Action of Ferric Sulphate on Pulpal Tissue – A Monograph

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Abstract: Pulpotomy is a procedure done when coronal pulp tissue is exposed by caries in primary teeth. Many techniques have been used for the treatment of pulpally involved primary teeth. One among those include ferric sulphate (FS) medicament which is used a hemostatic agent. Studies have shown that Ferric sulphate has good clinical and radiographic results with high tooth survival rates.

Keywords: ferric sulphate, hemostatic agent, pulpotomy

1. Introduction

In pediatric dentistry, pulpotomy is a common therapy which is performed in a primary molar with extensive caries but without evidence of radicular pathology when caries removal results in a carious or mechanical pulp exposure. The pulpotomy is a procedure which involves covering the pulp stumps with a pulp-capping agent to promote healing or an agent to fix the underlying tissue \cite{1}. Various pulpotomy agents, formaldehyde-based materials, electro surgery, lasers, glutaraldehyde-based medicaments, zinc oxide eugenol, bone morphogenic protein (BMP), collagen and calcium involving, dentin bridge inducing materials, have been used for the procedure.

Ferric sulfate or Fe\textsubscript{2}SO\textsubscript{4} is one among that which is a dark brown chemical agent with acidic properties. Ferric sulfate exerts its haemostatic effect through a chemical reaction with blood proteins; this property makes ferric sulfate a very efficient haemostatic agent, without need for help from the haemostatic system to exert its effect. It adequately control bleeding even in the patients with abnormal haemostasis \cite{2,3}. This property, with regard to the significant amount of proteins in the blood, makes ferric sulfate a very strong haemostatic agent.

2. Mechanism of Action

When ferric sulphate is applied, the blood proteins get agglutinated \cite{4}. Red blood cells which have sialated glycopolys embedded give a negative charged surface. This negativity will create a repulsive electric zeta potential between cells \cite{5}. When agglutination force exceeds the force of repulsive force generated by the negative charge, blood gets agglutinated.

![Hemagglutination reaction; blood group antigens and antibodies forming clumping of erythrocytes.](image)

**Figure 1:** Hemagglutination reaction; blood group antigens and antibodies forming clumping of erythrocytes.
and necrosis. Chronic inflammation of pulp may cause internal resorption. Therefore, zinc oxide eugenol may not be an ideal base for ferric sulfate pulpotomies due to the inflammatory tissue response [12].

Although the exact cause of internal resorption is unknown, there is speculation that whatever the precipitating factor, it produces a vascular change in the pulp that involves an inflammation and the formation of granulation tissue. There is an accompanying metaplasia of normal connective tissue and macrophages to form osteoclast-like giant multinuclear odontoclasts. It can also be due to the variation in the pulpotomy technique used or due to lack of predentine [13].

Radiographic changes can be osseous and dental. Resorption in bone, interradicular destruction, external root resorption, periapical bone destruction are the osseous resorptive changes examined. Whereas, dental changes can be due to the kind of medicament used and its pulpal response [14].

References