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Oral Hygiene In Orthodontic Patients – A Review.

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ABSTRACT-
Teeth are being held in position by investing soft and hard tissues. A successful orthodontic therapy goes in hand with a healthy periodontium. Immaculate maintenance of oral hygiene during orthodontic therapy is a skill that is difficult to achieve with mechanical toothbrushing alone. Therefore, using auxiliaries for oral hygiene maintenance is a very important part of the routine for most patients undergoing therapy. This literature review ahead focuses on various microbial andbiological markers that are found in GCF during inflammation with in-home and in-office therapies that have been proved effective in preserving good oral health during and after orthodontic treatment.
KEYWORDS-Oral hygiene, Gingival inflammation in Orthodontic therapy, Markers of inflammation, Gingival crevicular fluid.

INTRODUCTION-
Orthodontic tooth movement and remodeling are brought about when there is an external (orthodontic)force that stimulates inflammation and other biochemical changes. During orthodontic tooth movement, there are cellular and cytoskeletal changes that alter the gingival crevicular fluid flow rate, volume, and composition. Orthodontic appliances also provide expanded opportunities for dental plaque to get adhered to enamel or cemental surface which substantiates various evidence stating worsening of oral hygiene during orthodontic therapy. This

plaque accumulation can lead to a clinical condition called gingivitis. Gingivitis is a common condition where gingiva is inflamed, erythematous, and sometimes even painful. When left untreated, gingivitis can progress into periodontitis which affects the investing tissues of the teeth ultimately upsetting the orthodontic therapy. Banded surfaces are more prone to microbial invasion and plaque accumulation than bonded surfaces. There is also decalcification of enamel witnessed around the areas with band and brackets. These added inconveniences cannot be resolved with the help of manual dexterity alone and require extra care and management. This paper at the forefront discourses various methods in which the above-discussed issue can be treated without invasive periodontal therapy.

Microbial Accretion On Tooth Surface-

Colonization in the oral cavity begins when the fetus is close to birth. Oral microbes identified first in the oral cavity of an infant are Streptococcus salivarius, Streptococcus mitis, Veillonella species, Neisseria species, and Actinomyces species. Orthodontic appliances like bands, brackets, and orthodontic archwires make it difficult for the patient to clean the interproximal areas and become plaque traps which act as a niche for pathologic oral microorganisms.

These areas harboring orthodontic appliances especially are evidenced to elicit increased inflammation and concomitantbleeding on probing within 1-2 months of therapy when compared to sites free of the appliance. The extent of gingival inflammation is proportional to the duration of orthodontic treatment.

These microorganisms are elicited from plaque samples. There are two microbial colonies that are established on the tooth surface.First, the primary colonizers are primarily gram-positive gets adhered to the tooth surface and after colonization, it acts as a base for the secondary colonizing species to "coaggregate". The secondary colonizing species are primarily gram-negative.

PRIMARY COLONIZERS (Gram-positive)	SECONDARY COLONIZERS (Gram-negative)
1. Streptococcal species	1. Campylobacter species
2. Actinomyces species	2. Tanerella forsythia
3. Capnocytophaga species	3. Porphyromonas gingivalis
4. Eikenella species	4. Fusobacterium species
5. Aggegatibacter actinomycetomcomitans serotype a	5. Aggregatibacteractenomycetomcomitans serotype b

Biochemical Marker Activity During Otm –

Orthodontic tooth movement (OTM) is caused by structural and cellular changes in the periodontium employing an external stimulus that applies force on the tooth surface.

Inflammatory mediators (IM) play an important role in the movement of dental tissues while triggering inflammation in the gingival tissues. These inflammatory mediators coming into action during OTM can be elicited in the gingival crevicular fluid (GCF).

GCF can be harvested from the gingival sulcus by the following approaches-

1. Intracrevicular washing with syringes
2. Microcapillary pipette
3. Paper strips and Paper points

Biochemical analysis of GCF can either demonstrate a rise in the volume of GCF or increased activity of inflammatory mediator activity/concentration. Certain biochemical markers that seen during OTM are –

1. Lactate dehydrogenase (LDH)
2. Prostaglandin E2 (PGE2)
3. Interleukins (IL2, IL6, and IL8)

4. Acid and Alkaline phosphatase
   Markers like PGE2 and ILs play a major role in tooth movement by instigating bone remodeling but also cause gingival inflammation that will then further be aggravated by microbial deposition.

Oral Hygiene Maintenance During Orthodontic Therapy–

Proper tooth brushing technique is very vital during orthodontic therapy. In a study conducted by Patricia et al in 2013, it was proven that tooth brushing with the Bass method was the most effective way to prevent plaque accumulation and maintain periodontal health. Immaculate oral hygiene maintenance is extremely difficult with only brushing with orthodontic appliances in place. In these cases, patients undergoing therapy need to be supported with periodontal therapy. Periodontal therapy during orthodontic treatment should be non-invasive and should not be hindering with the OTM.

Numerous evidence prompt reduction in gingival inflammation without altering the rate of tooth movement. Oral hygiene can be maintained with supplementary dentifrices and therapies both at home and office respectively.

In-home maintenances are prescribed with substances like

1. 0.12% of Chlorhexidine and mouth rinses-
2. Amine Fluoride/Stannous mouth rinses/tooth pastes

These have been proved effective in reducing the amount of clinical gingival inflammation and visible plaque accumulation.

In-office maintenances like Ozonated water irrigation could be prescribed for patients with gingival inflammation. This method was proved effective by Dhingra et al. Reduction in gingival inflammation was seen after subgingival irrigation of ozonated water. A major shortcoming of this study was that there was no change spotted in the plaque accumulation that was existing on the tooth surface.

ETHICAL CLEARANCE – Not required as it is a review article
FUNDING- Self
CONFLICT OF INTEREST- Nil

CONCLUSION –

Oral hygiene is observed in a poorer condition in patients during orthodontic therapy when compared to the dental conditions of the same patient before and after the therapy. Orthodontic tooth movement involves harmony of various structural, cellular, and biochemical changes. Frontal resorption of bone is the ideal and most desired structural change during orthodontic therapy. Increased orthodontic force on the tooth causes weakening of the periodontium and marked gingival inflammation. Supplementary therapies along with proper toothbrushing can bring out a balanced, uneventful phase of orthodontic therapy that would be beneficial both to the orthodontist and to the patient.

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