Bridge design, part eight: the use of gold copings in bridgework

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In this article, Paul Tipton examines a further type of longer span bridgework

From the studies produced by Lindhe and Nyman it would certainly seem possible to succeed with long span bridgework, provided many of their criteria for success are followed, such as occlusal design, margin placement, oral hygiene etc. The other important aspect of this type of longer span bridgework is to control the stress on cement lutes, where failure can readily occur. When the prognosis of longer span bridgework is in doubt because of the loss of many units or mobility of abutments, gold copings can be used (Robertson, 1986). Copings (otherwise known as telescopic crowns) were originally used to overcome problems of parallelism in relation to the path of insertion of fixed restorations (Amsterdam, 1974).

TYPE OF COPING

The gold coping is a thin crown, 0.7mm thick, that is waxed directly onto the die and usually cast in yellow gold. They are made parallel to each other and can be sandblasted by the technician for extra retention (Figures 1 to 3) (Newburg, 1978). The margins are polished, however, as they will be exposed in the mouth. These copings are permanently cemented over the remaining abutment teeth with a traditional hard cement, such as zinc phosphate. The long span bridgework is then made in the conventional manner and cemented over the gold copings with a softer cement such as zinc oxide and eugenol such as 'Temp-bond' (Kerrs). Should excess stress be transferred to the cement lute then one or more of the soft cement lutes will preferentially fail.

Because the copings have been made parallel to each other there is reasonably good retention of the bridge, however, even without cement. When all the cement lutes fail and the cement washes out the patient will usually re-attend for further cementation with more soft cement.

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Figure 1: Three root-filled anterior and posterior teeth

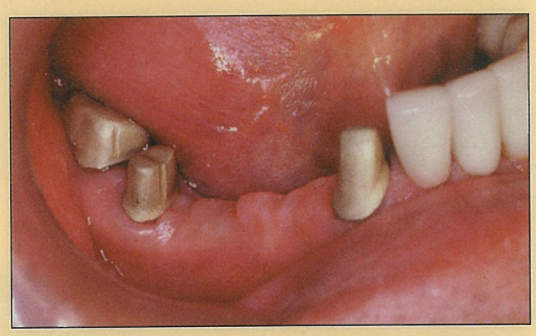

Figure 2: Sandblasted gold copings cemented in place with zinc phosphate

Figure 3: Three-quarter gold crown as a minor retainer in mandible

It is unlikely that caries will occur under the bridgework because the tooth structure is protected by the gold coping. Bridgework margins are placed above or incisal to the gold coping margins so that periodontal problems can be avoided. This style of bridge design does however require more aggressive tooth removal as an extra 0.6-1mm is required for the extra thickness of the gold coping and

Figure 4: Four retainers for full arch bridgework

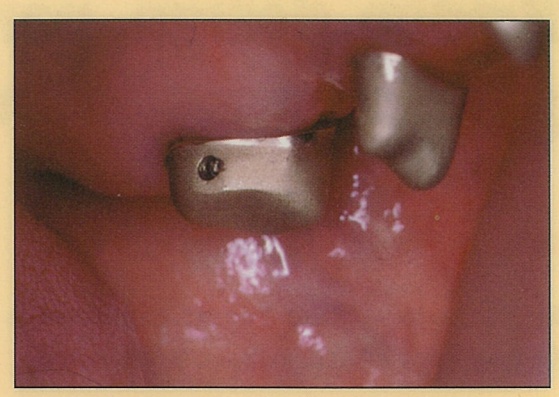

Figure 5: Screw block placed in the posterior gold coping

Figure 6: Bridgework screwed into the gold copings

Figure 7: Full arch bridgework

Figure 8: Full arch bridgework cemented onto copings with Temp-bond

cement lute. Alternatively, a non-precious coping can be fabricated when required, bringing the thickness of the coping down to 0.3 mm.

