Race To Retention : 2 Case Reports

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Abstract: Restoration of fractured incisors with composite resin are routine procedures. The retention of composite restoration is related to the bond strength of adhesive and the surface area available for bonding. In absence of enough bonding areas in fractured tooth of young people with resilient dentin, auxiliary retention through placement of threaded pin, will provide the required support and still maintaining the esthetics. Auxiliary retentive means, in the form of pins are often required for restoration of mutilated and broken tooth, especially in young patient’s teeth in which pulp chamber is relatively large, dentinal tubules are comparatively immature and gingival lines are still high. The threading acts dissipate and consume some of the insertion energy by cutting part of the pin channel in dentin walls. This case report fuses the retentive feature of threaded pin with the esthetic benefit of composite restoration in a fractured anterior tooth.

Key words: Coronal fracture, Self Threaded pins, Retention, Composite resin restoration.

INTRODUCTION

Auxiliary retentive provisions, in the form of pins are often required for restoration of mutilated and broken tooth, especially in young patient’s in which pulp chamber is relatively large, dentinal tubules are comparatively immature and gingival lines are still high.

i.i. Retention of pins in dentin:
The main objective of using this pin is to acquire or improve retention of the restoration in dentin. Self-threading pins will be 5-6 times more retentive than cemented pins. Friction grips pins will have 2-3 times the retention of a cemented pin. Pins placed closer than 2mm to each other in one tooth will result in a loss of pin retention in dentin.

i.ii. Proximity of pins to the DEJ:
2.0 Mm From The Dej Is Safe For Threaded Pins:

i.iii. Retention Of Pins To Restorative Materials:
Threaded pins are 4 times retentive than the friction grip, mainly due to the gnarled and threaded roughness of their surfaces. Restorative materials will occur at a pin length of 1.5mm. A bent pin could complicate the stress pattern.

i.iv. Mechano-Anatomical Principle for Pin-Placement:
Maxillary central incisor. This tooth has four pulp horns – three in the mesio-distal direction and one in the labio-lingual direction (cingulum). The cingulum pulp horn is the most pronounced. The lateral horns are close to the incisal angles and the whole pulp chamber is deviated lingually. In a cross-section at the cervical margin, there is an average of 1.5-1.8 mm of dentin circumferentially gingivally, with more dentin labially than lingually.

i.v. Pin location:
The ideal location is gingival, close to the proximo-labial and proximo-lingual corners. The second choice is the middle of a proximal gingival floor or the middle of a labial gingival floor and the third choice is incisal, where there is at least 2 mm or more of dentin between the labial and lingual enamel plates.

i.vi. Threaded Pin Technique:
Indications:
This is the most applicable and feasible of all the techniques for the following indications:
1. It is used for vital teeth.
2. Dentin to engage the pin is primary or secondary dentin properly hydrated.
3. Available pin location is at least 1.5mm from DEJ.

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4. A minimal number of pins is needed for the restoration.
5. Maximum retention of pin to dentin and restoration is needed for one reason or another. Each pin will have a wrench attachment portion where the driving wrench device can firmly hold it while driving the pin into the pin channel.

**Each Pin Is Furnished In One Of Following Designs:**
1. The standard design, 7mm in length, should be shortened after seating.
2. The selfshearing design automatically shears off at 4mm from the dentinal end, when this end comes in contact with the pin channel floor.
3. Pins with a disposable latch-head usually have a plastic head to fit a geared-down slow speed contrangle hand-piece. At the point where there is resistance for further threading, i.e., touching the pin channel bottom, the disposable latch-head will separate from the pin.

**Procedure:**
1. The procedure for using these pins can be expected from describing their designs. The pin channel is prepared as usual.
2. The pin is then engaged with its driving device and the pin is threaded continuously until it offers the resistant initiated by touching the pin channel floor.
3. This resistant may lead to self-shearing or disengagement of the driving device. One can cut the pin by nicking it at the desired length, using a very small bur in a high speed hand piece (M.A Marzouk, A.L Simonton, R.D Gross).

**Case Report One:**
**ii.i. Chief Complaints:**
A 23-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, with a chief complaint of fractured upper right front tooth.(Fig.1,2)
He reported an incident at home wherein a fall while playing had injured his front tooth.

**ii.ii. Clinical Examination:**
1. No pain in relation to maxillary right central incisor 21
2. No tenderness on vertical percussion
3. Electric pulp test and thermal tests were performed in relation to the maxillary anteriors. Positive response was observed only in relation to 21.
4. The involved tooth showed no signs of mobility.

