

Revitalizing Worn-Out Overdenture Attachments in One-Piece Implant Cases Using Silicone Matrix System: A Case Report

Abstract:

The case report discusses the use of a silicone matrix system for salvaging worn-out overdenture attachments in one-piece implant cases. It highlights the effectiveness of this technique and presents a detailed case study. One-piece or single-piece implant systems, where the intraosseous and abutment portions with the stud attachments consist of one unit, do not allow changing the worn-out abutment individually if required, thus ruling out any further use of implant and abutment once the attachment component faces extensive irreversible wearing. The 'Retention.Sil' – an additional curing elastomeric material in salvaging worn-out attachments of one-piece implants, emphasizes the revitalization process and effective use as an attachment for implant-retained overdenture, thereby extending the clinical use of one-piece implants and avoiding extensive invasive procedures in geriatric patients.

Key-words: Dental implants, Denture, Overlay, Implant supported dental prostheses,

Introduction:

Retention is an important factor in the success of prosthodontic overdenture attachments. SIL (self-adapting attachment system) is a type of attachment system that utilizes a silicone ring as a retentive element, a secure and stable attachment between the overdentures and abutment of the one-piece implant. It is designed to adapt to the abutment surface, which allows it to create a seal that keeps the overdentures in place.

An attachment is a mechanical device for a prosthesis's fixation, retention, and stabilization. Attachment systems are crucial to the longevity of implant overdentures. They are represented by bars and clip attachments for splinted systems or by a conjunct of un-splinted systems such as locators, ball anchors, magnets, and telescopic crowns.[1,2] The limitations include wear, complex fabrication, limited rotational freedom, cost factor, and periodic maintenance visits.[3,4]

A one-piece implant was introduced to incorporate a seamless transition of the implant to the trans-mucosal abutment.[5]

This design mimicking natural teeth exhibited several advantages such as solid unibody design, no split parts, single-stage surgery with either flap or flapless approach, and simple restorative techniques. Despite these advantages, one-piece dental implants have limited rehabilitative options when implants are at different levels and angulations.[6] Moreover, the main complication is the wearing out of the one-piece implant's stud component, which can be resolved only by removing the implants as the worn-out stud component fails to provide retention. Fabrication of a prosthesis salvaging the existing one-piece implants ensures a better quality of life and patient satisfaction.

¹ANAMIKA ABRAHAM, ²ANGLEENA Y DANIEL, ³ACHSAH ANN THOMAS

¹⁻³Department of Prosthodontics & Crown & Bridge, Christian Dental College, Ludhiana, Punjab

Address for Correspondence: Dr. Anamika Abraham
Assistant Professor,
Christian Dental College,
Ludhiana, Punjab-141008, India.
E-mail: dranamikaabraham@rediffmail.com

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This clinical report aimed to illustrate the versatility and effectiveness of mandibular overdentures retained by dilapidated one-piece implant abutments using additional curing high-performance silicone matrix material.

Clinical report:

A 78-year-old male patient reported to the Department of Prosthodontics with a chief complaint of loose mandibular implant-retained overdenture. Intraoral examination revealed three worn-out ball abutments in the mandibular arch (Figure 1).



Figure 1: Intraoral view showing worn-out ball abutments in the mandibular arch

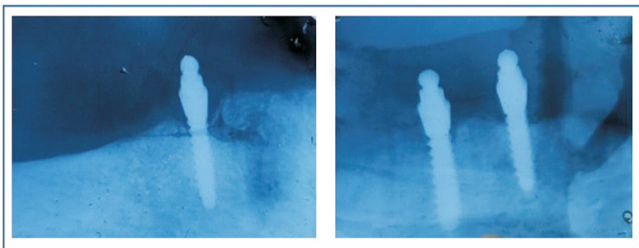


Figure 2: Radiological investigations revealed multiple one-piece implants.

The nylon inserts could not contribute to denture retention owing to poor adaptation over worn-out stud abutments. The patient was unwilling to undergo an extensive surgical procedure, removing the one-piece implant and placing new implants. Hence, an overdenture with novel high-performance addition curing silicone matrix (Retention. SIL Bredent) attachment in the mandibular arch and conventional maxillary complete denture was planned.

