

Zadake's Controlled Etchant Placer

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Abstract:

One of the most important events in the history of orthodontics was the introduction of direct Bonding. As early in 1950s when Buonocore introduced acid pre-treatment of enamel using phosphoric acid and showed that this increases adhesion. Given that dentin surfaces can easily be over-etched accidentally during adhesive pre-treatments leads to enamel demineralization, loss of bond strength and gingival irritation. This clinical innovation demonstrated a spring fabricated using 21gauge stainless steel wire containing square slot which is a simple, cost effective, and biologically compatible device with excellent etchant control for etching procedure.

Keywords: Controlled Etching; Enamel pre-treatment; Enamel demineralization, Bond strength

Introduction

One of the most important events in orthodontic appliances was the introduction of direct Bonding. This was the direct result of the pioneering work by Buonocore in the 1950's.¹ Buonocore introduced acid etching technique by using 85% phosphoric acid for 30 seconds. This led to dramatic changes in practice of orthodontics. Over etching of enamel leads to^{2,3,4}

- Enamel demineralization.
- Reduces surface tension leads to increased surface porosity.²
- Microporosity within the enamel, rougher surface if over etched.
- Resin tags retained in enamel -possible discolouration of resin³
- Fracture and cracking of enamel upon debonding⁴

Zadakes controlled etchant placer is devised to avoid the overflow of etchant on the tooth surface during enamel pre-treatment and allows controlled etchant delivery.

ARMAMENTARIUM [Fig 1]

- Etchant syringe
- 21-gauge stainless steel wire
- Universal Plier
- Hard Wire Cutter
- Heat /cold Cure Acrylic Polymer and Monomer



Fig 1: Armamentarium

Method of Fabrication

- First the 21-gauge wire is straightened and helix is prepared by rounding the wire at the base of syringe, and it is adjustable. [Fig 2]
- It has Vertical arm which is bent in 45-degree angulation at its other end and its length is adjustable. [Fig 3]
- Other end of a wire is bent in square shape [Fig 4] which matches bracket base of slot dimensions (0.022×0.028"). [Fig 5]
- Final design of Zadake's controlled etchant placer spring [Fig 6]
- Acrylic coat is added for additional thickness, to prevent excess flow of flowy/liquidy etchant. [Fig 7]
- End of the syringe is placed at below/above the arm of square. [Fig 8]

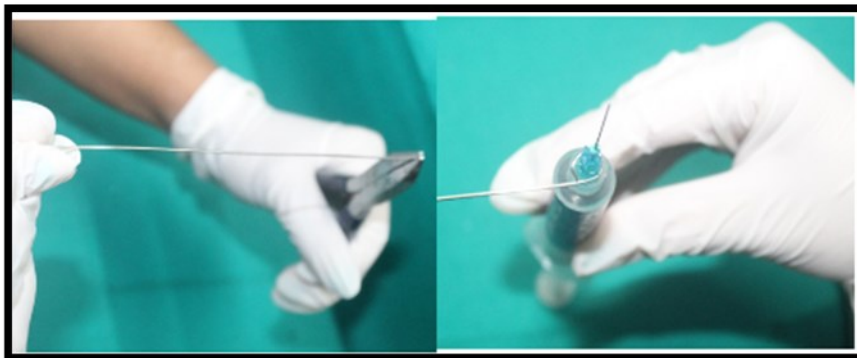


Fig 2: 21-gauge wire is straightened and helix is prepared by rounding the wire at the base of syringe, and it is adjustable

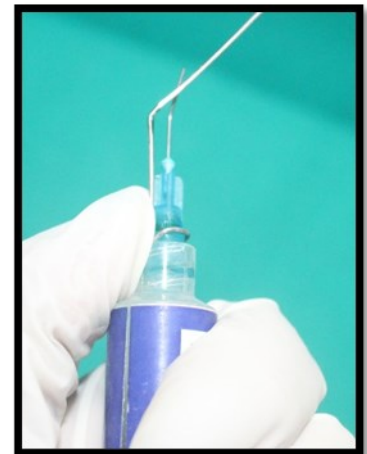


Fig 3: Vertical arm bent in 45° angulation at its other end and its length is adjustable

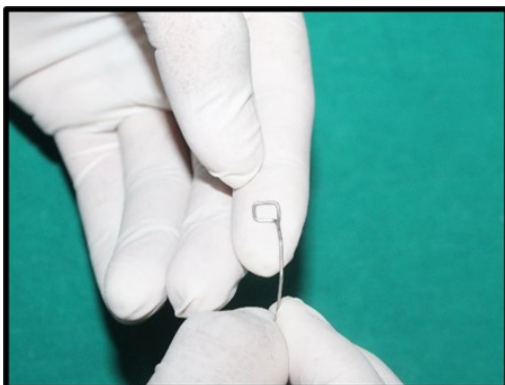


Fig 4: Other end of a wire is bent in square shape



Fig 5: Square matches bracket base of slot dimensions (0.022×0.028).



Fig 6: Final design of Zadake's controlled etchant placer spring.

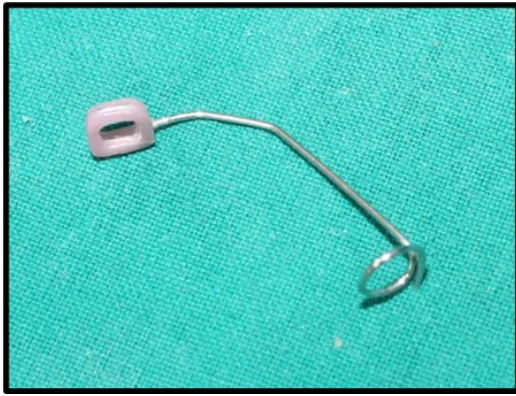


Fig 7: Acrylic coat is added for additional thickness to prevent excess flow of flowy etchant.



Fig 8: End of the syringe is placed at lower arm of square.



Fig 9: Controlled etchant delivery at desired bracket position through spring.



Fig 10: Spring is directed towards the enamel surface where bracket is to be positioned.

Methodology

- The spring is directed towards the enamel surface where bracket is to be positioned [Fig 9]
- Syringe is then pressed in such a way that it will allow a controlled etchant delivery at desired bracket position through spring. [Fig 10]

Indications

To avoid excess flow of etchant at bracket positioning site during enamel pre-treatment and to prevent enamel demineralization and gingival irritation.

Advantages

- To prevent excess flow of etchant on the tooth surface
- Useful for both liquid/gel etchant
- Simple design and easy to fabricate
- Cost effective
- Reduces demineralization
- Not technique sensitive
- Minimum armamentarium required

Limitations

- As it is based on bracket base dimensions, its use is questionable in case of molars for bondable molar tube placement.
- Waiting period for etching individual tooth is 15secs.

Conclusion

Zadake's controlled etchant placer is a novel, simple design fabricated by using 21-gauge stainless steel wire to prevent overflow of etchant, unwanted enamel demineralization and gingival irritation.

References

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