

Internal Attachments & Precision Attachments

An internal attachment (intracoronal direct retainer) is a type of precision attachment located within the normal contours of an abutment and functions to retain and stabilize a removable partial denture.

Usually the internal attachment consists of two components (Fig. 1). The first component, **matrix**, is a metal receptacle (holder) contained within the normal clinical contours of a fixed restoration. The second component, **patrix**, is attached to the corresponding removable partial denture.

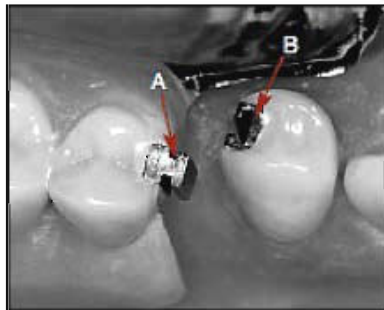


Figure 1: Internal attachment demonstrating the patrix (A) and the matrix (B).

Internal attachments (intracoronal direct retainers) may be subdivided into two categories based on the method of fabrication and tolerance of fit between components. If components are fabricated in metal using high-precision manufacturing techniques, they are considered **precision internal attachments**. These attachments usually exhibit long, parallel walls and excellent surface adaptation that fit together with tolerances of about 10 microns. These are ready-made attachments made by specialized companies and are more preferable from any fabricated by the dental technician due to the alloys used and precision in make them.

The second category shows a less intimate fit between matrix and patrix components. These are termed **semi-precision internal attachments**. Components usually originate as wax or plastic patterns, which are subsequently cast in metal. Unlike precision attachments, semi-precision attachments often display gently tapering walls. These are fabricated by dental technicians as a cast dovetail fitting into a counterpart holder in the abutment crown.

Internal attachments differ from **internal occlusal rests** because they use a securing device for retention without a visible clasp. Also, internal attachments

provide horizontal stabilization similar to that of internal occlusal rests, but additional extracoronal stabilization is usually desirable.

The internal attachment has two major advantages over the extracoronal attachment:

1. Elimination of visible retentive and support components.
2. Better vertical support through a rest seat located more favorably in relation to the horizontal axis of the abutment tooth.

Some of the **disadvantages** of internal attachments include the following:

1. They require prepared abutments and castings.
2. They require somewhat complicated clinical and laboratory procedures.
3. They eventually wear, with progressive loss of frictional resistance to denture removal.
4. They are difficult to repair and replace.
5. They are effective in proportion to their length and are therefore least effective on short teeth.
6. They are difficult to place completely within the circumference of an abutment tooth because of the size of the pulp.
7. They are considered more costly.

Internal attachments do not permit horizontal movement. Thus, all horizontal, tipping, and rotational movements of the prosthesis are transmitted directly to the abutment teeth. Therefore, internal attachments should not be used in combination with tissue-supported distal extension denture bases unless some form of stress-breaker is used between the movable base and the rigid attachment. Although stress breakers may be used, they do have some disadvantages and their use adds to the cost of the partial denture.

Precision Attachments

A precision attachment is “an interlocking device, one component of which is fixed to an abutment or abutments, and the other is integrated into a removable partial denture to stabilize and/or retain it.”

There are many types of precision attachments for partial dentures that **cannot** be classified as primarily of the intracoronal or extracoronal type. Neither can they be classified as relying primarily on frictional resistance or placement of an element in an undercut to prevent displacement of the denture. However, all of these use some type

of retentive means, located intracoronally or extracoronally, for providing retention without visible clasp retention.

Intracoronar direct retainers (internal attachments) of the locking or dovetail type are not recommended for distal extension removable partial dentures because of excessive leverages often associated with these attachments that may generate torque and tipping stresses on the abutment.

The non-locking type of the intracoronar direct retainers can be used in many cases of Class I and Class II partially edentulous situations. However, unless the cross-arch axis of rotation is common to the bilaterally placed attachments, torque on the abutments may be experienced.

Some indications for precision attachments are as follows:

1. Esthetics zone.
2. Nonparallel abutments present.
3. Improved retention.
4. As stress breaker in free end saddles and bridges.
5. Intracoronar attachments as effective direct retainers for removable partial dentures.
6. As a connector for sectional dentures.
7. To lock a connector joining saddles in the opposite side of the arch.
8. To retain hybrid dentures.

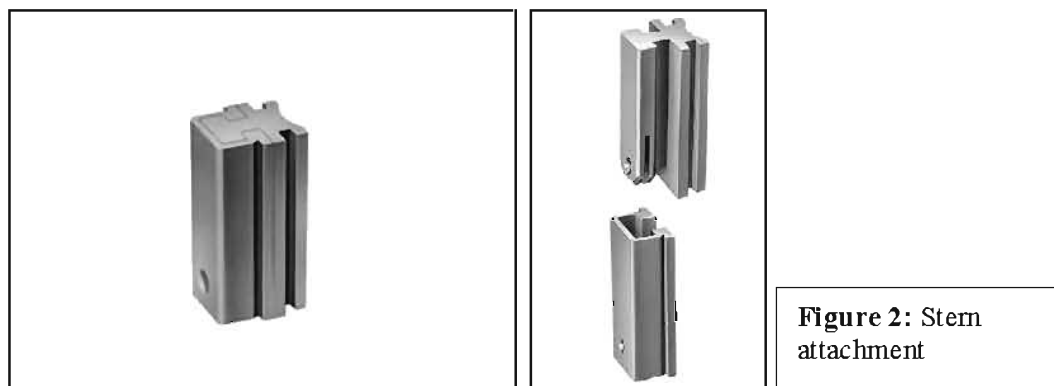
Some of the contraindications for precision attachments are as follows:

1. Along one precise path of insertion, the patient must possess an average degree of manual skill.
2. Patients with severe periodontitis.
3. Patients with abnormally high caries rate.
4. Where there is inadequate space (teeth that are very narrow faciolingually).

