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BEAM PROSTHESES ON ATTACHMENTS IN ORTHOPEDIC DENTISTRY: CLINICAL AND FUNCTIONAL ASPECTS AND APPLICATION PROSPECTS

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Annotation. Girder prostheses on attachments represent one of the most functionally sound removable prosthetics designs in orthopedic dentistry. This type of prosthesis combines the advantages of splinting support elements, uniform distribution of chewing load and a high degree of retention, which is especially important in the treatment of patients with partial and complete secondary adentia, complicated by a decrease in periodontal stability. The article discusses the design features of beam prostheses on attachments, the biomechanical principles of their functioning, indications and contraindications for use, as well as clinical and functional advantages over traditional clamp fixation systems. Special attention is paid to the issues of long-term stability of orthopedic structures and the influence of beam attachments on the condition of prosthetic bed tissues.

Keywords: beam prostheses, attachments, orthopedic dentistry, removable prosthetics, splinting, denture retention, adentia.

Introduction. Modern orthopedic dentistry is focused on the development and implementation of prosthetic structures that ensure not only the restoration of chewing efficiency, but also the preservation of the biological balance of the tissues of the oral cavity. In conditions of partial or complete loss of teeth, the problem of rational distribution of functional load, prevention of overload of supporting elements and ensuring the stability of orthopedic structures becomes particularly relevant.

Girder prostheses on attachments are one of the most promising areas in removable prosthetics. Their use makes it possible to combine supporting teeth, roots or implants into a single functional unit, thereby increasing the stability of the structure and reducing the adverse effects of chewing loads on individual elements of the dental system. Unlike traditional clamp clamps, attachment systems have a hidden location, which significantly improves the aesthetic characteristics of the prostheses and the comfort of the patient.

The purpose of this article is a scientific analysis of the constructive, biomechanical and clinical aspects of the use of beam prostheses on attachments in orthopedic dentistry.

Design features of beam prostheses on attachments.

The beam system is a rigid connection between the supporting elements, made in the form of a metal beam, which is fixed to crowns, stump inserts or implants. The removable part of the prosthesis contains a matrix part of the attachment, which ensures retention and stability of the structure.

Depending on the clinical situation, the beam can have a different cross-sectional shape (round, oval, rectangular or trapezoidal), which allows it to be adapted to the features of the prosthetic bed and functional loads. The beam is connected to the support elements by soldering, casting or milling, which ensures high precision fit and durability of the structure.

Attachments used in beam systems can be rigid or conditionally movable. Rigid attachments provide maximum stabilization, while movable elements make it possible to compensate for micro-movements of the prosthesis and reduce stress in the supporting tissues.

Biomechanical principles of functioning.

The main biomechanical advantage of beam prostheses is the redistribution of the chewing load between all supporting elements. Combining teeth or implants into a single unit reduces the load on each individual element, which is especially important in the presence of periodontal changes.

The beam structure helps to reduce vertical and horizontal overloads, prevents loosening of the supporting teeth and reduces the risk of their premature loss. In addition, the presence of a beam limits the unfavorable displacements of the removable prosthesis during chewing and speech, increasing the functional stability of the structure.

An important aspect is the influence of beam systems on the tissues of the prosthetic bed. Due to a more uniform distribution of pressure, injury to the mucous membrane decreases, the likelihood of prosthetic stomatitis and atrophy of the alveolar process decreases.

Indications and contraindications for use.

Indications:

* partial secondary adentia with preservation of a limited number of supporting teeth;
* periodontal diseases requiring splinting of support elements;
* the need to increase the retention of a removable prosthesis;
* prosthetics on implants with insufficient bone support for non-removable structures;
* increased aesthetic requirements of the patient.

Contraindications:

* pronounced mobility of the supporting teeth of the III degree;
* acute inflammatory diseases of the oral mucosa;
* poor oral hygiene;
* somatic diseases in the decompensation stage.

Clinical advantages of girder prostheses on attachments.

Compared to traditional removable dentures, girder structures have a number of significant advantages. First of all, it is a high degree of retention and resilience, which significantly improves the quality of life of patients. The absence of visible fixation elements has a positive effect on aesthetics and psychological comfort.

Beam prostheses demonstrate a more beneficial effect on the periodontal and oral mucosa, and are also characterized by a long service life, provided proper clinical and laboratory design. An important factor is the possibility of modifying the structure with the loss of individual supporting elements without the need to completely manufacture a new prosthesis.

Development prospects and current trends.

Modern digital technologies, including CAD/CAM systems, have significantly expanded the possibilities of manufacturing girder structures. The use of milled beams ensures high accuracy, improved fit, and predictable clinical outcome.

The development of implantology also contributes to the wider adoption of beam prostheses, especially in cases of complete adentia, where they become an alternative to fixed structures under limited anatomical conditions.

Conclusions. Girder prostheses on attachments are a highly effective method of orthopedic treatment of patients with partial and complete adentia. Their use ensures optimal functional load distribution, high stability and improved aesthetic performance. With the right choice of indications and compliance with the clinical and laboratory stages of manufacturing, beam prostheses contribute to the preservation of supporting tissues and improve the quality of life of patients. Further development of technologies and materials opens up broad prospects for improving this area in orthopedic dentistry.

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