The method of diagnosis and classification of the gingival line defects of the teeth hard tissues

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Abstract
For solving the problem of diagnosis and treatment of hard tissue defects the significant role belongs to the choice of tactics for dental treatment of hard tissue defects located in the gingival line of any tooth.

This work aims to study the problems of diagnosis and classification of gingival line defects of the teeth hard tissues. That will contribute to the objectification of differentiated diagnostic and therapeutic approaches in the dental treatment of various clinical variants of these defects localization.

The objective of the study – is to develop the anatomical-functional classification for differentiated estimation of hard tissue defects in the gingival part, as the basis for the application of differential diagnostic-therapeutic approaches to the dental treatment of hard tissue defects disposed in the gingival part of any tooth.

Materials and methods of investigation: There was conducted the examination of 48 patients with hard tissue defects located in the gingival part of any tooth. To assess the magnitude of gingival line destruction the periodontal probe and X-ray examination were used.

Results. The result of the performed research the classification of the gingival line defects of the hard tissues was offered using exponent power. The value of this indicator is equal to an integer number expressed in millimeters of distance from the epithelial attachment to the cavity’s bottom of defect.

Conclusions. The proposed classification fills an obvious gap in academic representations about hard tissue defects located in the gingival part of any tooth. Also it offers the prospects of consensus on differentiated diagnostic-therapeutic approaches in different clinical variants of location. This classification builds methodological “bridge of continuity” between therapeutic and prosthetic dentistry in the field of treatment of the gingival line defects of dental hard tissues.

Keywords
classification; hard tissue defects located in the gingival part; defects of dental hard tissues; diagnostics

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Problem statement and analysis of the recent research
For the problem solving in diagnosis and treatment of hard tissues defects the significant role belongs to the choice of tactics for dental treatment of hard tissue defects located in the gingival part of any tooth.

The reasons for the loss of gingival tissues could be various processes, particularly at the contact surfaces, secondary caries, tooth de pulpation, non-carious lesions of the teeth, broken part or even all wall of tooth, poorly made orthopedic structures. [1]

In the treatment of hard tissue defects located in the gingival part of any tooth, there is the number of specific problems: the inability to isolate the working field by means of cofferdam or other means of isolation; exposure to blood, saliva, gingival fluid in the working area, which reduces the effectiveness of any bonding system; deterioration of micro-dentures fixing. [2]

The methods of treatment could be changed depending on the size and location of the crown’s defect. For the tactical decisions making and compiling proper treatment plan of the patient first of all a detailed diagnosis must be established. There are various classifications of coronal tooth lesions, based on various criteria. Convenient enough and widely used topographic classification of the cavities in teeth crowns is the classification, which was offered by Black G.V. (1924) [3]. Despite the “age” and its shortcomings, this classification is used today in the world of dentistry, and is constantly being improved. [4, 5, 6]

But none of the improvements does not allow estimating the state of destruction of dental hard tissues in the gum area. Veneziani M. (2010) [2] was the first who has proposed a classification and algorithm of choice of treatment for patients with gingival tooth defects. But this approach focuses on the impossibility of imposing cofferdam during recovery of gingival defects and are not highlighted the peculiarities of orthopedic treatment. M. Żarow, (2013) [7] basing on two parameters – the position of the cavity relative to the edge of alveolar bone (i.e. biological width (Fig. 1) – normally 2 mm) and technical specifications that enable the imposition of
Figure 1. Biological width according to Gargiul

cofferdam – has proposed to allocate 5 classes of destruction of hard tissue areas.

But this classification is also based on such parameters as possibility for cofferdam imposition which the doctors cannot always estimate. Also in this prototype the author divides the defects depending only on his clinical vision of this disease treatment.

Diagnosis, treatment and prevention of any clinical condition are impossible without systematization. Therefore, we believe that there is an urgent need to review the classification of gingival line defects of the teeth that would satisfy fully the views of scientists and clinicians in Ukraine. Thus, improvement of diagnosis and classification of gingival defects of the teeth is an urgent problem that needs a solution.

The objective – is to develop the anatomical-functional classification for differentiated estimation of hard tissue defects located in the gingival part of any tooth, as the basis for the application of differential diagnostic and therapeutic approaches to the treatment of hard tissue defects located in the gingival part of any tooth.

