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An insight on trauma from occlusion -A review

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Abstract

This explains about the relationship between trauma and occlusion, highlighting how hidden aspects of traumatic experiences impact psychological well-being. It proposes a model that integrates occlusion into trauma processing, emphasizing its role in symptom manifestation and resolution. Therapeutic implications are discussed, emphasizing the importance of addressing occlusion dynamics in trauma treatment for effective healing.

Keywords: Trauma, occlusion, psychological well-being, healing, dynamics

Introduction

Generally it is accepted that trauma from occlusion (TFO) or occlusal traumatism is a separate entity, not related to periodontitis^[1]. But, it becomes a matter of discussion to designate them as entirely non- associated or completely associated conditions when both the conditions are present simultaneously. Though many studies have been done to evaluate any relation between trauma from occlusion and progression of gingival inflammation, incompatible results have been encountered^[2].

Definition

The following definitions are commonly been used to describe trauma from occlusion,

1. Injury to tissues results when occlusal forces exceeds the adaptive capacity of tissues. The resultant injury is termed as trauma from occlusion^[3].
2. According to world health organization (WHO) 1978, "Damage in the periodontium caused by stress on the teeth produced directly or indirectly by the teeth of the opposing jaw" is termed as trauma from occlusion^[4].
3. Tissues changes as a result of injury within the attachment apparatus as a result of occlusal forces^[5].
4. "Structural and functional changes in the periodontal tissues caused by excessive occlusal forces^[6].

Types of TFO

Acute Trauma

Periodontal alterations caused by an abrupt occlusal contact, such as biting on large item are known as acute trauma from occlusion. (e.g.: an olive pit). Causes of acute trauma from occlusion can also be restorations or prosthetic appliances that interfere with or may change the direction of forces of occlusion on teeth. As a result of acute trauma there can be caused tooth discomfort, percussion sensitivity, and increased tooth movement. If at all the force is removed by a shift in the location of tooth or by the wearing away or adjustment of the restoration, the injury may heal and symptoms could be decreased to an extent. Due to acute trauma cementum tears can also be caused^[7].

Chronic Trauma

Periodontal changes resulting from gradual alterations in occlusion due to tooth wear, drifting, and tooth extrusion linked with para-functional habits like clenching and bruxism are termed

Chronic Occlusal Trauma. It's more prevalent than acute occlusal trauma and carries a more significant therapeutic impact.

Occlusal trauma can manifest in various ways and is categorized into different types based on the injury's nature and its impact on teeth and surrounding structures ^[7].

Common types include:

- **Primary Trauma:** Direct damage to teeth, such as fractures, cracks, or chipping, caused by excessive biting forces ^[8].
- **Secondary Trauma:** Body's response to primary trauma, often leading to inflammatory reactions like pulpitis, causing toothache ^[9].
- **Tertiary Trauma:** Prolonged or severe trauma leading to long-term complications like tooth mobility, root resorption, or changes in tooth position ^[10].
- **Periodontal Trauma:** Damage to supporting structures like periodontal ligament and alveolar bone, causing gum recession and tooth mobility ^[11].
- **Abfraction:** Loss of tooth structure at the gum line due to tooth flexing under biting forces, often resulting in V-shaped notches near the gum line ^[12].
- **Attrition:** Gradual wear due to continuous contact between opposing teeth, leading to flattened or shortened tooth surfaces ^[13].
- **Erosion:** Weakening of tooth structure by dietary acids, making teeth more susceptible to occlusal trauma ^[13].
- **Bruxism-Related Trauma:** Excessive occlusal forces due to chronic teeth grinding or clenching, causing various traumas including cracked teeth and muscle pain ^[13].
- **Over eruption:** Opposing tooth over erupts when one tooth is missing and not replaced, creating occlusal interference and potential trauma ^[14].
- **Temporomandibular Joint (TMJ) Disorders:** Occlusal issues contributing to TMJ disorders, resulting in jaw pain, clicking, and restricted movement ^[15].

Proper diagnosis and treatment require dental expertise to assess the specific trauma type and recommend appropriate treatment, such as bite adjustments, restorative procedures, or orthodontic treatment.

Chronic occlusal trauma stems from prolonged, recurring forces affecting teeth and supporting structures, often caused by malocclusion, bruxism, missing teeth, occlusal interferences, or parafunctional habits. Its consequences can vary, from tooth wear to muscle pain and even TMJ damage. Treatment involves addressing underlying causes, potentially requiring orthodontic treatment, bite adjustments, dental restorations, or the use of night guards to mitigate bruxism. Regular dental check-ups are vital for monitoring and managing chronic trauma's impact on oral health ^[16].

Stages of Trauma from Occlusion

Trauma from occlusion typically progresses through various stages, reflecting the severity and evolving effects on dental structures and surrounding tissues. These stages provide a framework for understanding the impact of occlusal forces on oral health:

Initial Stage

- **Subclinical Changes:** At this early phase, occlusal forces

start to cause subtle changes, often not immediately noticeable.

- **Microscopic Damage:** Microscopic alterations occur within the tooth structure and supporting tissues ^[17].

Progressive Stage

- **Macroscopic Damage:** Occlusal trauma becomes more evident, leading to visible changes like wear facets, fractures, or cracks on the tooth surfaces.
- **Inflammation and Sensitivity:** The affected teeth may become sensitive to temperature and pressure due to pulpitis or inflammatory responses ^[18].

