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Non-Surgical Management Of Internal Resorption: Two Case Reports

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Abstract –
Internal root resorption is the progressive destruction of intraradicular dentin and dentinal tubules of the canal walls as a result of clastic activities. The process of internal inflammatory root resorption can either remain enclosed within tooth space or it may perforate. Non surgical management of cases with internal resorption includes optimal cleaning and shaping of root canal system with chemicomechanical means and complete degranulation of the defect. Intracanal calcium hydroxide dressing plays important role to halt the clastic activity within the root dentin as well as disinfecting the canal and defect. Thermoplastic gutta percha is used to seal the root canal system and the resorptive defect three diamensionally. Both cases in this case series were followed up for period of 18 months which showed successful outcome of this treatment protocol.

Keywords – *Internal resorption, Root resorption, Intracanal calcium hydroxide dressing, Thermoplatic gutta percha.*

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I. Introduction -

Root resorption is the loss of dental hard tissues as a result of clastic activities. It might occur as a physiologic or pathologic phenomenon. It is physiologic process in deciduous teeth, but is a pathological condition if encountered in permanent teeth[1]. Unlike bone that undergoes physiologic remodeling throughout life, root resorption of permanent teeth does not occur naturally and is inflammatory in nature. Roots are usually protected against external and internal root resorption by unmineralised organic cementoid and predentin, respectively, and therefore do not undergo resorption in normal circumstances. This is due to the inability of the clastic cells to adhere to unmineralised surfaces. Following inflammation of the pulpal tissue, clastic cells infiltrate the pulp chamber along with physiological blood supply and thereby initiate the process of internal tooth resorption[1,2].

Root resorption is broadly classified into two groups , external and internal resorption by the location of the resorption in relation to the root surface. Internal resorption has been reported as early as mid 18th century . Internal root resorption is a relatively rare in occurrence as compared with external root resorption, and its etiology and pathogenesis have not been completely understood[1-3]. Internal root resorption also poses diagnostic concerns because it is often confused with external cervical resorption (ECR). In internal inflammatory resorption, the loss of dentin keeps progressing until intervention is made, whereas in replacement resorption although resorption keeps occurring at a steady pace and there is a subsequent deposition of hard tissue[2-4].

Internal resorption is commonly associated with trauma, chronic pulpal inflammation, or idiopathic factors and is often asymptomatic, being detected accidentally during routine radiographic examination. Radiographically a radiolucent enlargement of the pulp space is often seen which is described as abrupt ballooning of root canal[1-3]. If untreated, the lesion will progress and will eventually perforate the root dentinal wall and even may result in loss of tooth[4].

These case reports aims to describe a reliable and predictable treatment protocol for non surgical management of cases with non perforating internal root resorption.

Case report – I

A 32 year old female patient reported to the department of conservative dentistry and endodontics with chief complaint of food lodgement in decayed tooth with blackish discoloration in upper left back region of the jaw. The patient gave history of spontaneous sharp pain 3 years back and history of restoration with same tooth # 25. Now patient is asymptomatic and on clinical examination there was fractured restoration with # 25 with no tenderness on percussion with # 25.

Electric pulp testing shows no response with #25 indicating non vital pulpal tissue.

Radiograph revealed carious involvement of the pulp chamber along with ballooning of the root canal with #25 suggestive of internal root resorption with #25.

Treatment procedure – First appointment –

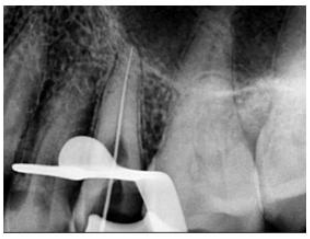
Informed consent was obtained After explaining the treatment plan to the patient and treatment was initiated with administration of 2% Lignocaine with 1:80,000 adrenaline.

Tooth #25 was isolated using rubber dam, followed by complete removal of remaining restoration and carious tooth structure. Access opening was done and straight line access was gained .

Cleaning and shaping was initiated after determining proper working length. Copious irrigation was done with 5.25% sodium hypochlorite solution normal saline. Sodium hypochlorite was activated with ultrasonic activation using Irrisafe ultrasonic tips. Chemicomechanical protocol was followed for the complete debridement of granulation tissue in the resorptive defect.

Canal was dried using paper points and intracanal calcium hydroxide dressing was given and aceess opening was sealed using temporary restoration. Second appointment was scheduled after 1 week in which calcium hydroxide dressing was changed.