1. Materials and methods

The examination of 48 patients with hard tissue defects located in the gingival part of any tooth was performed, who were in 2014-2016 treated at the center of dentistry in IFNNU.

The criterion for inclusion of patients into the study was the presence of hard tissue defects located in the gingival part of any tooth on one or several teeth with various etiologies of appearance, except wedge-shaped defects.

To assess the magnitude of gingival destruction the periodontal probe was used (Fig. 2), if necessary X-ray examination was used.

2. Results of investigation and discussion

We relied on a famous prototype of the method of classification of hard tissue defects located in the gingival part according to Žarow M., (2013) [7] based on two parameters – the position of the cavity relative to the edge of alveolar bone (i.e. biological width (Fig. 1) – normally 2 mm) and technical specifications that enable the imposition cofferdam. Žarow M. proposed to allocate 5 classes of damage of hard tissues in gingival areas.

The basis of elaboration of classification was our own scientific hypothesis that all dimensions (in assessing Fig. 1) of anatomical parameters can be compared to an integer number, that was measured in mm (attached epithelium 1 mm, attached connective tissue 1 mm, biological width 2 mm). To describe the depth of location of the cavity bottom defect in relation to the gingival level we use exponent whose value is equal to the distance (integer number expressed in millimeters) of the level of epithelial attachment to the bottom of the cavity defect. Diagnosis is carried out by periodontal probe, if necessary, modern methods of radiological examination could be used. If the cavity’s bottom is located over the gum – we put the sign “+” before exponent. If the cavity’s bottom is under the gum we put the sign “−”. If the cavity’s bottom is located at the level of epithelial attachment we inscribe exponent “0”. The defect of hard tissues we denote “C”. Thus, we propose the following classification:

- C⁺³ cavity’s bottom is 3 mm or more above the epithelial attachment;
- C⁺² cavity’s bottom is 2 mm above the epithelial attachment;
- C⁺¹ cavity’s bottom is 1 mm above the epithelial attachment;
- C⁰ cavity’s bottom is on the level of the epithelial attachment;
- C⁻¹ cavity’s bottom is 1 mm below the level of the epithelial attachment;
- C⁻² cavity’s bottom is 2 mm below the level of the epithelial attachment;
- C⁻³ cavity’s bottom is 3 mm or more below the level of the epithelial attachment.

In order not to heap up the diagnostic process with several classifications, the exponent power can be inserted into any
of the classifications that would indicate the depth of the gingival part destruction. It is best to combine classification proposed by us with classification elaborated by Black. For example: 2–1 class according to Black – cavity’s bottom is 1 mm below the level of the epithelial attachment, although it can be used with the others, such as: M–1OD–1 and others. In the available medical literature we have not found works, devoted to the issues of clear classification of hard tissue defects located in the gingival part of any tooth. It is clear that these defects can be divided into defects over gingival, defects on the level of the epithelial attachment and under the gums. The treatises by Żarow M. and M. Veneziani are devoted to diagnosis and treatment of the defects under gums [2, 7]. Schmidsered J. (2000), [8] has identified the five types of defects according to Black and proposed tactics of their treatment, they are more related to the defects over gums. At the present stage of dentistry development the dynamic growth of new knowledge, technologies and materials significantly changed the methods of treatment of hard tissues defects. [9] Therefore, lack of classification of gingival hard tissues defects of dentition forms a methodological gap in modern chain of treatment of such hard tissue defects.

3. Prospects for further research

In the future the proposed classification can serve as a basis for development of the algorithm of selection of method of restoration of dental hard tissues defects and for objective and unbiased comparison of published results of treatment of hard tissue defects located in the gingival part of any tooth.

4. Conclusions

In general, we believe that the proposed classification fills an obvious gap in academic representations about hard tissue defects located in the gingival part of any tooth, offers the prospects of consensus on differentiated diagnostic and therapeutic approaches in different clinical variants of this location and builds methodological “bridge of continuity” between therapeutic and prosthetic dentistry in the field of treatment of gingival defects of dental hard tissues in gingival areas. Equally important is the suitability of this classification for objectification and unbiased comparison of published results of treatment of hard tissue defects located in the gingival part of any tooth.

References

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