CALCIUM HYDROXIDE IN ENDODONTIC TREATMENT: A SHORT REVIEW

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ABSTRACT
Calcium Hydroxide is the versatile agent used in various endodontic treatments. Its unique properties like bactericidal effect, mineralization induction are important to understand. Present article is focusing on properties, rationale of Calcium Hydroxide use, and application in various endodontic treatments.

KEYWORDS: Calcium Hydroxide, Endodontic treatment, intracannal medicaments, weeping canal.

INTRODUCTION
Teeth are bio-composites that require controlled mineral deposition during their self assembly to form tissues with unique mechanical properties.[1] On the other hand biominerals such as calcium synthetically produced or obtained from natural sources. As the main constituent of biominerals calcium can be therapeutically used for preventing demineralization of hard tissues of the tooth along with the preservation and maintenance of the health of the pulp.[2] Nowadays calcium hydroxide is used as therapeutic agent for various endodontic and conservative treatments.

Calcium hydroxide was originally introduced to the field of endodontics by Herman in 1920 as a pulp-capping agent.[3] It is a white odorless powder with low solubility in water. Calcium hydroxide has a slow, controlled release of both calcium and hydroxyl ions. It has a high pH, is insoluble in alcohol, and is chemically classified as a strong base. The ionic dissociation leads to the formation of Ca++ and OH- ions. Ca++ induces hard tissue deposition and OH- having antibacterial action.[4]

Mechanism of action
Calcium hydroxide as dissociate produce the Hydroxyl ions. Hydroxyl ions are highly oxidant free radicals that show extreme reactivity with several biomolecules. This reactivity is high so this free radical usually not able to diffuses away from sites of generation. The hydroxyl ions damage to the bacterial cytoplasm membrane, denaturant protein, damages to the DNA, thus it shows bactericidal effect.[5]

Mineralization activity is seen as a pulp-capping agent and in apexification cases, a calcified barrier induced by calcium hydroxide. Because of the high pH of pure calcium hydroxide, a superficial layer of necrosis occurs in the pulp up to certain extend. Beyond this layer, only a mild inflammatory response is seen and, provided the operating field is kept free from bacteria when the material was placed, hard tissue may be formed.[5]

Applications of Calcium Hydroxide in Endodontics Intracannal Medicaments
Endodontic treatment requires the intracanal medicament for elimination of bacteria, prevention of bacterial growth, stop bacterial ingress and to cut off their nutrient supply to the bacteria in the canal. Calcium hydroxide is most commonly used as an intracanal medicament for disinfection of the root canal system.[6] Application of calcium hydroxide paste at intervals of at least 7 days is able to eliminate and/or reduce the total number of bacteria surviving even after biomechanical preparation.[7]

Calcium hydroxide has a little or no effect on the intensity or severity of postoperative pain following endodontic treatment.[8] The Effect of calcium hydroxide on pro-Inflammatory cytokines was studied and concluded that it leads to denaturation of these pro-inflammatory mediators such as interleukin-1α (IL-1α), tumor necrosis factorα (TNFα) and calcitonin gene-related peptide (CGRP) that is a potential mechanism by which calcium hydroxide contributes to the resolution of periradicular periodontitis.[9]
Calcium based sealers help in the formation of root-end hard tissue, antibacterial activity. Calcium hydroxide-based sealers having limitations like limited antibacterial activity, poor cohesive strength, greater solubility and marginal leakage.\(^\text{[10]}\)

**CONCLUSION**

Calcium hydroxide has been used for different purpose in endodontics and available in different forms. It is having wide range of antimicrobial activity. Even if some limitations are there to the calcium hydroxide. Hence further studies are recommended to evaluate the effectiveness of calcium hydroxide and its applications in the field of endodontics.

**REFERENCES**