“Longitudinal assessment of the caries development in individuals undergoing fixed orthodontic treatment”


Abstract
The aim of this study was to assess the caries development in individuals undergoing fixed orthodontic treatment along six months. Twenty two individuals (11-22 years) were assessed regarding caries, oral hygiene, sugar exposure, salivary flow rate (SFR), buffering capacity and pH of saliva at baseline, 1, 3 and 6 months after the orthodontic placement. Caries index was determined by Nyvad criteria. Buffering capacity decreased after 3 months (p<0.0001) and showed positive correlation with pH at baseline and after 1 month in patients who did not develop active caries lesions. SFR increased after 1 month (p=0.0283) After 6 months, 59.09% of participants developed caries (p<0.0001). Considering the high prevalence of dental caries found in these individuals and the detection of active caries lesions non-cavitated in the first 3 months after the adaptation of orthodontic appliances, the establishment of effective preventive measures even before the placement of the appliance, it is strongly suggested.

Key Words:
Dental Caries, Orthodontic Appliances, Saliva.

Introduction
Individuals submitted to fixed orthodontic treatment have a high risk of developing caries lesions1. Dental caries is a biofilm-sugar-dependent disease2. The biofilm formed in the presence of sucrose presents a rich matrix of extracellular polysaccharides that which are important for bacterial adhesion3. In the dynamics of dental caries process, the flow rate and saliva buffering capacity are presented as important protective factors for the homeostasis of the oral tissues. The aim of this study was to assess caries development in individuals undergoing fixed orthodontic treatment and observe the factors related to the balance between episodes of demineralization and remineralization as buffering capacity, pH and salivary flow rate.

Results and Discussion
The buffering capacity significantly decreased after 3 months (p<0.0001), coinciding with the time of active early caries lesions onset in these individuals. There was positive correlation between buffering capacity and salivary pH at baseline (r=0.70, p=0.04) and 1 month after the placement of orthodontic appliance (r=0.82, p=0.01) in individuals who did not develop active carious lesions. This data strengthen the concept that the buffering capacity of saliva plays an important role in maintaining the oral tissues homeostasis, acting to prevent the process of dental caries formation. Salivary flow increased after 1 month (p = 0.0283) and this temporary increase is due to the mechanical stimulation provided by orthodontic appliances4. After 6 months, 59.09% of the participants developed dental caries (p <0.0001). Our study present new data on the time of active early caries lesions onset in individuals under orthodontic treatment. It is important to highlight that the index Nyvad considers the white spot lesions as the first clinical evidence for the caries activity and may allow early diagnosis of the disease.

Conclusions
Considering the high caries prevalence found in the individuals and the detection of active non-cavitated carious lesions as early as 3 months after the placement of orthodontic appliances, the establishment of effective caries preventive measures, even before the orthodontic appliances placement is strongly suggested.