



ORAL MUCOSAL LESIONS AS A CONSEQUENCE OF ORTHODONTIC TREATMENT

¹Priyanka Kumaran, ²Aishwarya Ashok kumar, ³Suriya Maadasamy

¹Post graduate student, ²MDS, ³MDS

¹Department of orthodontics,

¹Thai Moogambigai Dental college, Chennai

Abstract:

Background: Oral mucosal lesions occurring due to orthodontic treatment is benign and acute. This lesion occurs as a result of poor oral hygiene, trauma and other factors caused by the appliances. Materials used during orthodontic treatment such as metal and ceramic brackets & wires have high possibility to give rise to traumatic and reactive lesions. Mucosal lesion in those cases might be from treatment-induced or from allergic root.

Aim: The present literature was carried out to elaborate the various mucosal pathologies that occur during or following orthodontic treatment, various diagnostic approaches and management of these lesions.

Discussion: During orthodontic treatment, because of appliances maintenance of oral cavity is pretty much difficult than normal due to which accumulation microorganisms are more leading to the formation of plaque. Due to irritation of fixed orthodontic appliances, there are few usual side effects such as ulcerations, pain and discomfort. Mucosal ulcerations are due to the trauma caused by orthodontic appliances. Diagnostic approach starts with clinical examination, medical examination and regular checkup appointments.

Conclusion: Oral mucosal lesions caused due to orthodontic treatment can be effectively managed by proper diagnosis, proper intra oral examination, advising periodic oral prophylaxis during the course of orthodontic treatment and early management of the lesions.

Keywords: *Mucosal lesions, Traumatic ulcers, Mycotic infections, Gingival enlargement.*

INTRODUCTION

Oral mucosa is very thin mucous membrane, this membrane tends to break easily and more vulnerable to form of ulcers and other infections. (1) Oral mucosal lesions occurring due to orthodontic treatment is benign and acute. This lesion occurs as a result of poor oral hygiene, trauma and other factors caused by the appliances. (2,3) The motto of orthodontic treatment is to correct the dental occlusion and to create more aesthetic and beautiful smile which gives the patient great self-confidence. Even though there are numerous advantages in many cases there are also few disadvantages which occurs along with the treatments. (4) Materials used during orthodontic treatment such as metal and ceramic brackets & wires have high possibility to give rise to traumatic and reactive lesions. Mucosal lesion in those cases might be from treatment-induced or from allergic root. (2) Due to irritation of fixed orthodontic appliances, there are few usual side effects such as ulcerations, pain and discomfort. Mucosal ulcerations are due to the trauma caused by orthodontic appliances. (1) Even though the lesions during the orthodontic treatment are painful and discomfort it heals quickly because of faster metabolism in adults. Oral lesions were found to be more present in patients wearing orthodontic appliances than in children. (3) During orthodontic treatment, because of appliances maintenance of oral cavity is pretty much difficult than normal due to which accumulation microorganisms are more leading to the formation of plaque. Hriday et al. in their study with orthodontic patients showed there is high plaque accumulation in those patients. Plaque accumulation is the ancestors for most of the dental problems such as dental caries and gingival inflammation. (5) Orthodontist should assess the oral cavity in each and every procedure and also before and after the treatment to ensure and achieve the outstanding result. (6)

METHODOLOGY

A structured literature search for articles written in the English language in PubMed/MEDLINE, EBSCOhost, Google Scholar, Scopus, IEEE Xplore Digital Library and Web of Science databases was retrieved by using MeSH terms “White Spot Lesions” OR “Orthodontic appliance therapy” AND “Mucosal pathology”, “Oral lesions” AND “Fixed appliance therapy,

Dental” OR “Ulcers” OR “Mycotic infections” OR “All Metadata”, “Coating agents”, “Orthodontic brackets”.

