Types of attachment in over denture therapy

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Overdenture conventionally is a partial or complete denture prosthesis constructed over existing teeth or root structure.Attachments are the linchpins of an overdenture. Based on the clinical situation there are various attachment systems that are used accordingly. It is important that the clinician knows well about the attachment system and the amount of mechanical load that the clinical situation is going to deliver on the system.

Introduction

Preventive prosthodontics has become a trend and the use of overdentures has increased to the point where it is now feasible alternative to most treatment plan outlines in the construction of a prosthesis for patients with some remaining teeth or even no teeth. Implant supported overdentures are presently one of the best options for replacing missing teeth due to their added advantages as well as they are not very expensive and are within the reach of many patients. Attachments are the linchpins of an overdenture.

Attachment Systems

The mostly commonly used approach for using abutments in overdenture therapy is using endodontically treated teeth with cast coping using some sort of attachment. This approach should be reserved for patients which requires significant improvement in retention and stability. The abutment need low caries index, adequate bone support, good periodontal prognosis and meticulous oral hygiene for taking the increased stress that the attachment brings to the tooth. Better retention is given on the casting by various means like lengthening the post in the root canal or by adding pins to the casting. The attachment needs some available interridge space for its construction.

Classification

Even though various types of attachment systems are available, mainly there are four types of attachment assemblies which are commonly used namely Stud attachment Bar attachment Magnets And Telescopic2 Wismeijer et al. (1999)5 and Epstein et al6 had described the absolute retentive capacity of overdenture attachments. Based on retention, the attachments can be classified into

1) Frictional, 2) Mechanical, 3) Frictional-Mechanical and 4) Magnetic Attachments.

Attachments based on resiliency are classified as:

- **Rigid non-resilient attachment: No movement is seen between the abutment and implant in such attachments. It is only recommended when adequate number implants are available**

Cr-Co cast bar on three implants with two LOCATOR attachments

Rigid, titanium milled hader bar utilizing 8 implants

Resilient, titanium milled hader bar utilizing 4 implants

- **Restricted vertical resilient attachment: Such attachments doesn't allow any lateral tipping or rotary movements. They can provide around 5-10% of relief by allowing attachment movements in a vertical direction**

- **Hinge resilient attachment:**

They are able to resist rotational forces and lateral tipping. They also provide 30-35% of reduction in load to the supporting implants

- • **Combination resilient attachment:** **There is unrestricted vertical and hinge movements in these and provide 45-55% of load relief by uniformly transferring the masticatory load from implants to the residual ridges**

- **Rotary resilient attachment:**

vertical, hinge, and rotation movements are allowed by these attachments. And to the supporting implants they provide 75-85% of load relief.

- **Universal resilient attachment:**

all kinds of movements are almost possible. There is 95% of load relief to the supporting implants.

Stud Attachments

- **Stud attachments are one of the oldest attachments used in overdentures. It has a male stud type that is attached to the base, which is a coping over an endodontically treated tooth stump or an implant abutment. They can be divided into two groups:**

- • Extraradicular, where male component projects from root stump or implant.
- • Intrardicular, where male component is a part of the denture base.

- **Disadvantages of using locator attachments are that they cannot be used in cases where rigid restoration is required and due to constant wear and tear, regular replacement of male nylon part is needed. In a retrospective no significant difference was observed between stud and bar attachments**

- **Gerber attachment allows vertical movement and a rigid attachment that does not allow movement of base.**
- **Dalbo attachment can be rigid, resilient, and stress broken, the resilient being the most commonly used. They allow vertical and rotational movement of the female component around a sphere shaped male component.**

- **Ceka attachments has male component affixed to tooth with four sections capable of being compressed and are flexible.**
- **Zest anchor attachments derives retention from within root and female component is cemented to place. They have advantage of overcoming the space problem that the attachment is within root structure.**

- **Introfix attachments is tall stud attachment providing frictional retention. It is adjustable as well as replaceable.**
- **Schubiger attachment uses a permanent form of fixation using a screw system. They also require paralleling mandrel and are highly indicated for teeth with diverging roots.**

- **Bar Attachments The purpose of bar attachment are splinting of the abutment teeth, retention and support of the prosthetic appliance.**
- **Hader bar system consist of preformed plastic bars and plastic/ metal clips. Retention can be improved by adding more clips.**

- **Dolder bar system supplied as both bar unit and joint. Since the bar is preformed it can approach only close adaptation to the ridge contour because it remains in a straight line. Ackerman and CM clip can have vertical and horizontal movements. Due to their smaller size and ease of fixation they are excellent option where bar system is indicated**

Magnets

- **Magnets were not very commonly used for dental purposes till few decades ago. Their benefits include simplicity, low cost,automatic reseating after denture displacement, comparative freedom of lateral denture movement, a low potential for trauma to the retained roots, self-adjustment, inherent stress breaking and no need of adjustments.**

Telescopic Attachment

- **The telescopic crowns have been in use since years, to connect teeth to overdenture, but their use in an implant supported overdenture is limited. As they provide rigid attachment they are sometimes used for immediate loading.**

Conclusion

There has been various attachment system used in tooth and implant supported overdentures. But to provide a successful treatment, the clinician should have a thorough knowledge of various attachments available, their use and adaptability in various clinical situations,benefits and demerits of using it.