PROSTHETIC REQUIREMENTS IN PERIODONTAL PROPHYLAXIS

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ABSTRACT

Aim of the study The purpose of this paper is to identify and analyze the shortcomings of achieving gnatho prosthetic devices and their detrimental effect on periodontal health, and the periodontal protection methods employed in the technological algorithm applied for fixed gnatho prosthetic devices. Material and methods To achieve periodontal prophylaxis, we analyzed the compliance in clinical and technological process of a series of technical requirements for rebuilding morpho-functional integrity of the dental arch by bridges. Results To achieve periodontal prophylaxis should be pursued during clinical and technological procedures the following: respect of coronary morphology, restoring the contour and position of contact areas, inter proximal embrasures restoration, restoration of the physiological contours of the buccal and lingual surfaces, the correct reproduction of natural cemento-enamel junction on mesial and distal faces, respect of gingival sulcus area, achieving perfect adaptation of the margins of restorations, periodontal protection in sub-sulcular area, achieving the profile of emergence. Conclusions By respecting these the principles, are ensured both restoration longevity and periodontal health.

Keywords: key word one, key word two

INTRODUCTION

Prosthetic restorations are usually lost due to periodontal damages or to the occurrence of marginal caries, but, most of the times, due to an incorrectly manufactured prosthetic device. The long-term prognosis of a fixed prosthesis depends to the greatest extent to the connection it has with the marginal periodontium.

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MATERIAL AND METHODS

In order to achieve periodontal prophylaxis, the clinical-technological process observed a series of technological requirements, which are summarized hereunder:

• Observance of crown morphology,
• Reconstruction of the outline and position of interproximal contact areas,
• Reconstruction of embrasures,
• Reconstruction of the physiological outlines of the vestibular and oral crown surfaces,
• Performance of an accurate enamel-cement junction on the mesial and distal
faces,
• Protection of the gum sulcus
• Achieving perfect adjustment of the restoration borders
• Periodontal protection in the sub-sulcular area
• Achieving the emergence profile.

The assessment of these principles was done by analyzing the design and manufacture deficiencies of 68 fixed gnatho prosthetic devices, and by identifying their negative effects on the marginal and deep periodontium.

RESULTS AND DISCUSSIONS

Observance of Crown Morphology

When working on the outline of the axial surfaces of the restorations, one must observe the morphology of natural crowns [1]. Any change in these parameters may have detrimental effects on the integrity of both marginal periodontium, and dental arches and occlusion relations [2,3].

Reconstruction of the Outline and Position of Interproximal Contact Areas

The interdental contact relations prevent food impact, thus preventing both injuries and interdental gum impairment [4]. Moreover, it contributes to dental arch stability and occlusion forces dispersion.

One of the periodontal prophylaxis requirements is contact areas recovery in order to prevent food impact. Food impact is favored by the inaccurate choice of contact area in connection to the vestibular and oral surfaces. West’s rules should be observed during the technological execution of the contact area [5]:
• When the interdental space is smaller than 2 mm, a single-piece prosthesis is recommended;
• When the space ranges between 2 and 4 mm, both teeth should be restored by fixed prostheses;

Figure 1A, B. Location of interdental contact areas

Figure 2. Observance of West’s rules in the restoration of the contact area in periodontal prophylaxis

Figure 3. Outline of reconstructed embrasures by micro-prosthesis modeling
• When the space exceeds 4 mm, it should be closed by the body of a fixed prosthesis.

**Reconstruction of Embrasures**

Embrasures result from the curves of the approximal faces of the neighboring teeth, being adjacent to the contact areas: vestibular, oral, occlusal (incisal) and cervical (6). They serve to guide food during mastication, thus preventing vertical food impact. The size of the embrasures depends on teeth shape and size, which dictate the position of the interdental contact area. Embrasure functionality is connected to the symmetry of the morphological components (embrasures symmetry law) [5].

**Reconstruction of the Physiological Outlines of the Vestibular and Oral Crown Surfaces**

Some particular morphological aspects of the lining periodontium are connected to the shape of the teeth. There are two major types of periodontal morphology: thin-scalloped and thick-flat [6,7].

Any type of periodontal biotype has a particular ratio between the thickness of the vestibular gum border and the convexity of the cervical third of the teeth, which enhances the continuity of the hard and soft tissue profile, so that food is deflected above the gum without getting into the gum sulcus.

Any alteration of the axial outline of the crown surfaces reconstructed by prosthetic means and the gum may result in destructive changes.

Superoutlined restorations (excessive axial curve) lead to gum inflammation and hyperplasia, which accounts for the difficult mechanical removal of dental plaque on the surface under superoutlined convexities [8].

Extreme vestibular and oral surface outlining should be avoided in order to
achieve periodontal prophylaxis, as excessive outlining seems to be more harmful than infraoutlining [8].

**Periodontal Prophylaxis when Defining the Mesial and Distal Outline of the Enamel-Cement Junction**

These outlines are particularly important due to their connections with the epithelial insert, as the later may be injured, especially in the front teeth, during stump preparation and cervical restoration adjustment [9,10].

![Image](image1.png)

**Figure 8. Consequences of the failure to achieve the mesial and distal outline of the enamel-cement junction in the maxillary canine**

![Image](image2.png)

**Figure 9. Retention areas resulting from inaccurate adjustment and insufficient polishing of a fixed gnatho prosthetic device**

**Protection of the gum sulcus**

The borders of the restorations located in the gum sulcus are thought to be an etiological factor enhancing chronic progressive marginal periodontitis [11].

**Achieving perfect adjustment of the restoration borders**

When placing restorations borders in the gum sulcus cannot be helped, the borders should be impeccably fitted and finished, and the intra-sulcular outlines should reflect gum sulcus morphology [12].

The retention areas that are the result of either insufficient finishing/polishing, or inaccurate marginal adjustment – the clinical detection of which is difficult – may lead to bacterial plaque retention and to the turning of that area in an ecologic niche [13,14].

**Periodontal Protection in the Sub-sulcular Area**

The dental-gingival junction area extending from the bottom of the gum sulcus and the apex of the alveolar bone is described as “biological space” (Gargiulo) [5]. When the borders of a prosthetic restoration are located in this space, the result is usually an inflammatory response [15]. Therefore, the most efficient way to prevent sub-sulcular
area impairment is to pay special attention to protecting this area during stump preparation and impression, as well as to avoiding aggressive crown borders placing in the gum sulcus [16].

Achieving the Emergence Profile

The emergence profile is the section of the axial surface of the tooth which extends from the foot of the gum sulcus, crosses the free gum and enters the buccal environment. It may extend vestibularly and orally to the anatomic equator of the tooth [17]. Interproximally it extends from the foot of the gum sulcus, from the enamel-cement junction to the interdental contact area.

Restorations with straight emergence profile in the gingival third facilitate toothbrush access.

Clinically speaking, the straightness of the emergence profile may be checked on the vestibular and oral surface of the restoration by means of a periodontal probe. On the other hand, the interproximal emergence profile of the restoration and its marginal adjustment are best assessed by X-ray [17].

CONCLUSIONS

1. Extreme vestibular and oral surface outlining should be avoided in order to achieve periodontal prophylaxis.
2. On the one hand, intrasulcular borders favor periodontogenic bacterial flora development, and, on the other hand, they prevent access for mechanical bacterial plaque removal.
3. The borders should be impeccably fitted and finished, and the intrasulcular outlines should reflect gingival sulcus morphology.
4. The conformation of the interproximal areas should allow access for plaque control.

REFERENCES