COMPARISON OF ZIRCONIUM AND STAINLESS STEEL CROWNS FOR THE FIRST PERMANENT MOLARS

Chakkanov Fakhritdin Khusanovich
Assistant Department of orthopedic dentistry
Samarkand State Medical University
Samarkand, Uzbekistan

Relevance

It is a difficult task to ensure the durability of restorations in the treatment of teeth severely destroyed due to the carious process, as well as teeth with molar incisor hypomineralization. Despite their effectiveness, artificial stainless steel crowns do not meet the aesthetic requirements of parents who prefer to make restorations that resemble natural teeth in color.

According to several studies, the success rate of treatment with pre-fabricated artificial crowns made of zirconium dioxide mounted on temporary molars after 18, 24 and 36 months corresponded to that when using artificial crowns made of stainless steel

Zirconium crowns are premium dental prostheses made of modern material, which belongs to metal—free ceramics.

Zirconium oxide (ZrO2) consists of biocompatible colorless crystals of high strength. Designed for serious chewing loads, the appearance is close to a natural tooth. After installation, allergic reactions and gum inflammation do not occur.

Advantages of zirconium crowns

Aesthetics. None of the materials from which dental orthopedic structures are made today can be compared with zirconium in their ability to imitate natural tooth enamel. Zirconium crowns are really impossible to distinguish from real teeth – that's the main advantage of such prostheses. The material expands the possibilities of

prosthetics, allowing you to accurately repeat the structure, refractive properties, shade, and anatomy of a "living" dental crown.

Endurance. Zirconium dioxide is stronger than both metal and ceramics, which are widely used in dental prosthetics today.

Stability of properties. Zirconium crowns, unlike ceramic and cermet crowns, retain their color throughout their entire service life.

Atraumatic. Preparation of a tooth for prosthetics with cermet usually involves depulpation and turning, whereas the installation of a zirconium crown, which has a much smaller thickness, does not require such drastic measures. In this case, minimal treatment is sufficient, and pulp removal is performed only in the presence of pulpitis.

Biocompatibility. Zirconium does not cause allergic reactions, so such dentures can be safely put on people who are prone to allergies.

The manufacture of prosthetic products made of zirconium is carried out in a dental laboratory. The model and the prosthesis itself are created using CAD/CAM computer technologies and special CNC machines, which ensures the highest accuracy and eliminates the human factor – the main cause of medical errors.

Zirconium crowns have many advantages, but only one significant disadvantage is the high cost of prosthetics, which is due to the high cost of the material and the complexity of the production process of orthopedic structures of this type.

Goal. The aim of the study was to evaluate and compare the clinical characteristics of pre-fabricated artificial crowns made of zirconium dioxide and artificial crowns made of stainless steel in the restoration of severely damaged first permanent molars in children.

Materials and methods

The study involved 69 children aged 6 to 12 years with extensive carious lesions of the first permanent molars. A total of 36 pre-fabricated artificial crowns made of zirconium dioxide and 36 artificial crowns made of stainless steel were installed.

The assessment of clinical parameters included: time spent on preparation, packing and fixation; amount of plaque; marginal fit; chip/fracture of the crown; retention; obstruction to eruption of the second permanent molar; satisfaction of parents with treatment.

Results and conclusions

12 months after the fixation of artificial crowns, a clinical assessment revealed statistically comparable indicators of retention, edge fit, the occurrence of structural defects and retention of dental plaques between artificial crowns made of zirconium dioxide and artificial crowns made of stainless steel.

Due to the better aesthetics, the parents preferred pre-made artificial crowns made of zirconium dioxide.

The clinical time required for the manufacture and installation of pre-fabricated

artificial zirconium dioxide crowns was almost twice as long as for stainless steel crowns.

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