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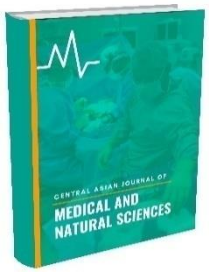

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Clinical and Functional Rationale for the Use of Inlays from Various Types of Material

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Abstract: A ceramic inlay is a micro-prosthesis made in a laboratory or dental office by an indirect method. Being an independent construction, it perfectly restores chewing functions, shape, color and aesthetics of a damaged tooth. Ceramics is a durable and stable material that is firmly entrenched in modern dentistry due to its high aesthetic and mechanical properties.

Key words: dental restoration, ceramic inlay, microprosthetics, secondary caries, filling.

Ceramic restoration with inlays of the lost part of the tooth is increasingly being used as the best alternative to composite fillings in case of significant destruction of the teeth of the chewing group. It must be said that this process requires good technical skills and artistic talent, combining the abilities of a dentist and a technician [1, 2, 5, 13, 17]. “Ceramic restorations can be made in such a way that even a dentist can hardly distinguish them from healthy teeth,” says G. Schillinburg [25].

According to Iordanishvili A. K., “at present, the high efficiency of using ceramic inlays to replace defects in the crown part of the tooth is obvious” [12].

With the advent and introduction into dental practice of composite restoration systems and endodontic fiberglass pins, it became possible to restore teeth with a good aesthetic result in one visit. At the same time, many dentists do not use pins at all, restoring the roots of teeth, motivating their choice of this technique by the good adhesive qualities of the restoration systems. But is such recovery always effective and complete? No not always. A number of clinical studies and observations have shown that without an intracanal pin it is impossible to carry out a high-quality restoration of the crown part of the tooth, and even the presence of one does not always guarantee a good long-term result. Therefore, in our clinic, when restoring the roots of teeth, the use of standard endodontic pins or individual stump inlays is a prerequisite. We use all available types of pins and inlays, but in this article we want to detail an unpopular technique among dentists for restoring the roots of teeth using composite inlays made in a direct way with combined fixation. This method is very simple and effective, does not require special skills, which allows it to be used in any clinics and offices with standard tools and materials. Our practical experience has shown not only the indispensability of this type of tooth root restoration in most clinical cases, but has also been a factor in reconciliation between supporters of the cast metal stump inlay and lovers of standard endodontic pins.

But before proceeding to the description of the method of manufacturing a composite inlay reinforced

with a fiberglass post, it is necessary to recall the requirements for the root of the restored tooth, as well as compare the pros and cons of more traditional methods of root restoration.

Intracoronal inlays have indications for significant destruction of the tissues of chewing teeth. "With the localization of type O cavities and the index value of 0.2 on premolars and 0.2-0.3 on molars, the cast inlay includes the body and the fold. If the value of IROPZ is 0.3 on premolars and 0.4-0.5 on molars, occlusal coating of tubercle slopes is carried out. With IROPZ values of 0.3-0.6 on premolars and 0.6 on molars, the entire occlusal surface and tubercles are covered" [20]. Composite filling has no indications at IROPZ values of 0.3-0.6.

Advantages of ceramic inlays over fillings.

Assessing the advantages of ceramic microprostheses, V. N. Trezubov claims that "the advantages of inlays over fillings are their high strength, shrinkage compensated by the fixing material, precise marginal fit, the possibility of contact points and crown angles, and color stability" [22].

Besides:

- the tab is able to completely imitate the anatomy of a natural tooth;
- under the tab, as a rule, there is a minimal recurrence of caries due to the constant volume of ceramics, good marginal fit and lack of shrinkage of the material;
- when using inlays, there is less load on the prepared tooth walls, so that the wall does not break off over time;
- in comparison with the composite, the ceramics have a better biological compatibility with the hard tissues of the teeth;

since the inlay is installed at once, unlike a filling, this reduces the risk of saliva getting on the restored tooth, which prevents the leakage of the connection with the tooth tissues and, consequently, the development of secondary caries [11, 15, 18, 23].

Clinical cases of replacing composite fillings with indirect ceramic restorations.

