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CURRENT DATA ON THE USE OF METAL-CERAMIC STRUCTURES WITH PROSTHETIC TEETH

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Resume. *The issue of prosthetics with metal-ceramic structures based on vital teeth is relevant. Orthopedic dentists often prefer to depulpate the supporting teeth in order to avoid complications, despite the fact that many researchers point to the advantages of vital teeth over depulpated ones.*

Keywords: *depulpation, cermet, questionnaire.*

The problem of depulpation of teeth in prosthetics of patients is still relevant. In most cases, pulp removal is performed during prosthetics with metal-ceramic structures, although this is not always justified. According to Russian researchers (Borovsky E.V., Ashmarin A.N. 2007) 97% of teeth under metal-ceramic structures are depulpated [4]. This situation in prosthetics of patients with metal-ceramic structures, as a rule, is due to the fact that orthopedic dentists are afraid of problems that arise in the process of working with vital teeth. First of all, this is due to the need for anesthesia, the use of protective coatings and the manufacture of dental crowns. Problems can also include increased sensitivity of treated teeth due to the opening of dentine tubules, as a result of which the pulp is exposed to chemical, physical stimuli, bacteria and their waste products, which can lead to its hyperemia and even the development of acute or chronic pulpitis [2, 7, 8, 13]. Prosthetics based on vital teeth has a number of advantages, of which the main one is the absence of complications related to the quality of endodontic treatment. The complex structure of the root canal system, the presence of deltas, branches create difficulties in the preparation and obturation process. For successful treatment, it is necessary to use an effective isolation system of the surgical field (cofferdam), expensive endodontic instruments and equipment, and X-ray monitoring is also mandatory. However, even compliance with all of the above conditions cannot 100% guarantee the absence of complications after endodontic treatment [4, 6, 11, 13]. Data from foreign scientists (Palmqvist S., Swartz B. 1998), based on 15-year observations of various orthopedic structures on vital and depulpated teeth, indicate in favor of preserving the pulp of the tooth when using it as a support [11, 15, 16]. These studies have shown that the possibility of failure in cases where support is carried out on depulpated teeth is higher than when using vital teeth. According to the data obtained, the greatest number of failures was observed when using depulpated teeth as distal supports of bridge prostheses, in prostheses with cantilever segments, as well as in combined prostheses with rigid fixation [11]. Scientists explain the higher percentage of complications compared to vital teeth by damage to the tissues of the apical periodontium and a violation of its cushioning function as a result of endodontic treatment. Therefore, depulpated teeth tolerate increased loads worse than vital ones. A number of Russian authors (H.A. Kalamkarov, M.B. Knyazeva, I.Y. Lebedenko) also believe that prosthetics using vital teeth is preferable, and it is necessary to depulpate the supporting teeth only according to indications that can be presented in the form of three groups [7, 10]. The first group includes anomalies of position,

development and age characteristics of some groups of teeth. Anomalies of the tooth position suggest supra- or infraposition, vestibular or oral inclination greater than 15 °, extra- or intraalveolar position.

