[Low-cost simple anchorage systems in the removable hybrid prosthesis. Locator Root Attachment and Würzburg post]

Teubner E, Galindo ML, Arnold D, Marinello CP.


[Article in French, German]

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Abstract

For a simple and provisional retention of a removable prosthesis, less expensive direct retainers are an option compared to indirect cast gold copings with attachment. The Dalbo-Rotex-retainer and the Ticap-system are clinically established. The Locator Root attachment and the Würzburger Stift were recently introduced. The Locator Root attachment uses a massive profiled cylindrical post as a radicular anchorage. The Würzburger Stift has a small endodontic part which is retained by four spreadable lamellae in a convergent cavity. They further differ in the design of the male and female part. Depending on the clinical situation these characteristics can offer benefits and disadvantages. Both systems are documented and their indication, advantages and restrictions are discussed with clinical relevance.

Artikel frei einsehbar unter:

⇒ http://www.sso.ch/doc/doc_download.cfm?uuid=AA92B7E41185B8C4BAC3968AC3DF54E4&&IRACER_AUTOLINK&

Implant supported overdenture for the atrophic mandible.

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Abstract

A long-term denture wearer exhibited advanced alveolar bone loss, resulting in an atrophic mandible. Symphyseal bone height was 10 mm. The inferior alveolar nerve and mental foramen were close to the crest of the mandible. The symphyseal region was available for endosteal implant placement. Patient was an 83-year-old white male who was medically compromised. Anticoagulant therapy was stopped and INR evaluated prior to implant surgery. With the help of computerized tomography, four Nobel Biocare Tapered TiUnite narrow platform implants were placed anteriorly between the mental foramina. An implant-
supported mandibular overdenture was fabricated. Locator attachments provided retention and stability for the prosthesis. This helped improve the patient’s quality of life.

Artikel frei einsehbar unter:


Effect of simulated masticatory loading on the retention of stud attachments for implant overdentures.

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J Oral Rehabil. 2010 Sep 6. [Epub ahead of print]

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Abstract

Summary This study assessed the effect of simulated mastication on the retention of two stud attachment systems for 2-implant overdentures. Sixteen specimens, each simulating an edentulous ridge with implants and an overdenture were divided into two groups, according to the attachment system: Group I (Nobel Biocare ball-socket attachments) and Group II (Locator attachments). Retention forces were measured before and after 400 000 simulated masticatory loads in a customised device. Data were compared by two-way anova followed by Bonferroni test (alpha = 0.05). Group I presented significantly lower retention forces (Newtons) than Group II at baseline (10.6 +/- 3.6 and 66.4 +/- 16.0, respectively). However, differences were not significant after 400 000 loads (7.9 +/- 4.3 and 21.6 +/- 17.0). The number of cycles did not influence the measurements in Group I, whereas a non-linear descending curve was found for Group II. It was concluded that simulated mastication resulted in minor changes for the ball attachment tested. Nevertheless, it reduced the retention of Locator attachments to 40% of the baseline values, what suggests that mastication is a major factor associated with maintenance needs for this system.

Locator® oder Kugelanker?

Eine Hilfe für die klinische Entscheidungsfindung

Büttel AE, Bühler NM, Marinello CP.


Abstract:

Various attachments are available to retain overdentures on natural roots or implants. Technical aspects, the clinical handling, the capability to adapt or repair and the costs are parameters to be considered when choosing the appropriate attachment. Ball attachments and bars are clinically established and well documented. Ball attachments as prefabricated, unsplinted units are easily replaceable and show hygienic advantages, while bars show favorable stability. The Locator is a newer, popular clinical alternative to these established
attachments. The ball attachment and the Locator are compared from a technical and clinical point of view.


Testing the retention of attachments for implant overdentures - validation of an original force measurement system.

Fromentin O, Lassauzay C, Abi Nader S, Feine J, de Albuquerque Junior RF.


