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(دراسة حيوانية)**

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**Immunohistochemical analysis of an
innovative material versus MTA in
repair of furcation perforation in dogs
(An Animal study)**

Thesis
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degree in Endodontics

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Dedication

This work is dedicated to ...

My beloved parents, to whom I owe every success I ever approach in my life.

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My beloved wife and daughter for being the light of my life.

Introduction

Iatrogenic perforations in the furcation area may occur through out the course of endodontic access opening due to an incorrectly directed bur, during post space preparation, or during attempts to locate calcified canals. The prognosis of root perforations depends on its size, location, time elapsed since the defect has been open to the oral cavity before sealing and the amount of periodontal irritation. When a perforation has occurred, the initial attempt at correction should be nonsurgical internal repair. Corrective surgery could be reserved for cases in which internal repair is not a treatment option or when internal repair is failed. Nonsurgical immediate repair using proper filling material may prevent the resulting communication between perforation site and gingival sulcus, and thus favorable prognosis could be achieved. An important factor in both nonsurgical and surgical approaches is the use of an ideal repair material that have the ability to seal the defect and induce new hard tissue formation.

A wide range of filling materials are used for perforation repair such as zinc oxide eugenol cement, intermediate restorative material (IRM), super ethoxybenzoic acid (EBA), composite resins, glass ionomer cements and mineral trioxide aggregate (MTA). However, MTA (ProRoot MTA) has been

used successfully in endodontics for the past years. Recently, new products similar to MTA have been introduced into the market including MTA-angelus, MTA-bio, Bioaggregate.

More recently, a new material, Biodentine has been developed as a part of new approach seeking to simplify the clinical procedures. Biodentine is a calcium silicate-based bioactive material specially designed as a “dentine replacement”. It has a wide range of applications including endodontic repair (perforations, apexifications, resorptive lesions and retrograde filling material).

Biodentine has 2 main advantages when compared to other calcium based cements: 1- faster setting time (12 min) 2- superior mechanical properties. Those superior physio-chemical in addition to the good biological behavior make it suggested to be used as permanent dentine substitute.

Review of Literature

Root perforation is a mechanical or pathological communication formed between the supporting periodontal tissues of the tooth and the root canal system ⁽¹⁾. perforations result in the defective dentine root wall or floor alongside the surrounding cementum. This communication compromises the health of the periradicular tissues and debilitates the viability of the tooth ^(2,3,4,5). perforations are viewed as genuine complication in dental practice and represent various diagnostic and management issues ⁽⁶⁾. In any case, when teeth are of strategically significance, perforation repair is obviously shown at whatever point conceivable.

Perforations happen essentially through three conceivable ways: procedural mistakes happening during root canal treatment or post-space drilling ^(7,8) resorptive procedures ⁽⁹⁾ and caries. Most perforations result from procedural errors ^(10,11). Mishaps prompting these defects are most commonly during access opening by a bur or excessive removal of dentine from the dangerous zone in curved canals during canal shaping with either rotary or hand files, misdirected files during negotiation of curved or tight canals ^(12,13,14),