Vol. 10, No. 2,April-June 2018

CLINICAL STUDY OF PERIODONTAL PARAMETERS DURING THE ORTHODONTIC TREATMENT

Dorina-Cerasella Şincar[1], Răzvan Leaţă[1], Gabriel-Valeriu Popa[1], Mioara Decusară[1*] Earar Kamel[1]

[1]"Dunărea de Jos" University, Galaţi, Romania, Faculty of Medicine and Pharmacy, Department of Dentistry

Correspondent author *:* *e-mail*: mioaradecu@yahoo.com

ABSTRACT

Introduction. Dento-maxillary abnormalities are an important factor affecting periodontal health, so one of the goals of orthodontic treatment is to promote better dental health and to prolong the life of the teeth. Orthodontic treatment contributes to improving oral hygiene by correcting dental irregularities and reducing (or eliminating) occlusal trauma. The placement of orthodontic appliances near the gingival sulcus, the accumulation of the plaque and the impediments they pose to the oral hygiene habits affect the periodontal health condition and complicate the orthodontic recovery process. **Aim of the study.** The purpose of this study was to clinically assess the evolution of the relationship between orthodontic therapy and gingival health. **Material and methods.** The study group comprised 31 patients with dento-maxillary abnormalities treated with orthodontic treatment. In 20 patients, was applied fixed orthodontic treatment and, at 11, functional mobile device. In these patients a periodontal clinical examination was performed at different times throughout the orthodontic therapy. **Results.** In this study, it was observed that plaque index values and those of gingival inflammation increased in all patients between baseline and end of treatment. These increases were statistically significant in patients treated with fixed orthodontic appliances. Also, in patients treated with functional devices have seen these parameters increase but after treatment they were not statistically significant. **Conclusions.** Regardless of the quality of bacterial plaque control, patients undergoing orthodontic treatment have an increased risk of developing generalized gingivitis in a very short time. In addition, the duration and type of orthodontic treatment significantly influence the development and development of this type of pathology.

Key words: orthodontic treatment, bacterial plaque, gingivitis.

Introduction

Dento-maxillary abnormalities are an important factor affecting periodontal health, so one of the goals of orthodontic treatment is to promote better dental health and to prolong the life of the teeth. Orthodontic treatment contributes to improving oral hygiene by correcting dental irregularities and reducing (or eliminating) occlusal trauma. The placement of orthodontic appliances near the gingival sulcus, the accumulation of the plaque and the impediments they pose to the oral hygiene habits affect the periodontal health condition and complicate the orthodontic recovery process. The clinical examination performed on patients after insertion of the orthodontic appliances reveals the presence of chronic infection, inflammatory hyperplasia, alteration of periodontal attachment, alveolar bone as well as gingival recession.[1] But orthodontic tooth movement may facilitate management of restorative and aesthetic problems in adults. Such difficulties may be related to fracture scaling or absent teeth, teeth in the version, excess space, or inappropriate implantation for a prosthetic space, increased extrusion

teeth, which is hindering tooth implantation, and other diseases (Ong et al. 1998). [1,2,9] A compromise periodontal tissue must be considered when formulating a treatment plan and only after assessment of this issue can be initiated orthodontic treatment. Orthodontic treatment can be adjunctive to periodontal therapy. Loss of periodontal support and tooth may result in elongation, spacing and position changes of incisors, rotation and tilting of premolars and molars going to the collapse of posterior occlusion and decreasing of vertical dimension. [3,4,5]

Aim of the study. The purpose of this study was to clinically assess the evolution of the relationship between orthodontic therapy and gingival health.

Material and methods. The study group comprised 31 patients with dento-maxillary abnormalities treated with orthodontic treatment. In 20 patients, was applied fixed orthodontic treatment and, at 11, functional mobile device. In these patients a periodontal clinical examination was performed before and after orthodontic therapy. All groups of age were assessed following clinical indicators: plaque index (PI), papillary bleeding index (PBI), depth probing (AS), gingival recession (R), width of attached gingiva. At the clinical evaluation, the method of analysis was based on the quantification of the mean value of the following indices: the presence or absence of visible plaque, the presence or absence of visible inflammation at the buccal and distal parts of each teeth, the presence or absence of gingival recession before or after orthodontic treatment.The loss of clinical attachment was assessed by periodontal probe assessing the depth of the pockets and the degree of recession, at the level of each test tooth in at least 6 sites (V, O, MV, ML, DV, DL), the reference element for assessing the loss of attachment being JAC (amelo-cement junction) expressing the distance to the bottom of the sulcus / pocket in millimeters. The need for complete evaluation by using odonto / periodontal indicators was determined after a diagnosis and was included in the formulation of the treatment plan to quantify the condition and to monitor the odonto / periodontal condition. Monitoring is commonly claimed for plaque and gingivitis. Where scanning has detected periodontal pockets and other features of significance for carious/periodontal disease, monitoring has been carried out for these clues. [3,10,11] Analysis of any phenomenon related to oral health, in particular incidence of periodontal abnormalities in the population, using statistical methods, requires an informed choice of the study object known as statistical totality (sample). To estimate the significant differences in the averages of two diagnostic routes, the t-Student criterion was used and the statistical correlation between the qualitative parameters was presented by the contingency tables. Before any evaluation (of all investigations), we proceeded to obtain informed consent[12,13].

