

HISTOLOGICAL AND HISTOCHEMICAL EVALUATION OF FURCAL PERFORATION REPAIR IN DOGS USING MINERAL TRIOXIDE AGGREGATE (MTA) MIXED WITH WATER BASED LUBRICANT

Ghada Mansour*, Ashraf Zaazou** and Amal El Hak#

ABSTRACT

Furcation perforation offers a great challenge to the dentist and causes poor prognosis of affected teeth. Mineral trioxide aggregate (MTA) is a multipurpose material, that has many uses, such as root end filling, pulp capping, and perforation repair. The present study was conducted to evaluate histologically and histochemically the effect of a new MTA formulation when mixed with Surgilube gel® on repair of furcation perforation. Eight dogs were included in this study. Access cavities were performed in mandibular premolars. One side of the mandible was used as experimental group, where the furcation perforations in four premolars were immediately sealed with a mixture of MTA and Surgilube gel. In the other side of the mandible, two premolars were used as positive controls where perforations were left unsealed, whereas the other two premolars were negative controls left intact without perforation. Clinical examination was performed at baseline and before euthanizing the animals. Four dogs were sacrificed after one month, whereas the remaining were killed after four months. Histologic evaluation was done using H & E and Trichrome stains, as well as histochemical examination for detection of alkaline phosphatase (ALP) enzyme activity. Negative controls showed normal healing clinically with neither pocket formation nor radiographic bone loss. This was confirmed histologically and histochemically. As for the MTA group, the same clinical findings were observed. Histologic evaluation at one month revealed mild inflammation, and appearance of early signs of regeneration including formation of new cementum and alveolar bone. Tissue maturation and calcification were evident at four months in this group with disappearance of inflammatory reaction. The perforations were sealed with periodontal attachment apparatus reformed at that site. Concerning unsealed perforations, they were associated with pocket formation. Histologically, they showed at one month severe inflammatory reaction with formation of fibrous tissue, whereas at four months, inflammation was still persisting with incomplete healing evidenced by fibrous tissue, irregular woven bone and small amount of new cementum. Histochemical evaluation revealed more intense reaction of ALP activity in MTA group, that was decreased at four months compared to one month as an indication of tissue mineralization. According to this study, MTA mixed with Surgilube gel is an excellent repair material for furcation perforations that has the potential of periodontal regeneration.

* Assistant Professor of Oral Medicine, Peridontology, Oral Diagnosis and Radiology, Faculty of Dentistry, Alexandria University.

** Lecturer of Endodontics, Faculty of Dentistry, Alexandria University.

Assistant Professor of Oral Biology, Faculty of Dentistry, Alexandria University.