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Abstract

Summary The aim of this study was to validate an original portable device to measure attachment retention of implant overdentures both in the lab and in clinical settings. The device was built with a digital force measurement gauge (Imada) secured to a vertical wheel stand associated with a customized support to hold and position the denture in adjustable angulations. Sixteen matrix and patrix cylindrical stud attachments (Locator(R)) were randomly assigned as in vitro test specimens. Attachment abutments were secured in an implant analogue hung to the digital force gauge or to the load cell of a traction machine used as the gold standard (Instron Universal Testing Machine). Matrices were secured in a denture duplicate attached to the customized support, permitting reproducibility of their position on both pulling devices. Attachment retention in the axial direction was evaluated by measuring maximum dislodging force or peak load during five consecutive linear dislodgments of each attachment on both devices. After a wear simulation, retention was measured again at several time periods. The peak load measurements with the customized Imada device were similar to those obtained with the gold standard Instron machine. These findings suggest that the proposed portable device can provide accurate information on the retentive properties of attachment systems for removable dental prostheses.
The in vitro effect of different implant angulations and cyclic dislodgement on the retentive properties of an overdenture attachment system.

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Abstract

STATEMENT OF PROBLEM: The retentive capacity of ball attachments may be altered by a change in implant angulations. Purpose: The purpose of this in vitro study was to investigate the effect of cyclic dislodgement on the retention of an overdenture attachment system when 2 implants were placed at angulations of 0, 5, 10, 15, and 20 degrees.

MATERIAL AND METHODS: Twelve acrylic resin blocks were fabricated and divided into 6 groups of 2 pairs each. In each of the 6 groups, 1 acrylic resin block was used to house the implants (block A), while the other (block B) was used to house the overdenture attachments. Two implants positioned at 0/0 degrees, with a standard plastic component (white) designed for 0-degree angulations, served as a control (CTRL), while the other 5 pairs of implants were placed in 5 different angulations: 0D: 0/0 degrees, 5D: 5/5 degrees, 10D: 10/10 degrees, 15D: 15/15 degrees, 20D: 20/20 degrees (n=5). The extended range (green color) attachment was used for all groups except the control group. Implants (4.3 mm x 13 mm, internally hexed) were placed in blocks B. All angled implants were mesially tilted. Thirty pairs of attachments (Locator) were used. Dislodging cycles were applied to the overdenture attachment system. The initial retentive forces among the groups were not identical. The cycles required for the retentive forces of the attachments to decrease from the initial values to 60 N, and then to 40 N and 20 N, were recorded for standardization purposes. One-way ANOVA and Tukey HSD tests were used to analyze the difference in retention loss among the 6 groups (alpha=.05). A regression analysis (alpha=.05) was also performed to investigate the relationship between the implant angulation, the retentive force, and the logarithm of the number of cycles required for ball attachment retention decrease.

RESULTS: The 1-way ANOVA and the Tukey HSD tests revealed significant differences for the number of cycles required by different implant angulation groups for the initial retentive values to decrease to 60 N, 40 N, and 20 N (P<.001). The 0D and 5D groups required the longest time for retention loss, while 20D and CTRL groups demonstrated the shortest time for retention loss. The results of the regression analysis of the logarithmic number of cycles on retentive force and implant angulation demonstrated a significant effect (P<.001).

CONCLUSIONS: Implant angulations negatively affect attachment retention longevity. (J Prosthet Dent 2009;102:140-147)
The change in retentive values of locator attachments and hader clips over time.

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Abstract

PURPOSE: The aim of this study was to examine early changes in retentive values of implant overdenture attachments during multiple pulls.

MATERIALS AND METHODS: Two implant attachment systems (Hader bar and clip, Locator system) were used in this study. The experimental groups were divided into yellow Hader clips, white Locator attachments, and green Locator attachments. Each group consisted of 21 matrix attachments. The attachments were placed into a custom-made acrylic resin block seated passively on another acrylic block containing a Hader bar or two Locator abutments with different angulations. Each attachment was subjected to 20 consecutive pulls using a universal testing machine. The peak load-to-dislodgement of the attachments after each pull was documented, and the percent reduction of the peak load-to-dislodgement was calculated. One-way ANOVA and Tukey's honestly significant difference test were used for data analyses. A p < or = 0.05 was considered significant.

