

Management of invasive cervical resorption with sandwich technique
using mineral trioxide aggregate: a case report

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Introduction

External root resorption is a progressive and destructive loss of hard dental tissue, initiated by a demineralized or denuded area of the root surface.¹ One of the frequent types of external root resorption is invasive cervical resorption (ICR), described in detail by Heithersay². “invasive cervical resorption is a clinical term used to describe a relatively uncommon, insidious and aggressive form of external tooth resorption, which may occur in any tooth in the permanent dentition. The etiologic factors include: traumatic injuries, orthodontic treatment, internal bleaching, periodontal treatment, restorative treatment and idiopathic.”³

Characterized by its cervical location and invasive nature, this resorptive process leads to progressive and usually destructive loss of tooth structure. Resorption of coronal dentin and enamel often creates a clinically obvious pinkish color in the tooth crown as highly vascular resorptive tissue becomes visible through thin residual enamel. Essentially, the same resorptive process can occur in other tooth locations: in erupting teeth it may arise through an enamel defect

in the tooth crown and may be termed invasive coronal resorption, while a more apical source may be termed invasive radicular resorption.

Clinical classification

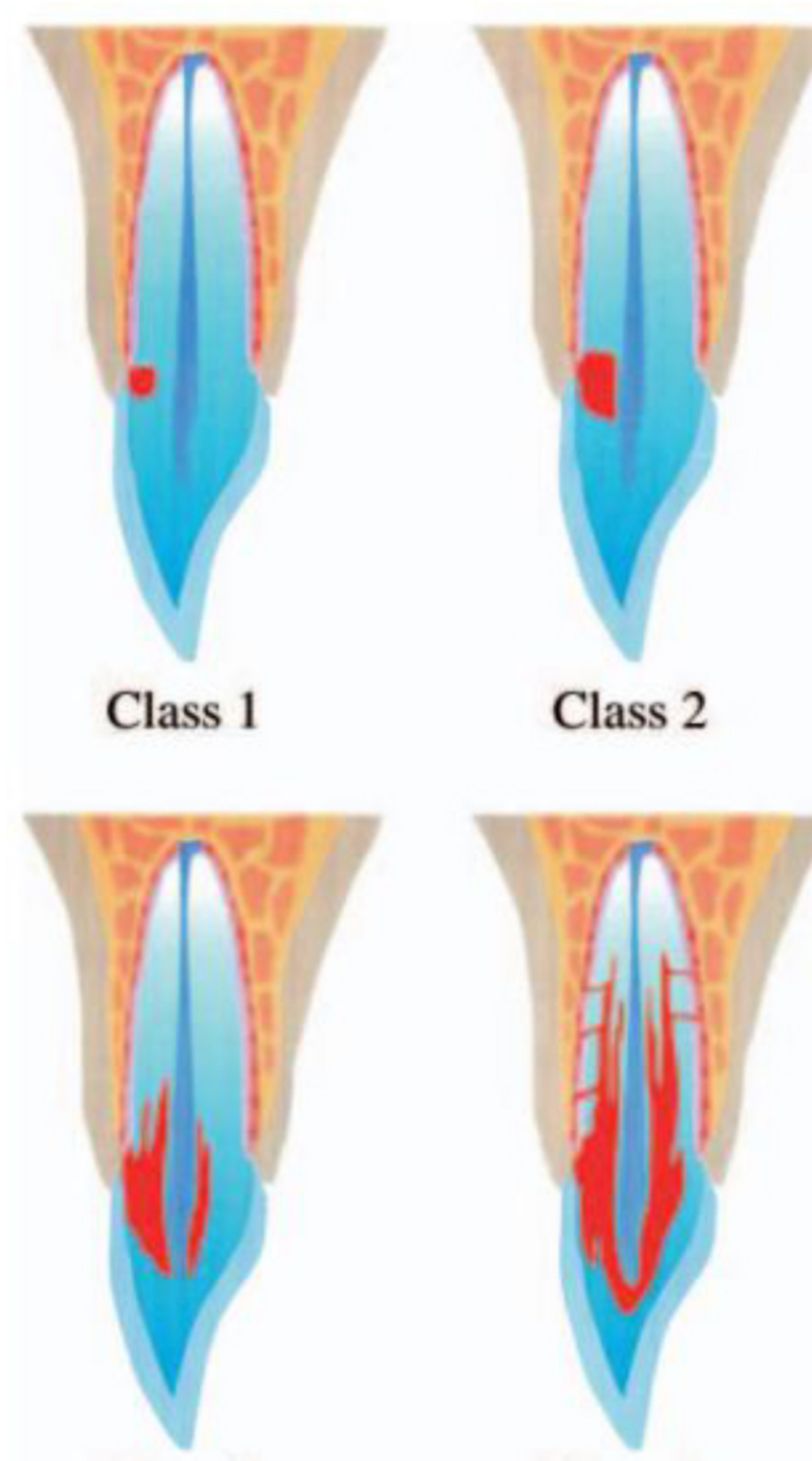
A clinical classification has been developed by the author both for research purposes and also to provide a clinical guide in the assessment of cases of invasive cervical resorption.

