

Extended Eyelet Method: A New Technique for Maxillomandibular Fixation

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Abstract Treatment of maxillofacial fractures may require maxillomandibular fixation (MMF) as an important step in the treatment modality. Interdental eyelet wiring (Ivy loop method) is one of the commonly used methods. This method has the disadvantage that associated dentoalveolar fractures and subluxated teeth were not addressed. Also, this method lack horizontal bracing across the fracture site, as possessed by Risdon's method of horizontal wiring. The purpose of this article is to present extended eyelet method of wiring which avoid these disadvantages.

Keywords: *intermaxillary fixation, maxillomandibular fixation, maxillofacial trauma, maxillofacial fractures, ivy eyelet wiring, risdon wiring*

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1. Introduction

Fractures in the maxillofacial region are treated by either open reduction or closed reduction. Maxillomandibular fixation (MMF) may be required as an important step in the treatment of these fractures. Various methods of MMF were described in the literature. These methods of wiring are Gilmer's direct interdental wiring. Interdental eyelet wiring (Ivy loop method), Leonard button wiring, Col. Stout continuous or multiple loop wiring, Obwegeser method of wiring, Risdon's method of wiring and Arch bar method of wiring [1,2].

Interdental eyelet wiring (Ivy loop method) is one of the commonly used method. This method has the disadvantage that associated dentoalveolar fractures and subluxated teeth were not addressed. Also, this method lack horizontal bracing across the fracture site, as possessed by Risdon's method of horizontal wiring. The purpose of this article is to present extended eyelet method of wiring which avoid these disadvantages.

2. Technique

A 26 gauge stainless steel wire is used for construction of extended eyelets. The wire is stretched by 10% of the original length so as to prevent loosening of the wires after insertion. Over-stretching should be avoided as this leads to work hardening of the wire. Work hardening makes the wire brittle and difficult to use because it will break easily. Approximately 36 cm long pre-stretched wires are used for construction of extended eyelets. To make an extended eyelet this single length (36 cm) is twisted around the shaft of a rod of 3 mm diameter at approximately the

middle of the wire. This makes an extended eyelet with a loop, twisted portion and two arms. The two arms are cut off obliquely to equalize their length and to produce a sharp point which will readily pass through the interdental space. This is similar to conventional Ivy eyelet described in the literature. The only difference is that the length of the two arms is greater than that of conventional eyelet.

After proper preparation of the patient and anesthesia, the wiring can be done utilizing sterilized extended eyelets. The two arms of the extended eyelet are grasped with a wire holder and passed through the interdental space between first and second molars from the buccal to lingual/ palatal side (Figure 1: Step 1). The two arms are grasped and passed back to buccal side through the adjacent distal and mesial interdental spaces (Figure 1: Step 2).

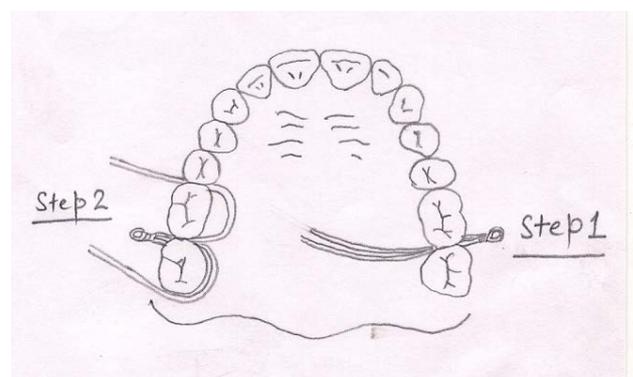


Figure 1. Step 1- Extended Eyelet arms passed through the interdental space from the buccal to lingual/ palatal side. **Step 2-** The two arms passed back to buccal side through the adjacent distal and mesial interdental spaces

The distal arm is inserted through the loop of the extended eyelet and both mesial and distal arms are pulled

in unison. This will lead to adaptation of loop into the interdental space between molars (Figure 2: Step 3). The two ends of the wires are twisted together in a clockwise direction (Figure 2: Step 4).

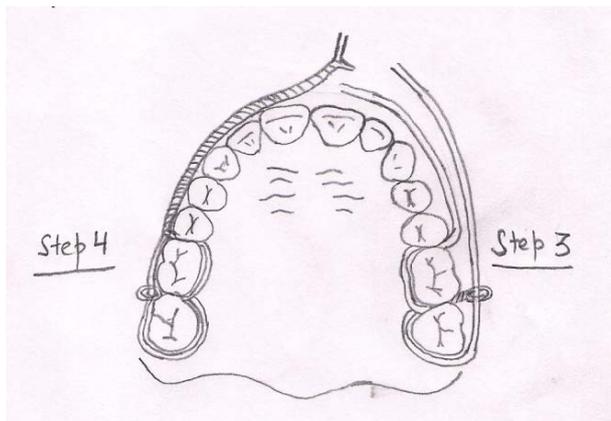


Figure 2. Step 3- The distal arm is inserted through the loop. **Step 4-** The two ends of the wires are twisted together

This is similar to conventional Ivy eyelet placement. The only difference is that the twisted arms are of greater length. Using similar protocol four extended eyelets are placed (one in each quadrant). In case of lack of suitable tooth and depending upon the fracture line, the extended eyelets can be placed anteriorly between first molar-second premolar or between first and second premolars.