RESULTS: There was a significant difference in the percent reduction in peak load-to-dislodgement between the attachments after the first pull (p= 0.005) and after the final pull (p= 0.0001). The yellow Hader clips exhibited the least percent reduction in peak load-to-dislodgement (6.50 +/- 3.59%) after the first pull, followed by the white Locator attachments (8.60 +/- 4.42%); the green Locator attachments exhibited the greatest reduction (11.05 +/- 4.94%).

CONCLUSION: The results of this in vitro study demonstrate that retentive values of the Locator attachments are reduced significantly after multiple pulls. Although this reduction might not be noticeable to the patient, it is recommended that the clinician place and remove the overdenture multiple times before delivery.

A comparative in vitro study on the retention and stability of implant-supported overdentures.

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Abstract

OBJECTIVES: Implant-supported overdentures have become the treatment of choice in restoring complete edentulism, but the number of implants required and type of connectors to
assure retention and stability are still controversial. The aim of this study was to evaluate the effect of connector type and implant number and location on the retention and stability of implant-supported overdentures by measuring retentive forces during vertical and 2 types of rotational dislodgment.

METHOD AND MATERIALS: Two model designs were selected based on the number and location of the inserted implants: In a first setup, 2 implants were placed in the canine regions; in a second setup, 2 implants were placed in the canine regions and 2 in the premolar regions. Three types of connector were used in each model: magnets, balls, and locators; 10 resin bases were fabricated and 3 hooks fixed at tripodal locations for chain testing. Vertical dislodging forces and 2 aspects (oblique and posterior rotational dislodging forces) of stability were tested.

RESULTS: Two-way analysis of variance showed significant differences in retention among the 3 connectors in the 2 models, with the lowest values obtained with the magnet group (mean [SD]: 2.15 N [0.09]) and highest values with the locator group (31.30 N [0.12]). Posterior rotational dislodging forces showed higher values than vertical or lateral forces in both models; 4-implant models required higher dislodging forces than did 2-implant models.

CONCLUSION: Locator connectors provide significantly higher retention and stability of implant-supported overdentures, followed by ball connectors and then magnets. The 2-implant design offers less retention and stability than the 4-implant model. Number of implants and type of connector significantly affected retention and stability of implant-supported overdentures.


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Abstract

Background: There is a lack of clinical studies on the self-aligning attachment system (Locator(R); Zest Anchors, Inc. homepage, Escondido, CA, USA) for two-implant-retained overdentures in the edentulous mandible. Therefore, a comparison of the Locator with two traditional designs (a rotational gold matrix and a rubber O-ring type) in clinical 1-year use was conducted. Materials and Methods: From 2003 to 2007, 60 patients received two Osseotite(R) TG Standard implants (BIOMET 3i Implant Innovations, Palm Beach Gardens, FL, USA) in the intraforaminal area of the edentulous mandible. The implants were left unloaded for 3.5 months, randomized to three different attachment systems, and loaded through a mandibular overdenture. Twenty-three patients received a self-aligning attachment system (Locator) and 33 patients a ball attachment (Dal-Ro(R)[BIOMET 3i Implant Innovations]n = 25; TG-O-Ring(R)[Cendres & Metaux SA, Biel-Bienne, Switzerland]n = 8). After 12 months of delivery of the overdentures, the oral situation was evaluated: prosthodontic maintenance and biologic complications, subjective patients' experience, and
oral health-related life quality (Oral Health Impact Profile [OHIP-G 49]). Results: After 1-year of clinical service, 8 of 120 implants were lost (9.6%). The Locator system brought up 34 prosthetic complications, especially the need for change of the male parts or activation because of loss of retention. The TG-O-Ring patients showed 14 complications, most of them the change of the O-Rings. The patients with the Dal-Ro abutment had seven minor complications in 12 months of clinical use. Biologic complications and patients' oral health-related life quality showed no significant difference among the three experimental groups. Conclusions: Prosthodontic maintenance was restricted to loss of retention for all systems. Within the observation period of this study, the self-aligning attachment system showed a higher rate of maintenance than the ball attachments. The patients' oral health-related life qualities as well as the biologic parameters do not differ when using the three abutment systems.

