* Disadvantages of the Rotherman attachment:
1. Sufficient bulkiness of the female lug lingually to give retention (this might cause changes in the anatomy of the area and discomfort for the patient).

2- Chair side insertion is very difficult (the alignment of its parts might change during the pickup impression).

 Note: both the o-ring and rotherman attachments are types of the stud attachment.

* **Bar attachment:**
* It's a bar and saddle; between every 2 bars there is a saddle to give retention.

Two main types: rigid or flexible

Dolder bar is the most popular example that can be:

1. Dolder bar unit “rigid: cannot be used when the abutments are questionable.
2. Dolder bar joint “flexible”; it can be used if you aren't sure of the prognosis of the abutments.

This type of attachment needs a minimum of two abutments that are joined by a bar. Clips (saddle) will be attached to the fitting surface of the denture. The clip is U shaped

The unit type provides retention by friction between the bar and the clip as there’s no space available ( intimate contact) provided that there’s no movements in this type “rigid”.

In the joint type, space is available both horizontally and vertically which allows for certain movements bucco-lingually and in the vertical direction, and retention is gained by the engagement of the saddle to the undercuts of the bar.

* Advantages of the bar attachment:
1. Splinting the teeth rigidly ( for questionable teeth)
2. Provides good retention, support, and stability
3. Cross-arch stabilization
* Disadvantages of the bar attachment:
1. Bulkiness of the lingual area of the attachment
2. Looseness or wearing of the material due to the constant wearing and removal
3. Requires manual dexterity ( old patients will find its use difficult)
4. Plaque accumulation

To ensure adequate cleaning of the attachment either the bar is slightly touching the gingival area or there should be enough space underneath the bar.

Note: the abutments of the overdenture can be either natural teeth or implants.

For the upper arch 4 implants are required.

For the lower arch 2 implants are enough

* **Magnet attachment:** Cobalt Samarium magnets “also called rare earth magnet” is a common example.

Not as strong as the bar attachment. Gives retention to a limit which might be considered as an advantage by many people as it doesn’t cause damage to the underlying structure upon removal but this issue is controversial.

* Properties of Cobalt Samarium magnets:
1. It has a high magnetic field strength that holds the denture in its place in the patient’s mouth.
2. They possess a high resistance to demagnetization.

The old types of magnets were affected by the saliva and the oral environment and showed a decrease in the effectiveness with time or what's called "demagnetization", but the Cobalt Samarium “rare earth” magnet showed a continuous effectiveness and was not affected by the oral environment.

1. Magnetic retention is self limiting: retentive forces within the range 155-980 g have been reported.

The magnetic field is self limited, which means, if the patient is eating or talking, the denture will be stable in the mouth. And when the patient tries to remove the denture from its place, it will be easily removed, and this is very important, because if the magnet provides very strong field, each time the patient tries to remove the denture, the abutments will be affected.

A study showed a range of 155-980 gram of resistance force to the removal forces.

Note: when the force exceeds 980 grams demagnetization will occur.

One part of the magnet will be on the abutment, the other part will be in the denture (in the acrylic).

It's used in handicapped pts, pts with poor dexterity and poor muscle coordination.

The smoothness of the magnet makes it easier to be cleaned than other types of attachments.

* Advantages of magnet attachment:
1. Simple to use, once the patient inserts the denture, the magnets will move it to the proper place. Other types need to be aligned in a special way to be inserted in the patient’s mouth, which is harder for the patient.
2. Economically, it’s cheaper and doesn’t require a frequent change as it’s easier to be used and easier to be cleaned.
3. Reduce the forces transmitted to the abutments “as we said about the self limited magnetic field”.
4. Require little maintenance.

**\* Drawbacks of Overdenture attachments:**

1. Increase the cost of treatment.

2. Maintenance is mostly more complicated, as it needs more care from the patient.

3. Increase the bulkiness might lead to denture fracture, whether the bulk was lingually as in the case of Rothermann attachment or in the vertical dimension as in other attachments. Increase in the bulkiness might lead to unwanted forces on the denture and results in fracture of the denture.