Class 1 – Denotes a small invasive resorptive lesion near the cervical area with shallow penetration into dentine.

Class 2 – Denotes a well-defined invasive resorptive lesion that has penetrated close to the coronal pulp chamber but shows little or no extension into the radicular dentine.

Class 3 – Denotes a deeper invasion of dentine by resorbing tissue, not only involving the coronal dentine but also extending into the coronal third of the root.

Class 4 – Denotes a large invasive resorptive process that has extended beyond the coronal third of the root.



Case Report

A 21-year-old male patient presented to the Department of Conservative dentistry and endodontics, Panineeya college of dental sciences, with a gingival swelling and pink spot localized in the labial cervical area of the maxillary left central incisor (Figure 1). Patient gave history of trauma. The patient reported that the gingival swelling and discoloration had increased in size during the past weeks. Intraoral examination showed that the tooth was not sensitive to percussion and responded positively to a thermal sensitivity test. In the cervical region of the labial surface, a pink discoloration under a remaining thin and fragile enamel layer was visible. To localise the exact location of defect CBCT had been advised (Figure 3,4,).

The external cervical resorption was diagnosed as Heithersay class III invasive cervical resorption. The patient expressed a strong desire to preserve the tooth and consented to a treatment plan with root canal treatment, followed by sandwich closure using MTA.

On 1st sitting granulation tissue was removed (Figure 5) and access opening was done working length is determined using ingle method (Figure 7) the defect was covered with Calcium hydroxide (Figure 8), Temporisation was done (Figure 9). Patient was recalled after 14 days, On the next appointment cleaning and shaping was done with waveone reciprocating system upto 40 apical size. 3% NaOCl and 17% EDTA irrigation was used during entire procedure. Master cone was selected (Figure 11), obturation was done (Figure 12). The resorptive defect peripheries was covered with MTA (Figure 13), patient was recalled next day for closure of defect using sandwich technique (Figure 14,15). Finishing and polishing was done (Figure 16). Finally, a veneer was cemented on to the prepared tooth (Figure 17). Patient has been followed for 6 months (Figure 17).

