Retention and deformation of a new attachment model for mini-implantretaineoverdentures

Editorial

The gradual loss of retention and the need for periodic replacement of attachment system components are the most frequent complications in implant-supported overdentures. Develop a new polymeric attachment model for overdentures and compared your retention and deformation with a conventional O-ring attachment system. A matrix with two mini-implants with ball abutments was used to simulate the mandibular border during a fatigue resistance test. A total of 60 polyacetal (n=20), polytetrafluoroethylene (PTFE) (n=20) and O-ring (n=20) attachments were captured in pairs with acrylic resin and subjected to 3.625 insertion/removal cycles, simulating 30 months of overdenture use. The internal and external deformation of the attachments was assessed using an optical stereomicroscope. One-way analysis of variance and Tukey's test (α=0.05) were used for statistical evaluation. The polyacetal attachment system showed the highest retention (P<.001), followed by the O-ring and PTFE attachments. The O-ring attachments exhibited the lowest deformation (P<.001), and the polyacetal attachments had the highest internal deformation (P<.001). The new polyacetal attachment model that was developed resulted in the high retention of mini-implant-retained overdentures, and despite the deformation experienced, the results suggested a period longer than 30 months before replacement would be required.

The gradual loss of retention and the need for periodic replacement of attachment-system components are the most frequent complications in implant-supported overdentures. The purpose of this in vitro study was to develop a new attachment system for overdentures with polymeric materials and compare its retention and deformation with a conventional O-ring attachment system.

A matrix with 2 mini-implants with ball abutments was used to simulate the mandibular border during a fatigue resistance test. A total of 60 polyacetal (n=20), polytetrafluoroethylene (n=20), and conventional O-ring (n=20) attachments were captured in pairs with acrylic resin and subjected to 3625 insertion and removal cycles, simulating 30 months of overdenture use. The internal and external deformations of the attachments were assessed using an optical stereomicroscope. One-way ANOVA and the Tukey honestly significant difference tests were used for statistical evaluation (α=.05).

The polyacetal attachment system showed the highest retention (P<.001), followed by the O-ring and polytetrafluoroethylene attachments. The O-ring attachments exhibited the lowest deformation (P<.001), and the polyacetal attachments had the highest internal deformation (P<.001).

The aim of this in vitro study was to evaluate the effect of modification of the attachment on stress transmitted to the abutment tooth and residual ridges in lower unilateral distal extension partial dentures. Materials and Methods: An acrylic lower unilateral distal extension cast with the first premolar as the main abutment was constructed. Three types of commonly used extracoronal castable attachments were selected, namely: (1) Preci-vertix standard, CEKA attachment, (2) Preci-sagix mini size, CEKA attachment, (3) OT–cap normal, Rhein 83. They underwent a simple new modification and their effect on stress distribution was studied. Six attachment retained removable partial dentures were constructed: among them, three with nonmodified attachments, and three with modified attachments. Four strain gauges were installed on the acrylic cast to measure the microstrain induced around the abutment tooth and residual ridges. A unilateral static vertical load of 300 Newton was applied on the first premolar and the first molar at a crosshead speed of 2 mm/min and microstrain was recorded using specific miniature Universal Testing Machine. Data were collected and analyzed using the Wilcoxon test for comparison between attachments before and after modification. Results: The highest microstrain was recorded for modified OT cap and modified Preci-sagix attachment around the abutment tooth and residual ridges respectively. While modified PV attachment showed the lowest microstrain around abutment and residual ridges. Conclusion: Maximum strain induced around the tooth and residual ridges in cases of OT cap and Preci-sagix attachments. Among all attachments, the use of Preci-vertix showed better stress distribution around both abutment and residual ridges.