SCREW RETENTION

One or more screws can also be incorporated into the restoration so that when the cement lute fails the bridgework does not fall out of the mouth but is retained by the screws. This gives the patient added confidence in his restoration (Figures 4 to 8). Careful preparation techniques are required for this type of retention as the screw could (in certain situations) pull the coping off the tooth, leading to an increased risk of caries. The screws are usually placed into the end abutments, which require special tooth preparation. The end abutment is prepared so that it is tilting distally, allowing for a distal path of insertion of the coping. As has been previously discussed in previous articles in this series, bridgework usually unseats from an anterior-posteri-

Figure 9: Combined complex perio/endo case

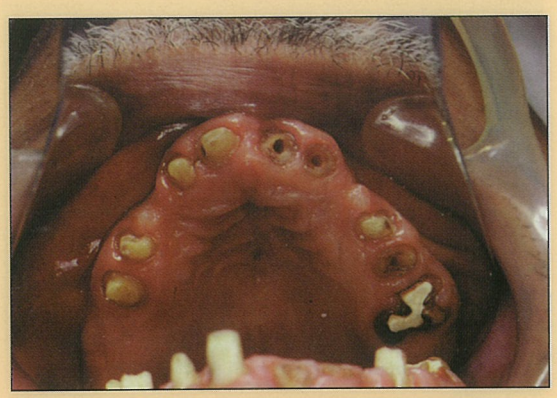

Figure 10: Occlusal view showing remaining compromised abutments

Figure 11: Gold copings cemented in place with zinc phosphate

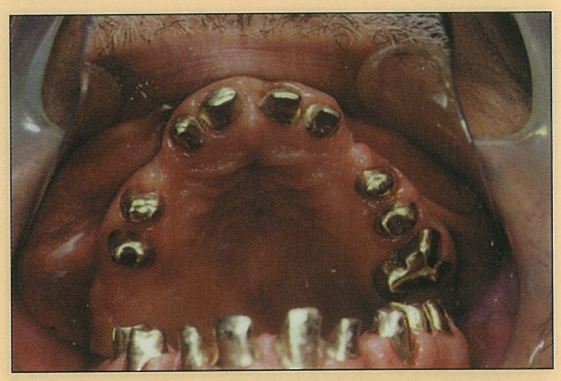

Figure 12: Occlusal view

Figure 13: Full arch bridgework cemented onto copings with Temp-bond as long-term provisional prior to definitive implant treatment

or direction of force and therefore the fit of the coping on the tooth will resist this type of dislodgement, thus maintaining a cement seal between the coping and the tooth. The technician will upright and parallel the abutment by waxing and casting his gold coping parallel to all the others for seating of the bridge and correct path of insertion.

USES

One of the major advantages of this style of bridgework is the flexibility it brings to a restoration. In theory, the bridge can be removed by untapping (and unscrewing) so that problems with abutment teeth and periodontal disease can be treated. In this manner, periodontal maintenance is more easily achieved, root fillings and cast posts and cores can be fabricated without drilling through the superstructure and teeth can be removed, roots resected and the bridge modified prior to re-cementation (Figures 9 to 13).

