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Short Note

Orthodontic Archwire Soldering Technique using the "Vibhute Orthodontic Soldering Jig"

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Abstract

Orthodontic treatment often involves chairside joining hook on archwires with free hand soldering. Hooks are required on archwire for the purpose of application of retraction forces with closed coil springs or with elastomeric chain. Soldered hooks are prefered on archwire for intermaxillary fixation in orthognathic surgeries. Brass wire hooks are often soldered on archwire with free hand soldering. Crimpable hooks although convenient to use, but dependon pure mechanical lock and have a disadvantage of slippage along the archwire over a time, so soldering brass wire hooks to archwire is still practiced classicaly. Precise position & angulation of J-hook is very important without loosing properties of stainless steel archwire during soldering because undesirable annealing. Stabilizing archwire and precision in joining hook during free hand soldering has been tedious, especialy for beginers. Use of Vibhute Orthodontic Soldering Jig and press stand is explained here with illustartions.This apparatus is found to be very convenient chairside to solder hooks to the archwire.

INTRODUCTION

Orthodontic treatment often involves chairside joining hook on archwires with free hand soldering. Hooks are required on archwire for the purpose of application of retraction forces with closed coil springs or with elastomeric chain. Brass wire hooks are often soldered on archwire with free hand soldering [1]. Crimpable hooks although convenient to use, but depend on pure mechanical lock and have a disadvantage of slippage along the archwire over a time [2,3]. So soldering brass wire hooks to archwire is still practiced classically [1]. Precise position & angulation of J-hook is very important without losing properties of stainless steel archwire during soldering because undesirable annealing [4]. Stabilizing archwire and precision in joining hook during free hand soldering has been tedious, especialy for beginers. To make it easier, "Vibhute's Orthodontic Soldering Jig" apparatus has been designed and explained.

MATERIAL AND METHODS

Arch wire-positioning Jig, vertical press-stand, stainless steel archwire, brass wire, flux, and soldering torch.

Archwire-stabilizing jig

It has two vertical supporting arms with horizontal round tube for inserting archwire through it, which hold the arch wire in premolar regions. Light traction spring applied at midpoint of archwire for preventing archwire movement, thus it stabilizes the base archwire parallel to floor in transverse plane (Figure 1A). Base of Jig is adjustable in 3 planes for tilting of plane of archwire as per requirement.

Vertical press-stand

Brass wire to be soldered is attached to head of vertical stand. Head travels in precise vertical direction up and down with help of manual pressing handle (Figure 1B).

Soldering technique

1. Attach brass wire to be soldered to head of vertical press-stand. 2cm to 3cm brass wire kept outside head and fixed. Flux is applied to tip of brass wire and solder is transferred on it with soldering torch flame. Solder ball will appear on brass wire tip (Figure 2A).

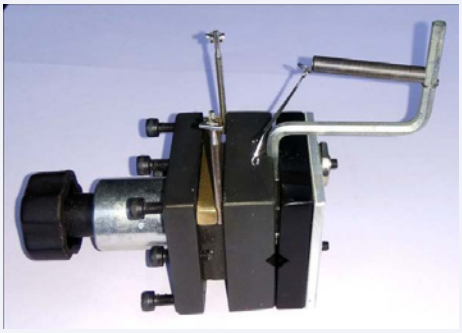

Figure 1a Archwire-stabilizing Jig having two horizontal tubes and pulling spring to be engaged at midpoint of arch wire.

2. Mark on archwire after confirming the distance intraorally where brass wire hooks to be soldered. Insert archwire through the tubes and stabilized with traction spring on jig (Figure 2B).

3. Jig with mounted archwire kept on base of vertical stand. Prior to soldering, ensure that brass wire comes in contact with markings on archwire by pressing handle down (Figure 3A, Figure 3B). Contact of both wires may be kept for 'Butt Joint' or 'Lap Joint' as desired.

4. Flux applied at marked locations on base archwire. Solder ball on brasswire heated with solder torch sharp flame, as solder melts, instantaneously handle is pressed down to join two wires (Figure 3C). Joint is quenched immediately with water drops. Extra brass wire is cut leaving amount of wire required for preparation of hook (Figure 3D). Archwire is disengaged from jig and ready for use after polishing the joint.

