

Ministry of Health of Ukraine
Poltava State Medical University

THE NEED FOR CLOSING OF DENTINAL CANALS DURING INDIRECT RESTORATION

Zubchenko S.G. – c.med.s, assistant of department
propaedeutics of orthopedic dentistry

Kalashnikov D.V.– c.med.s, docent of department
propaedeutics of orthopedic dentistry

Zubchenko Y.P. – a dentist in the educational – scientific
– treatment unit “Dental center”

Maliuchenko M.M. – c.med.s, assistant of department
propaedeutics of orthopedic dentistry

Palaguta V.E. – student of the 2nd year of the 7th group

Poltava - 2023

The relevance of the topic in orthopedic dentistry can cause complications in the form of pulpitis or increased sensitivity after tooth preparation. This phenomenon can occur as a result of the opening of the dentinal tubules and the entry of the microbiome and chemical irritants into them.

The question of immediate sealing of dentin during preparation of teeth for permanent prosthetics is still relevant. (IDS) is a new approach in the field of indirect restorations.

Dentin coating is carried out immediately after the tooth preparation stage before the impression removal procedure. It is not known whether it is still possible to achieve an effective bond between the dentin covered with a layer of adhesive resin and the restoration after 2 to 4 months from the moment of fixation of provisional structures.

The aim of the study. The purpose of this study was to determine the difference in the adhesion strength of permanent E- max structures to tooth dentin when using the DDS (delayed dentin sealing) and IDS techniques, based on the time interval from the moment of preparation to the stage of fixation of the structure (2, 7 and 12 weeks, respectively) , while using two different dentin bonding agents.

Research materials and methods.

Twenty extracted human molars were collected and divided into 5 groups. A two-component total etching adhesive system Optibond FL (Kerr) and a two-component self-etching adhesive system Clearfil SE Bond (Kuraray) were used. For each dentin bonding agent, control samples were prepared using the direct immediate bonding technique and restoration with Z100 photocomposite.

Preparation of the other specimens was carried out either by the indirect access technique without the dentin prebonding procedure (DDS) or with immediate dentin sealing (IDS), which was performed immediately after the preparation step. Temporary structures (Temfil) were installed on the teeth with IDS for 2 weeks, 7 weeks and 12 weeks before fixation of already permanent restorations.

Research results. All teeth were prepared for a continuous tensile strength (MTBS) test 24 hours after the final restoration with composite veneers (Z100).

From 10 to 11 sections ($0.9 \times 0.9 \times 11$ mm) from each tooth were selected for testing. The results of the MTBS test for each of the five experimental groups were collected and analyzed using a two-factor analysis of variance by the ANOVA method (dentin-bonding system, sequence of application), and each tooth (results of the MTBS test for each of 10-11 slices) was used in qualities of a separate dimension.

For both adhesive systems, the adhesion strength values of group C and all IDS groups differed slightly and exceeded the mark of 45 MPa. The bond strength of DDS groups was lower than that of other variations ($P < 0.001$), when SE Bond was used, it was 1.81 MPa, when Optibond FL was used, it was 11.58 MPa. The highest bond strength value was obtained in the case of Optibond FL in the following time ranges: 7 weeks (66.59 MPa) and 12 weeks (59.11 MPa).

These values were significantly higher compared to SE Bond with similar temporal conditions with values of 51.96 MPa and 45.76 MPa ($P = .001$ and $P = .003$), respectively.

Conclusions. When preparing a tooth for indirect restoration coverage, the use of the IDS technique, which aims to apply a two-component dentin-bonding agent in combination with total etching or coating with a two-component self-etching dentin-bonding agent (before the impression removal stage), leads to similar bond strength values as and in the case of freshly applied adhesive. The bond strength does not depend on time, even after 12 weeks from preparation to fixation of the permanent orthopedic structure.