No clasps please! A further attachment solution

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Attachments are elements for linking removable prostheses with existing teeth (abutment teeth). These require crowns in order to accept the attachment. They can be used with removable prosthetics and with crown and bridge techniques.

They comprise a primary element that is permanently cemented in the oral cavity and the secondary component that is firmly linked with the actual prosthesis. Attachments are particularly applicable when it proves impossible to produce parallel abutment teeth simply. The attachment is used to create a bridge between misaligned abutment teeth such that a secure insertion becomes possible.

Types of attachments

Attachments are divided into two groups, intracoronal attachments (within the crown of a tooth) and extracoronal attachments (exterior to the tooth crown).

Both types are available either as prefabricated attachments ie they are manufactured commercially and are then simply ‘assembled’ by the technician. They can be obtained in a wide variety of shapes, sizes and materials.

Alternatively, there are bespoke attachments, which are wholly prepared in the laboratory, though sub-units can be incorporated during construction.

Whether prefabricated or bespoke, an attachment is always made of a male and female part. Both parts slide together during the insertion of the prosthesis and result in a firm connection.

Advantages:

- No need for glued connections (apart from with RSS attachments)
- Patient-friendly insertion and removal of the prosthesis
- Precision calibration of friction settings
- Ease with which female components can be interchanged in practice
- Longevity and robust functionality as there are no complicated mechanisms
- Easily adapted to the local space constraints and therefore no reduction of the prosthesis aesthetics; more graceful than double crowns
- Abutment teeth are coated in ceramics in contrast to telescopic solutions
- Price advantage over telescope crowns with 5 or more crowns

Manufacturing

Bespoke attachments require a high level of competence in milling and casting methods; however, they can be adapted to nearly all situations. If you compare the costs of prefabricated standard-sized attachments versus the bespoke attachments, (taking account of the work involved), then the cost difference is negligible.

The final casting of the preparations is no different to that for larger bridge work. The milling model is produced as usual then based on the model. The optimal alignment position for the attachment is determined such that the rods on the male attachments are aligned parallel to one another.

Bridge with male parts of Rod attachments

Complete work with inserted CoCr

As with any crown or bridge, the work on an attachment begins with the preparation of the abutment teeth. The individual abutment blocks are taken into account when determining the alignment direction for the attachment. The alignment direction is determined in exactly the same way as for the planning of individual small bridges. Circumstances permitting, it is beneficial to create a bit more space on those dental surfaces where the attachments are to be fixed to bring the male components as close to the tooth axis as possible to avoid the creation of damaging lateral forces.

In order to protect the attachment from overloading by tension and pressure forces, each component is protected from these forces via a stress breaker: this avoids breakage of the male element or expansion of the female one.

A horseshoe-shaped depression is milled into the crown(s), which has vertical grooves milled at either end. This prevents movement of the attachment along the sagittal axis. The ledge of the milled horseshoe depression is able to absorb axial pressure and distribute it over the crown block. The stress breaker then fits...
The grooves and ledges are already incorporated during wax modelling and are pre-milled with special wax mills.

The cast crowns then proceed to the first fitting and the coping impression in the dental practice. The crowns are returned to the lab with the over-impression from which the master model is created. The abutment crowns are shaded with ceramics. Due to the expected oxidation during the firing of the ceramics, it is only possible to mill and polish the surfaces afterwards.

It is a great help at this juncture if the dental positioning has been established previously.

After firing, the crowns carrying the attachments are transferred with a key to the milling plate (made out of plaster of Paris or an appropriate material). If the conversion of the wax model into methacrylate does not require any special effort; however, one should not forget to protect the attachment from unwanted intrusion of the resin by blocking with wax.

The housings for the female components are coated with composite, rendering the attachment invisible. Generally, rod attachments and similarly constructed attachments require a bordering gap in order to incorporate an extracoronal attachment.

If the construction requires an attachment point in a still-complete dental row, then a groove-shoulder attachment can be used.

These are intracoronal horseshoe-shaped elements that are attached to the oral side of the crown (hiding them from view) to which the matching interlocking denture with mirrored elements can attach (see article 1 in this series). The secondary construction, as well as a stress breaker, is made of high-quality gold alloy that is soldered with the model cast to guarantee a perfect and tension-free fitting (Note: you cannot exchange the male component within RSS).

Conclusion

Ninety-five per cent of all attachment work can be completed with the two attachment types described here.

Attachments are particularly applicable when it proves impossible to produce parallel abutment teeth. The attachment is used to create a bridge between misaligned abutment teeth such that a secure insertion of a prosthesis becomes possible. They can be a cost-effective alternative to double crowns. They are aesthetically attractive and user-friendly solutions for the patient.

As with the production of telescopes, the handling of the model and the casting materials require considerable experience in order to get a really good fit of the stress breakers and the base of the cast.

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