Volume : 3 | Issue : 11 | November 2014 • ISSN No 2277 - 8179

A Protocol for Periodontal Examination in the Orthodontic Practice for Treatment of Adult Patients With Periodontal Disease

Dental Science

KEYWORDS : orthodontics, periodontal examination, adults

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ABSTRACT

Purpose: The current study presents an exemplary protocol for periodontal examination in the orthodontic practice for treatment of adults with periodontal disease.

Materials and methods: 204 patients (20- 60y.) with periodontal disease, indicated for orthodontic treatment were examined. Teeth impressions and photo documentation were taken. Oral hygiene, gingival biotype, clinical attachment level, type of frenulum, bleeding on probing, pocket depth and tooth mobility were examined. The clinical crown height was measured on casts before and after the treatment. All the data was filled in tables.

Results: Based on the data, special forms were made. A protocol for periodontal examination of adult patients with periodontal disease in the orthodontic practice was established. The protocol was applied before, during and after the end of the orthodontic treatment.

Conclusion: Such a protocol gives the orthodontist a chance to observe the periodontal tissues' health during the treatment.

Introduction.

The epidemiological studies indicate that more than 40% of orthodontic patients are adults and 75% of people over the age of 40 have periodontal disease. This requires the periodontal examinations to be included in the orthodontic protocol for treatment of adult patients with periodontal disease.

Purpose. The aim of the current study is to present an exemplary protocol for periodontal examination in the orthodontic practice for treatment of adult patients with periodontal disease.

Materials and methods. In this study were included 204 patients between 20 and 60 years of age with periodontal disease, indicated for orthodontic treatment. For the orthodontic analyzes, teeth impressions of each patient were taken and casts were made. Intraoral and facial photo documentation was made before, during and after the end of the orthodontic treatment with Canon EOS – 550D Camera with Sigma EM-140 DG Ring Flash. In clinical settings were examined:

1. Oral hygiene status (OHI-S). Oral hygiene status was assessed by Green and Vermillion (1964) index [8]. It has two components, the Debris Index and the Calculus Index. The six surfaces examined for the OHI-S are selected from four posterior and two anterior teeth. It has been established that poor oral hygiene impacts quality of orthodontic treatment; affects the orthodontic treatment outcomes; prolongs treatment times [1] (about 0.67 month); allows significant plaque accumulation around brackets [15] and subsequent white spot lesions can occur [16]; induces periodontal destructive processes as gingivitis, gingival hyperplasia [21] and other periodontal diseases [6].

2. Gingival biotype (GB). The gingival biotype was classified, according to De Rouck et al. (2009) classification. The simple visual inspection method based on the following four clinical parameters: crown width/crown length ratio, gingival height, papilla height, and gingival thickness was used for the assessment. This classification is based only on a maxillary observation regardless of the mandibular parameters.The following biotypes were identified: thin-scalloped, thick-scalloped, and thick-flat scalloped gingival biotype [9,18].

As the gingival thickness affects the treatment outcome possibly because of the difference in the amount of blood supply to the underlying bone and susceptibility to resorption, it is important part of the periodontal examinations [7].

3. Type of Frenulum. The new classification of upper frenulum includes: attachment of the frenulum to the mucogingival junction (Mucosal Frenulum); attachment of the frenulum to the attached gingiva (Gingival Frenulum); attachment of the frenulum to the papilla (Papillary Frenulum); attachment of the frenulum passes right up to the papilla, while inserting in attached gingiva. (Papilla penetrating Frenulum) [3,5,15]. Short, thick maxillary labial frenulum with wide attachment base can be considered as an etiologic factor for diastema, delayed upper jaw development, gingival recession and hampered orthodontic treatment (fig.1) [4].

Fig.1. Frenulum classification.

4. Tooth mobility (TM). According to Miller classification (1950) it is classified as: Class 0 - Complete tooth stability; Class I - Tooth can be moved less than 1mm in the buccolingual or mesiodistal direction; Class II - Tooth can be moved 1mm or more in the buccolingual or mesiodistal direction [14]. No mobility in the occlusoapical direction (vertical mobility); Class III - Tooth can be moved 1mm or more in the buccolingual or mesiodistal direction. Mobility in the occlusoapical direction is also present;

5. Pocket Depth (PD). PD is the distance in mm from the gingival margin (GM) to the base of the sulcus or periodontal pocket (PP) was measured with a calibrated periodontal probe-Hu Friedy at 6 points at each tooth.

6. Bleeding on probing (BOP). It is the most reliable clinical indicator of significant gingival inflammation [17]. Its absence indicates a high likelihood of maintaining periodontal health [11,19]. For this reason, it can be considered as a parameter for use in the daily practice. BOP was evaluated as prognostic value in identifying sites at risk for periodontal breakdown during the orthodontic treatment. BOP was registered at 6 sites of each tooth in 3-month period.

7. Keratinized gingiva (KG). KG was measured using periodontal probe Hu- Friedy and roll test. The observations of Lang and Löe (1972) suggest that at least 2mm of keratinized gingiva, corresponding to approximately 1mm of attached gingiva, is recommended in order to maintain gingival health [2,12].