Pre-operative radiograph showing internal resorption with 25



Working length determination with 25

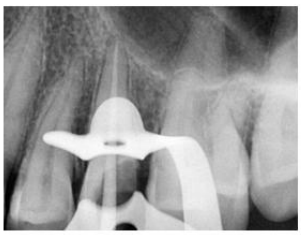
Intracanal calcium hydroxide dressing given with 25

Third appointment –

Calcium hydroxide dressing was removed with copious irrigation using 5.25% sodium hypochlorite solution and normal saline along with ultrasonic tips.

Canal was dried with paper points and master cone gutta percha was selected.

Sectional obturation was done in the apical third of canal, followed by backfill with thermoplasticized gutta-percha and bioceramic sealer. Backfill was done till the coronal third of canal including 3 dimensional sealing of resorptive defect.



Master cone selection with 25

Sectional obturation of apical third canal with 25

Backfill was done with thermoplastic gutta percha and biocermaic sealer to seal resorptive defect

Patient was kept under follow up for 1,3,6,12 and18 months. Patient was totally asymptomatic and 18 months follow up radiograph showed perfect sealing of the defect.

Pre operative radiograph

18 months follow up radiograph

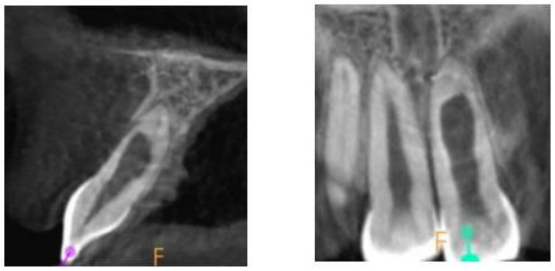
Case report – II

A 21 year old male patient reported to the department of conservative dentistry and endodontics with chief complaint of intermittent pain and sensitivity in upper front region of the jaw. The patient gave history of traumatic injury 4 years back due to fall from bike. On clinical examination there was slightly extruded # 21 with normal physiologic mobility. There was no tenderness on percussion with # 21.

Electric pulp testing shows no response with #21 indicating non vital pulpal tissue.

Radiograph revealed ballooning and enlargement of the root canal from coronal third to middle third with #21. CBCT imaging shows non perforating internal root resorption with #21.

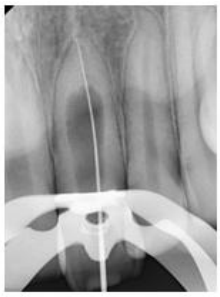
Pre-operative radiograph showing internal resorption with 21



CBCT sectional views showing non perforating internal resorption with 21

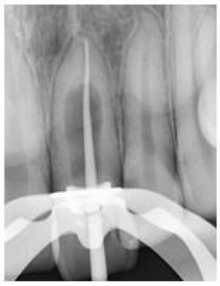
Treatment procedure –

Informed consent was obtained After explaining the treatment plan to the patient and treatment was initiated. Further all procedural steps were followed same as that of case report I.



Working length determination with 21

Intracanal calcium hydroxide dressing given with 21



Master cone selection with 21

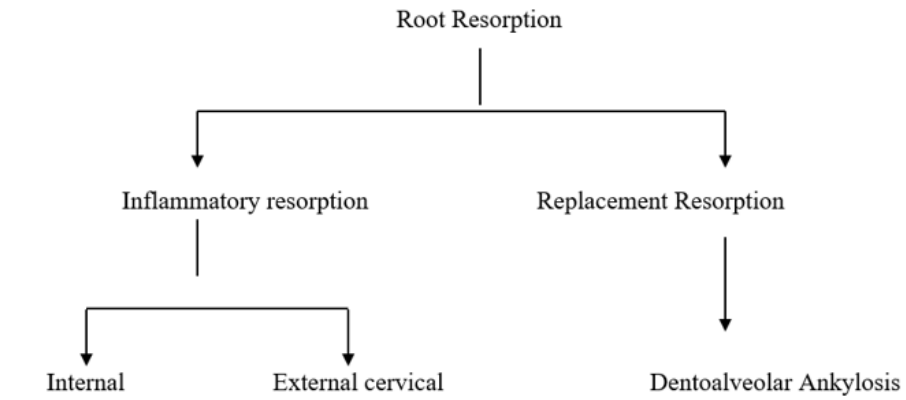
Sectional obturation followed by backfill with thermoplastic gutta percha and bioceramic sealer

Pre operative radiograph with 21

18 months follow up with 21

II. Discussion:

To summarize the knowledge on root resorption from the point of view of clinical relevance, Leif Tronstad classified root resorption in1988.



