

RESEARCH AND EDUCATION

Retention of mandibular implant-retained overdentures with two different attachment designs: An in vitro study



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Implant-retained overdentures have many benefits, for example, preservation of bone volume, improved retention, stability, function, proprioception, and comfort, in comparison with complete dentures.¹ According to the McGill and York consensus meetings, an overdenture with 2 implants may be the first treatment option for the edentulous mandible.^{2,3} Different attachment systems can be used in implant-retained overdentures, including bar, ball and socket, magnets, LOCATOR attachments, and OT equators. An attachment system with a metal-to-metal interface (TITACH; Dental Evolutions Inc) has been recently introduced and was evaluated in the present in vitro study.

The TITACH attachment exhibits a metal-to-metal interface between the cap and the abutment, unlike the nylon attachments in the Zest Anchor LOCATOR system (Zest Dental Solutions). The TITACH consists of 3 parts: TITACH abutment, TITACH cap, and a silicone sleeve. The metal cap has vertical slots to allow it to open on engaging the abutment. The silicone sleeve acts as a block-out during the pick-up of the cap. After the pick-up, this silicone sleeve is sectioned in half and inserted between the cap and the cap housing so that it locks

ABSTRACT

Statement of problem. Retentive force and loss of retention should be considered when selecting an attachment. Studies that evaluate the retentive force and the effect of repeated cycles of insertion and removal on the TITACH attachment with a metal-to-metal interface are needed.

Purpose. The purpose of this in vitro study was to measure the retention of mandibular implant-retained overdentures with 2 different attachment designs before and after 1000 insertion and removal cycles.

Material and methods. Two dental implants were inserted at the mandibular canine region bilaterally in a completely edentulous model. Sixteen mandibular implant-assisted overdentures were fabricated to form 2 groups, each with a different attachment design. One group received 8 pairs of TITACH attachments, while the other group received 8 pairs of LOCATOR attachments. A cyclic loading machine was used to perform 1000 insertion and removal cycles. A universal testing machine was used to evaluate retentive force before and after insertion and removal cycles. Data were analyzed by using the Mann-Whitney *U* test and Wilcoxon signed-rank test.

Results. When retentive forces before and after 1000 insertion and removal cycles were compared, the TITACH attachment showed significantly higher retentive force than the LOCATOR ($P < .05$). However, the LOCATOR attachment showed a significantly lower percentage change in retentive force ($P < .05$).

Conclusions. The TITACH attachment group showed favorable initial and final retentive force compared with the Zest Anchor LOCATOR attachment group. However, the LOCATOR attachment group showed favorable lower percentage change in retentive force. (*J Prosthet Dent* 2020;123:738.e1-e6)

under the outer edge of the cap. Moreover, each attachment resists between 31 and 40 N.

The Zest Anchor LOCATOR attachment has several advantageous characteristics, including resiliency, self-aligning feature, dual retention, and ease of replacement of the nylon-retentive inserts.⁴ Its clinical performance has been reported to be favorable.^{5,6}

The retentive force provided by an attachment system should be high enough to retain the denture during function and prevent displacement by oblique forces. The retentive force is a contributing factor to the

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