In this case, if orthodontic treatment is impossible or the patient refuses it for one reason or another, as a result of uneven preparation of different tooth surfaces, the tooth cavity will inevitably be opened, which fully justifies its preliminary depulpation. Developmental abnormalities include imperfect dentin and amelogenesis, Fournier's teeth, Getchinson's teeth, and other congenital anomalies. In this case, the crown part of the tooth has an inadequate shape and dimensions for the manufacture and optimal fixation of structures, which determines the need for reinforcement and restoration of the clinical crown of the tooth using pin structures with preliminary depulpation. In addition, the first group of causes of depulpation can include the young age of the patient and the structural features of some groups of teeth. For example, the lower incisors throughout a person's life have small vestibulo-oral and mesio-distal dimensions, therefore, in the manufacture of a number of structures, after odontopreparation, the wall thickness from the medial or distal side will be less than 1 mm, which is an indication for strengthening the tooth with pin structures with preliminary depulpation. The second group of indications can include carious and non-carious lesions of the teeth. If, in case of carious destruction, the height of the crown part of the tooth remaining after removal of necrotic tissues is less than 5 mm or the carious process is localized at the root of the tooth, then there is a need for reinforcement with pin structures and restoration of a full-fledged stump with preliminary depulpation. Complicated caries refers to an inflammatory process in the pulp of the tooth or in the periapical tissues. In some cases, the patient does not consult a doctor in the acute period, and the inflammation may turn into a chronic stage, or, against the background of weak reactivity of the body, primary chronic inflammation develops. Such teeth may not bother patients for a long time. But when planning orthopedic treatment, at the diagnostic stage, it is very important to identify such foci with the help of additional examination methods and perform endodontic treatment of these teeth before prosthetics. Non-carious lesions include: a fragment of a part of the tooth crown, a deep crack of the tooth crown, traumatic pulpitis that developed during the manufacture of the prosthesis, trauma to the dental alveolar complex, accompanied by detachment of the neurovascular bundle, a wedge-shaped defect, increased abrasion of teeth. When a part of the tooth crown is broken off, the fracture line may pass in the immediate vicinity of or through the tooth cavity. The latter is an absolute indication for depulpation. If the tooth cavity is not affected, it is necessary to estimate the height of the remaining crown part from the point of view of adequate fixation of the future prosthesis and, if it is less than 5 mm, then before prosthetics it is necessary to depulpate the tooth and restore the stump using pin structures. A wedge–shaped defect is a fairly common pathology found in almost all age groups. It can create a problem when prosthetics of teeth with a significant defect of hard tissues in the gingival region, especially when the wedge-shaped defect reaches the middle of the root diameter. After odontopreparation, the stump of such a tooth becomes much thinner and becomes less resistant to the horizontal component of the chewing load. Such a clinical situation has an unfavorable long-term prognosis, since the manufactured restoration can eventually lead to complications in the form of a horizontal fracture or fracture of the crown part. Therefore, before prosthetics, teeth with significant wedge-shaped defects are recommended for depulpation followed by reinforcement. With increased tooth abrasion of the II and III degrees and a decrease in the height of the lower face, as a rule, the remaining part of the clinical crown has insufficient height and does not allow to produce an adequate non-removable structure without restoring the stump of the tooth with pins, which naturally requires tooth depulpation. The third group of indications includes situations where the need for depulpation is due to the structural features of prostheses. For example, when preparing lateral incisors or premolars of the upper jaw for structures requiring the creation of a circular ledge 0.8 - 1 mm wide (for example, metal-free restorations), there is a risk of opening or damage to the tooth pulp due to thinning of the dentine wall. There is also a need for depulpation when using the root canal for additional retention of