Retention and load transfer characteristics of implant-retained auricular prostheses.

Williams BH, Ochiai KT, Baba T, Caputo AA.


Abstract

PURPOSE: The use of osseointegrated implants for maxillofacial prostheses reduces the need for adhesives, provides for a more stable and more esthetic prosthesis with thinner margins, and results in increased patient acceptance and confidence. The purpose of this study was to compare the retention and load transfer characteristics of differently designed implant-retained auricular prostheses.

MATERIALS AND METHODS: A photoelastic model was fabricated of the auricular-temporal region of a human skull. Craniofacial implants 3.75 mm in diameter and 4 mm long were embedded in locations typically selected to retain auricular prostheses. Two retention mechanisms were evaluated on the implants: a Hader bar with 3 clips and the use of 3 Locator attachments. The retentive capacity of the prostheses was determined on an Instron test machine. Initial retention and changes with multiple removals were examined. Dislodgment forces were applied to each retentive device in the field of a circular polariscope. Resulting stresses were monitored and recorded photographically.

RESULTS: The highest initial retention demonstrated by the Locator device was 12.4 +/- 0.9 lb, and the highest retention value for the Hader bar with clips was 7.5 +/- 1.1 lb. All attachments decreased in retention after multiple removals. The Locator devices produced higher peri-implant stresses compared to the Hader bar-with-clips design.

CONCLUSIONS: Since higher retention is associated with higher stresses, results of this study suggest that a balance between retention and stress production is necessary in selecting a retention mechanism for the specific requirements of the
patient being treated. The Locator attachment was correlated with higher retention values as well as with higher peri-implant stress compared to the Hader bar-and-clip attachment design. Retention decreased and then stabilized after multiple

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**Photoelastic stress analysis of various retention mechanisms on 3-implant-retained mandibular overdentures.**

Celik G, Uludag B.

*J Prosthet Dent. 2007 Apr;97(4):229-35.*

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**Abstract**

STATEMENT OF PROBLEM: There are various stress transfer studies of 2- or 4-implant-retained mandibular overdenture designs. However, the influence of various types of attachments and implant inclination on stress distribution of 3-implant-retained mandibular overdenture designs has not been sufficiently assessed.

PURPOSE: The purpose of this study was to compare the load transfer characteristics of 4 attachment systems for 3-implant-retained mandibular overdenture designs for vertically oriented and inclined implants.

MATERIAL AND METHODS: Two photoelastic mandibular models were fabricated having 3 screw-type implants (3.7 x 14 mm with 4.8-mm diameter abutment platform) embedded in the interforaminal region. In the first model, the implants were parallel to each other and vertically oriented. In the second model, 1 implant in the midline was vertically oriented, and the other 2 implants were positioned 20 degrees divergent from the center implant. Four retention mechanisms were studied for each model—the Locator, Swissplus ball, Bredent bar, and Bredent bar-ball. The bar design connected the 3 implants, and the bar-ball design used the bar in a similar fashion but additionally incorporated distally placed ball attachments. A vertical force of 135 N was applied unilaterally to the central fossa of the right first molar. The resultant stresses that developed in the supporting structure were monitored photoelastically and recorded photographically.

RESULTS: For the splinted and unsplinted 3-implant-retained overdenture designs evaluated, moderate and low level stresses were observed with different attachment systems. For both the vertically oriented and inclined implants, the bar-ball attachment system produced the lowest stress level.

