

Triple antibiotic paste in primary teeth- A Review

Aarthi J.Reader¹, Kaviarasu²

¹M.D.S Department of Pedodontics, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research, Narayanapuram, Pallikaranai, Chennai-600100, Tamilnadu,India.

²B.D.S., Undergraduate student Department of Pedodontics, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research, Narayanapuram, Pallikaranai, Chennai-600100, Tamilnadu,India.

E-mail id: ¹aarthijagadeesan@gmail.com

Abstract: *In primary teeth the foremost goal of endodontic treatment is to eliminate all bacterial infection by endodontic instrumentation. Lesion sterilization and tissue repair (LSTR) therapy is an unconventional endodontic technique which requires less instrumentation succeeded by placement of a triple antibiotic paste on the floor of the pulpal cavity. Antibacterial drugs have proven to be successful in eliminating microorganisms from root canal, thereby resulting in successful endodontic treatment.*

Keywords: *Triple Antibiotic paste, Lesion sterilization and Tissue repair, Primary teeth*

1. INTRODUCTION

Lesion Sterilisation and Tissue Repair is a technique that involves a combination of antibacterial drugs for treatment of necrotic primary molars (Ciprofloxacin, Metronidazole and Minocycline) for disinfection. This concept (LSTR) was evolved by the Cariology Research Unit of Niigata University school of Dentistry in japan. ⁽¹⁾

In 1951, the initial topical antibiotic introduced to endodontics was Grossman's polyantibiotic paste and there after different antibiotic combinations have been used, which include, Septomixine forte, combination of penicillin, bacitracin, streptomycin and sodium caprylate and clindamycin. Nevertheless, none of these mixtures has been confirmed to be 100% effective in eliminating all the bacterial strains from the root canal system. After the use of Triple antibiotic paste, the entire sterilization of root canals could be attained within two weeks; hence, retaining the medicament for greater duration in the canals might not be useful. Thus combination of disinfection with antibiotic paste for two weeks, followed by root canal filling might be beneficial in the successful management of chronically infected primary teeth. ⁽²⁾

LSTR in primary teeth was confirmed to be successful even in cases of teeth with resorbed roots and draining fistulae. Recalcification of softened dentin instantly follows sterilization of the lesion. Healing of draining sinuses, periradicular lesions and gingival abscesses may be due to the bactericidal action of the Triple Antibiotic Paste.. ⁽³⁾

THE PREPARATION OF 3MIX:

The most important part of LSTR therapy is the preparation of triple antibiotic paste. The antibacterial drugs used, i.e., Ciprofloxacin, Metronidazole, Minocycline were pulverized separately into powder in clean mortar and pestle after the elimination of enteric coating on the drugs. To avert exposure to light and moisture, drugs are advised to be kept individually in tightly capped porcelain containers. The recommended ratio of drugs to be used is 1:1:1.⁽⁴⁾ The final preparation should be a soft ball like structure measuring about 1mm in diameter. A combination of Propylene glycol (P) and Macrogel (M) are used as vehicles to promote a good diffusion of medicament through surrounding root dentin and peri radicular tissues.⁽⁵⁾

INDICATIONS OF LSTR IN THE PRIMARY TEETH:

There is an array of clinical conditions like mobility, drastic bone loss, advanced root resorption, non-vital teeth and radiolucency in the furcation area which can be considered to be treated with LSTR.⁽⁶⁾

CONTRAINDICATIONS OF LSTR IN PRIMARY TEETH:

Lesion sterilization tissue repair is not suggested for children with infective endocarditis and children with known allergy to the agents used. Radiographic confirmation of major external and internal resorption, deciduous tooth nearing shedding and teeth with perforated pulpal floor are also situations where LSTR is not recommended.⁽⁶⁾

ADVANTAGES:

The important benefit of LSTR is that it can be completed in one visit, is a painless procedure, simple and less time consuming. This is especially beneficial in pediatric patients.⁽⁶⁾ LSTR facilitates to protect the primary tooth until its exfoliation, decreasing the need for unnecessary extraction and placement of a space maintainer.⁽⁶⁾

DISADVANTAGES:

The most significant disadvantage is the discoloration caused by minocycline. It is hard to assess the filling radiographically due to lack of radiopacities in triple antibiotic paste. Allergic reactions, drug side effects and the risk of cyst formation are other disadvantages.⁽⁶⁾

FACTORS INFLUENCING THE ACTION OF TRIPLE ANTIBIOTIC PASTE:

Sufficient quantity of drug used should be used in LSTR thereby in order of the drugs to spread periapically from the canal to ensure sterilization. Smear layer acts as a hurdle to the dispersal of triple antibiotic paste and the elimination of the smear layer facilitates better absorption of medicaments, contributing to disinfection and sterilization. Greater discoloration is seen with triple antibiotic paste containing minocycline and there are two methods to prevent the discoloration. They are 1. Application of bonding agent and curing it for 20 seconds and 2. Application of flowable composite and curing it for 30seconds.⁽⁶⁾

POST-TREATMENT EVALUATION CRITERIA:

Review should be done after one month with a clinical/radiographic evaluation. Postoperative review specifies healthy treatment consists of absence of pain, swelling, redness, abnormal mobility and presence of good soft tissue. Radiographic evaluation were a reduction in the six of any pathologic inter-radicular, periapical radiolucencies, evidence of bone regeneration and radiographic continuity of the lamina dura.⁽⁵⁾

2. REVIEW OF LITERATURE

Phtima T and Palinee D reported 3mix paste to have good clinical success rate but relatively lower success rate when evaluated radiographically and the end of 2 years follow-up they reported clinical success rate of 3 mix to me 75% clinically and 36.7% radiographically . They experimented eighty caries involved lower primary tooth for 58 children from the age of 3 to 8 years received a 3mix medicaments by non-instrumentation endodontic treatment ⁽⁵⁾ When compared to conventional pulpectomy and non-instrumental LSTR therapy, endodontic treatment of infected deciduous teeth treated with 3MIX succeeded by instrumentation and obturation provided an exceptional success. ⁽³⁾ However, it has been suggested that the application of 3Mix antibiotic paste cannot substitute conventional root canal treatment in the long term. ⁽⁵⁾ LSTR could be regarded as an option that eliminates the causative microorganism from the lesion by sterilizing and facilitating repair with the aid of individual's own natural immune system. ⁽⁶⁾ TAP, Augmentin and tigeicycline in a hydrogel at 1mg/ml, decreased bacterial growth notably with lesser colour change. ⁽⁷⁾ In community based dental programmes it is an easy, time-saving and cost-effective technique for relief of symptoms. Some cases were radiographically not successful with progression of internal resorption even though clinically asymptomatic. ⁽⁴⁾

3. CONCLUSION

LSTR therapy contributed an exceptional alternative to pulpectomy and extraction for non-vital pulp therapy in primary teeth. Treatment using triple antibiotic paste has shown an excellent clinical and radiographic success followed by instrumentation and obturation.

SOURCE OF FUNDING: Nil

ETHICAL CLERANCE: Not required

CONFLICT OF INTEREST: Nil

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