**ii.iii. Radiographic findings:**
No Periapical Radiolucency was seen.(Fig. 3)
There was no pulpal exposure.

**ii.iv. Diagnosis:**
1. Ellis Class-II fracture in relation to 21
2. No significant bone loss was observed.

**ii.v. Treatment Plan:**
1. Pin channel preparation using Fairfax Stabilok custom drill(Fig. 4,5)
2. Pin channel made by the Stabilok drill(Fig.6)
3. Fixation of pin completed (Fig.7)
4. Restoration with Tetric N Ceram (IVOCLAR VIVADENT) After application of Metal Primer(IVOCLAR VIVADENT, LOT R60212) On to the Self Threaded Pins (Fig.8,9)
5. 6 months post operative view (Fig.10)

**Case Report Two:**
**iii.i. Chief Complaints:**
A 27-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, with a chief complaint of fractured upper left front tooth.(Fig.11)
He reported sports injury involving his front tooth.

**iii.ii. Clinical Examination:**
1. No pain in relation to maxillary left central incisor 11
2. No tenderness on vertical percussion
3. Electric pulp test and thermal tests were performed in relation to the maxillary anteriors. Positive response was observed only in relation to 11.
4. The involved tooth showed no signs of mobility.

iii.iii. Radiographic findings:
   No Periapical Radiolucency was seen. (Fig.13)
   There was no pulpal exposure.

iii.iv. Diagnosis:
   1. Ellis Class-II fracture in relation to 11
   2. No significant bone loss was observed.

iii.v. Treatment Plan:
   1. Pin channel preparation using Fairfax Stabilok custom drill
   2. Pin channel made by the Stabilok drill
   3. Fixation of pin completed (Fig.12)
   4. Restoration with Tetric N Ceram (IVOCLAR VIVADENT) After application of metal primer on to the self threaded pins. (Fig.14)
   5. 6 months post operative view (Fig.15)

Fig. 1: Pre-operative view
Fig. 2: Pre operative palatal view
Fig. 3: Pre operative IOPAR
Fig. 4: Fairfax Stabilok custom drill

Fig. 5: Pin channel preparation using Fairfax Stabilok custom drill

Fig. 6: Pin channel made by the Stabilok drill

Fig. 7: Fixation of pin

Fig. 8: Post Restoration

Fig. 9: Post operative view
Fig. 10: 6 months follow up

Fig. 11: Pre-operative view

Fig. 12: Fixation of pin

Fig. 13: Pre operative IOPAR

Fig. 14: Post Restoration

Fig. 15: 6 months post operative view
Discussion:

Adhesive technology has undergone great progress in the last decade; however, bonding to the dentin still remains challenging. Adhesive failure is still a particular risk for restorations.

In this case report, dentin pins were found to amplify the retention of the composite restoration with the tooth structure.

Macro-mechanical retention provided by dentin pins played an important role in this case. Moffa showed that the self-threading pin creates five to six times more retention than the cemented pin inserted to the same depth in dentin. (Moffa, J.P., et al., 1969)

Markley recommended using a channel depth of up to 5 mm with a cemented pin, against the 2 mm recommended for the self-threading design. (Markley, M.R, 1995).

Most self-threading pin systems now offer a range of pins of differing diameters. In certain cases where the pin is loose, it may be possible to use a larger-diameter pin, either with or without further modification of the channel. Such modification usually consists of enlargement of the channel with the appropriate-size twist drill to allow the new pin to seat satisfactorily.

With this in mind, it would seem sensible, to commence placement with the narrowest-diameter pin in a given system. This allows the operator the option of using a larger pin if necessary. An additional benefit with this approach is that the use of smaller-diameter pins creates less dentinal stress around the channel, reducing the risk of crack generation in the surrounding dentin. (Durkowski, J.S., et al., 1982)

Conclusion:

Pin placement is exacting and requires operator skills. Several problems may arise during the procedure, and success often depends more on the dentist's skill and judgement than on the particular pin used. (Evans, J.R., J.H. Wetz, 1977). The reason for this failure of the pin to engage itself in the dentin is usually the creation of an oversized channel which cannot "grip" the pin adequately. Undoubtedly, prevention is better than cure, and meticulous preparation of the channel is vital for pin placement to succeed. (Courtade, G.L., 1968)

REFERENCES

Operative Dentistry-Modern Theory And Practice: M.A Marzouk, A.L Simonton, R.D Gross