

A Method For Rapid Arch Ligation

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Arch ligation represents a large percentage of the total time spent at the operatory chair. This is not only because of the number of individual ligature ties needed per patient, but also due to the frequency that archwires need to be changed or modified. If arch ligation time could be reduced markedly, the time saved could be spent profitably in other procedures or in needed arch changes which might otherwise be postponed under pressure of time.

MATERIALS

A straight 5½ inch Kelly hemostatic forceps is adapted as follows: A finger grip area is formed at the box joint with a grinding wheel by reshaping the rectangular form of the joint area into a more cylindrical shape that will roll smoothly between finger and thumb. This reduction in circumference permits a greater degree of rotation for each unit of distance the forceps is pushed along the middle finger during the act of spinning. Care must be taken not to reduce this area too much, as a weakened joint may warp or break under the strain of use. By leaving the ground box area rough, better finger traction is afforded.

The forceps ends are usually too long and need shortening. This can be done most readily by notching circumferentially with the edge of a grinding wheel, bending the ends off with a plier, then smoothing on the wheel. This brings the working tip of the forceps to an effective distance from the box joint where the fingers grip the instrument and, by reducing the clamp length, creates a firmer grip on the ligatures.

Shown before the Univ. of Illinois Alumni Society, March 1964.

This distance can be varied to preference, the main purpose being to maintain sufficient length to have the fingers free of the patient's lips and cheeks during the spinning. One and a quarter inches from forceps tip to box pin is an effective length. Figure 1 illustrates the resultant form.

The specific shape for ligature tie loops is probably best determined by each individual in accordance with the type of brackets he uses. The important thing is that they be uniform in size and shape so that time is not lost adjusting them. Since hand formed loops are variable and time consuming, a mechanical forming device must be considered. Ligature forming pliers are helpful but usually need alteration to form acceptable loops. Another method involves formation on a contoured die. The ligatures thus formed are then placed in the forceps and given their final adaptation. In Figure 2 note bends

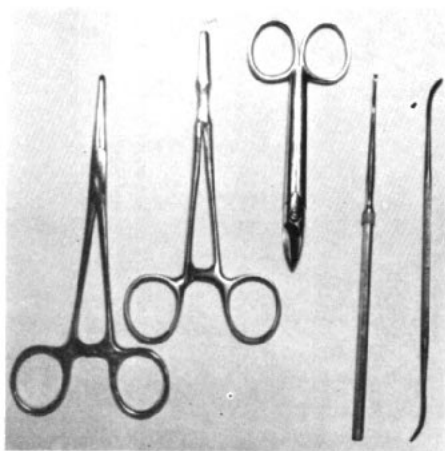


Fig. 1 Left to right, Kelly hemostat, adapted hemostat, crown and bridge scissors, ligature director and jewelry file.

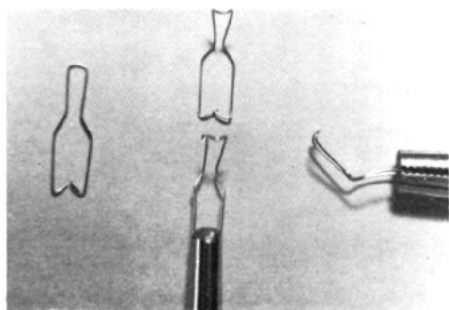


Fig. 2 Preformed ligatures loaded and bent.

of 90° at the tip of the ligature. These are approximately .020 inch from the end to conform to archwire size. Bends of 45° are made at the base of the neck to catch bracket corners. It takes about two minutes of an assistant's time to load and bend a full set of a dozen ligatures using a #142 plier.

Crown and bridge scissors with serrated blades, a jewelry file and a ligature director are the other instruments needed.

METHOD

The instrument setup includes loaded ligature hemostats, ligature director, crown and bridge scissors and a curved jewelry file (Fig. 3).

An adapted Kelly hemostat holding a preformed ligature loop is passed by the assistant to the operator, who grasps it between his first two fingers and thumb

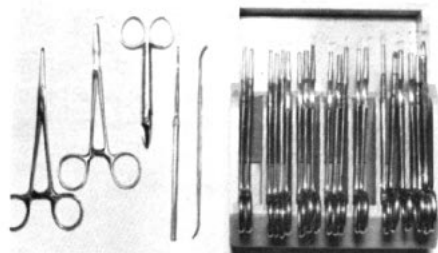


Fig. 3 An instrument rack used for storing and transporting.

almost like a pencil (Fig. 4, above). The ligature wire, very short and thus easily controllable, is applied over the bracket (Fig. 4). Should any corner not catch the bracket, a ligature director held in the left hand can be used to guide the wire into place (Fig. 4, middle). Properly preformed ligature loops are important in facilitating this part of the procedure. If special arch-

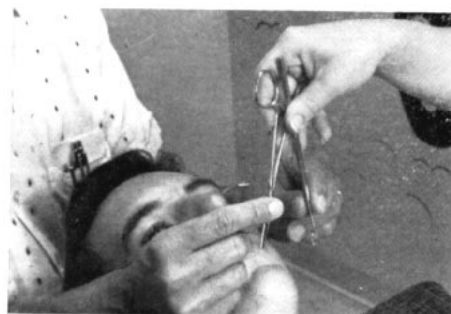


Fig. 4 Tying the ligatures. The forceps are spun between the thumb and finger, rolling them to the end of the middle finger.

wire activation is needed, it is obtained by pressing the archwire to position within the bracket with the ligature director while the ligature is tied. When the ligature is secured around the bracket, the forceps is spun between the thumb and middle finger with two or three quick movements, rolling it to the end of the middle finger, thereby twisting against the bracket (Fig. 4, below). The side of the hand may rest lightly on the patient's face for stability.

At this point various methods may be used to handle the forceps and tie ends. As the nurse passes a loaded hemostat in working position to the doctor, she disengages the last hemostat with her other hand (Fig. 5). The doctor need not move his hands or eyes from the zone of operation. After one-half arch (or a complete arch, as preferred) has been ligated in this manner, the ligature ends are clipped with the scissors to the desired length and tucked under with the jewelry file.

An alternative method involves giving the forceps additional spins until the tie ends break between the forceps and the bracket. The surplus length of tie end is thus removed with the forceps, and the scissor-clipping step is bypassed. Should a tie break too close to the bracket, it need not be removed then, but another tie can be placed over it thus maintaining the rhythm of the procedure. Ligating from right side to left avoids new ligatures hanging up on previously made tie ends. The method is easiest when done working from behind the patient. These procedures can be followed using only two forceps by having the nurse reload each forceps immediately after she disengages it from the previous tie. While this is somewhat slower than having a dozen forceps pre-



Fig. 5 While one ligature is being tied, the next is ready.

loaded in a rack, it has the advantage of less initial outlay for forceps while the method is being appraised.

While the description of this technique necessarily involves a rather detailed and involved explanation, in practice the method is simple. Depending upon the experience and speed of the individual operator, from one and one-half to two minutes should be sufficient for tying two full arches and tucking in tie ends. While saving time is important, an equally significant consideration is the ease of positive bracket engagement which makes the entire procedure less demanding. While practice is necessary at first, the method soon becomes reflex in nature.

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