Case report. Patient: S.R., Age: 14, Female. Heredo-collateral and personal history of no correlation. The reasons for the presentation: the patient presented for physiological reasons, accusing pain at the 46 tooth during mastication and brushing. The intraoral objective clinical examination signaled the following:

- Dento-alveolar incongruence with severe cramping, which caused dental malposition , rotations;
- In this case it is possible that permanent tooth may have been affected by the second deciduous tooth affected by carious processes and thus, together with the well-

developed incisors, caused the great space reduction for canine rash; that is why canines have created a vestibular corridor, becoming ectopic and affecting the physiognomy and even the psyche of the patient

- Inflamed gum, changed color and edema
- The dento-alveolar incongruence with crowding reduced the volume of interdental papillae; many of them becoming hypertrophic and hyperplasic, like a pediculous or sesil polyp, with a large base of implantation.
- This disharmony has also led to self - defeating difficulties that have led to varying degrees of periodontal disease (periodontal bleeding, tartar, periodontal recessions in areas of incongruity;

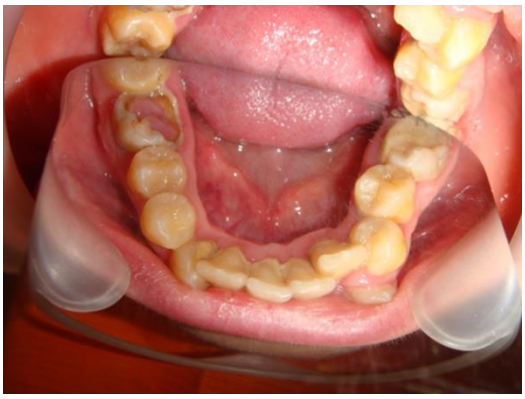

Fig.1The endooral aspect of the mandibular dental at arch at the onset of treatment

Fig.2 The endooral aspect of the dental arches the onset of treatment

The complementary examination of orthopantomography revealed:

- The mesial coronary radiotransparencies of the 6-year maxillary tooth corresponding carious processes in those areas
- The radiotransparent areas at the 3.6 root tooth that indicated the osteolysis process in this area
- The inclination of the lower premolar axes determined the narrowing of the canine eruption space.

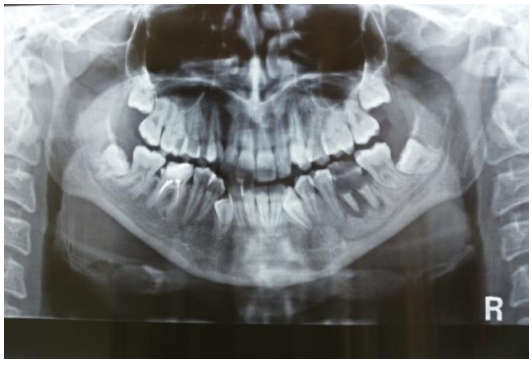

Fig.3 Panoramic radiography. Clinical aspects at the onset of periodontal-orthodontic treatment

Fig.4 The endooral aspect of dental arches during the orthodontic treatment

The treatment consisted in:

- the oral cavity sanitation by professional hygiene: scraping and professional brushing;
- extraction of root residue 3.6
- treatment and reshaping of existing odontal lesions
- orthodontic treatment

The patient received counseling on the importance of proper oral hygiene to maintain local and general health - use of Bass technique for dental brushing and secondary aids for removal of bacterial plaque. Due to poor oral hygiene, during orthodontic treatment, oral hygiene index (OHI) and gingival index (GI) were increasing. The oral shower with betadine and hydrogen peroxide (3%) were recommended in a ratio of 1: 4, twice a week for the first 2 weeks.

