The Locator Attachment: Free Standing Verses Bar-Overdentures

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The Locator attachment, introduced years ago has become the most widely utilized implant attachment both for free standing applications as well as in bar-overdenture approaches. This article will address an overview of both applications as well as suggesting protocol as to when one approach may be better suited for long term success.

The Locator Attachment

The Locator attachment consists of a female portion that is positioned either on a free standing implant or incorporated into a bar and a male component. The male is composed of a delrin plastic element inserted into a metal housing which is incorporated into the removable prosthesis. The metal housing serves two purposes, it allows each changing of worn males without the need for reluting a component into the denture base and it allows some pivotal movement providing some stress breaking abilities. (Fig. 1)

Fig. 1 A cross section of the Locator attachment demonstrating its "free floating" delrin male within the metal housing.

Locator Implant Abutment

Currently, the Locator implant abutment is available for fifty-one different implant companies (Table 1). This permits its use on virtually most implant systems in use world wide. The implant abutment is provided with different connectors to mate with the various implant systems in use today. (Fig. 2)

Table 1: Locator Implant Abutment availability

AB Dental	Dicoa	Osstem
Ace Surgical	DSI/Dong Seo Inc.	Osteo-Implant
Almitech	FMZ Gmbh Alphatech	Perioseal
Alpha Bio	Geass srl	Sargon
Astra Tech	Imbionic Implant System	Schutz Dental
Attachments International	Implant Direct	SERF Implanter L'Innovation
Bego Implant Systems	Imtec	SIC Invent Gmbh
Bicon	Intra-Lock	Southern Implant
Bio-Horizons	Keystone/Lifecore	Sterngold Implamed
Bio-Lok	Klockner	Straumann
Biomet 3i	Kyocera	Sybron Implant Solutions
BTI	Lasak	Tatum Surgical
Camlog	M & K Dental Gmbh	Tekka
Curasan/Riemser	Medentis Medical Gmbh	Thommen Medical
Dentegris/Dental Tech	MIS	Zimmer
Dentium USA	Neoss	Ziterion
Dentsply Friadent	Nobel Biocare	ZL-Microdent

Fig. 2 Connector variations of the Locator Implant Abutment permit its use on various implant systems. (L-R external hex, conical connector & morse taper)

Once the specific implant system has been identified, the practitioner needs to determine the tissue height at each site providing at least a half millimeter greater cuff height then the tissue thickness. The abutment is provided in increases of cuff height beginning at 1 millimeter through 6 millimeters (Fig. 3).

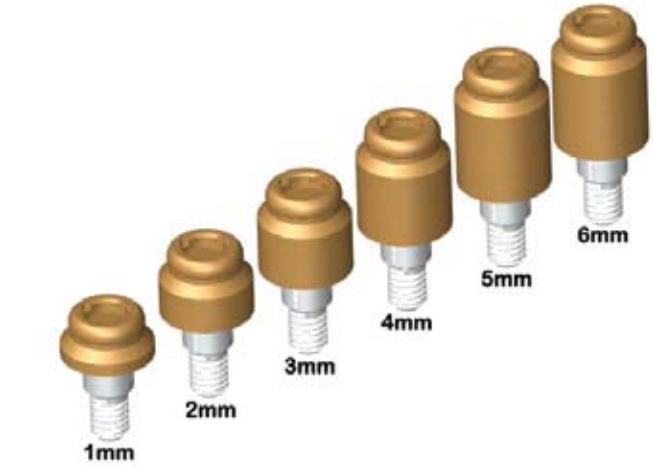

Fig. 3 Various cuff heights are available for the Locator Implant Abutment from 1mm to 6mm.

In the fully edentulous mandibular arch when only two attachments are to be utilized it is best to spread the fixtures as far apart as possible with ideal locations in the 1st premolar area. This is to minimize any anterior posterior rotation that would be seen if placed into the incisor areas. (Fig. 4).

Fig. 4 Two Locator attachments placed to improve the retention on a stable mandibular denture.

An atrophic mandible may preclude implant placement in the posterior due to crestal positioning of the inferior alveolar nerve. When implants can only be placed between the cuspid positions and there is a lack of posterior ridge height to stabilize the prosthesis, use of additional free-standing implants can improve prosthesis stability. (Fig. 5).

The edentulous maxilla presents added factors to consider. Elimination of the palatal aspect of the denture when only anterior implants are utilized leads to posterior drop of the denture due to the loss of the denture's posterior palatal seal and gravity. Ideally, placement of posterior fixtures will provide a much more stable prosthesis but that is dependant on the maxillary sinus position and available bone. (Fig. 6)

Fig. 5 Five Locator attachments placed in an atrophic mandible to improve denture retention.