Maxillary and the mandibular primary impression were made with irreversible hydrocolloid (Alginate-Dentsply). The study cast was obtained. The special tray was created using auto-polymerizing resin. Border molding was done with green stick compound (Dental Products of India), and the impression was made with light body polyvinylsiloxane impression material (Zhermack Elite Hd++). The master cast was made. Jaw relation; try-in, and denture processing was done conventionally.

For the chair-side pick-up the position of the ball abutments was localized and ground out of the intaglio surface of the denture. The created recesses were conditioned with multi-SIL primer. The primer was dried for 3 minutes. Retention. SIL 600 was filled into the recess up to the top, and the denture was placed over the ball attachment. (Figure 3)



Figure 3: Retention. SIL 600 with multi-SIL primer

The patient was guided to close in centric relation and maintain gentle biting pressure for 3 minutes. Afterward, the denture was removed from the mouth, and excess silicone was removed using a BP blade (Figure 4). Further post-insertion instructions were given to the patient. Recall appointments were scheduled for follow-up.



Figure 4: Denture with Retention.SIL matrix attachment

Discussion:

Commitment towards providing cost treatment options has ensured implant-retained overdentures as a mainstay of therapy for rehabilitating the edentulous mandible, thereby counteracting the challenges posed by conventional complete dentures in advanced residual ridge resorption cases.

The overdentures can be attached to the implants with splinted attachments such as bars and clips or un-splinted attachments such as Locators, ball anchors, double crowns, and magnets. Because of more minor space requirements within prostheses, easy cleaning, more economical alternatives, and less technique sensitivity, un-splinted anchorage attachments have been advocated with implant-retained overdentures.[1,2] The most common prosthetic complication associated with these attachments is the loosening of the retentive mechanism. Plastic deformation, wear, and surface abrasion are all possible causes for the loss of retention.[2]

Further, abutment screw loosening does not arise in one-piece

implants due to the absence of an abutment screw as opposed to a two-piece implant system, where it has been reported to occur in 7% to 40% of cases.[3] Despite the above benefits, demerits of one-piece implants include the need for immediate restoration, especially in the aesthetic zone leading to an increased risk of overload during the initial bone healing period. Moreover, after the placement of a one-piece implant, it is impossible to change the worn-out abutments; hence a more straightforward alternative like novel addition curing high-performance silicone has paved the way for extending the life of worn-out single abutments in a one-piece implant by its revolutionary retentive mechanism.[6]

The retention. SIL matrix attachment system (Bredent Medical GmbH and Co. KG) offers several advantages over other attachment systems. For example, it allows for easy placement and removal of the overdenture, provides consistent retention, and minimizes wear on the abutment surface.

In addition, the SIL system can be used with tilted implants, which can be difficult to manage with other attachment systems. These PVS attachments are available in three different hardness values. These include retention. SIL 200 with the retentive force of 200g, retention. SIL 400 with a retentive force of 400 g and retention. SIL 600 with the retentive force of 600 g. They are available in light, medium, and dark pink, respectively. Multi-SIL primer is used to achieve an effective bond of the PMMA denture base material and silicone.[9] Retention. SIL does not require metal housing. Retention. SIL 400 and retention. SIL 600 should be replaced every two years in the oral cavity. Hardness values (after 24 hours) of retention. SIL 200, retention. SIL 400 and retention. SIL 600 is 25 ± 2 Shore A, 51 ± 1 Shore A, and 63 ± 2 Shore A, respectively.[6,7,8]

It ensures a stable and comfortable fit thereby higher masticatory efficiency because of the resilient nature of the material, especially in elderly patients with poor manual dexterity, and allows for immediate loading of implants. The high tenacious strength of the material secures the prosthesis in place through mechanical interlocking with frictional contact. It is accompanied by low adherence to microbial plaque and decreased stress on the supporting tissues. Further, it provides greater latitude of movement and comfort to bruxer patients. [9,10]

Hence, in specific situations, harmonizing the retentive characteristics of the attachment system to the physical conditions and needs of the patient may be an essential consideration in treatment planning. Further laboratory and

clinical research are required to understand the wear pattern and retentive nature in long-term clinical use.

Conclusion:

Retention. SIL matrix attachment is a customized, reliable, and cost-effective alternative for rehabilitating patients with worn-out overdenture attachments of one-piece implants.

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