Fig.5 Endooral aspects of dental arches at the end of orthodontic treatment

Index value	OHI	GI LÖE și SILNESS	PBI	SBI
Initial	**1**	**1**	**1**	**0**
At 6 months	**1**	**2**	**1**	**1**
At 12months	**1**	**2**	**1**	**1**
At the end of orthodontic treatment	**2**	**3**	**3**	**4**

Table I. Evolution of the oral hygiene index and the gingival inflammation indexes

The patient was monitored from periodontal point of view, measuring the inflammation signs of weekly.The patient is still in the periodontal treatment stage.

Results. In our study, distributions of visible plaque, visible inflammation, gingival recession were evaluated before and after the functional and fixed orthodontic treatment.

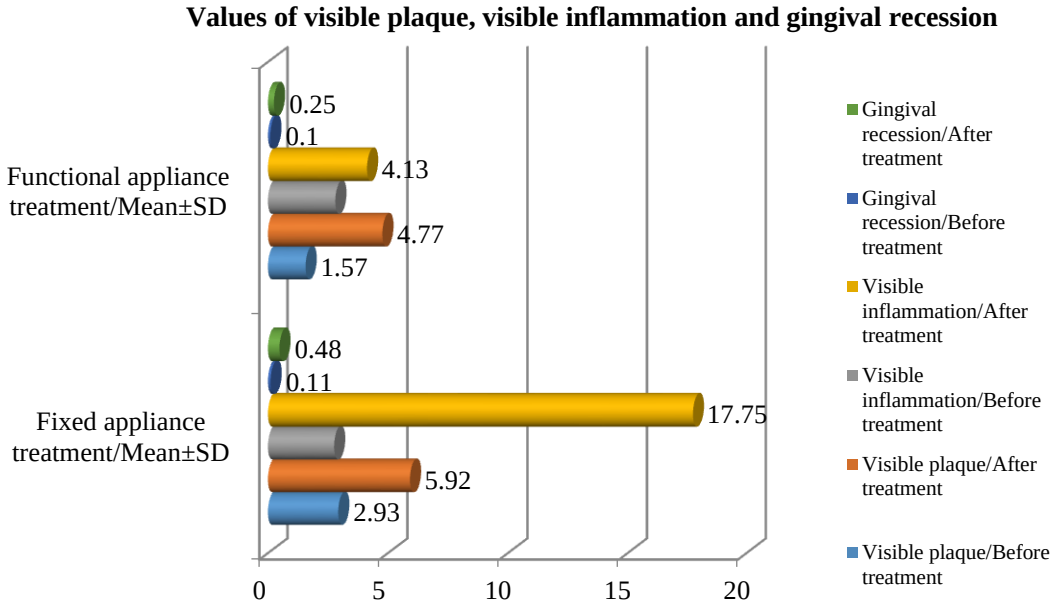

Fig.6 Values of visible plaque, visible inflammation and gingival recession

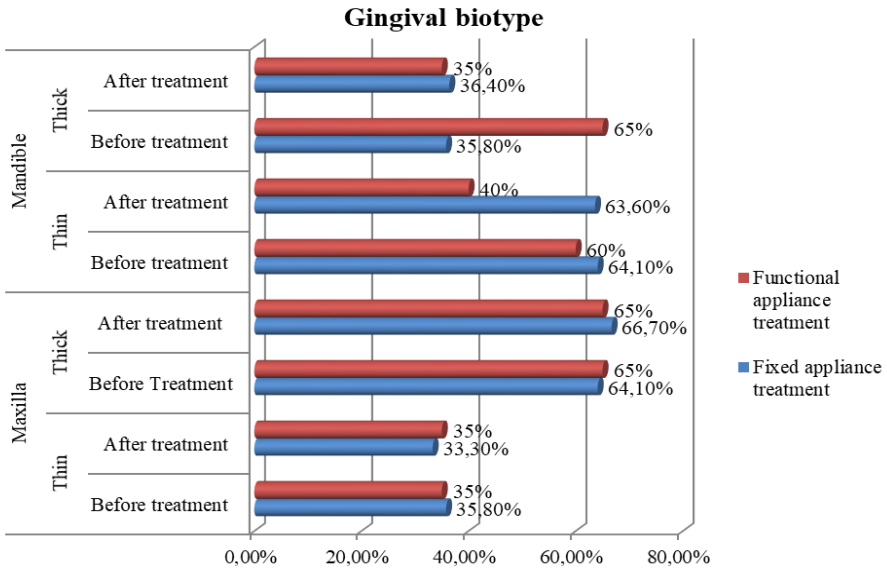

Fig.7 Gingival biotype

In this study, it was observed that plaque index values and those of gingival inflammation increased in all patients between baseline and end of treatment. These increases were statistically significant in patients treated with fixed orthodontic appliances. Also, in patients treated with functional devices have seen these parameters increase but after treatment they were not statistically significant. The presence of gingival inflammation, a thin gingival biotype, of a reduced widths of the keratinized gingiva were significantly correlated with the development or evolution of the gingival recession. It has been shown that most cases of gingival recession that appear during orthodontic treatment, are more common in maxillary teeth and at anterior mandibulla.

