

Simplified Activation of Closing Loops

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There are two basic force systems that can be used for space closure. With a continuous archwire, the friction between each individual bracket and the wire is difficult to predict. The second approach entails bending various types of loops into the wire. This method is friction-free and thus provides more precise anchorage control, but it carries the problem of activation and reactivation of the closing loop.

Some clinicians bend omega loops mesial to the terminal bands and activate the closing loops by tying ligature wires from the loops to the bands. A similar technique involves soldering hooks in the same positions. These methods require considerable chairtime for marking the archwire in the mouth and bending the omega loop or soldering the hook. Tying the ligature wire can be difficult if the terminal tooth is a second molar. If the loop or hook becomes flush to the mesial surface of the band before the space is completely closed, the archwire must be removed and rebent, or the hook must be removed and repositioned.

The other common technique for activating a closing loop is to bend the archwire distal to the terminal molar band. This method has many disadvantages:

- It is difficult to activate the loop accurately.
- The distal end of the wire is hard to grasp and bend. Excessive force can cause patient discomfort or dislodge the molar band. A protruding distal end can irritate the soft tissues.
- If the loop is overactivated, the wire must be unbent and slid through the molar tube before a new bend can be made distal to it. The same problem applies if the archwire has to be removed before complete space closure due to appliance breakage. Sometimes the archwire has to be cut mesially and then passed distally through the molar tube.
- Reactivation of the archwire a millimeter or two from the previous bend is extremely difficult.

Alternative Techniques

Modifying the distal leg of the closing loop allows simple and accurate multiple activations. One design incorporates a small loop bent in a mesial direction (Fig. 1A). A step-in bend is required distal to the loop to maintain continuous archform (Fig. 1B). Once the archwire is in place, the teeth distal to the space are ligated together (Fig. 1C). The end of the ligature wire is then threaded through the small loop and tightened to activate the closing loop (Fig. 1D). The tail of the ligature wire is tucked in, and the end of the archwire is cut flush to the distal of the terminal molar band (Fig. 1E). After space closure, the loop becomes passive (Fig. 1F).

A similar design uses a U-bend instead of a small loop, allowing activation of the wire without a step-in bend. A three-pronged plier is used to bend this closing loop (Fig. 2).

Case Report

An adult patient presented with four bicuspids previously extracted. After canine retraction, a 5mm space remained on each side between the lateral incisor and the canine (Fig. 3A). A closing-loop archwire with a U-bend was inserted, and the first molars, second premolars, and canines were

ligated together (Fig. 3B). The ligature wire was brought through the U-bend and activated with a hemostat (Fig. 3C). The ligature wire was then cut and tucked in, and the distal end of the archwire was cut flush with the molar band (Fig. 3D).

This procedure was repeated monthly for three appointments. On the fourth visit, the canine was bypassed for the final activation (Fig. 3E). One month later, the space was completely closed, and the maxillary arch was ready for a continuous archwire (Fig. 3F).

Conclusion

This article does not address the biomechanics of loop design; the examples shown are simple vertical loops. The distal legs of other types of loops can be similarly modified, however, to allow easy activation and reactivation. □

FIGURES

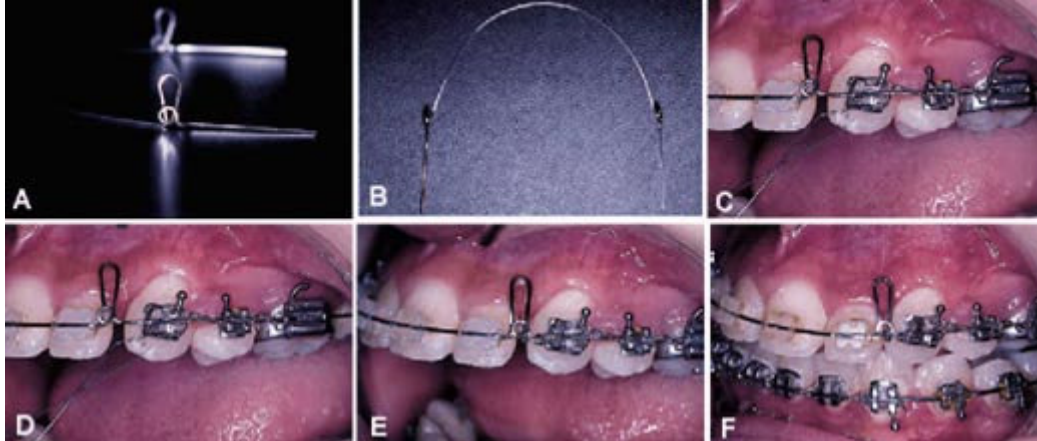


Fig. 1 A. Small loop bent mesially in distal leg of closing loop. B. Step-in bend placed distal to loop to maintain continuous archform. C. With archwire in place, teeth distal to space ligated together. D. End of ligature wire threaded through small loop and tightened. E. Tail of ligature wire tucked in. F. Space closure after one month.