DISCUSSION

Crimpable hooks although convenient to use, but dependon

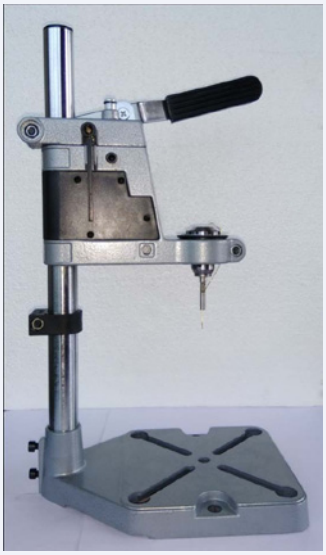

Figure 1b Vertical press stand with attached brass wire in head.

Figure 2a Solder ball on brass wire tip prepared.

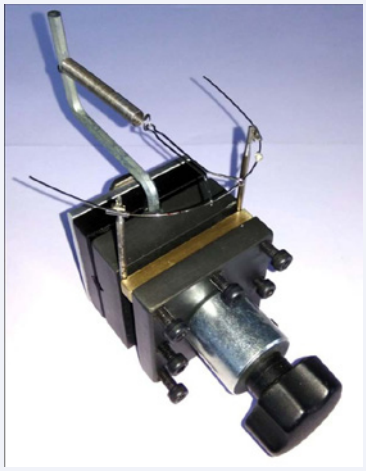

Figure 2b Marked archwire for precisely soldering hooks, inserted in jig.

Figure 3a Before soldering, check anticipated contact of vertical brass wire and horizontal archwire at desired marked position.

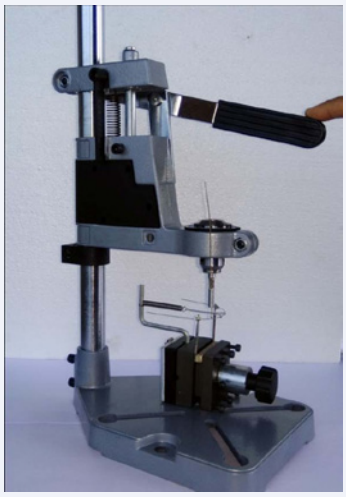

Figure 3b Wires were brought in contact faster just by pressing handle downward.

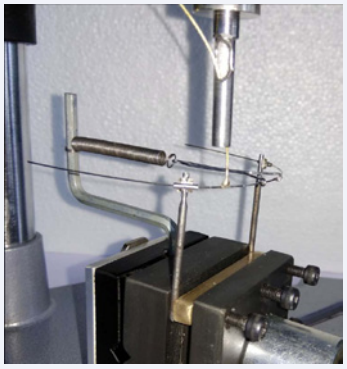

Figure 3c With application heat source, as solder melts, handle is pressed down instantaneously and soldering process accomplished.

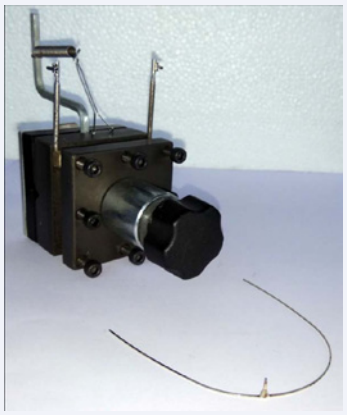

Figure 3d Extra brass wire is cut leaving amount of wire required for preparation of hook. Archwire disengaged from jig.

pure mechanical lock and have a disadvantage of slippage along the archwire over a time, so soldering brass wire hooks to archwire is still practiced classicaly. Advantages and disadvantages of both types of hooks have been discussed in literature. Although soldering methods could alter metal release in oral environment their levels are insignificant. Soldering with this fixture has advantages:

1. More precise when compaired to free hand soldering.
2. Less sensitive to hand movements and easier technique.
3. Apparatus is portable.
4. Saves chairside time.
5. Reproducibility in quality.
6. Versatility in use of JIG for soldering according to different appliances.

CONCLUSION

Soldering Technique with Vibhute Orthodontic Soldering Jig and press stand is very convenient chairside apparatus to solder hooks to the archwire.

CONFLICT OF INTEREST

Applied for Indian patent by the corresponding author and in process.

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