Pin Retained Amalgam

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Introduction

Dental amalgam is one of the most versatile restorative materials, which constitutes approximately 75% of all the restorative materials which are used by dentists. The combination of a reliable, long-term performance in load bearing situations, the low technique sensitivity, the self-sealing property and the longevity of dental amalgam is unmatched by those of other dental restorative materials. Since Markley's first report on the pin retention of amalgam in 1958, much research has been done on this topic. In 1969, Moffa et al, reported on the retentive properties of three different pin designs in dentin and amalgam. 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.

Cemented pin technique

Indications

1. This technique is ideal for all pin retained restorations, as it creates least crazing and stress in the remaning tooth enamel and dentin.
2. It is the technique of choice when the available location of the pin is very close to DEJ.
3. It is used when bulk of dentin to accommodate a pin is limited.
4. Only technique to be used in restoring endodontically treated teeth.
5. It is the ideal for a sclerosed, tertiary, calcific barrier or any other highly mineralised or dehydrated dentin.
6. It is recommended for use in U and L-shaped pins in class 4 restorations and foundations.
7. It is the only technique for cross linkage of two parts of the same tooth.

Procedure

As advocated by Markley, with subsequent modifications is as follows:

After preparing the pin channel, a piece of wire is cut to designated length, using a wire cutter. Hold it with a magnetized tweezer and try it in the pin channel for proper fitting. Pins are cemented with a luting cement introduced in the channel using a endodontic explorer tip or a lentulo spiral at slow speed. Using a tweezer, right pin for the specific pin channel is held firmly from its cavity end, dipping the pin channel end into the cement and seating it firmly into the pin channel. After the cement has completely set, excess cement is flaked off and amalgam is placed layer by layer and condensed.

Case Report

A 26 year old female patient reported to the department of conservative dentistry and endodontics with a chief complaint of food lodgement in right lower back tooth region since 2 months. Medical history of the patient was non contributory. on clinical examination, presence of extensive caries involving the buccal surface were seen. The tooth was asymptomatic and no pain could be elicited. The tooth responded positively to the thermal and electric pulp testing. The involved tooth showed no signs of mobility. The patient's informed consent and necessary ethical clearance were obtained. The procedure was started with the caries excavation and elimination of the weak enamel margins. Pin channel preparation was done using the conventional burs available (tapered and no 271 inlay bur) followed by fixation of the pin which were made by 19 gauge orthodontic wire. After the pins were inserted matrix band adaptation was done , zinc phosphate cement base was placed and the amalgam was condensed layer by layer. Carving was done to get the proper contour of the tooth followed by occlusal adjustment and finishing and polishing.

Discussion

Polymerization shrinkage is a major concern during the placement of the direct, posterior, Resin Based Composite (RBC) restorations. As compared to the similar amalgam restorations, the placement of a direct RBC restoration takes 2.5 times longer due to the complex sequence which is included in the incremental techniques . Patients with para-functional habits are not the ideal candidates for similar treatments. If a conventional, continuous, fast-curing technique is adopted, the bonding interface may remain intact, but microcracks may develop just outside the cavosurface margins due to the stress of polymerization shrinkage. Conversely, alternative, indirect methods for restoring the severely destroyed molars and the premolars with tooth coloured and cast metal restorations are also available, but, the operative procedures for these are more complex and time consuming and they come at higher costs. The cardinal principles for the cavity preparation for a pin-retained amalgam restoration are, firstly, the conservation of the remaining tooth structure and secondly, the removal of all carious / weakened tooth structures. Pins do not obviate the need for the cavity preparation, but they rather complement the features of the cavity design. Pins by themselves incorporate stresses in the tooth structure. Hence, a judicious blend of minimal pins and cavity features are ideal, to have the maximum of the retention and the resistance features. For an ideal retention, the existing facial and lingual walls should be parallel rather than converging occlusally. The approximal areas of the tooth should contain boxes with retention grooves, whenever practical. Additional retention may be provided by placing slots and dovetails in the remaining tooth structure. The area that has to receive a vertical pin should be flat and perpendicular to the long axis of the tooth, and

it should present a zone of dentin which is sufficiently wide for the placement of a pin. In general, any area which is designed to receive a pin should be reduced enough to allow a pin length of 2.0 mm and an amalgam covering of at least 0.5 mm around the pin and 2.0 mm occlusal to the pin. The position of a pin depends on several factors, first of which is the internal morphology of the cavity. Secondly, the external morphology of the tooth must be considered. Thirdly, the anticipated bulk of the amalgam must be considered, since the pins which are placed in areas of greater bulk are less likely to weaken the amalgam. Finally, the anticipated points of the occlusal load must be considered, since a vertical pin which is positioned directly below an occlusal load weakens the amalgam significantly. The prediction that the amalgam would not last until the end of the 20th century was wrong. Conversely, recent studies have concluded that the combined amalgam-composite cusp coverage restoration showed acceptable clinical performance over a period of time. Yet, amalgam continues to be the best bargain in the restorative armamentarium because of its durability and technique insensitivity.

Conclusion

Amalgam restorations have served the dentistry profession well and they will continue to do so in the years to come. In terms of longevity, they are probably superior to composite resins, especially when they are used for large restorations and cusp capping. The newer high copper single composition alloys offer superior properties, but they may not offer a good seal as the older amalgams. Amalgam can be continued to be used as a material of choice if aesthetics is not a concern.

Fig 1. Pre Operative

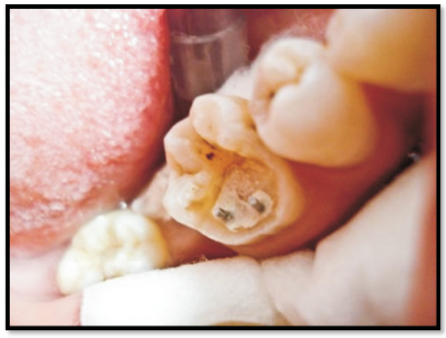

Fig. 2 Pins Cemented And Base

Fig 3. Amalgam Restoration Polished

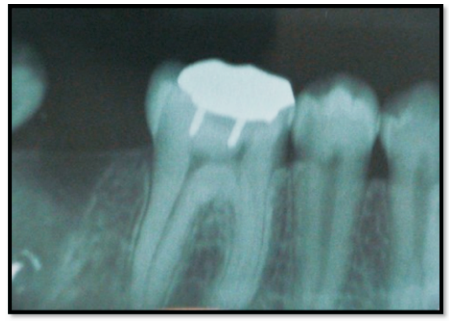

Fig 4. Post Operative Iopa

Product Talk

Endo Instruments

Dentmark

Wa-1 File Single File System