8. Recessions (R). Recessions were measured using Hu-Friedy periodontal probe from the GM to the cemento-enamel junction (CEJ). Some studies demonstrate that individual behavioral factors such as oral hygiene control and GB, among others, may contribute or predispose to gingival recession [13]. From the orthodontic perspective, however, a possibility of formation of alveolar bone dehiscences during treatment and the presence of

gingivitis during and after therapy is most important [20].

The data from PD, R and KG was filled in a specially prepared forms (Fig.2):

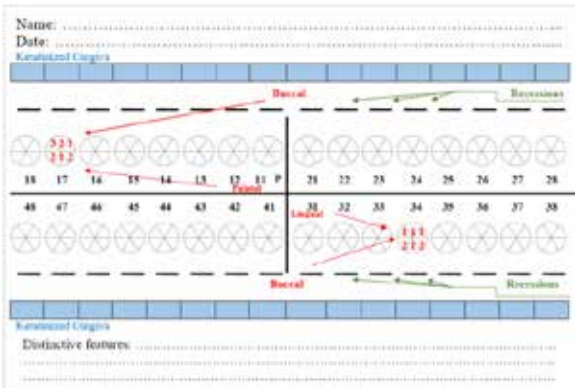

Fig.2 A specially prepared form for pocket depth, recessions and keratinized gingiva values.

9. Clinical Attachment Level (CAL). CAL - a measurement of the position of the soft tissue in relation to the cemento-enamel junction was calculated as:

CAL = PD + R (recession - the distance from the gingival margin to the CEJ)

CAL = PD – GH (the gingival hyperplasia).

10. Basic Periodontal Examination (BPE). BPE was made after the dentition was divided into 6 sextants. A WHO BPE probe was used (World Health Organization probe), which has a "ball end" 0.5 mm in diameter, and a black band from 3.5 to 5.5 mm. Light probing force was used (20-25 grams). The highest score of each sextant was recorded.

According to the Scoring codes:

0 - No pockets >3.5 mm, no calculus/overhangs, no bleeding after probing; 1 - No pockets >3.5 mm, no calculus/overhangs, but bleeding after probing; 2 - No pockets >3.5 mm, but supra- or subgingival calculus (SC) /overhangs; 3 - Probing depth 3.5-5.5 mm; 4 - Probing depth >5.5 mm; * - Furcation involvement

The treatment plan was established according to the code:

0 - No need for periodontal treatment; 1 - Oral hygiene instruction (OHI); 2 - OHI, removal of plaque retentive factors, including all supra- and SC; 3 - OHI, root surface debridement (RSD); 4 - OHI, RSD. Need for more complex treatment; referral to a specialist may be indicated; * - OHI, RSD. Assess the need for more complex treatment; referral to a specialist may be indicated.

11. Clinical crown height. The Clinical crown height was measured before and after the end of the orthodontic treatment on casts. The measurements were made using electronic caliper with an accuracy of 0.01 mm from fixed point of the occlusal surface/ incisal edge to the gingival margin.

12. Bone resorption. The Bone resorption was measured on digital panoramic radiographs using periodontal probe Hu-Friedy (black rings on 5, 10, 15 mm) and X-ray light box. The data was filled in special forms (Fig.3):

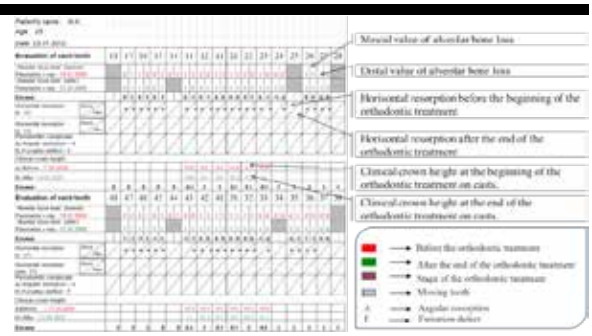

Fig.3 A specially prepared form for adult patient with periodontal disease.

Results.

Based on the data, special forms were prepared, in order the registration of the information to be facilitated. A protocol for periodontal examination of adult patients with periodontal disease in the orthodontic practice was established. The protocols for periodontal tissue condition control were applied before, during and after the end of the orthodontic treatment.

Discussion.

Many Adult patients suffer from mild to severe forms of periodontal disease, which can worsen during the orthodontic treatment phase. It is important for the orthodontist to identify the periodontal problems early and make a proper treatment plan arranging the orthodontic and periodontal therapy in a proper sequence, to enhance the patient's periodontal health. Therefore the orthodontist should be able to identify any pathology from normal periodontal status during the orthodontic therapy. As a basic rule orthodontic treatment should not be started until inflammation of gingiva has decreased to minimum to adequate scaling, root planning and correction of other irritant factors and it is of utmost importance to do periodic checkups during orthodontic treatment every 8 to 12 weeks [10,22].

After regenerative periodontal therapy healing period of 4-6 months is recommended before orthodontic tooth movements are initiated [22]. Regeneration of the PDL does not occur when inflammation is present in the periodontal tissues [6].

Conclusion.

In connection with the increased age of orthodontic treated patients, the necessity of systematized protocol for diagnostic and treatment also is increased. The introduction of periodontal examinations of adult patients with periodontal disease, indicated for orthodontic treatment, allow a better treatment control which is important for the final results. Such an interdisciplinary approach gives the orthodontist a chance to observe the periodontal tissues' health during the tooth movement.

Volume : 3 | Issue : 11 | November 2014 • ISSN No 2277 - 8179

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