CONCLUSIONS: For vertical and inclined implant designs, lowest stress was transferred to all implants with the bar-ball attachment system, while moderate stresses were observed in implants on the loaded side with unsplinted attachment systems. The highest stress level observed with all attachment systems was
moderate. For the vertical implant design, the observed stresses were distributed to all implants except with the ball attachment system, which demonstrated little discernible stresses on the non-loaded side implant.

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**Retention characteristics of attachment systems for implant overdentures.**


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**Abstract**

PURPOSE: The aim of this study was to compare the retention characteristics of various overdenture attachment systems commonly used to retain overdentures to dental implants.

MATERIALS AND METHODS: An edentulous mandibular model was constructed incorporating 2 parallel 4.0 mm x 13 mm Branemark implants placed in the canine regions. Attachments were embedded in a metal-reinforced experimental overdenture designed to be dislodged from the model by a universal testing machine. Tensile dislodging force was applied to the overdenture at a cross-head speed of 50 mm/min. Five overdentures were constructed for each of the attachment systems. The attachments evaluated were the Hader bar & metal clip, Locator LR pink, Locator LR white, Spheroflex ball, Shiner magnet, Maxi magnet, Magnedisc magnet, ERA white, and ERA gray. Each apparatus was tested with 5 specimens per attachment system. Peak load-to-dislodgement was measured. Analysis of variance and Scheffe multiple comparison tests were applied to the data with alpha< or = 0.05 level of significance.

RESULTS: Peak load-to-dislodgement for all attachment systems ranged from 3.68 +/- 1.32 N to 35.24 +/- 1.99 N. Strain-at-dislodgement, calculated from stress-strain curves, ranged from 0.78 +/- 0.20% to 2.78 +/- 0.5%. The ERA gray attachment demonstrated the greatest retention, with a peak load-to-dislodgement of 35.24 +/- 1.99 N, and a relatively low strain-at-dislodgement of 1.64 +/- 0.09%. Less retention was recorded for the Locator LR white, Spheroflex ball, Hader bar & metal clip, and ERA white systems. The Locator LR pink attachment demonstrated still less retention with a load-to-dislodgement of 12.33 +/- 1.28 N. Significantly high strain-at-dislodgement was recorded for the Hader bar & metal clip and Locator nylon attachment systems. The lowest dislodging loads and strains were recorded for the Shiner magnet, Maxi magnet, and Magnedisc magnet attachments.

CONCLUSIONS: Results suggest that the attachment systems evaluated may be grouped into high (ERA gray), medium (Locator LR white, Spheroflex ball, Hader bar
& metal clip, ERA white), low (Locator LR pink), and very low (Shiner magnet, Maxi magnet, Magnedisc magnet) retention characteristics.

Photoelastic analysis of the effect of palatal support on various implant-supported overdenture designs.

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Abstract

STATEMENT OF PROBLEM: The effect of palatal support on various types of implant-supported maxillary overdenture designs has not been sufficiently assessed.

PURPOSE: The purpose of this study was to photoelastically evaluate the palatal support of 3 designs of maxillary implant-supported overdentures.

MATERIAL AND METHODS: A photoelastic model of an edentulous maxilla was fabricated with four 3.75 x 13-mm 3i implants. Three maxillary overdenture designs were fabricated: a splinted Hader bar incorporating 2 distal ERA attachments with anterior clips; non-splinted Zaag 4-mm direct abutments and attachments; and nonsplinted Locator 2-mm direct abutments and attachments. All restorative components and attachments were fitted and observed for passivity of fit and alignment. The overdentures were first tested with complete palatal coverage. Unilateral 25-lb loads were applied at the left and right first molars and the incisive papilla area. The photoelastic effects were monitored and recorded photographically. The palatal area was removed from the 3 overdentures and the loading regimens were repeated.

RESULTS: The highest stresses under central loading were seen with the splinted Hader bar and complete palatal coverage, followed by similar levels of stress with either Zaag or Locator attachments. After removal of the palate, the center load demonstrated greater differences between designs. The highest stresses were observed with the Hader bar, followed by the Zaag and then Locator attachments. Lack of palatal coverage demonstrated higher levels of stress around implants and visible supporting tissues. The unilateral load produced the highest stress for the splinted Hader bar, followed by Locator, and then Zaag.