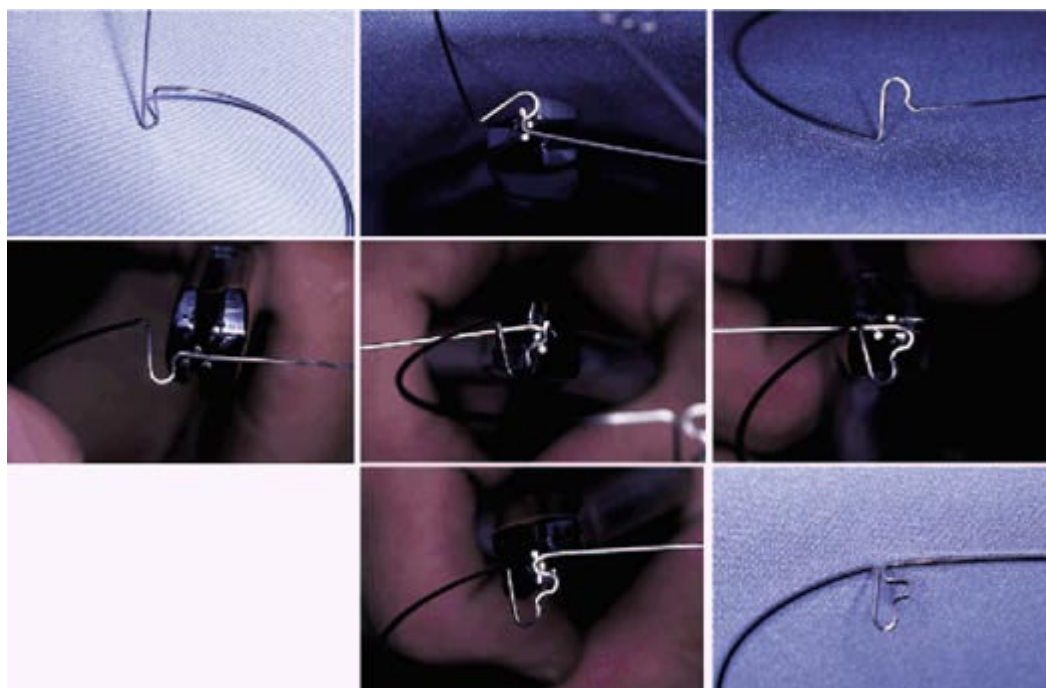


Fig. 2 U-bend placed in distal leg of closing loop with three-pronged plier, avoiding need for step-in bend in archwire.

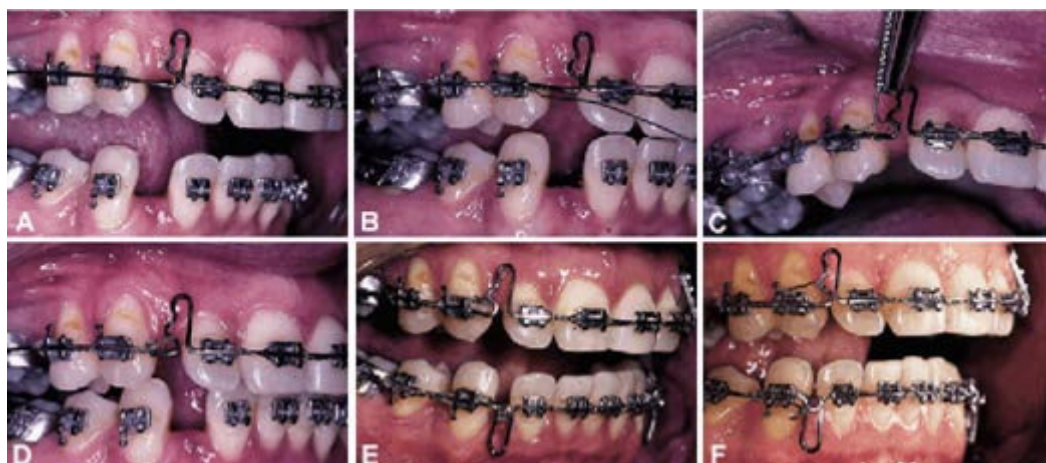


Fig. 3 A. Adult patient with 5mm space between lateral incisor and canine after canine retraction. B. Closing-loop archwire with U-bend placed; first molar, second premolar, and canine ligated together. C. Ligature wire threaded through U-bend and activated with hemostat. D. Ligature wire cut and tucked in. E. Canine bypassed in final activation. F. Space closure after four months.