Milling technique: Dentures without clasps

Part 1: Basics

By Frieder Galura

Figure 1. Attachment technique: It's matching!

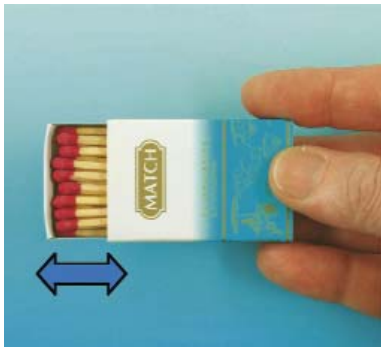

Figure 2. How does it work horizontally?

Figure 3. How does it vertically work?

In this introductory article we will investigate attachment techniques and how they work. How do you to explain to a client the basic functioniing of an attachment in dental prosthetics. One way is to use this analogy. Take a matchbox (Figure 1) as a simple example for an attachment technique. First, hold it horizontally and push the drawer from one side to the other (Figure 2). Then hold the box vertically (Figure 3). Though the inner part is in an upright position, it will not fall to the ground. Why? Because both parts have parallel contact surfaces. They move against each other with a certain resistance (friction), which holds both parts together. Now imagine that the inner part is a primary telescopic crown (fixed) and the outer part, a secondary telescopic crown (removeable). In this example, it's easy to show, how a telescopic or attachment denture is inserted inside a client's oral cavity and cannot be removed without external forces.

How does it fit?

We differentiate three kinds of fits:

1. Wider fit (loose fit): R1 < R2 (Figure 4).There will be less friction to fix the denture in a client's oral cavity. The hold of the prosthesis must be secured by a locking element.
2. Tighter fit (pressed fit): R1 > R2 (Figure 5). The denture can't be removed without strong forces. The periodontium of the support teeth will be damaged (Exception: tapering crowns).
3. Transitional fit: R1 = R2 (Figure 6). That's an ideal fit, if the layer of saliva is taken into consideration; consequently a transitional fit with a tendency to a looser fit.

Industrial milling techniques: (Figure 7)

All attachment parts (male and female) are produced in the industry by milling work. A precision fit is achieved in a size of microns that, for example, include prefabricated dental attachments like

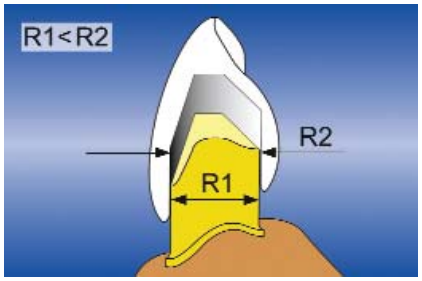

Figure 4. Loose fit: R1 < R2

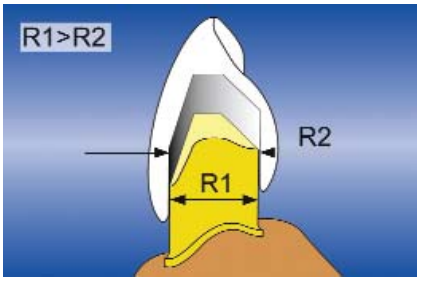

Figure 5. Pressed fit: R1 > R2

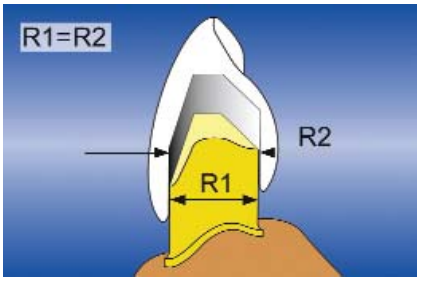

Figure 6. Transitional fit: R1 = R2

rematitan attachments (Figure 8) which is a series production of mainly a large number of pieces. Another example for series production are tiologic titanium implant abutments (Dentaurum Implants), which are milled with a precision of one thousandth millimeter (Figure 9). The milling object as well as the milling tools are checked by a laser-beam. Though the complete milling process is fully automatic, the milling time of a single abutment takes 14 minutes.

Dental milling technique:

In dental milling techniques we exclusively produce custom-made pieces. Only the primary parts (Figure 10) are milled by means of a milling machine. The secondary parts are mainly fabricated by casting technique. The fit is far from those of the industrial standard. The precision results of dental milling can't be compared with that of industrial production, but past experience shows, that the dental milling


Figure 7. Industrial milling machine.

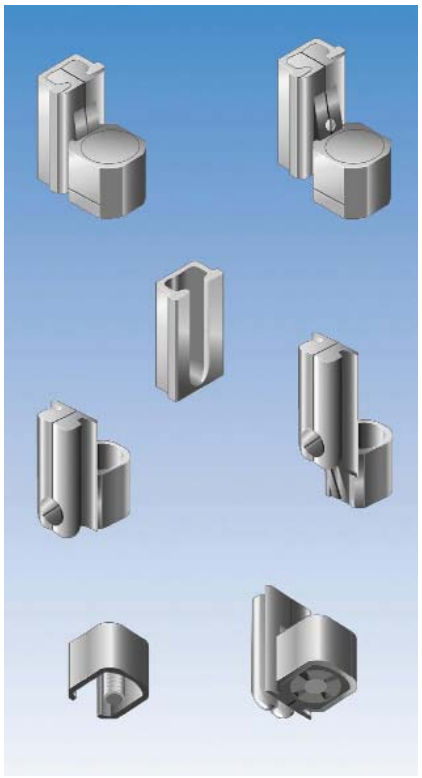

Figure 8. rematitan attachments.

Figure 9. Series production: tiologic titanium abutments (Dentaurum Implants).

Figure 10. Dental milling technique.

technique works for the patient's benefit because the elasticity of the support teeth helps the case with a minimum of inexactness.

A new telescopic denture, which gives a little feeling of tension in the patients mouth is mostly fitting tension-free after several days as a result of an „orthodontic follow-up treatment".In other words the teeth have slightly moved to accomidate this tension. This kind of tolerance doesn't work in the case of an implant work as implants dont move like real teeth!

About the author

Frieder Galura trained as a dental technician at the University Dental Hospital in Heidelberg, Germany. He has worked in many dental practices and laboratories in Germany, concentrating on ceramics, milling work and attachment techniques. He commenced working for Dentaurum as dental technician in the prosthetic department in 2002 and has lectured and run training programmes for them both in Germany and throughout the world. Since 1995, he has been published in dental technical magazines in Germany, France, Spain, Italy and Japan.