The ***main types of precision attachments*** are as follows:

1. Internal attachments (intracoronar direct retainer):

These attachments are in the form of key and keyway (Fig. 2) and they are incorporated entirely within the cast crown. They are mainly used in connecting a fixed prosthesis with a removable partial denture. Stern attachment & Ney attachment are examples of such types of attachments.



2. Extracoronal attachments:

They are situated external to the crown and can provide stability and retention for removable prostheses. These are less rigid attachments that can be used with distal extension partial dentures. The main disadvantage with extracoronal attachments is that more space is required within the removable partial denture as they are bulky. Examples of these attachments include the Dalbo (Fig. 3) and Ceka attachments.

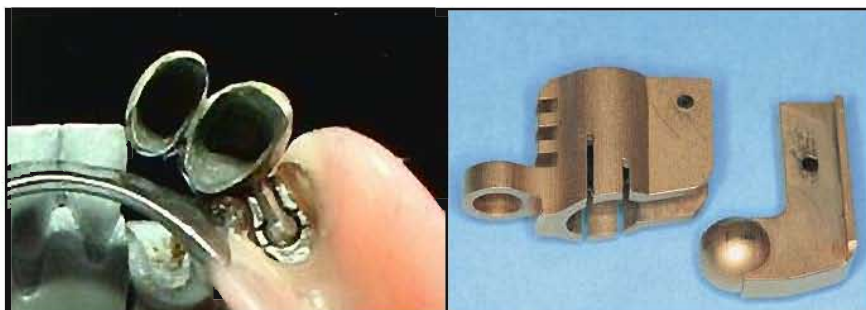


Figure 3: Dalbo extracoronal precision attachment incorporated in the denture (left). Male and female components (right).

3. Stud or anchor attachments:

These attachments are either intra-radicular or extra-radicular. Such attachments can be made in rigid form for bounded saddle situations and in resilient forms for free end saddles. Stud attachments consist of a post like male secured to the diaphragm of coping female which engages the male post. Retention is obtained by frictional fit or snap like action. One of their advantages is that the crown root ratio is improved with low profile stud attachments. Zest anchor (Fig. 4), Rotherman, and Gerber (Fig. 5) are examples of stud attachments.

Figure 4: Zest anchor attachment.



Figure 5: Gerber attachment.



In general for distal extension partial dentures it is recommended that the intracoronal attachment is used in cases where the periodontal condition of the distal abutment is good. On the other hand, the extracoronal attachment is used with fairly good alveolar ridges and with periodontally weaker abutments.

4. Bar attachments:

Used for splinting groups of teeth and for overdenture retention and stabilization (Fig. 6). They consist of a precision attachment bar and channel clips. Examples are Ackerman, Dolder, and Hader bar. The main disadvantage of bar attachments is that they cannot be used with reduced interocclusal space.



Figure 6: precision attachment bar and channel clips.

Ackerman Bar is probably the most versatile and popular factory made bar. There are two types of bar: round and egg shaped. One advantage of the round bar is that it can be bent in all directions and can be constructed to follow not only the antero-posterior relationship but also the vertical changes in the arch. The egg shaped bar has extra rigidity making bending more difficult. Retention is achieved through engagement of the clips with the undercuts of the bar.

Dolder Bar is also available in two types; (1) Pear shaped which allows a degree of resilience of movement between it and the sleeve and (2) Parallel bar which allows no movement. Dolder bar units are tooth supported and non-rotational and are indicated where numerous attachments are present (four in three planes). Friction

between the walls provides retention. In Dolder bar units paralleling of bars is more important which is provided with a special paralleling mandrill.

Selection of an Attachment for a Removable Partial Denture

1. The first decision that must be made is whether to use an intracoronal or extracoronal attachment.
2. The second decision to be made is whether to use a resilient or a non-resilient type.
3. The third consideration is that the largest attachment can be used within the given space should be chosen to gain maximum stability, retention, and strength for the prosthesis.

REFERENCES

1. Arti, Gupta A, Khanna G, Bhatnagar M, Markose GM, Singh S. (2018) Precision Attachments in Prosthodontics: A Review. *Int J Prev Clin Dent Res* 5(2): S34-39.
2. Carr, A.B., Brown, D.T. (2011) McCracken's Removable Partial Prosthodontics. 12th ed. St. Louis, Missouri: Mosby, Inc., Elsevier Inc.
3. Nigam A, Singh A, Shekhar A, Gupta H. (2013) Precision Attachments – An overview. www.journalofdentofacialsciences.com 2(4): 41-44.
4. Phoenix, R.D., Cagna, D.R., Defreest, C.F. (2008). Stewart's Clinical Removable Partial Prosthodontics. Phoenix, 4th ed. Quintessence Publishing Co, Inc.