Milling technique: Dentures without clasps

Part 3: Conical crowns

By Frieder Galura

Figure 1.

"In the past the fit of telescopic crowns was often too tight due to expansion troubles with investments and casts. This made the handling of a telescopic denture difficult for the patient... The conical technique works with a simple principle of a pressed fit..."

Figure 2.

Figure 3.

Figure 4.

An ice cream cone is without doubt one of the most familiar conical shapes to us, even better when it is filled with our favourite gelato! The conical shape is the basis of the system of conometry and was envisaged by professor Karlheinz Körber at the end of the 1960's to retain removable prosthetics. He definitely had the theoretical idea because in the past the fit of telescopic crowns was often too tight due to expansion troubles with investments and casts. This made the handling of a telescopic denture difficult for the patient. At worst, the periodontal structures were damaged and the support teeth sometimes were lost through an unintentional extraction.

The conical technique works with a simple principle of a pressed fit. The working principle is explained with plastic cups (Figures 2-4). If one cup is completely put into another, there is an intimate fit and they become wedged together.

To start a new prosthesis, the dentist prepares the support dies tangentially. After fabricating the model (Figure 5), the dies are surveyed for the best path of insertion. You can use a conometer (Figure 6) which has a certain amount of "room to move" between 0° and 12°. The highest adhesion is achieved with an angle of 2°. If the conical angle is higher than 6° the pressed fit is compromised and lost.

From an aesthetic point of view, the laboratory technique starts in a similar fashion to the telescopic technique starting with surveying in the anterior area (Figures 7+8). Figure 9 shows a disadvantageous path of insertion of premolar 25 surveying with a wax-scraper 2°. In order to decrease the undercut in the distal area, you can work with instruments calibrated to an angle of 6° (Figure 10).

Figure 5.

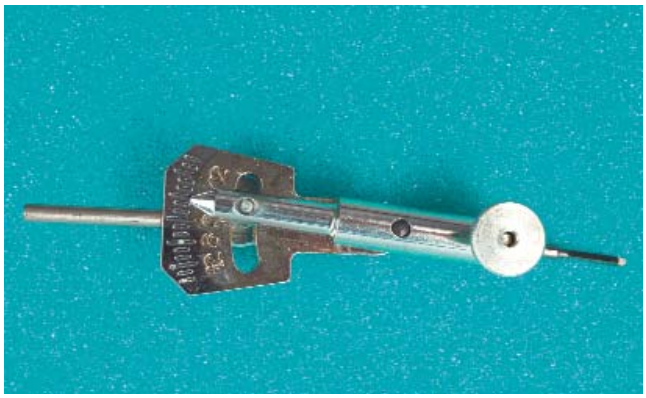

Figure 6.

Figure 7.

Figure 8.

Figure 9.

Figure 10.

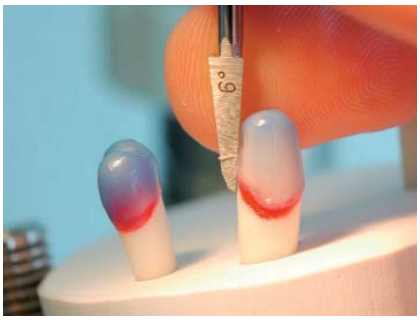

Figure 11.

Figure 12.

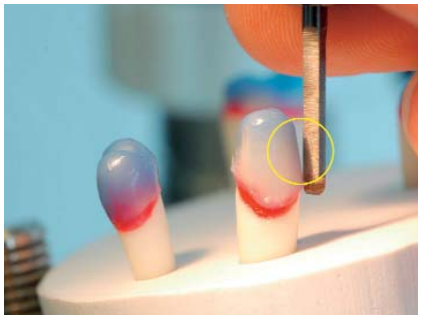

Figure 13.

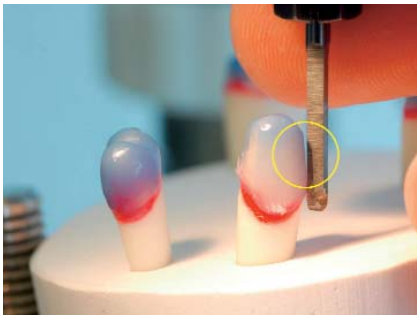

Figure 14.

Figure 15.

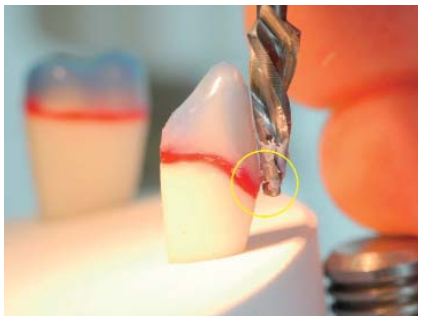

Figure 16.

Figure 17.

Figure 18.

Figure 19.

Figure 20.

Figure 21.

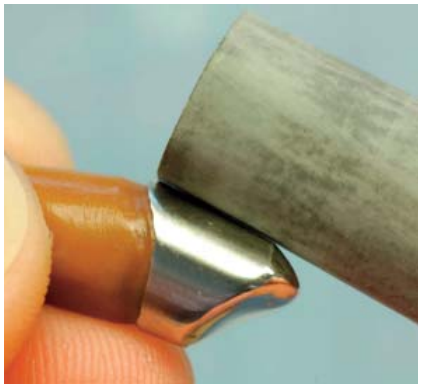

Figure 22.

Figure 23.

Figure 24.

All conical crowns are surveyed with a 6° angle (Figure 11) and milled (Figure 12) with exception of the premolar. Then hold a wax-scraper at 0° next to the canine conus from the mesial side (Figure 13) and turn the model mesially in an angle of 4°-5° (Figure 14). In this way, the premolar 25 is also milled with a 6° angle (Figure 15).

The disadvantages of milling the 6° angle is the undercut present in the marginal area of the canine (Figure 16), which may later result in a visible metal margin. That's why the decision was to work in this case with 2° tools (Figures 17 and 18), though the metal margin of the premolar in the distal non-visible area would be higher.

Figure 19 shows the finished wax crowns made with StarWax M (Dentaurum, Germany). Primary conical crowns are exclusively milled without a shoulder. A shoulder milling would prevent the wedge effect in an early contact with the secondary crown in the shoulder area. In the next step, the wax crowns are invested and cast with remanium star (Dentaurum, Germany).

After the try-in in the dental practice, the secondary impression is taken and the fabrication of a milling base as described in the previous article about telescopic crowns (*eLABORATE* Nov/Dec 2007) follows. Before beginning with the metal milling, the primary parts are surveyed with a parallel scraper both for undercuts as well as for avoidance of a 0° angle wall which would result in unwanted friction and therefore a telescopic fit. After this check the primary crowns are milled one after another with 2° burs (Figures 20 and 21). Finally, we give a matt finish to the surface with strips of abrasive paper of grit size 600 (Figures 22 and 23). In general, the primary conical crowns should not be high gloss polished as this will result in a better fit. The final figure (Figure 24) shows the conical work with cast partial denture, which was produced in the process of a one-piece cast, however, that's a story for another time.

This will be continued in a future issue with Part 4: Channel-shoulder attachments.

About the author

Frieder Galura was 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.