the artificial crown, and when prosthetics with capping prostheses with intra- or extra-root locking clamps. In addition to the above, it can be added that during the preparation of vital teeth, the pulp chamber of which has a large size or non-standard position, the horn of the pulp chamber is often opened. In this situation, teeth are usually depulpated already in the process of orthopedic treatment, since it is extremely difficult to predict the occurrence of such a situation at the stage of treatment planning. There are a number of conditions that must be observed in order to achieve success and avoid complications during prosthetics on vital teeth [3, 7, 10]. Firstly, adequate anesthesia is necessary, since preparation for metal-ceramic structures is associated with the removal of a significant amount of hard tissues, which can cause unpleasant pain. It is necessary to carry out intermittent preparation of tooth tissues with the obligatory use of intensive water cooling (the volume of supplied water should be at least 40-50 ml /min). Adequate water cooling avoids overheating of the pulp, because an increase in temperature in the pulp chamber by more than 6-7 ° C leads to irreversible changes, since denaturation of protein molecules occurs at temperatures above 42 ° C. When using intensive water cooling, there is naturally a need for a good aspiration system to ensure the convenience of the orthopedic dentist and patient comfort [5, 10]. A number of requirements are also imposed on cutting tools. Burs for processing vital teeth for metal-ceramic crowns should have good cutting properties. Otherwise, excessive pressure during preparation can cause a significant increase in temperature even when using abundant water cooling. In addition, coarse- and medium-grained bores should only be used to remove enamel and surface layers of dentin, and fine-grained abrasives should be used for further grinding of hard tissues. The burs must also be centered, otherwise vacuole dystrophy of odontoblasts is possible due to osmotic shock. When dissecting vital teeth, the use of marker bores and special techniques that allow removing a given thickness of hard tooth tissues is justified. This, on the one hand, ensures good aesthetics of the manufactured structure, on the other, allows you to maintain a sufficient thickness of hard tissues, thereby reducing the risk of complications [2, 5, 14]. It is important for the successful preparation of vital teeth to know the safety zones of different groups of teeth in patients, taking into account age characteristics. These data are presented in the most detail in the works of B.S. Klyuev in 1972, N.G. Abolmasov in 1967 and allow an orthopedic dentist to make a decision on depulpation or preservation of the vitality of the supporting teeth, depending on the group affiliation and age of the patient [1]. One of the main factors determining the success of prosthetics is the manufacture of dental crowns and the use of protective coatings. The use of desensitizers and film-forming protective preparations makes it possible to reduce the sensitivity of prepared vital teeth and protect the tooth pulp from the penetration of microorganisms of the oral cavity through open dentine tubules. The coating of prepared vital teeth with special preparations and the manufacture of temporary crowns, according to most authors, is mandatory [6, 8, 12]. Compliance with the above conditions is mandatory. If it is impossible to fulfill any of the conditions, the direction for depulpation of the supporting vital teeth is justified.

Materials and methods. Together with the chief dentists of the regions, a survey of orthopedic dentists of the Republic of Uzbekistan was carried out. The survey was conducted among orthopedic dentists who are on advanced training courses at the Department of General Dentistry, as well as among orthopedic dentists in all fields. As a result, 153 orthopedic dentists took part in the survey. During the survey, orthopedic dentists were asked to answer a number of questions about the indications for depulpation, the causes of the insolvency of metal-ceramic prostheses and technological aspects of prosthetics (preparation, use of water cooling, marker bores, manufacture of pharmacological structures, coating of teeth with drugs to reduce sensitivity). The data obtained were processed using the Microsoft Office Excel computer program.

The results and their discussion. First of all, we were interested in information – how many orthopedic dentists produce metal-ceramic structures based on vital teeth without prior referral for depulpation of the supporting teeth. According to the survey data obtained in the Republic of Uzbekistan, the majority

of orthopedic dentists (71.3%) try to keep their supporting teeth vital and send them for depulpation only according to strict indications, and 28.7% of orthopedic dentists who took part in the survey always send them for depulpation of vital supporting teeth, regardless of the clinical situation.

It should be noted that according to the results of a survey of orthopedic dentists, 80% of respondents in the Bukhara region try to keep their supporting teeth vital as much as possible. The results of the dental torpedo survey determined the indications for depulpation of teeth used as supports for prosthetics with ceramic-metal structures, and allowed them to be distributed according to their significance. The most common indications were the abnormal position of the supporting teeth and the Popov-Hodon phenomenon, in the presence of which orthopedic dentists consider it advisable to depulpate teeth in 100% and 97.4%, respectively. 57.6% of the respondents attributed pathological erasability to indications for depulpation of supporting vital teeth. In the fourth (39.7%) and fifth (30.1%) places, respectively, the presence of a carious cavity or filling on the supporting tooth and the young age of the patient. If it is necessary to use a large number of supporting teeth and when replacing a large-length defect, 29.6% of orthopedic dentists are sent for depulpation. Marginal periodontal diseases are an indication for depulpation in only 18.5% of doctors.

The quality of dental care depends not only on the qualifications and professional level of specialists, but also largely on the material and technical base. At the moment, there is a need for further study of this issue and the development of algorithms for the preparation of vital teeth for metal-ceramic structures.

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