

Role of Triple Antibiotic Paste in Dentistry: A Review

Abstract:

Various antibiotics are used in dentistry for disinfection. One of them is a triple antibiotic paste which is a combination of three different antibiotics namely metronidazole, ciprofloxacin and minocycline. TAP is used in many clinical situations in dentistry such as vital pulp therapy, regenerative endodontics etc. But there are some drawbacks associated with TAP. To overcome these drawbacks, modified triple antibiotic paste (MTAP) was introduced in the dentistry. This article reviews about the clinical application of TAP along with its composition and drawbacks.

Key-words: Intracanal medicaments, Triple antibiotic paste, Regenerative antibiotics.

Introduction:

Microorganisms play crucial role in the cause of various dental infections. There are both aerobic and anaerobic bacteria present in the periapical region. Due to which there is a clinical relevance of different types of antibiotics in dentistry. Treating it with single antibiotic will be not sufficient to attain complete disinfection. Combination of antibiotics has been reported to be a successful regimen. One of them is triple antibiotic paste. It is a combination of metronidazole, ciprofloxacin and minocycline. Triple Antibiotic Paste (TAP) was developed by Hashino and colleagues. They investigated the efficacy of the paste in eliminating microorganisms from the root canal system(1).

The outcome of their studies was very effective in the elimination of the bacteria from the root canal system.[2] Metronidazole, ciprofloxacin and minocycline are present in 1:1:1 ratio in TAP. TAP has multipurpose use in dental treatment such as in vital pulpotomy, regenerative endodontics and in case of non vital young permanent tooth with open apex[3]. This article discuss the role of TAP in dentistry along with its composition and drawbacks.

Composition of Triple Antibiotic Paste:

As the name suggests TAP is composed of three antibiotics each one having its own antimicrobial properties. These antibiotics are metronidazole, ciprofloxacin and minocycline. The TAP is formed by mixing the all three antibiotics in the ratio of 1:1:1 in vehicle of macrogol and propylene glycol. These vehicle agents improves the penetrating ability of the antibiotics. Antibiotic and carrier are mixed in the ratio of 5:1.[4]. Other name for triple antibiotic is 3 Mix –MP.

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Received : 13 Dec., 2024, **Published :** 31 March, 2025

Access this article online	
Website: www.ujds.in	Quick Response Code 
DOI: https://doi.org/10.21276/ujds.2025.11.1.18	

How to cite this article: sharma, swati, Vyavahare, N., Patil, P., & Raikar, A. (2025). Role of Triple Antibiotic Paste in Dentistry - A Review. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 11(1).

Metronidazole:

It is a Nitroimidazole compound that has a broad spectrum of activity against protozoa and anaerobic bacteria. It has a bactericidal effect.

Ciprofloxacin:

It is a second-generation fluoroquinolone having bacteriocidal action against gram negative bacteria.

Minocyclin:

It is a semisynthetic derivative of tetracycline bacteriostatic having action against gram –ve and +ve bacteria.

To overcome some of the side effects of Conventional TAP, modified TAP (MTAP) is described in the literature combining Ciprofloxacin, Metronidazole, and Clindamycin 30% of each with 10% of iodoform to improve its radioopacity. [4,5,6]

Clinical Application of Tap:

1. Intracanal Medicament:

TAP can be used as a intracanal medicament due to its antimicrobial properties. TAP should be used in proper concentration because if used in lower concentration its will be ineffective as disinfectant and if used in higher concentration it can be cytotoxic to stem cells and apical papilla cells. According to the Study done by Arruda et al, it suggested that the use of TAP in the conc. of 1mg/ml is both effective and also not cytotoxic. [7, 8].

2. Lesion Sterilization and Tissue Repair (Istr):

This therapy is used to treat necrosed primary molars with periapical pathology and resorbed roots so as to retain them till exfoliation[9]. Such primary teeth cannot be treated by conventional biomechanical preparation and obturation (pulpectomy). So, chemomechanical means of preparation is used to disinfect the canal. The chemical used for disinfection of canal is TAP (ciprofloxacin, metronidazole and minocycline) in the ratio of 1:1:1 or 1:3:3(9,10). For enhancing the effect of TAP, Macrogol and propylene glycol or saline are used as vehicle that allow penetration of TAP in the dentinal tubules[9,11].

3. Regenerative Endodontics/revascularisation:

Due to its broad spectrum antibacterial property, TAP is used for canal disinfection during revascularization procedure in immature permanent teeth. Thus the canal disinfected with

TAP provides the favourable environment for the stem cells to regenerate which takes place during revascularization of the immature permanent teeth (12, 13).

Drawbacks of Tap:

The drawback of TAP found is that one of its constituent i.e. minocyclin can cause tooth discoloration. To overcome this disadvantage modified triple antibiotic paste (MTAP) was introduced in which minocycline has been replaced by another antibiotic. MTAP is composed of metronidazole, ciprofloxacin and clindamycin. (14,15)

Conclusion:

Canal disinfection is a crucial part for any endodontic procedure to be successful. Many intracanal medicaments are available for that purpose and one of them is TAP which has shown promising results.

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