Advanced Stage

- **Tooth Mobility:** Prolonged trauma can cause increased mobility or movement of the affected teeth.
- **Gum Recession:** Periodontal tissues may start to recede due to damage to the periodontal ligament and alveolar bone.
- **Root Resorption:** Resorption of tooth roots may occur as a response to chronic trauma ^[19].

Complicated Stage

- **Severe Tooth Damage:** The trauma leads to significant tooth structure loss, compromising the tooth's integrity.
- **Chronic Pain:** Persistent or recurrent pain in the affected tooth or jaw area becomes more pronounced.
- **TMJ Disorders:** Chronic trauma can contribute to temporomandibular joint (TMJ) disorders, causing jaw pain, clicking, and limited jaw movement ^[20].

Understanding the stages of trauma from occlusion is crucial for timely diagnosis and appropriate intervention to mitigate the effects and preserve oral health. Early detection and intervention at the initial and progressive stages can prevent further damage and improve treatment outcomes.

Radiographic Features of Trauma from Occlusion

Radiographic imaging can provide valuable insights into the effects of trauma from occlusion on dental structures and surrounding tissues. Here are the key radiographic features associated with trauma from occlusion:

Periapical Radiographs

- **Alveolar Bone Loss:** Changes in bone density and morphology, indicating possible periodontal trauma.
- **Widened Periodontal Ligament Space:** Increased space around tooth roots due to inflammation or mobility.

Bitewing Radiographs

- **Interdental Bone Loss:** Loss of bone height between teeth due to periodontal trauma.
- **Crestal Bone Loss:** Horizontal bone loss along the tooth's neck, a sign of periodontal problems caused by occlusal trauma.

Panoramic Radiographs

- **Altered Tooth Position:** Abnormal tooth angulation or displacement due to occlusal forces.
- **TMJ Changes:** Discrepancies in the temporomandibular joint, such as condylar remodeling or flattening, indicating possible TMJ involvement.

Occlusal Radiographs

- **Root Resorption:** Evidence of resorption at the root

surfaces due to chronic occlusal trauma.

- Cracks or Fractures: Radiolucent lines indicating cracks or fractures in the tooth structure due to excessive occlusal forces.

Cephalometric Radiographs

- **Changes in Jaw Relationship:** Alterations in the position of the mandible or maxilla relative to each other, highlighting occlusal discrepancies.
- **Facial Symmetry:** Asymmetry or deformities in the face or jaw due to prolonged occlusal trauma.

Radiographic assessment, combined with clinical examination, aids in diagnosing trauma from occlusion and understanding its impact on oral structures. It helps in planning appropriate treatment, which may include bite adjustments, orthodontic intervention, or restorative procedures to mitigate the effects of occlusal trauma ^[19].

Treatment Plan

Creating a treatment plan for trauma from occlusion involves addressing the specific type and severity of the trauma ^[16]. Here's a generalized approach that can be customized based on the individual's condition:

Comprehensive Evaluation

- **Clinical Assessment:** Thorough examination of the oral cavity, including occlusion, tooth mobility, wear patterns, and signs of trauma.
- **Radiographic Evaluation:** X-rays to assess the extent of damage to teeth, bone, and surrounding structures.
- **Patient History:** Understand parafunctional habits, existing dental work, and any history of occlusal trauma.

Occlusal Analysis

- **Bite Assessment:** Analyze the bite to identify malocclusion, interferences, or abnormal tooth contacts.
- **Occlusal Adjustment:** Modify tooth surfaces or restorations to achieve a more harmonious and stable bite.

Orthodontic Intervention

- **Orthodontic Treatment:** Correct misalignment or malocclusion through braces, aligners, or other orthodontic appliances.
- **Space Management:** Address missing teeth to prevent over eruption and occlusal interferences.

Restorative Dentistry

- **Dental Restorations:** Repair or replace damaged teeth using fillings, crowns, or veneers to restore proper function and aesthetics.
- **Inlays or Onlays:** Use custom-made restorations to rebuild damaged tooth structure.

Periodontal Management

- **Scaling and Root Planing:** Treat gum disease through deep cleaning to manage periodontal trauma.
- **Periodontal Surgery:** Address advanced periodontal trauma with surgical interventions like gum grafts or bone grafts.

Management of Parafunctional Habits

- **Night Guards or Splints:** Fabricate custom oral appliances to protect teeth from clenching or grinding during sleep

(bruxism).

- **Behavioral Changes:** Counsel the patient on habits like nail biting or pen chewing to minimize trauma.

Patient Education:

- **Oral Hygiene Instructions:** Emphasize proper oral care and hygiene practices to maintain oral health.
- **Dietary Guidance:** Offer advice on a tooth friendly diet and avoiding acidic foods and drinks.

Follow-up and Monitoring:

- **Regular Check-ups:** Schedule follow-up appointments to monitor progress and make necessary adjustments to the treatment plan.
- **Occlusal Records:** Maintain accurate records of occlusion and changes over time.

Collaboration between general dentists, orthodontists, periodontists, and prosthodontists may be necessary for a comprehensive treatment plan. The objective is to alleviate the effects of trauma from occlusion, restore oral health, and prevent further damage. Individualized treatment plans will be based on the patient's unique condition and needs ^[20].

Conclusion

Trauma from occlusion, also known as occlusal trauma, refers to damage caused to teeth and their supporting structures due to an imbalanced bite or excessive forces during chewing. In conclusion, managing and preventing occlusion trauma is crucial for preserving dental health and overall wellbeing. Early detection, proper occlusal adjustment, and patient education on oral hygiene and bite equilibrium are essential components of a comprehensive approach to address and mitigate trauma from occlusion.

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