In the first clinical case, the patient came with complaints of tooth roughness. An objective examination revealed a chipped enamel on the chewing surface on the distal lingual tubercle of the first molar on the right side of the lower jaw. There is a composite filling on the 4.6 tooth, the marginal fit is broken, it differs markedly from the natural tooth in color and does not correspond to the anatomical characteristics of the chewing surface of the molar and, therefore, does not carry a full-fledged functional load. Tooth destruction according to IROPZ=0.5. The patient was offered to restore the destroyed molar with a ceramic inlay.

According to S. A. Naumovich, "inlays with overlapping cusps (overlay type) can be an organ-preserving alternative to the use of full crowns when restoring significant defects in the chewing surface of the tooth" [18].

After the treatment plan was approved, the tooth was prepared for restoration. The preparation was carried out taking into account the recommendations of S. A. Arutyunov, namely ". there are general rules for the formation of a cavity for metal-free tabs:

- there is no finishing of cavity edges;
- divergence of cavity walls 6-12°;
- cavity width not less than 1.5 mm;
- rounded inner corners;

- the outer border of the cavity should be within the limits of the enamel (for adhesive fixation);
- all intersurface angles of the cavity should be about 90°" [4].

According to the authors' advice, "odontopreparation is carried out in a typical way, as for adhesive fixation with composites. It is desirable that the cavity on the occlusal surface be at least 1.5 mm deep" [12]. It is important that the border of the inlay and the tooth does not fall under a direct load during chewing, "... when preparing for a ceramic inlay, the creation of enamel bevels and thin areas is contraindicated" [4].

After preparation, impressions were made from the dentition, which should very accurately reproduce the prepared tooth, since this factor ensures the degree of fit of the inlay [20, 22]. The next step is to match the color of the ceramic so that the inlay matches the natural tissues of the tooth as closely as possible [3, 6, 21, 24]. In the laboratory, after casting from high-strength ceramics and pressing, an individual pattern was applied to the inlay, and then it was glazed. To do this, the characteristics of the patient's teeth were taken into account, "... the minimum thickness of the material should be 1.5-2.0 mm" [18].

The polishing of the inlay was carried out in accordance with the recommendations of A. K. Iordanishvili, "finishing and polishing of the inlays is carried out with carbide cutters, silicone elastic heads, and finished inlays are polished using HP-Paste" [12].

After the laboratory stage of manufacturing a ceramic inlay, there is a clinical stage - this is the setting of the inlay. Using composite cement under magnification, the insert was fixed into the prepared cavity so that the gap between it and the tooth tissues did not exceed a few microns. It actually merges with the walls of the tooth, "... the accuracy of the marginal fit in such structures is 20-30 microns" [12].

The patient is satisfied with the restoration and informed that with proper hygienic care and professional teeth cleaning every six months, she can be sure that the inlay will last a long time and you can forget about treatment for 10-15 years.

Let's consider another clinical case. The patient complained of pain in tooth 2.6. On examination, secondary caries was found under the filling. Usually, after 1-3 years, the filling material shrinks, which leads to a violation of the marginal fit, provoking secondary caries. There is tooth decay according to IROPZ=0.55. The woman was offered to replace the failed composite filling with a pressed ceramic inlay, since here it is necessary to restore most of the lost dental tissue.

Currently, due to their advantages, all-ceramic inlays are increasingly replacing composite fillings when replacing significant defects in the chewing surface of the teeth. This phenomenon has been substantiated by many authors of works on orthopedics and practically confirmed by our clinical cases. On the basis of the work carried out, we obtained visual data on the marginal fit and aesthetic properties of the ceramic inlay. Thanks to multiple magnification, the border between the tooth tissues and the restorative material was visualized. By microscopic examination, it was possible to verify the high accuracy of pairing of ceramic structures with tooth tissues in comparison with composite fillings. As a result of prosthetics, the tooth looks aesthetically pleasing and natural, and, most importantly, after treatment, in the presence of an anatomical inlay, the chewing load will be adequately distributed to the tooth, preventing wall chips and cracks.

Conclusion

Ceramics have been clinically proven to have excellent adhesion to dental hard tissues. The absence of microscopic irregularities and gaps under magnification, good adhesion and natural appearance allow

us to draw conclusions about the use of inlays as the best restorative material for the chewing group of teeth and the expediency of its use in specific cases.

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