DIAGNOSTIC APPROACH

Primary elementary lesion is guide to the diagnosis of mucosal lesion present in the oral cavity. The lesions are macule, papule, plaque, nodule, vegetation, vesicle, pustule, erosion, ulcerations. The description of the lesion includes number of lesions, site, size, borders, induration, color and texture. Diagnostic approach starts with clinical examination, medical examination and regular checkup appointments. Diagnosis may require further more test such as blood examination, serological examination, biopsy and imaging. Clinical examination, intra oral examination includes date of onset of lesion, type of lesion and its appearance along with its signs and symptoms. Progress of the lesion may be continuous, intermittent or even constitute a recurrence. Extra oral examination consists of inspection of extraoral swelling, facial asymmetry, palpation of lymph nodes and salivary glands. Other history which can lead to the diagnosis are family history, dental history, ethnic origin, life style and their medications. Medical examination is important as systemic manifestations may accompanied by oral manifestation in case of mucocutaneous disease that starts to appear in skin, nail, hair and skin associated structures. The data collected from the patient should be documented with medical file for further monitoring of the patient. (2)

DISCUSSION**MUCOSAL PATHOLOGIES**

Mucosal pathologies allied with orthodontic treatment are of three etiological reasons they are traumatic, infectious and reactive. Trauma injuries are of various forms based on the severity caused by different materials used during the treatment. Erosions or keratosis caused by the friction associated with brackets to the oral mucosa whereas wound ulcers are associated with arch wires which pierces the oral mucosa facing them. Mucosal erythema and erosions are due to the mini screws.

1. Traumatic ulcer

Ulcers are easily traumatized from teeth and food particles these ulcers can be secondary infected by microorganisms. Traumatic ulcer is very common in oral cavity caused by acute or chronic trauma. In orthodontic treatment, patient may get traumatic ulcer by rubbing of the lips and cheeks on brackets, bands or cleats. Occasionally, palatal or lingual arches may cause trauma to the palate or tongue. (6) The incidence of traumatic ulcer ranges from 60-80%. (1) Amongst oral ulcerations in orthodontic treatment, traumatic ulcer is most frequent ones. It is painful caused due to aggression and iatrogenicity of a piece of orthodontic equipment or the head of a mini-screw. Located next to the causal element, Keratosis is a defensive reaction of the mucosa in the face of aggression. It settles in reaction heals in 10–15 days after elimination of the cause. Sometimes, the healing process is painful and botryomycoma can be observed. Necrosis represents the extreme stage of the traumatic lesion. (2) Management can be divided into preventive and definitive therapy. Wax over the bracket may significantly reduce trauma and discomfort. Rubber tubing on the unsupported arch wire also reduces the risk of iatrogenic damage. (6)

Management of oral ulcers following orthodontic treatment

Coating agents	Aluminium chloride, Aluminium hydroxide, Magnesium hydroxide, Hydroxypropylcellulose, Sucralfate
Topical anesthetics	Dyclonine hydrochloride, Xylocaine hydrochloride, Benzocaine hydrochloride, Diphenhydramine hydrochloride
Lip lubricants	Water-based lubricants, Ianolin
Analgesic agents	Benxydamine hydrochloride
Newer agents	Tetracycline mouthwash, Prednisolone mouthwash, Alcohol-free povidine-iodine mouthwash.

2.Epulis

Epulis is a benign inflammatory tumor of the gingiva. The etiological factors are local chronic irritating factors such as braces, tartar and interdental space. (2) On clinical examination epulis is seen as localized, firm, pink and uninflamed nodule in the marginal gingiva or alveolar process. usually, pain is absent. (2,7) In orthodontic treatment inflammatory epulis is commonly seen. It is highly vascularized and readily bleeds on palpation. Treatment to this is excision of the tumor and removal of the causative factor. Patient is also given proper oral hygiene instructions. In children, the presence of an inflammatory epulis requires a CBC to rule out leukemia. (2)

3.Mucocele (Mucooid cyst)

