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A Simplified Spring winder for Clinical Application

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Abstract

Introduction: The fabrication of coils using heavy gauge stainless steel wire for use in appliances such as the Churro Jumper can be a tedious task and can often result in spaced coils that lead to more flexibility than can be desired, leading to a decreased force application and hence overall lengthened treatment time. Using well placed, tightly adherent coils the force of which can be controlled by placement of the desired number of coils can help to mitigate this shortcoming. **Technique:** The spring winder described here is easy to fabricate using easily available stationary articles which can be repurposed to form an efficient winder that can coil springs with reduced effort as compared to that would have been required when using orthodontic pliers only. The stationary repurposed for this winder is the electric etching pen which provides a good framework for fabricating the winder. In addition, clear acrylic is used along with a syringe body to hold the winding components. The syringe is filled up with clear acrylic and winding rods are laid down within the acrylic which holds it firmly in place. In addition, the syringe body is embedded into the electric pen handle which allows for easy turning the winder so as to exert effective force while reducing operator effort and fatigue. This also allows for winding of heavy gauge orthodontic wire with little effort. **Conclusion:** A simplified spring winder can be best indicated for the fabrication of coils for fixed functional appliances like Churro Jumper.

Keywords: Spring winder, Stainless steel wire, Coils, Acrylic, Spring.

INTRODUCTION

Fixed functional appliances have been in use from many years for the correction of Class II malocclusions [1]. In orthodontic practice, various clinical applications require the fabrication of coil springs using a stiff/heavy gauge stainless steel (SS) wire [2, 3]. Example: Churro Jumper which is fabricated using 1mm round SS wire [4]. Commercially available spring winders for winding heavy gauge steel wires are expensive and an unnecessary investment.

The available spring winders used in orthodontics mainly deal with winding of carbon coated round stainless steel wires (AJ Wilcock). The round SS wires used for heavy gauge wire appliances are harder to wind efficiently, as they tend to exhibit greater resistance to deformation as a consequence of their greater comparative diameter [5].

Hence, the need for a simple and yet efficient winding of heavy gauge round SS wires can be addressed using this device. This spring winder can be used in chair side applications for fabrication of multiple coils efficiently (Figure 1).

Figure 1: The Spring winder.

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There are 3 components of the spring winder:

a) 1.5 mm x 25 mm stainless steel rod (core rod to wind the wire)

b) A plastic 10 ml syringe (stabilizing medium and can be filled with acrylic)

c) A modified palm grip handle (longer the handle, better the torque delivery, hence easier winding). An electric etching pen was used which are easily available commercially for the purposes of fabricating this spring winder.

d) 3.0 mm x 10 mm stainless steel rod (notched to resist wire spring back during winding)

All of the aforementioned components can be utilized by making use of a commercially available stationery, the electric etching pen which is normally used to etch markings on hard surfaces (Figure 2).

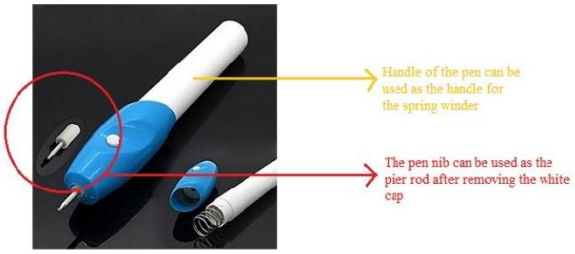

Figure 2: Electric etching pen used for the fabrication of the Spring winder.

TECHNIQUE

Fabrication of the spring winder

- The heavy stainless steel core utilized can be repurposed from a small DC powered electric motor shafts which are designed to resist torsional forces under high rpm. This can come in handy, particularly when winding a heavy gauge stainless steel wire, example 1.0 mm conventional round SS wire.
- A 10 ml syringe is taken apart retaining the volumetric part. Fill clear acrylic till about three quarters of the syringe body, till the level of approximately 3 ml starting at the bottom. (Clear acrylic facilitates proper placement and alignment of the core rod and the pier rod).
- The corresponding rods are inserted at 3 cm distance apart from each other and at this point seated into the acrylic. The core rod is left protruding 20 mm above the level of the syringe base, while the height of the pier rod can be set at 3 mm (Figure 3).

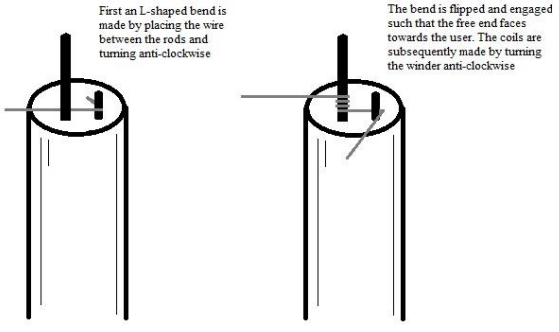

Figure 3: Method of fabrication of coils.

- After proper positioning and 90° inclinations, the acrylic is filled up to the remaining part of the syringe around the two rods and then made to set and harden, and the pier rod notched on both sides.
- The modified palm grip handle can be made to fit tightly with syringe, by first wrapping the syringe in duct tape or cellophane tape and then tightly wedging it into the handle.

Fabrication of coils using the spring winder

1. Make an L-shaped wire bend after placing an appropriate length of wire end between the two rods. The bend is made by rotating the handle anti-clockwise. A wire from a spool is recommended for this step. The wire should pass between the rods on their opposite sides (Figure 4).

Figure 4: The fabricated coil spring.

2. The L-shaped bend can be given an obtuse angle for better engagement. If the L-shaped bend is slipping during fabrication due to it bending downwards, it should be straightened so it is in the same plane as the winder platform.
3. Subsequently, turn the winder handle anti-clockwise to create the coils in opposite direction to the bend.
4. During release of the tension in the wire following fabrication of the coils, loosen the grip on the handle of the winder till it rotates freely in hand resulting in tension release.
5. The bent wire portion can also be straightened back and engaged again between the rods and can then be used to add coils to that end.
6. Up to 15 coils can be accommodated when using 1.0mm diameter SS wire in this type of design. The modification of the length of the winding rod will allow for more or less coils as needed (Figure 5).

CONCLUSION

The spring winder can be best indicated for the fabrication of coils for fixed functional appliances like Churro Jumper.

Conflict of interest

None declared.

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