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ASSESSMENT AND COMPARISON OF BONE REMODELING ACTIVITY AND PAIN IN CONVENTIONAL AND SELF-LIGATING BRACKETS.

By

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ABSTRACT

❖ **BACKGROUND :**

Bone remodeling activity is an intricate cascade of events involving complex processes. Orthodontic force application can cause changes in the dental and paradental tissues. During orthodontic treatment, orthodontic force results in alveolar bone remodeling due to alveolar bone resorption i.e osteoclastic cell activity in the compression side which is coupled by successive bone formation carried out by osteoblastic cells in the tension side. This bone remodeling activity can be assessed by tracing certain biomarkers during the subsequent inflammatory stages during the orthodontic mechanotherapy. Bracket systems in today's era have different pace of bone remodeling activity with good patient compliance as they claim to be painless at the same time.

❖ **OBJECTIVE :**

The objective of this study is to evaluate osteoblastic & osteoclastic activity in conventional brackets as well as self-ligating brackets followed by comparison of the bone remodeling activity between the two bracket systems along with evaluation and comparison of pain experienced by the patient during the fixed orthodontic treatment.

❖ **MATERIALS & METHODS :**

40 subjects (22 females, 18 males) in the age group of 15-40 yrs (mean age - 17.8 yrs) where 20 subjects were treated with conventional prescription (MBT) & 20 subjects were treated with self-ligating prescription (Damon Q) undergoing non-extraction line of treatment (mild-moderate crowding i.e 3-6mm) were included in the study. A total of 10ml unstimulated salivary sample from each patient (5ml in 2 tubes for each patient) was collected. They were evaluated for presence and concentration of ALP and TRAP biomarkers in the whole unstimulated salivary sample. This was collected 3 weeks after bonding to assess the bone remodeling activity during the initial alignment stage of fixed orthodontic therapy. The salivary samples of ALP & TRAP will be analyzed with enzyme-linked immune sorbent assay(ELISA) technique.

The pain score was subjectively recorded with the questionnaire along with numeric rating scale on the same day as sample collection.

❖ **RESULTS :**

Analysis was done by independent sample t test. On assessing ALP & TRAP in both the subgroups i.e MBT & Damon prescription it was found TRAP values were noted statistically significant when compared with ALP among MBT groups suggesting higher bone resorption activity when compared to bone formation. It was noted that there was no statistically significant difference between ALP & TRAP among Damon groups. When compared the bone remodeling activity it was found the TRAP levels were statistically significant in MBT group when compared with Damon group indicating osteoclastic activity i.e bone resorption is more in MBT bracket system leading to faster bone remodeling activity. Upon evaluation & comparison of the pain experienced between MBT & Damon prescription, it was found that there is no statistically significant difference between the two groups.

❖ **CONCLUSION :**

This study concluded that, during the initial tooth alignment stage the bone remodeling activity of conventional bracket system(MBT) was more as compared to Self-ligating bracket system (Damon Q) & there was no difference in the pain intensity as experienced by the patient.