Illustrations



Fig -1 Pre-operative



Fig -2 Pre-operative



Fig -3 Pre-operative CBCT



Fig -4 Sagittal view CBCT



Fig- 5 Removal of granulation



Fig - 6 Defect involving pulp



Fig - 7 Working length



Fig- 8 Calcium hydroxide placed



Fig-9 Temporisation done



Fig-10 Isolation

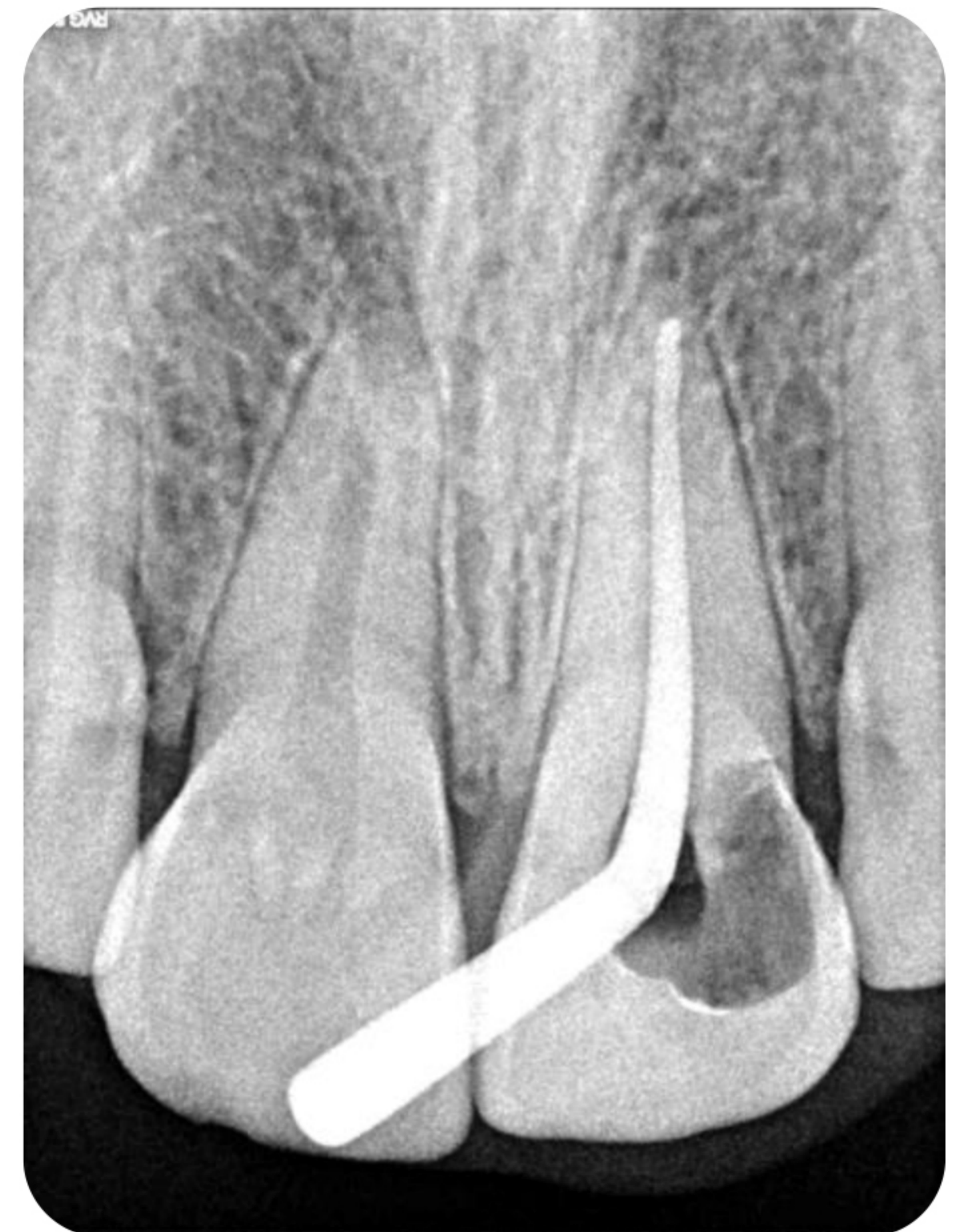


Fig -11 Master cone placement

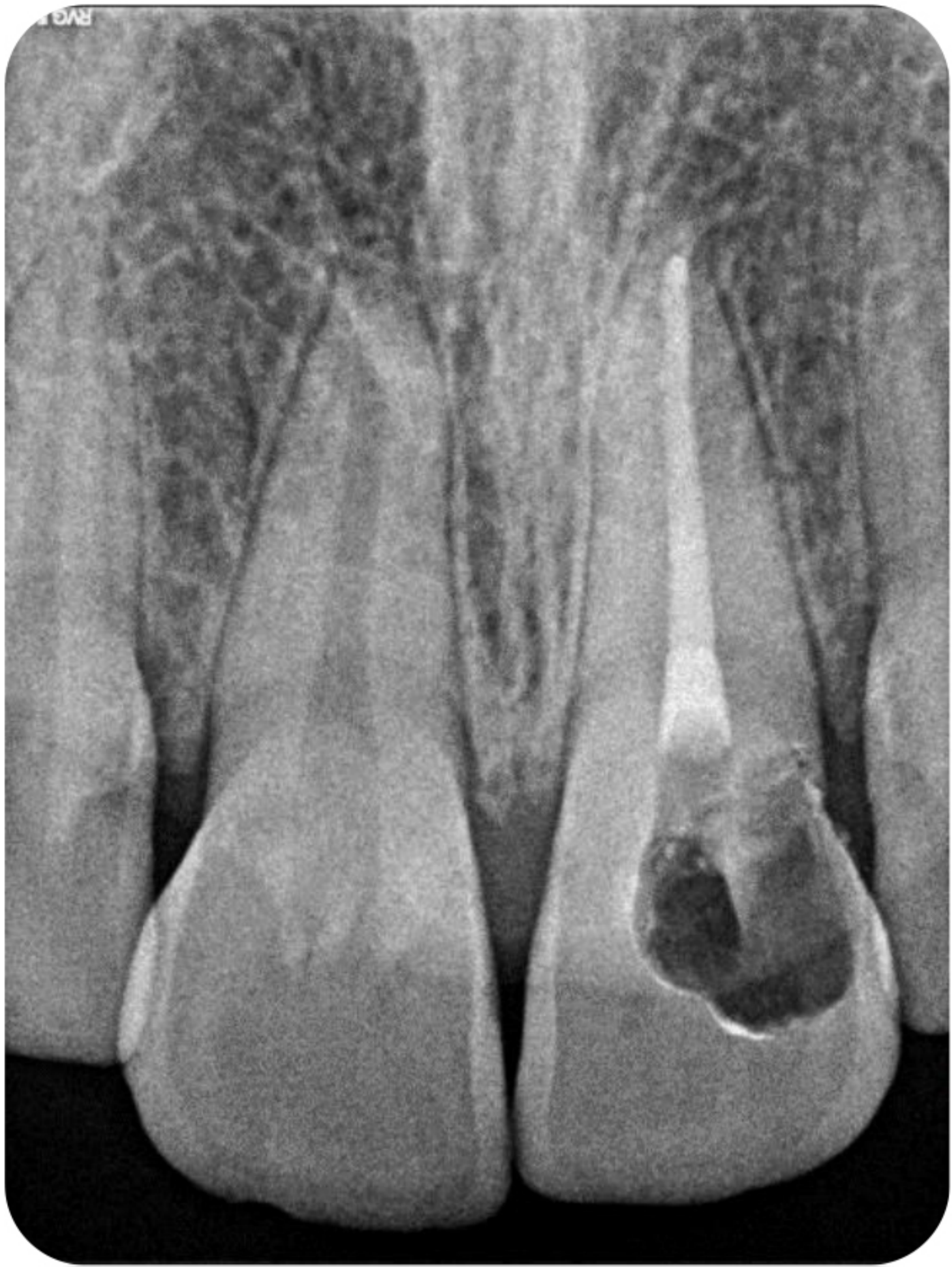


Fig-12 Obturation

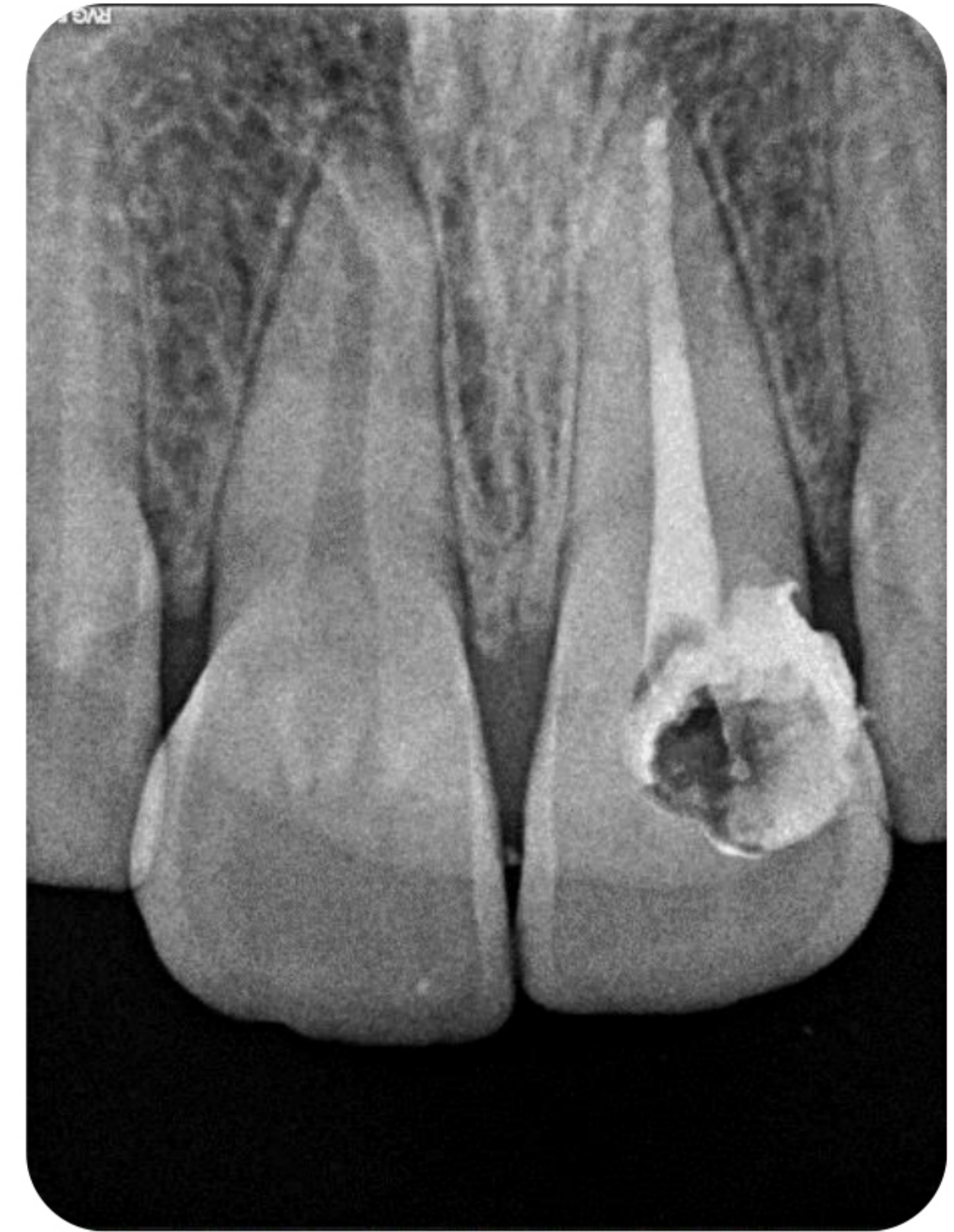


Fig- 13 MTA placement



Fig- 14 Closed with sandwich



Fig-15 Closed with sandwich technique



Fig- 16 Finishing and polishing



Fig -17 Veneer cemented

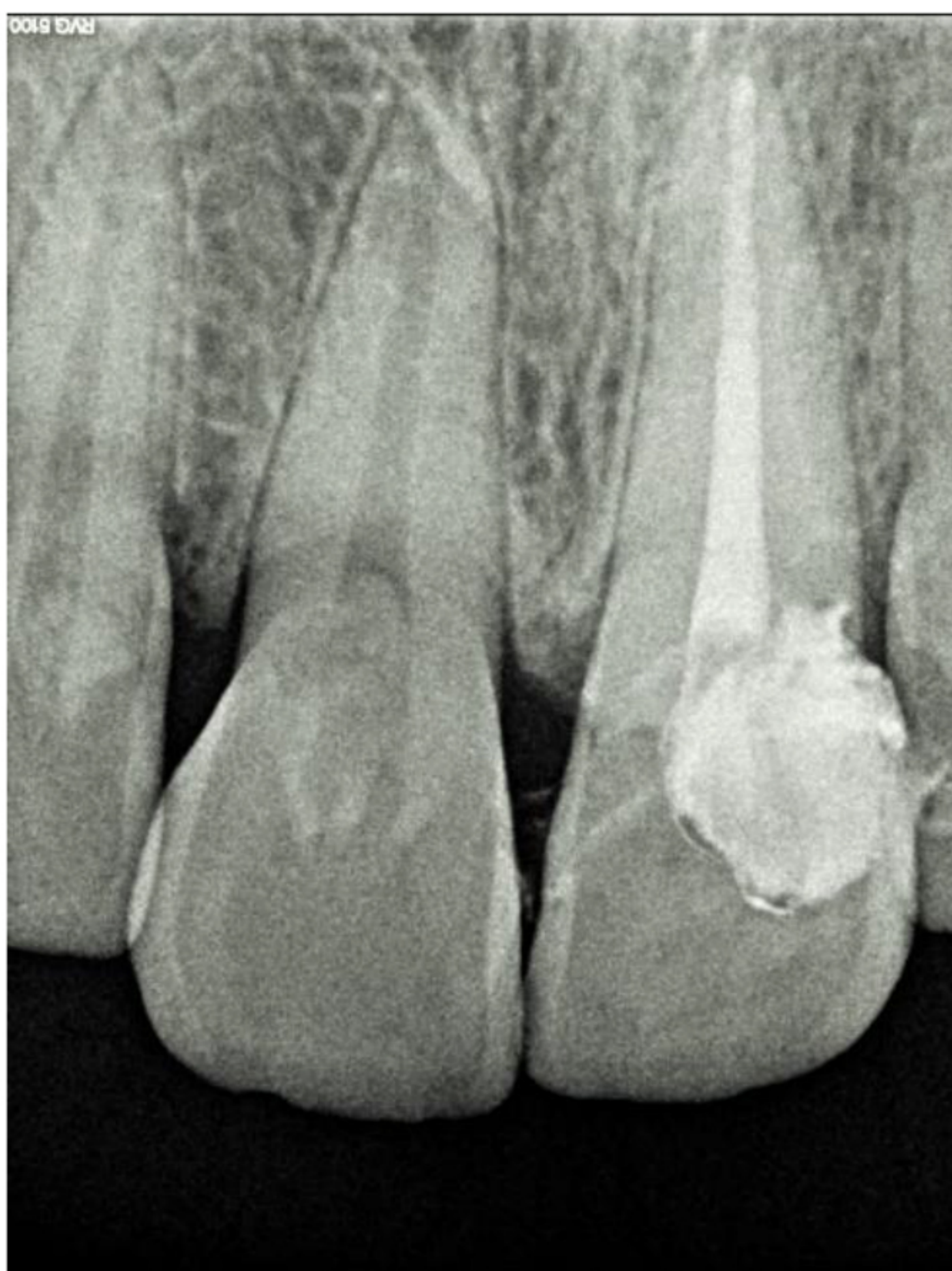


Fig -18 6 months follow up

Discussion

Invasive cervical resorption is a relatively uncommon and clinically challenging condition with an academically debatable pathogenesis. The invasive and somewhat aggressive characteristics of the process, coupled with its histopathologic