The twisted arms of extended eyelets of left and right side are further twisted together in the midline of the arch similar to Risdon's method. The excess wire is cut off and pushed into the interdental space to avoid injury to the adjacent soft tissues. These two twisted arms on the buccal side will act as an arch bar (Figure 3: Step 5).

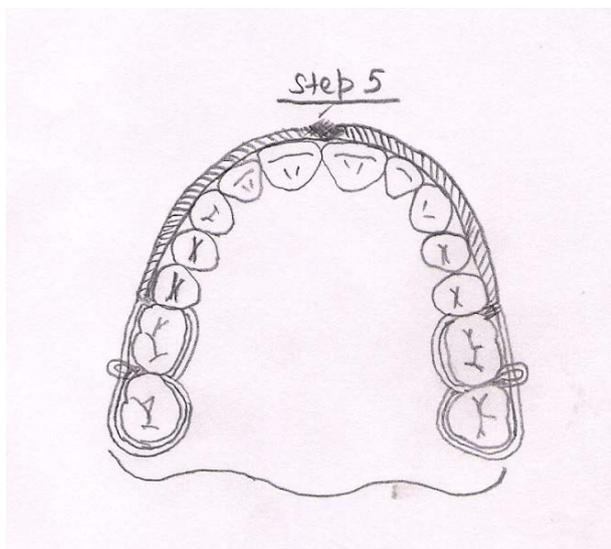


Figure 3. Step 5- Twisted arms of extended eyelets of left and right side further twisted together in the midline

The individual subluxated teeth are reduced in their pre-morbid position and splinted to this arch bar using secondary wires. These secondary wires are placed around individual tooth. One end of these wires coming below the arch bar and other above on the buccal side and then twisted together (Figure 4: Step 6). Excess is cut off and pushed into interdental space. This is similar to Risdon's method of wiring (Figure 4: Step 7).

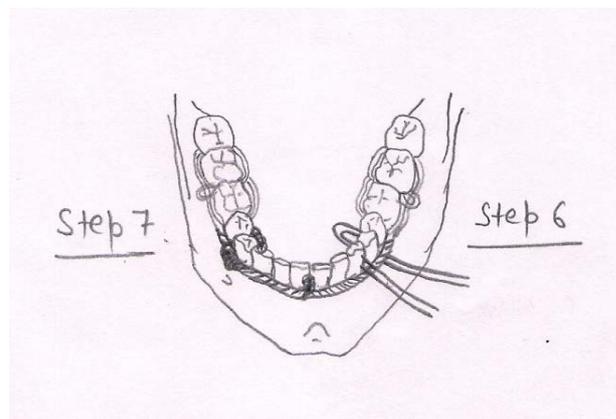


Figure 4. Step 6- Secondary wire passed around the neck of Individual tooth. **Step 7-** Individual tooth splinted to Risdon type arch bar

Maxillomandibular fixation (MMF) is done by passing wires through loops of corresponding extended eyelets in maxilla & mandible and twisted together. Additional stabilization in MMF is gained by passing additional wires around the arch bar or between loop and arch bar. For greater rigidity MMF wires are placed not only in posterior regions but also in the anterior region of the jaw. (Figure 5: Step 8, 9).

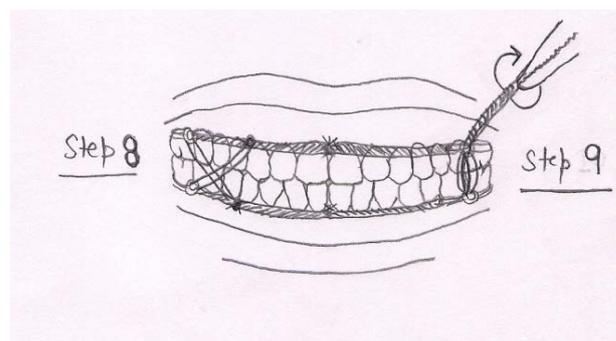


Figure 5. Step 8- MMF: wires passing between loops and Risdon type arch bar. **Step 9-** MMF: wires passing between loops only

3. Discussion

In this extended eyelet method of wiring the subluxated teeth and associated dentoalveolar fractures are addressed at the same time. Also, this takes the advantage of horizontal bracing across the fracture line similar to Risdon's method of wiring. Additionally, no special armamentarium and training is required for this method. It is cost effective as compared to Erich arch bar method or composite splinting, which are also used for dentoalveolar fractures.

As with any intervention, this wiring method has certain advantages and disadvantages. The main advantage is that this technique is economical requiring only 26 gauge wire and minimum armamentarium. Another advantage is the ease with which this technique can be employed with minimal of training as compared to other methods requiring sophisticated lab procedures like cap splinting. Also, in case of isolated dentoalveolar fracture this technique can be used without maxillomandibular fixation.

The basic disadvantage is that this technique involves placement of twisted portion of arch bar in anterior region

similar to Risdon method and can lead to trauma to lip mucosa. This can be taken care of with the help wax application in this region of thickened twisted wires. Another disadvantage is that if the extended eyelet forming arch bar breaks, it require removal of all the secondary wires and broken extended eyelet.

The main indications of this technique are minimally displaced fractures of maxilla or mandible and isolated dentoalveolar fractures.

The extended eyelet method is basically a combination of Ivy eyelet method and Risdon's method of wiring. Thus, it utilizes the advantages of both these methods and

avoiding the disadvantages of conventional Ivy eyelet method of wiring. Both these methods are well established in the maxillofacial trauma management. So, there is no fear in adopting to this new method of wiring.

References

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