Clinical Diagnosis and Management of Orofacial Pain

Dermot Canavan

Irish Pain Society 2014
GLOBAL YEAR AGAINST OROFACIAL PAIN
OCTOBER 2013 – OCTOBER 2014
International Association for the Study of Pain
Orofacial Pain: Unique Anatomical Tissues

Influenced by input from the cervical spine

- Headache
- Meninges
- Cornea
- Nasal/oral Mucosa
- Dental Pulp
- TMJ

Eating
Speech
Emotional Expression
Sexual Behaviour
Trigeminal Pain *Versus* Spinal Pain

- Tissues uniquely sensitive, cornea, tooth pulp
- Shorter conduction distances
- Less sympathetic efferents in face
- Unique central connections in TGN
- Representation on Sensory Cortex
- Headaches
- Toothache
- Neuralgias
- BMS
- Atypical Odontalgia
Diagnosing Orofacial Pain
Our Challenge as Clinicians

• Pulpal Pain (Toothache) is most common cause of orofacial pain
• Myofascial Pain is most common cause of extraoral pain
• 81% of patients attending a specialist orofacial center had pain sources outside the trigeminal system but failed to mention them

Diagnosing Orofacial Pain

• TMD Patients:
  • Associated with Fibromyalgia, chronic fatigue, headache, panic disorder, IBS, back pain, multiple chemical sensitivity, and PTSD
  • These comorbid conditions differentiate orofacial pain patients from those seeking dental care
  • If all pain sources are not revealed treatment outcome are likely to be poor

Pain Pathways
And What Makes The Pulp So Painful

Pain Activation
Wiegelt A, Terekhin P, Dorfler A, Forster C.

‘The representation of experimental tooth pain from upper and lower jaws in the human trigeminal pathway’

PAIN Volume 149, Issue 3, Pages 529-538, June 2010

Differences in the activation between
- Non-painful dental stimulation
- Chronic orofacial pain and
- Acute dental pain

Single Inflamed tooth can
- Active a broad area of trigeminal innervation
- Trigger sensory – motor dysfunction
- Activates both medial and lateral pain projection systems
- Majority of areas activated showed no difference between upper or lower tooth activation
Gustin SM, Peck CC. Wilcox SL.
Different pain, different brain: Thalamic anatomy in neuropathic and non neuropathic chronic pain syndromes.
J Neurosci 2011; 31: 5956 - 5964

ABSTRACT:
Trigeminal neuropathic pain (TNP) and temporomandibular disorders (TMD) are thought to have fundamentally different etiologies. It has been proposed that TNP arises through damage to, or pressure on, somatosensory afferents in the trigeminal nerve, whereas TMD results primarily from peripheral nociceptor activation. Because some reports suggest that neuropathic pain is associated with changes in brain anatomy, it is possible that TNP is maintained by changes in higher brain structures, whereas TMD is not. The aim of this investigation is to determine whether changes in regional brain anatomy and biochemistry occur in both conditions. Twenty-one TNP subjects, 20 TMD subjects, and 36 healthy controls were recruited. Voxel-based morphometry of T1-weighted anatomical images revealed no significant regional gray matter volume change in TMD patients. In contrast, gray matter volume of TNP patients was reduced in the primary somatosensory cortex, anterior insula, putamen, nucleus accumbens, and the thalamus, whereas gray matter volume was increased in the posterior insula. The thalamic volume decrease was only seen in the TNP patients classified as having trigeminal neuropathy but not those with trigeminal neuralgia. Furthermore, in trigeminal neuropathy patients, magnetic resonance spectroscopy revealed a significant reduction in the $N$-acetylaspartate/creatine ratio, a biochemical marker of neural viability, in the region of thalamic volume loss. The data suggest that the pathogenesis underlying neuropathic and non-neuropathic pain conditions are fundamentally different and that neuropathic pain conditions that result from peripheral injuries may be generated and/or maintained by structural changes in regions such as the thalamus.
Does Toothache Influence Headache and/or Neuropathic Pain

Examining the relationship between pulpal pain, headache and trigeminal neuropathic pain!
Does Toothache Influence Headache and/or Neuropathic Pain
Clinical Case

- 38 year old mother of 3 children
- 7 Year history of episodic severe right side facial pain
- Pain always started in region upper right first molar and spread to right eye temple and back of head,
- Associated with nausea and vomiting, vertigo, visual disturbance
- Long history of jaw joint locking on right
- Numerous bite splints, joint injections and jaw joint surgery
The Migraine Patient
The Hypersensitive Brain
Migraine Characteristics

- **Prodrome**
- **Aura:** Sensory or Motor
- **Nature of Pain**
- **Postdrome**

- **Prodrome:**
- Depression/Elevation
- Polydipsia
- Polyuria
- Fluid Retention
- Fatigue
- Food Cravings
- GIT Upset
Migraine Characteristics

• Prodrome
• Aura:
  - Sensory or Motor
• Nature of Pain
• Postdrome
Clinical Case

- Pain Diary
- Overuse of analgesics
- Headache preventive meds
- Sleep hygiene, diet, exercise
- Referral for mindfulness training
- Simple exercise program for TMD symptoms
- Acute breakthrough pain – medications or GON blocks
Cluster Headache

