REVASCULARIZATION USING LESION STERILIZATION AND TISSUE REPAIR: A CASE REPORT

Abstract- Clinicians encounter a variety of scenarios in which a permanent tooth has been damaged by trauma, followed by peri-radicular alteration, and is beyond the scope of typical endodontic operations to save. Because of the limited root length, it is difficult to keep a permanent tooth with an open apex. In today's world of modern dentistry, a new treatment option that is less intrusive and time-consuming could be advantageous to both the patient and the physician. The use of lesion sterilization and tissue repair for pulp revascularization is presented in this case report.

Keywords- dental pulp, antibiotics, revascularization, sterilization

INTRODUCTION

Revascularization has proven to be an effective viable therapeutic option for immature teeth with pulp necrosis; artificial apical barrier techniques allow root development to continue while pulp vitality is restored. Passive chemo mechanical preparation using manual instruments and auxiliary chemical substances with antibacterial properties and minimal toxicity, antimicrobial medicine placement, and subsequent bleeding induction are all part of root canal preparation for revascularization. From 2001 onwards, revascularization was introduced as an alternative to apexification. Over the course of a 5-month follow-up, increased dentinal wall thickness and closure of the apical foramen were noted.[1]

Conventional treatment of immature teeth is accomplished by inserting long-term calcium hydroxide paste with the aim of inducing the formation of a calcified barrier which will further allow for the subsequent filling of the root canal.[2] an alternative technique to the use of calcium hydroxide is to produce an apical MTA (Mineral Trioxide Aggregate) barrier, avoiding the periodical exchange of intracanal medication[3]. However, both techniques have the same disadvantage of not allowing the continuity of root development, causing the main to stay weakened and thus increasing the danger of fracture[4]

A new perspective that is less invasive and time-consuming will be a ray of hope for the affected person as well as the clinician in the cutting-edge generation. In such therapeutic situations, the LSTR (Lesion Sterilization and Tissue Repair) asserts its importance. The concept of LSTR treatment was developed by the cariology research section of Niigata University's Faculty of Dentistry in 1990 and promoted by Takashige. The LSTR is an endodontic treatment that comprises no or minimal instrumentation, as well as the administration of antibiotics in a propylene glycol vehicle to disinfect root canal systems and peri-apical lesions. Caries, pulpitis, and root canal infection are all treated with it. LSTR works by repairing itself through the host's inherent defense mechanisms. The bacterial burden can be reduced by medicating the canals and pulp chamber. Medication-assisted sterilization will result in a cleansing and debridement effect

of 20 to 40%. Three mix MP pastes[5] are made up of an amalgamation of three antibiotics, as well as the solvents macrogol and propylene glycol.

PREPARATION OF TRIPLE ANTIBIOTIC PASTE

The preparation of the Triple Antibiotic Paste is the most crucial stage in LSTR. (Fig1) Takushige et al. proposed the most common combination. Metronidazole, ciprofloxacin, and minocycline are some of the antibiotics in this category. Separate dappen dishes are used to administer commercially available antibiotics. The enteric coating of the pill is removed with a blade, and the outer capsular material is removed from the capsule. Then every of the additives are powdered one at a time in clean Mortar and pestle. Care must be taken to avoid wetting of powder. At this degree, if the powder has to be stored, it can be stored separately in tightly capped porcelain containers and stored in dark place or in the refrigerator to prevent exposure to light and moisture. After right Pulverization, each of the components is taken in a clean Glass slab/blending pad. Then a part of the solvent is allotted. The triple antibiotic mixture has most impact whilst seven parts of powder are mixed with one a part of Solvent. So after allotting, the powder is divided into seven components and every element blended separately with the Solvent to ensure uniform consistency of the combination. The final coaching can be a gentle ball-like shape of 1 mm Diameter. If the mixture is gentle add greater 3 blend powder to this. If the training turns into flaky, dry and too tough, then add extra solvent. Resultant opaque paste has to be saved in hermetic boxes. If the mix turns translucent on storage, it has to be discarded.[6-8]

CASE REPORT

This is a case of 14-year-old patient came to the department of conservative and endodontics with fractured tooth. On clinical examination it was found to be Ellis class III fracture with 11. Clinical examination revealed lack of response to pulp sensibility tests, percussion, and palpation.

Radiographic Examination Revealed That Tooth #11 Had Incomplete Root Formation, And Periapical Lesion.(Fig 2)

The Diagnosis of Pulp Necrosis with Chronic Periapical infection was confirmed. After evaluating the choices, the treatment choice was pulp revascularization.

After preparation of triple antibiotic paste, access cavity was prepared. Local anesthesia was given, and rubber dam isolation was done. The access cavity is prepared using round bur, and the necrotic tissue is removed followed by irrigation with saline and sodium hypochlorite. The ethylenediaminetetraacetic acid (EDTA) was used to allow deeper penetration of antibiotics into the dentinal tubules. Cavity was prepared to place medicament using a round bur at the canal orifice which is 2 mm deep, and 1 mm wide, and is meant for retaining the triple antibiotic paste at the canal orifice. After proper drying, the paste is placed in the cavity, and followed by MTA was placed. (Fig 3)

The radiographic control after one year and six months of treatment revealed that the lesion had disappeared, and there was thickening of the dentin walls. (Fig 4, 5, 6)

DISCUSSION

Bacteria found mostly in the root canal system and the surface layer of a contaminated root canal wall can be easily removed with standard endodontic treatment. However, bacteria that remain in the deep layers of root canal dentin may leak out into the periapical area, causing difficulties. One of the medical procedures that can be utilized to sterilize endodontic lesions is the application of an antibacterial medicinal medicine.[9] Because the bacterial makeup of contaminated root canals is complicated in nature, a single antibacterial drug, even if it is a broad-spectrum antibiotic, may no longer be effective. Microorganisms may also infiltrate root canals via a variety of oral sources, including dental biofilm, saliva, and carious dentin, which may smear the root canal at some point during endodontic therapy.[10] Antibacterial treatment must be used to target all of these microorganisms. Because obligate anaerobes make up the bulk of microorganisms in the deep layers of contaminated dentine in the root canal wall, metronidazole was originally the antibacterial medication of choice. Metronidazole even at excessive concentrations can't eradicate all microorganisms indicating the necessity of different pills.[11,12] Thus, ciprofloxacin and minocycline, in addition to metronidazole had been added to sterilize contaminated root dentin. This antibiotic paste must be able to penetrate the root canal dentin. By combining these tablets with propylene glycol and macrogol, the penetration capability of these pills was once increased. Cruz et al.[13] revealed the penetrating ability of propylene glycol. In patients with internal/external root resorption, physiologic root resorption exceeding 2/3 root size, and requiring short-term home management, Lesion Sterilization and Tissue Repair could be a viable option.[14,15]This approach might also additionally locate utility in uncooperative children and with special health care needs in whom traditional endodontic cure can't be carried out due to related conditions.

CONCLUSION

Endodontic treatment with an antibiotic mix (ciprofloxacin, metronidazole, and minocycline combined with propylene glycol and macrogol) has demonstrated good clinical and radiographic results in this case report. However, we recommend that more clinical and histological studies be conducted with a longer follow-up period.

Figure 1

Triple antibiotics mix preparation

Figure 2

Preoperative radiograph

Figure 3

Triple antibiotics followed by MTA placed

Fig 4- 6 month follow up

Fig 5-12 month follow up

Fig 6-18 month follow up

Figure 7

Post op after composite restoration

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