

Ligature (Pre Adjusted Edge-wise Appliances) Making Simplified in Orthodontics: Education Pearls

Narendra Sharma, Sunita Shrivastav, R. H. Kamble, P. V. Hazarey, Preethi Sharma

Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India

ABSTRACT

The buccal archwire used in the pre-adjusted edgewise appliances technique is anchored to the brackets by means of ligatures made of soft stainless steel wire of about 0.010 inch diameter. These ligatures are seated under the flanges of the brackets. Various methods have been advocated seating and tying the ligatures. The performed ligatures used in this method differ from those conventionally used in that they can easily and quickly be formed on a jig constructed from available orthodontic material.

Key words: Ligature, pre-adjusted edgewise appliances technique, stainless steel wire

INTRODUCTION

Ligatures have constituted the method of securement, in the vast majority of cases, though self-ligating brackets have been a recent innovation. Stainless steel ligatures have been the time-tested method of ligation and continue to be widely used. Elastomeric modules were introduced for their ease of application.^[1] A wire used for tying or binding IC called ligature. Ligature wires are soft stainless steel wires of 0.008-0.010 inch in diameter. These may be used to hold or ligate the archwire in brackets or to tie segments of teeth together by wrapping around the brackets attached on teeth. The ligature wires are flexible and can be twisted to tighten and secure the archwire in place during the later stages of treatment. As recently as 1998, zygoma ligatures were proposed as an option for maxillary anchorage.^[2] When stainless steel became available, this was universally

adopted as a method of ligation. Stainless steel ligatures have several benefits inherent qualities.

They are cheap, robust and essentially free from deformation and degradation, and to the extent they can be applied tightly or loosely to the archwire. They also permit ligation of the archwire at a distance from the bracket. This distant ligature is particularly useful if the appliance tends to employ high forces from the archwires because this high force prevents sensible full archwire engagement with significantly irregular teeth.

Despite these good qualities and widespread use, stainless steel wire ligatures have some drawbacks, and the most immediately apparent of these are the length of time required to place and remove ligatures.

The archwire used in the edgewise or pre adjusted edgewise appliances (PEA) technique is anchored to the brackets by means of ligatures made of soft stainless steel wire of about 0.010 inch diameter. These ligatures are seated under the flanges of the brackets. Various methods have been advocated for seating and tying the ligatures. Renfroe describes a technique of seating and tying entirely by hand.^[3] This method enables one to maintain good tension control on the wire, but has

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Address for correspondence:

Dr. Narendra Sharma, Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India.
 Phone: +919326390639, E-mail: sharmanarendra047@gmail.com

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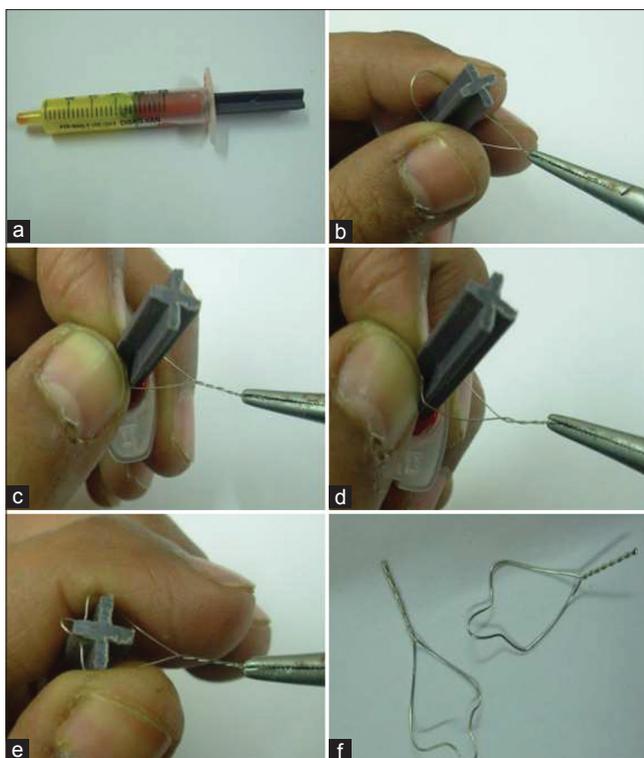


Figure 1: Steps in the formation of ligature, (a) Normal syringe with piston, (b) Piece of ligature wrap around piston, (c) Twisting of ligature tail around piston, (d) Grip the ligature on the edge of piston, (e) Lift the tail upside by gripping the body of ligature against edge of piston, (f) Ligature ties ready to use

the disadvantage of being laborious and wasteful since the long ends of the wire necessary to afford a good grip are subsequently discarded. A modification of the above technique is the use of ligature-locking pliers which enables a tight tie to be made, but is also tedious and wasteful. These disadvantages can be overcome by using the method advocated by Bean to seat and tie the ligature with a hemostat or artery clamp. Such preformed ligatures are unobtainable at the moment, but this should not preclude their use as they can easily and quickly be formed on a jig constructed from available orthodontic material described by Oosthuizen^[4]. The preformed ligatures used in this method differ from those conventionally used in that the ends are short and twisted together. Ligatures preformed in this manner are more easily centered and clamped in the beaks of the hemostat.

Bortoly *et al.*^[5] evaluated the sliding resistance of esthetic ligature in an *in vitro* study and pointed that frictional forces generated by esthetic elastomeric ligatures under simulated oral environments are not stable and are more related to tensile force than to surface characteristics of the ligatures. Teflon-coated and stainless steel ligatures

showed the lowest initial frictional forces, but there was no difference in friction of stainless steel and post-stretched elastomeric ligatures.^[1]

PROCEDURE

The twisting mechanism comprises a piston of a suitable length through which the ligature wire is fed from the spool [Figure 1a-f]. The twisting device, i.e., piston is fixed to the body at the inlet end to hold it in a convenient position for receiving the wire from the spool. In order to provide for the even twisting of the two ends of the ligature, a half eyelet is disposed of on the piston at the free end. To form a ligature, the ligature wire is fed from the wire spool, through the eyelet, round the former, and back to be held in the artery forceps. The artery forceps arm are then rotated about the piston until a pigtail of desired length is formed. The completed or formed ligature is removed from the former and ready for the use.

Col. V Sharma and Col J Sen Gupta in their study concluded all the three appliances i.e., PEA, Standard Begg and the modified Begg appliance are capable of delivering consistent, acceptable results in extraction cases.^[6] There was a significant difference in the time required for treatment completion between the Begg and modified Begg appliances, the latter being less time-consuming. The modified Begg appliance is more economical and efficient as compared to Begg Appliances. PEA has also the potential to replace the Begg appliance without any loss of efficiency.

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