features, raise questions as to the nature of the lesion. The invading tissue arises from the periodontal ligament but differs from periodontal tissues in both structure and behavior. The precursor cells of the periodontal ligament, being ectomesenchymal in origin, have the potential to differentiate into cells capable of laying down fibrous tissue or calcified tissue (4). For invasion to occur, a defect in the cementum/cementoid layer is a likely prerequisite (5). This may be of developmental origin in a small zone near the cervical area, or the result of physical or chemical trauma. Such a cementum–cementoid deficiency allows direct contact between dentin and the potentially resorptive cells of the periodontium.

It appears that all types of dental resorption share common cellular mechanisms. Resorption of teeth results from the activation of clastic cells, termed odontoclasts, which are morphologically similar, if not identical, to osteoclasts

In this particular case report CBCT was advised to as it give exact location of the lesion. The lesion was flushed with 90% trichloroacetic acid as recommended by Heithersay. Trichloroacetic acid was thought to inhibit the activity of the osteoclast. Calcium hydroxide medication was applied due as it was thought that high ph. would inhibit the activity of osteoclast.

Reciprocating system was used in this case as rotary instrumentation has detrimental effects on the root due to formation of microcracks, and wave one reciprocating files are made of a special nickel-titanium alloy called M-wire that provides increased flexibility and improved resistance to cyclic fatigue of the instruments.

In the present case, MTA was employed because of its high biocompatibility, excellent sealing, good performance in the presence of moisture and induction of formation of a hard tissue barrier due to its high pH. It forms an apatite-like layer on its surface when it comes into contact with physiologic fluids. MTA was used to arrest cervical resorption, to prevent further resorption, and to preserve pulp vitality also in a class 3 defect, in which, according to Heithersay.

Because MTA is not a hard material, it could not reinforce the tooth structure. Hence, resin composite is the material of choice in reinforcing the tooth structure. However, because of the inadequate sealing ability of composites against biological fluids and poor biocompatibility, the restoration of resorptive defects initially with resin composite as a liner followed by lamination with RMGIC (RSR) is recommended in this case.

Conclusion

This case report demonstrates a favourable clinical outcome for surgically accessible ICR lesions when MTA is used as a repair material in combination with a glass ionomer cement and composite resin.

References

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