4. Plaque control is more difficult. As we said before, the shape of attachments increases the liability to plaque accumulation.

5. Higher loads transmitted to abutments, as the attachment is directly inside the abutment itself, which increase the load on the abutment.

 **Precision attachments**

It’s defined as a mechanical device other than clasp that functions as a direct retainer. This is used for partial dentures and not Overdenture.

Precision attachments are more aesthetic than the clasps. Thus a high need of aesthetic is the main indication for their use. The abutments have to be crowned in order to use precision attachments.

Again, attachments are the same wither for Overdenture or partial denture, they’re composed of two parts, one to be cemented on the abutment and the other part will be fixed to the denture “wither it’s a Co\Cr partial denture or a complete Overdenture”. Though attachments come in different shapes, they follow the same principles, they attach the denture to the abutment to provide retention, and they could be rigid “retention is gained by friction” or flexible “flexibility is gained by the shape of the attachment itself”.

**\* Classification of attachments:**

* 1. **According to fabrication:**
		1. Precision: prefabricated, machined component just need to be attached to the denture. It’s more precise and expensive.
		2. Semi precision: less precise as errors might occur during processing, handmade (it's a wax).
	2. **According to the rigidity:**
1. Rigid type that takes retention from friction
2. Resilient type that gives stress breaking action for the attachment
	1. **According to the design:**
3. Key and key hole.
4. Ball and socket.
5. Bar attachment.
	1. **According to the relation to the abutment:**
6. Intra coronal, one half of the attachment is inside the crown of the abutment.

\* Consist of two parts:

 A flange joined to prosthesis to give lateral bracing.

 A slot imbedded in the restoration.

\* Provide rigid connection.

\* Frictional retention.

\* The loads here are with the long axis of the abutment but it's concentrated on the abutment so overloading might cause damaging in this case.

1. Extra coronal, outside the crown.

All parts of the attachment are outside the contour of abutment tooth.

Loads are applied outside the long axis of abutment tooth producing torque forces which are damaging to the tooth this is why all or most of them should be supplied with stress breakers like springs.

Note: stress breaking is usually used for extra-coronal attachments

* 1. **According to Preiscel classification:**
1. Intra coronal attachment
2. Extra coronal attachment
3. Stud attachment
4. Bar attachment

Extra coronal attachments should always be resilient.

**\* Negative aspects on attachment use:**

* 1. Additional expenses.
	2. Poor dental motivation.
	3. Manual dexterity. Very old patients won’t be able to use attachments.
	4. Repair.

**\* Contra-indications of attachment use:**

1. Short clinical crown. Minimal accepted length of crown is 6 mm because the attachment itself is 4 mm.
2. Minimum 4mm of vertical space for attachment
3. Short bucco-lingual width.
4. Inadequate space between the pulp and the normal contour. Severe preparation is performed and we don’t want to do pulp exposure.
5. Poor oral hygiene

Kennedy class I and II requires extra coronal resilient attachments

Kennedy class III requires intra coronal attachment (rigid)

**\* Advantages of Precision attachments**

1. It provides retention without metal display.
2. It provides some horizontal stabilization.
3. It has been claimed that stimulation to the underlying structure is greater. Still not proven yet

**\* Disadvantages of Precision attachments**

1. They must never be used in distal extension condition without stress breaker.
2. Full cast crown must be prepared on abutment.
3. They can’t be used in short clinical crowns
4. They can’t be used when the pulp is large.
5. They are not appropriate for patients who lack muscular coordination.
6. Both clinical and laboratory procedures require special skill.
7. They are difficult to repair, depends on the type
8. Very expensive.

**Conclusion:**

* **Clasp – type RPD**
	+ Low coast
	+ Ease of fabrication and maintenance
	+ Predictability of results
* **Attachment RPD**
	+ More esthetic
	+ Need for abutment alignment

Need for cross arch bracing or the attachment itself may contain parts to do bracing.

GOOD LUCK

Dana Manaseer