Mucocele (Pseudocyst) is a fluid filled swelling usually due to trauma. Resulting from the extravasation of saliva after the rupture of the excretory canal. It develops mainly in the accessory salivary glands and particularly on the lower lip and the floor of the mouth. It takes the form of a painless translucent or bluish collection, is hemispherical, and ranges in size from a few millimeters to a few centimeters in diameter. Excision is the treatment of choice for removal of cyst. (2)

4.Mycotic infections

Mycotic infections are very rare. The main causative agent being *Candida albicans*, opportunistic pathogen, present about 50-60% of the population and its concentration increases in the presence of removable resin devices. *Candida* is a normal commensal present in the oral cavity under certain pathological conditions it becomes pathogenic that causes candidiasis. (2)(8) The main risk factors are long-term use of antibiotics or a background of immunosuppression/ depression.

Clinically, oral thrush is seen as diffuse erythematous stomatitis of the mucous membranes. Whitish granulations converge to form slightly fluffy white layers, which are more or less extensive and detach easily on scraping to give way to an erythematous mucous membrane (or even bleeding). When these layers are very extensive, they form a pseudo-membrane.

Angular cheilitis is a particular form of candidiasis. It is characterized by angular cheilitis with bilateral involvement of the labial commissures on the cutaneous and mucous slopes. It is affected by salivary flow and maceration in the commissural folds and maintained via a licking behavioral tic. The diagnosis of candidiasis is clinical. Treatment involves the elimination of aggravating factors and a local treatment with amphotericin B (Fungizone®) as a first-line defense (oral suspension, 2 spoons in mouthwash 5 times a day for 3 weeks; take the mouthwash then swallow to prevent digestive dissemination). (2)

5.Gingival enlargement

Gingival overgrowth is a very common condition in the orthodontic population that is characterized by gingival enlargement possibly resulting in pseudo-pocketing with or without attachment loss. (9) Gingival enlargement (GE) occurs as a result of an increase in plaque retention and less efficient oral hygiene care. Kloehn and Pfeifer described some etiologic factors for orthodontic treatment-induced GE such as mechanical irritation through bands, chemical irritation by cement, accumulation of food, and poor oral hygiene care. Inflamed soft tissues occur by the significantly increased inflammatory cells, which leads to edema, that further influences the subgingival ecosystem to create an anaerobic surrounding, which, in turn, causes microflora shift. (10) Hyperplasia occur in the context of chronic irritation created by multi-attachment devices or palatal plates. Localized around the irritative cause, they take the form of an increase in tissue volume, are firm and covered with a healthy, erythematous, or keratotic mucosa. (2) In orthodontic treatment, the extraction of teeth, most commonly, first or second premolars, may be required. Orthodontic space closure of extraction sites may result in gingival invagination or accumulation of gingival tissue. (9)

6.Diapneusia

Diapneusia is indirectly linked to orthodontic appliances via the spaces they create. Frequently, it presents as an asymptomatic nodule and is generally <1 cm in diameter. It can be located on the cheeks, lips, and tongue and is caused by excessive suction (wide interdental space). Treatment consists of the removal of the lesion's root. Relapses may be avoided if the cause is corrected. (2)

7.Stomatitis due to nickel allergy

Nickel ion release is a strong sensitivity reaction cause that may lead to hypersensitivity. It can cause pain and inflammation to the soft tissues. (11) Cases of nickel allergy are reported during orthodontic treatment (use of Ni-Ti arches). This allergy affects approximately 19% of the general population and corresponds to a delayed cell-mediated hypersensitivity (type IV of the Gell and Coombs classification). It occurs in two phases: a sensitization and an expression phase. Clinically, 2-3 days after the second exposure, it manifests as contact dermatitis or edema. Reactions at the mucosal level are rare because the nickel is coated with a salivary film, the alloy is of better quality than that of a piercing, and the mucosa presents fewer antigen presenting cells than on the skin. In addition, the oral medium may induce nickel tolerance. (2)