CONCLUSIONS: Removal of the palatal support produced a greater effect and more concentrated stress difference for maxillary overdentures than differences between the attachment designs tested.
Restoration of divergent free-standing implants in the maxilla.

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Abstract

Divergent implants in the maxilla can make restoration with removable prosthetics difficult when the implants will not be splinted with a superstructure. Attachments to be used with individual implants require that the implants be within 10 degrees of divergence. This article will address a new angled male designed to fit the locator attachment (female component) that can accommodate up to a 40 degrees divergence.

Bar overdentures utilizing the Locator attachment.

Schneider AL, Kurtzman GM.


University of Maryland School of Dentistry, Department of Restorative Dentistry, USA.

Erratum in:


Abstract

Implant-retained overdentures are a restorative option for both the fully and partially edentulous arches. A new attachment, the Locator, which features a reduced interarch requirement and the advantage of built-in guide planes providing precise insertion, is described. The Locator is an advancement in attachment technology, with an improved design combined from the best features of a ball attachment, an ERA attachment, and a cap attachment.
Unsplinted implants retaining maxillary overdentures with partial palatal coverage: report of 5 consecutive cases.

Cavallaro JS Jr. Tarnow DP.


Abstract

PURPOSE: It is believed that maxillary dental implants must be splinted when used to retain removable overdenture prostheses in order to maintain osseointegration. This paper presents clinical cases to demonstrate that contemporary implants can function in an unsplinted manner to retain maxillary removable overdentures with partial palatal coverage.

MATERIALS AND METHODS: Five consecutive patients were treated using a specific surgical and prosthodontic protocol. Twenty-five textured-surface implants were placed to retain overdenture prostheses in five patients, with a minimum of 4 implants per patient. These patients were followed for 12 to 48 months postloading.

RESULTS: To date, none of the implants have lost osseointegration, and radiographic marginal bone levels are stable. Patients have been able to maintain soft tissue health around the unsplinted implants. The patients have verbally indicated that they are comfortable and that their maxillary overdentures function well.

CONCLUSION: This preliminary report presents 5 consecutive cases in which unsplinted implants maintained osseointegration when used to retain removable overdenture prostheses with limited palatal coverage. It appears that unsplinted maxillary implants can be used to retain a maxillary overdenture.

Evaluation of stable retentive properties of overdenture attachments.

Rutkunas V. Mizutani H. Takahashi H.


Abstract

Objectives: To evaluate fatigue of stud (ERA Overdenture (orange and white), Locator Root (pink) and OP anchor # 4) and magnetic (Magfit EX600W) attachments by measuring maximum retentive force. To compare retentive force of overdenture attachments after their reach stable retention. To determine minimum number of cycles required to reach stable retention. Material and methods: Three specimens of each type of attachment were used. Micromaterial testing machine (MMT-250NB-10, Shimadzu Co., Tokyo, Japan) with a sensor interface PCD-320 and software package PCD-30A (Kyowa Electronic Instruments Co., Tokyo, Japan) was used to
performe 2000 insertion-removal cycles with 50 mm/min cross head speed. Maximum retentive force was measured initially and after each 40 cycles. Statistical analysis: paired-samples t-test, one-way ANOVA and Scheffe post-hoc tests (P<0.05). Results: Before and after fatigue simulation statistically significant differences existed among the five types of attachments. Decrease of retention was characteristic for all attachments except OP. After fatigue LRP was most retentive. Magnetic attachments preserved maximum amount of retention measured at the baseline (98%). EO and EW attachments have preserved only 25% and 37% of initial retention respectively. Conclusions: Due to fatigue overdenture attachments gradually lose their retention. Stud attachments are more susceptible to fatigue than magnets. Eight hundred cycles are required to achieve relatively stable retention of overdenture attachments.