Further abutments may be added by soldering new

Figure 14: Six remaining anterior teeth against full lower arch bridgework

Figure 15: Upper diagnostic wax up

Figure 16: Anterior tooth preparations

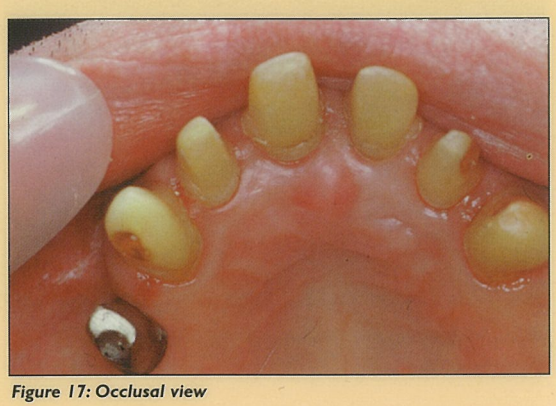

Figure 17: Occlusal view

Figure 18: Silver dies or master model

Figure 19: Occlusal view showing two implants on the model

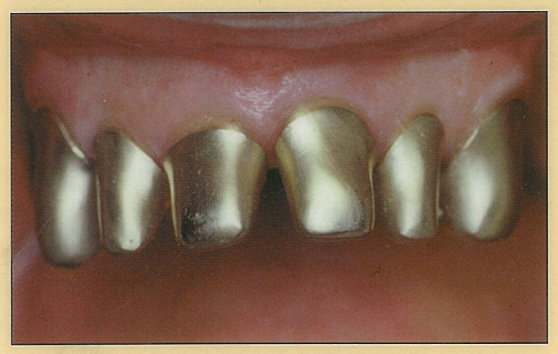

Figure 20: Sandblasted gold copings cemented with zinc phosphate

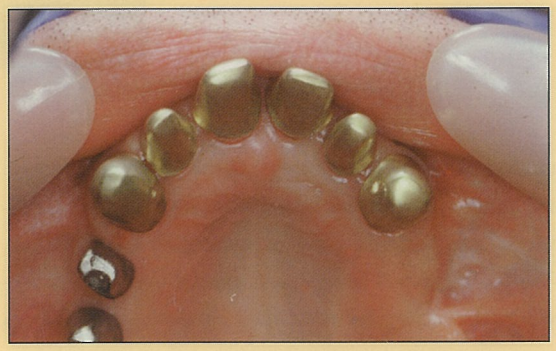

Figure 21: Occlusal view showing two custom-made abutments on the implants

Figure 22: Full arch bridgework ready to be cemented with 'Temp bond' (Kerrs)

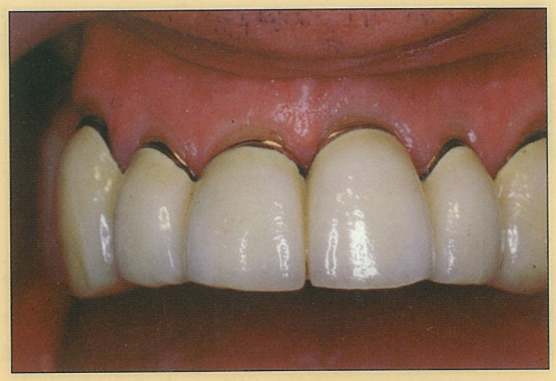

Figure 23: Anterior view showing supragingival gold margins and low lip line

retainers or attachments and anticipating future modifications (Kaldahl, 1985). Be aware, however, that this type of bridge cannot then be removed for porcelain addition without the increased risk of porcelain fracture whilst in the furnace due to saliva contamination.

Multiple unit bridgework when cemented on mobile abutments often fails to seat adequately unless venting is performed. An alternative is the use of copings where an incomplete seal and seat is less detrimental (Faucher, 1983). This type of bridge is also often used as an interim prosthesis whilst implants are placed around the tooth abutments to take the patient from a tooth-supported bridge to an implant-supported bridge without the need for a removable prosthesis (Figure 13).

AESTHETICS

Aesthetics can be compromised by this type of bridge because - as previously mentioned - extra tooth preparation is required (which may not always be possible) and there are also two finish lines. Ideally, both these finish lines should be metal and supragingival for provision of fit and oral hygiene and will not compromise aesthetics if the patient has a low lip line. (Figures 14 to 23). Should extra tooth preparation not be completed then an over-contoured bridge or one that shows excess opaque porcelain on the labial surface may result.

CONCLUSIONS

Gold copings can be an excellent long-term, or provisional restoration as the coping can protect the tooth from caries and cementation failure. Maintenance is made easier by the ability to remove the superstructure at will. Aesthetics can often be compromised by the need for greater tooth reduction and often two visible metal margins.

The next article in this series will concentrate on the Lindhe and Nyman bridge or periodontal prosthesis. ■

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