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CASE REPORT

Intra-Radicular Rehabilitation Of Weakened Anterior Root - A Case Report

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ABSTRACT:

The thin-walled roots of the anterior teeth with wide flared canal spaces, requiring restoration, are at a high risk of getting fractured if they are traditionally restored by using conventional cast metal post-cores. Such root canals can be reinforced by using materials which are capable of bonding to the dentinal tooth structure within the root canal, thus enabling the defective endodontically treated root which is capable of supporting a post and core. Such adhesive materials create a potential for the reconstitution and rehabilitation of the lost dentinal tissue in order to save and ensure the continued function of the badly damaged tooth, which otherwise would have been extracted. This case report describes a case where GIC TYPE 9 was used as intra-radicular reinforcement material.

Keywords: intra-radicular rehabilitation, Reinforcement, GIC TYPE 9, weakened root canals, thin dentinal walls

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INTRODUCTION:

Many anterior teeth that require post retained restorations are severely weakened due to caries which extend into the radicular dentin. Following the removal of such extensive dental caries, the coronal part of the root canal may be left widely flared and encircled only by a narrow rim of intact radicular dentin which is too weak to withstand normal masticatory forces and is prone to fracture. The restoration of such teeth with excessive dentin loss presents a challenge to clinicians. Pontius and Hutter suggested two methods for the restoration of weakened roots canals, which were conventional and intraradicular reinforcement methods [1]. The conventional placement of a retentive pin is not possible because of the lack of dentine substance at the coronal portion of the root. Using cast metal posts does not strengthen or reinforce the tooth, but may cause wedging forces at the already thin and weakened portions of the root and increase the risk to fracture.

To ensure a better prognosis in such cases, a technique called as the "Reinforcement Technique" was introduced by internally strengthening the thin dentinal wall of the pulpless teeth [2]. The interradicular reinforcement method includes placing a thick intermediate layer of adhesive material,

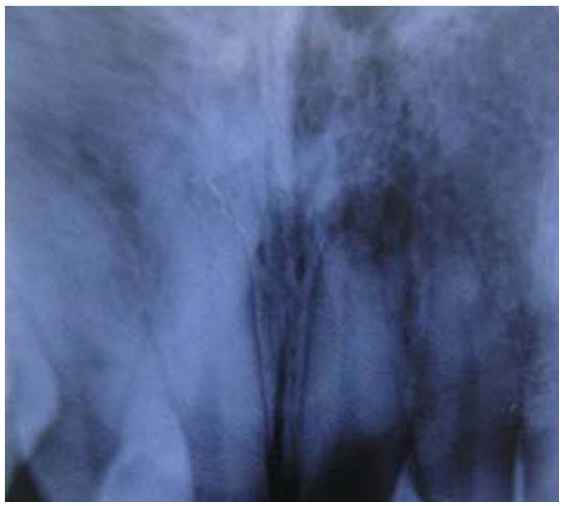
sandwiched between the root dentine and a small-diameter metal post or dowel, to improve the fracture resistance of such roots. When the weakened root is internally rebuilt with suitable adhesive dental materials, the root is dimensionally and structurally reinforced to support and retain a post and core for the continued function of the tooth [3].The intention behind the use of adhesive materials is to enable them to act as a dentine substitute before cementing a small-diameter metal post in teeth and to increase the fracture resistance by increasing the internal thickness of the root.

CASE REPORT:

A 20 year old male patient reported to the department with the complaint of discoloured and fractured upper front tooth. He gave a history of trauma to his front tooth 5 years back. On examination, #21 was found to be grossly decayed and most of the coronal structure was lost [Table/Fig 1].

[Table/Fig 1]: pre-operative photograph

The intraoral periapical radiograph showed periapical radiolucency [Table/Fig 2]. The root canal appeared wide and flared, particularly in the coronal portion.



[Table/Fig 2]: Pre-operative radiograph

It was decided to carry out the conventional root canal treatment method [Table/Fig 3]. Regarding the restoration of the tooth since the remaining dentinal thickness was very less, it was decided that the root canal would require reinforcement. It was decided that root dentin should be reinforced with adhesive cement so as to strengthen the root. The patient was thoroughly informed about the processing of the treatment and with his consent, the treatment was started.

[Table/Fig 3]: Completed endodontic treatment

Gutta percha from the canal was removed carefully by using peeso reamer, without disturbing the apical third of the filling. GIC TYPE 9 was then mixed to the desired consistency and was placed into the coronal portion of the canal. An 80 no finger spreader was coated with vaseline, was centred in the root canal and held in the centred position till the cement got set [Table/Fig 4].

[Table/Fig 4]: Canal reinforced using GIC type IX

The spreader was taken out and a radiograph was taken to ensure the adequacy and patency of the reinforced canal [Table/Fig 5].

[Table/Fig 5]: Radiograph to check the potency of the prepared canal

A custom made post and core procedure was then carried out in the prepared canal in the usual manner ([Table/Fig 6], [Table/Fig 7]) and the tooth was restored with porcelain which was fused to a metal crown ([Table/Fig 8], [Table/Fig 9]).

[Table/Fig 6]: Post luted – clinical

[Table/Fig 7]: Post luted – radiographic

[Table/Fig 8]: Restored tooth – clinical

[Table/Fig 9]: Rrestored tooth – radiographic

On following up for a period of 6 months, the tooth was found to be clinically asymptomatic and the radiograph showed healing of the periapical lesion.

DISCUSSION:

Endodontically treated teeth can be directly restored with numerous components (dentin, gold, stainless steel posts, composite resin or alloy build ups), but the potential for these materials to behave differentially than dentin under dynamic load or thermal expansion may affect the resultant modulus of the elasticity, tensile strength and compressive strength of the remaining tooth structure. Hence, this dissimilarity promotes failure. Also, the strength of the remaining tooth structure is directly related to the bulk of the remaining dentin and the fracture resistance is increased by increasing the dentin thickness [4]. Anterior teeth having wide flared canals are at high risk of fracture, because the strength of any tooth is directly related to the bulk of the remaining dentin [5]. Also, as the teeth are endodontically treated, the effort required to fracture the dentin is less because of the potentially weaker collagen intermolecular cross-links [6]. Thus, for a flared canal, it is important that lost tooth structure must be replaced with a strong substitute and that the remaining structure must be protected from functional stress.

Management of the thin dentinal walls include

- **Without fracture**
  Intraradicular rehabilitation
  _ Glass Ionomer Cement
  _ Composite
- **With fracture**
  a) non surgical management
  _ Calcium Hydroxide
  _ Intraradicular Rehabilitation
  _ Mineral Trioxide Aggregate
  b) Surgical management
  _ Glass Ionomer Cement
  _ Mineral Trioxide Aggregate
  c) Extraction in untreatable cases

In this case, the root dentin was reinforced with GIC Type 9 cement so as to strengthen the root. Long post was used as Yang *et al.*, 2001 reported that better stress distribution occurred with longer posts. The conservation of the remaining tooth structure was done by avoiding the use of posts with a large diameter, as recommended by Standlee *et al* [7]. Parallel post was used, as the tapered posts and core displayed a higher failure rate and they were less retentive than teeth which were treated with parallel-sided posts.

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