8.Erythema multiforme

Erythema multiforme is an inflammatory disorder that affects the skin or mucous membrane or both. The Patients with erythema multiforme should have acrally distributed typical target lesions or raised edematous skin papules with or without mucosal involvement. In severe form, can be on the trunk, in the oral cavity, nasopharynx, conjunctiva and urethra. Urticarial papules, vesicles, and bullae in severe disease. Individual lesions heal without scarring in 1 to 2 weeks. The lesions usually spread quickly. Patients sometimes have other symptoms, such as bloodshot eyes and eye pain. Poor oral hygiene during orthodontic treatment may

induce erythema multiforme. The use of orthodontic bands and fixed acrylic appliances should be avoided whenever possible in high-risk patients with poor oral hygiene. A risk of bacteremia induced by traction of unerupted, exposed and bonded teeth has been suggested. The main orthodontic procedure that has been postulated to cause a bacteremia has been placement of a separator (12)

CONCLUSION

Orthodontic treatment can cause mucosal pathologies due to mechanical irritation, allergy etc. So periodic check up of oral mucosa along with orthodontic treatment is mandatory. Every orthodontist must be aware of the lesions caused by the treatment, failing on this will lead to delay in the treatment, discomfort of the patient and also the unnoticed lesions with long duration such as traumatic ulcer may also can carcinoma. Sporadic checkup and proper diagnosis enhances the treatment.

REFERNCES

1. Incidence of Oral Ulcers in Patients undergoing Orthodontic Treatment. Ritesh Gupta, Nanika Mahajan, Shivani Jandial, Bhanu Kotwal, Simran Kaur, Sharad Kharyal. International Journal of Preventive and Public Health Sciences • Jul-Aug 2017 • Vol 3 • Issue 2
2. Orthodontics and oral mucosal lesions in children and teenagers. L. Sicard, L. Benmoussa, N. Moreau, B. Salmon, A.-L. Ejeil. J Dentofacial Anom Orthod 2018;21:207
3. Oral mucosal lesions during orthodontic treatment. MARINKA BARICEVIC¹, MARINKA, MRAVAK-STIPETIC, MARTINA MAJSTOROVIC, MARIJAN BARANOVIC, DENIS BARICEVIC⁴ & BOZANA LONCAR. International Journal of Paediatric Dentistry 2011; 21: 96–102
4. Oral mucosal ulceration during orthodontic treatment: The perception of patients and knowledge and attitude of the orthodontic practitioners. Fahda AIDahash, Dhuha AlShamali, Wejdan Al Bander, Raghad Bakhsh, Waad Al Madhi, Sara Al Senani
5. Assessment of Oral Health Problems in Patients Receiving Orthodontic Treatmen. Akshay Gupta* and Karanprakash Singh
6. Mainali A. Occurrence of Oral Ulcerations in Patients undergoing Orthodontic Treatment: A Comparative study
7. Amit Arvind Agrawal. Gingival enlargements: Differential diagnosis and review of Literature
8. Mucocele on the Lower Lip – a Case Report . Edmund C. Rose,Christian Rose²
9. G. FARRONATO, L. GIANNINI, G. GALBIATI, P. CANNALIRE, G. MARTINELLI, I. TUBERTINI, C. MASPERO. Oral tissues and orthodontic treatment: common side effects
10. Angelina Gorbunkova, Giorgio Pagni, Anna Brizhak, Giampietro Farronato, Giulio Rasperini. Impact of Orthodontic Treatment on Periodontal Tissues: A Narrative Review of Multidisciplinary Literature
11. Diksha Agrawal, Priyanka Jaiswal. Gingival Enlargement during Orthodontic Therapy and Its Management.
12. Elih. Nickle induced allergic stomatitis in treatment using fixed orthodontic appliance.
13. Anand Sharad Ambekar, Suresh Kangane, Yatish Joshi. Does Orthodontic Treatment induce Erythema Multiforme?