Fig. 6 A maxillary edentulous arch with good palatal and vestibular depth with four evenly spaced Locator attachments to aid in retention of the denture.

Locator Bar - Overdentures

Besides the benefit of cross-arch stabilization to resist lateral loads placed on the prosthesis which are then transmitted to the implant fixtures, bars provide another benefit. They allow distalization of an attachment bilaterally beyond where the fixture positions. This permits a wider spread of the retentive elements and provides a more stable prosthesis. (Fig. 7 and 8)

Fig. 7 A maxillary bar-overdenture with three Locator attachments placed to overcome lack of vestibule and a shallow palate.

Fig. 8 A mandibular bar-overdenture with three Locator attachments placed to permit distalization of the posterior attachments providing a broader retentive base for the removable prosthetic.

The principles of A-P spread, as initially espoused by Dr. Charles English, dictate that a distal cantilever may be extended distal to the posterior fixture a distance of 1-1.5 times the distance between a line drawn through the posterior fixtures and the most anterior fixture. This allows, depending on the patient, a cantilever one to two teeth distal to the posterior fixture.

Additionally, as the denture is predominantly supported by the over-denture bar and not soft tissue, denture sore spots are not a concern as is seen in free-standing applications. So, patient comfort is improved as well as stability.

Free - Standing Verses Bar - Overdentures

As has been long documented in the literature, implants handle loads along the long axis of the implant very well long term. But, lateral loads are not managed well and can lead to bone loss, mobility and eventual loss of the implant. The decision to use free-standing implant abutments should be determined based on the lateral stability of the removable prosthesis. If sufficient residual ridge is present to stabilize the denture when lateral forces are applied to it, then the implant attachments serve to only prevent "lift-off" of the denture and free-standing attachments will work well in the long term. Yet, when bone loss has led to a shallow vestibule or the depth of the palatal vault yields a flat maxilla, mastication permits the denture to move laterally with no resistance from the arch. These cases may be better served by use of a bar to cross arch splint the implants, provide stability to lateral dislodgement and also allow distalization of the attachments posterior to where implant fixtures can be placed.

The tendency in the edentulous maxilla that will be treated with an implant retained removable prosthesis is to eliminate all of the palatal coverage in an attempt to minimize the denture and maximize the patient's perceived comfort. This may contribute to increased load on the implant fixtures and lead to failure of the case in the long term. When implant retained removable prosthetics are utilized, frequently fewer implants are placed and their locations are selected to avoid the necessity for grafting. This is done to keep the treatment cost lower making it more affordable for the patient then a fixed approach that would require grafting, more implants and a higher laboratory fee. If the maxilla has sufficient vestibular depth or a deep enough palatal vault and the implants can be spaced sufficiently then elimination of the palatal coverage is possible. But the aim in free-standing cases is to use the implants as retentive elements, not as supportive elements. This requires that the residual ridge be loaded instead of the implants on maximum intercuspation. When a relatively flat maxilla is encountered maintenance of the anterior palatal coverage will provide a hard stop during mastication limiting loads on the implants. Patients who have gagging issues typically will tolerate this palatal coverage as gagging is induced when the posterior palatal is covered not the anterior in most patients.

In those patients who request that the removable prosthesis is minimized as much as possible, utilization of a bar will permit elimination of a great majority of the denture base without overloading the individual implant fixtures due to the cross-arch stabilization the bar permits. This does require placement ideally of implants into the areas between 1st premolars bilaterally. This will allow the bar to be extended following A-P spread principles. It is important that the posterior saddles have good adaptation to the residual ridge so that mastication on the removable prosthesis does not lead to anterior posterior rocking that may contribute to issues with both the prosthesis and denture.

Conclusion

The Locator attachment allows use in either free-standing and bar approach's providing good retention of the removable prosthesis. With it's self-aligning feature minimal wear is placed on the attachment during insertion, which will lengthen clinical use before need to replace the delrin male.

When used in free-standing applications the Locator Implant Abutment, it is available for virtually every implant system on the market.

As discussed, the bar approach is well suited in those instances where a flat maxillary or mandibular ridge presents. But when a stable denture is present and the patient's only complaint is denture "lift-off" when functioning then a free-standing approach may be well suited.

Treatment selection should be based on sound clinical principles and not guided by the financial aspects. When patient finances dictate a budget that does not allow the use of more implant fixtures or a bar approach, care should be taken in how much of the denture base is eliminated so that lateral load is not increased on the individual fixtures.