Discussions. Implications of anatomy, periodontal physiology and pathology within orthodontic are multiple

links between orthodontics and periodontology there determination in both directions: on the one hand, orthodontic movement can not be achieved without relying on dental periodontium and secondly, periodontium quality directly influences success and stability of orthodontic treatment. Making a treatment plan of an adult patient is often a challenge for orthodontist because, although adults are more compliant, they often have periodontal problems, teeth with abrasion / attrition, restorations well / poorly made, missing, uneven spacing and other deficiencies periodontal and restorative that can compromise the outcome of treatment. [6,7,8]

Conclusions. Regardless of the quality of bacterial plaque control, patients undergoing orthodontic treatment have an increased risk of developing generalized gingivitis in a very short time. In addition, the duration and type of orthodontic treatment significantly influence the development and development of this type of pathology. It is strictly necessary a planning wich takes into account modified biomechanics due to loss of attachment and dental mobility.

References

1. Ong MA1, Wang HL, Smith FN.(1998). Interrelationship between periodontics and adult orthodontics.J Clin Periodontol. Apr;25(4):271-7.
2. Ogino Tomoko, Nakamura Yoshiki, Kazuhiro Gomi b, Ayao Hirashita (2006). Orthodontic contribution to the periodontal management of a patient with localized aggressive periodontitis (post-juvenile periodontitis), Orthodontic waves 65:81 – 8710.
3. Dănilă Cătălina Elena, Mârţu Silvia (2009). Radiographic assessment of periodontal status included in orthodontic treatment of molars II situated at tipping medial positionJournal of Romanian Medical Dentistry,vol.13,nr.3 : 56-60.
4. Toma V, Cioloca DP, Forna Agop D et al., IL 18 as an important gingival inflammatory biochemical marker in children and adolescents with insulin-dependent diabetes mellitus, Revista de chimie, Vol. 67, no. 12, December, 2016, pg. 2545-2551
5. Cardaropoli Daniele, Gaveglio Lorena (2007). The Influence of Orthodontic Movement on Periodontal Tissues Level, Seminars in Orthodontics, Vol 13, No 4 (December): pp 234-245
6. Cioata, R.,Balan,A., Antohe,M.E.,Savin,C., IgnaT,G., Basno,A., Researches Regarding New Biomaterials Involved in Sports Mouthguard, Materiale Plastice 53 (1), 147-149
7. Popescu E, Agop Forna D, Kamel E, Forna NC, Bone substitutes used in guided bone regeneration technique review, Materiale plastice, Volume 54, no.2, 2017, pg. 390-392
8. S. Solomon, I. Ursarescu, A. Martu, I. Luchian, D. Agop-Forna, S. Martu, N.C. Forna, Photo-activated toluidine blue o as adjunctive periodontal treatment, Revista de Chimie, Vol. 66, no. 8, August, 2015, pg. 1166-1168
9. Acar A, Canyürek U, Kocaaga M, Erverdi N.(1999). Continuous vs. discontinuous force application and root resorption, Angle Orthodontist 69:159-164.
10. L.E.Checherita, N.C. Forna, O.Stamatin et al., Correlations between biochemical parameters integrated in stomatognathic system dysfunctional syndrome, Revista de chimie Volume: 64 Issue: 10 ,2013 Pages: 1172-1181
11. Danila C., Rudnic I., Stangu C., Mârţu S. (2008) Influence of different orthodontic brackets on adherence of microorganisms in vitro. Rev. Medico-Chirurgicala, 112,1,supl.1,359-362.
12. Genco RJ, Borgnakke WS. (2013). Risk factors for periodontal disease. Periodontol 2000 62(1): 59-94.
13. Lang NP, Suvan JE, Tonetti MS.(2015). Risk factor assessment tools for the prevention of periodontitis progression. A systematic review. J Clin Periodontol; 42(S16)(Suppl. 16): S59-70.