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Comparative evaluation of fracture resistance of primary anterior teeth restored with long dentine posts and teeth restored with short fiber posts: An in vitro study

Reham E.L. Ghazawy, Amira Badran



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Graphical abstract

Background: Badly broken primary teeth that require pulp therapy present a high-risk of biomechanical failure due to the loss of tooth substance resulting from pre-existing decay and endodontic therapy itself. The introduction of Biological dentine posts offered an excellent alternative for restoring such teeth. The ideal post material should have physical and mechanical properties that are similar to those of dentine. Accordingly there is no such material other than dentine itself. Another concern in restoring endodontically treated primary teeth is the need to find a material that can resorb in a similar way to natural tooth structure as a part of the exfoliation process allowing normal eruption of permanent successors. The difficulty of finding such a material had urged Pedodontists to only use short posts in restoring badly broken primary anterior teeth which adversely affected the retention of the posts and resulted in a less favorable stress distribution along the post. The aim of the current study was to assess the effect of using long dentine posts on the fracture resistance of endodontically treated primary anterior teeth in comparison to primary anterior teeth restored with short fiber posts.

Methods: A sample of thirty primary anterior teeth was collected from the outpatient clinic of Pediatric Dentistry and Dental Public Health Department. Ten extracted premolars were also collected from the outpatient clinic of Oral and Maxillofacial Department. Both departments are at the Faculty of Dentistry, Ain Shams University. The roots of the premolars were used to prepare twenty dentine posts of a standardized shape and dimensions, using CNC milling machine. After receiving proper filing and endodontic radicular preparation, the primary teeth were divided into two groups (fifteen teeth in each group). The first group was restored with dentine posts of 5 mm length, and the second group was restored with fiber posts 3 mm in length. For both groups, fracture resistance testing was performed using universal testing machine.

Results: Mann-Whitney U test was used to compare between the two post types. Long dentine posts showed statistically significantly lower mean fracture resistance than short fiber posts.

Conclusion: Short fiber posts offered better fracture resistance when compared to long dentine posts.

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