Typically Male
Attacks 2 – 3 day
Nocturnal Activation
Autonomic Symptoms
Possibly localised to teeth
Excrutiating Intensity
Duration 30 -180 mins
Chronic Paroxysmal Hemicrania

- Typically Female
- Multiple Attacks
- Duration 5 – 15 mins
- Autonomic Symptoms
- Location varies; Jaws, Teeth, Forehead, Occiput
Chronic Daily Headache

- Heavy Sensation
- Tight Band Around Head
- Continuous Pain
- May be associated with Analgesic Overuse
- Muscle Recruitment
- Migraine Transformation
Headache Influences on The Orofacial Region

• Migraine/Headache pain frequently involves the face and oral cavity, mimicking dental and/or neuropathic trigeminal pain
• Episodic Primary Headache Disorders like migraine, cluster and CPH may appear to originate in the oral cavity
• Headache Disorders may be aggravated by dental procedures or oral surgery
• Patients with headache disorders may experience widespread dental sensitivity
Neuropathic Trigeminal Pain
Conclusions The presence and duration of preoperative pain from the tooth site, lasting at least 3 months, a positive history of previous chronic pain experience or painful treatment in the orofacial region, and female gender were important risk factors associated with persistent pain after successful endodontic treatment.

*International Endodontic Journal 2005*
Neuropathic Pain After Dental Procedures

• Wisdom tooth removal
• Implant placement
• Root canal therapy
• Oral surgery procedures
Neuropathic pain, as well as anaesthesia, frequently occurs following iatrogenic trigeminal nerve injury similar to other posttraumatic sensory nerve injuries. This must be acknowledged by clinicians as a relatively common problem and informed consent appropriately formulated for patients at risk of trigeminal nerve injuries in relation to dentistry requires revision.

• RESULTS:
  • Patients were aware of signing consent forms for the surgery in 11 cases and 8 of those felt they were not explicitly warned about nerve injury. Over 70% of patients were referred after six months post injury. Implant surgery planning involved intra-oral films only (30%), CBCT (10%), dental pantomograph (50%) and long cone peri-apical radiographs (48%). However, no radiographic evidence pre- or postoperatively was provided by the referring practitioner in 15% of cases. Intra-operative problems included bleeding and neurological symptoms. Proximity of the implant bed or implant to the inferior alveolar canal was evident radiographically. This showed contact with roof inferior alveolar nerve canal in 44% of cases, protrusion into the canal in 20% of cases, crossing of the canal in 20% cases and distance in one case, presumed to be due to local anaesthetic injury. All patients presented with a demonstrable neuropathy, which included neuropathic pain (50%) that interfered with speaking, kissing and socialising.

• CONCLUSIONS:
  • Consent, preoperative planning and appropriate referral were inadequate in provision of mandibular implants in this patient group. Recommendations have been proposed to improve practice and possible novel strategies are suggested for the prevention and improved management of these complications.
Veneers: Persistent Pain

- Location: Upper Centrals
- Intensity: Severe
- Type: Burning, Aching
- Presence: Continuous
- Agg by: Nil
- Allev by: Nil
- Onset: After tooth preps
Veneers: Persistent Pain

- **History of Treatment:**
- Central root filled on three occasions
- GDP twice
- Specialist Endodontist once
- Analgesics/Antibiotics
Veneers: Persistent Pain

- **Relevant Findings:**
  - Tenderness in premaxilla bilaterally
  - Tenderness in infraorbital regions
  - Centrals are extremely sensitive to touch
  - Local Sensory Abnormalities: Allodynia, Hyperalgesia, Hyperpathia, increased response to cold
- **Special Tests:**
Trigeminal Neuropathic Pain Induced by External Trauma

History
Lower Incisors traumatised by direct blow. RCT modified but did not eliminate the pain. Patient insisted on removal of teeth and placement of implants.

Treatment Options
- Anticonvulsants/Tricyclics
- Nerve Blocks:
  - Mandibular Division
  - Steroid Injection
  - Stellate Ganglion Block
Looking to the Future

PENS
Teaching Models for undergraduate and postgraduates students
Prevalence of neuropathic pain

30% of hospitalized and 20% of community-dwelling diabetes patients have peripheral neuropathy

Distal sensory polyneuropathy may be present in 35–55% of patients with HIV

Neuropathic pain may be present in 20–40% of mastectomy patients

30% of hospitalized and 20% of community-dwelling diabetes patients have peripheral neuropathy

7% of patients with low back pain present with pain of neurogenic origin

8–11% of poststroke patients present with neuropathic pain

Prevalence of CTS-related pain in the general population has been estimated to be about 16%

Chemotherapy-induced neuropathy may occur in up to 40% of patients depending on the drug and dose

Nervous system damage

Diabetes

Chemotherapy

HIV

Radiculopathy

Surgery

Stroke

Carpal tunnel syndrome (CTS)

Dentistry

?
Thank You

Dermot Canavan
Dublin Dental University Hospital
and
69 Eglinton Road,
Donnybrook, Dublin

dcanavan@iol.ie