated.
The Many Faces of Pain
What We Don’t See/ We Don’t Know!!!
Greater awareness does not come in a single blinding flash of enlightenment.

• It comes slowly piece by piece, and each piece must be worked for by the patient effort of study and observation of everything, including ourselves.

Scott Peck
Road Less Traveled 285