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# The Early Impact of Fixed Orthodontic Therapy on Dietary Behavior, Weight Status, and Salivary Physicochemical Characteristics

A Thesis
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# Abstract

**Background:** association between weight status on one hand and oral hygiene, gingival health, salivary characteristics, and dietary habits on the other are still not fully determined or proven. Fixed orthodontic treatment had deleterious effects on oral hygiene and oral health that are well documented in literature, but literature lacks focusing on the early effects of fixed orthodontic appliance related to oral hygiene and oral health.

The study aims are evaluating the early impact of fixed orthodontic therapy on patients` oral hygiene, gingival health, salivary physico-chemical characteristics, and dietary habits; in relation to patients` weight status.

**Materials and methods:** an observational, follow-up, self-controlled study was conducted among 54 subjects (25 males and 29 females; within limited age of 16-18 years old) who were willing to be treated with fixed orthodontic appliance. Patients were categorized according to their Body Mass Index (BMI) into 3 weight status groups: underweight, normal weight, overweight and obese. Then clinical evaluation of oral cleanliness was applied through the use of plaque index (PlI) and the calculus index (Cal I) division of the periodontal disease index. The gingival health assessment was done through the criteria of the gingival index (GI) by Loe and Silness. Then unstimulated salivary samples were collected from patients. All previous examination and salivary sampling were done thrice: before bonding of the fixed orthodontic appliance (1st visit), 2 weeks after bonding (2nd visit), and 4 weeks after bonding (3rd visit). Salivary samples are examined to evaluate changes on salivary properties (flow rate, pH, viscosity, calcium concentration, phosphate concentration) during the three visits. Finally at the 3$^{rd}$ visit, a dietary behavior questionnaire (adopted from Al Jawad, 2011) was introduced to each patient to be answered.

**Results**: the results showed a significant change in all the study parameters and for the three weight status groups through visits; except salivary pH of normal weight group, and salivary viscosity of underweight group. Gingival index, dental plaque index and calculus index had significant increase for all weight status groups during the 2nd visit, and continue increasing during the 3rd visit. Salivary flow rate increased significantly for all weight status groups in the 2nd visit, and then all mean values decreased in the 3rd visit. Salivary pH for underweight and overweight and obese group had significant decrease in the 2nd visit, while normal weight group pH had non significant decrease. All groups' pH values were raised in the 3rd visit. Salivary viscosity values were significantly decreased for both normal weight and overweight and obese groups in the 2nd visit, while underweight group values had non significant decrease. Salivary calcium concentration values showed significant decrease for all BMI weight status groups in the 3rd visit. Salivary phosphate concentration values showed significant increase for all BMI weight status groups in the 3rd visit. Dietary behavior questionnaire showed that pain caused by fixed orthodontic appliance leads to change the amounts and types of food; mainly during the first two weeks of treatment.

There was a strong correlation in a positive direction between oral cleanliness indices and gingival health index, while no other constant and clear correlation was found between any of the other study parameters.

**Conclusions:** treatment with fixed orthodontic appliance causes early changes in patients` oral hygiene, gingival health, salivary characteristics, and dietary behavior. These changes were not influenced by the patients` BMI weight status.