The etiology of root resorption requires two phases: injury and stimulation. Injury is related to non-mineralized tissues covering the external surface of the root, pre- cementum, or internal surface of the root canal, the pre-dentin. The injury is similar to several types of root resorption and maybe mechanical following dental trauma, surgical procedures and excessive pressure of an impacted tooth or tumor. It may also occur following chemical irritation and during bleaching procedures. Denuded mineralized tissue is colonized by multinucleated cells which initiate the resorption process. However, without further stimulation of resorption cells, the process will end spontaneously.

Internal root resorption is an uncommon but clinically significant pathologic condition of the pulp–dentin complex characterized by progressive loss of dentin from within the root canal. The etiology is often associated with chronic pulpal inflammation triggered by trauma, caries, or iatrogenic injuries.

Histopathologically, the process involves the activation of multinucleated odontoclast-like cells within the pulp space, which resorb dentin and occasionally cementum. The resorptive lacunae are typically lined by these clastic cells and are infiltrated by fibrovascular granulation tissue, reflecting an inflammatory environment [5,6].

Diagnosis primarily relies on imaging. Conventional periapical radiographs reveal a round or oval radiolucency symmetrical and continuous with the root canal outline. However, two-dimensional radiogra phs are limited in differentiating internal from external cervical resorption. Cone-Beam Computed Tomography (CBCT) offers high-resolution, three-dimensional imaging that accurately delineates lesion size, extent, and perforation status, facilitating treatment planning [7] Pulp vitality tests often show partial vitality, as the apical pulp tissue frequently remains unaffected in early stages [8].

Irrigation plays a critical role in management because mechanical instrumentation alone is insufficient to access the irregular resorptive defect. Copious irrigation with sodium hypochlorite (NaOCl) is essential due to its potent tissue-dissolving and antimicrobial properties. Continuous replenishment and agitation, such as passive ultrasonic irrigation, improve penetration into irregular areas and enhance biofilm removal [9,10]. Effective irrigation ensures complete elimination of organic pulp remnants and microbial biofilms, preventing persistence of the resorptive stimulus.

Calcium hydroxide is widely used as an interim intracanal medicament following debridement. Its high pH (approximately 12.5) creates an unfavorable environment for clastic cell survival and neutralizes acidic products within the resorption site [11].

Moreover, it possesses strong antimicrobial activity, aiding in the elimination of residual bacteria from inaccessible canal areas. Application for 7–14 days has been shown to arrest the resorptive process and promote conditions favorable for hard tissue repair [12].

Obturation of a resorbed canal poses unique challenges because of irregular, enlarged cavity dimensions. Conventional cold lateral condensation may leave voids and fail to adapt to complex geometries. Thermoplasticized gutta-percha techniques, including warm vertical compaction and injectable gutta-percha systems, offer superior flow and adaptation to internal irregularities [13]. Combined with bioce ramic sealers, these methods enhance the three-dimensional seal and reinforce weakened dentin walls [14].

Clinical outcomes are favorable when internal resorption is diagnosed early and treated comprehensively. Case series have demonstrated that integration of copious

NaOCl irrigation, calcium hydroxide dressing, and thermoplastic obturation results in predictable healing and long-term retention of affected teeth[15]. However, when perforation or advanced structural compromise occurs, surgical repair with bioceramic materials or even extraction may be indicated [16].

Over all, internal root resorption management requires an evidence-based approach that combines advanced imaging for diagnosis, effective irrigant protocols, antimicrobial intracanal medication, and three-dimensional obturation techniques. Emerging bioceramic materials and activation-assisted irrigation are expected to further improve treatment success rates.

III. Conclusion:

Prompt and early diagnosis, identification of etiology and its resolution along with proper treatment plan are obligatory for successful treatment outcome of cases with internal resorption. With the advanced diagnostic technologies like, CBCT, a more conservative management can be expected. Modern endodontic techniques such as optical aids, ultrasonics, and thermoplastic filling techniques offer opportunities for rehabilitation as well as predictable prognosis of the resorbed teeth.

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