Ministry of Higher Education
and Scientific Research
Baghdad University
College of Dentistry

Histological and Immunohistochemical Evaluation For Bone Morphogenic Protein-2 on Healing Process of Extracted Tooth Socket Treated by Grape Seed Oil in Rabbits

The Thesis

Submitted to the Council of the College of Dentistry, Baghdad University, In Partial Fulfillment of Requirements for the Degree of Master in Oral Histology

Submitted by

Manar Abd Alrazaq Hassan

B.D.S.

Supervised by

Prof Dr. Nada M. H. Al-Ghaban

B.D.S., M.Sc., Ph.D. (Oral Histology and Biology)

Baghdad- Iraq

2019 A.D 1440 A.H

Abstract

Back ground: One of the wound types that frequently present in the dentistry field was found after extraction of teeth. The feasibility of healing of the wound in the socket include the healing of wounds in soft tissues and involved the healing of the bone. The most important type of alternative medicine was herbal medicament, that widely used in the healing of different wounds. The benefit of Grape seed oil due to their anti-oxidant and anti-inflammatory effect, in addition to bioactive and bio-inductive effect that promotes bone healing and reduce the inflammation after extraction. Bone Morphogenetic Protein-2, as a cytokine that was first detected in cartilage and bone, and found that it supports the improvement of the bone. Bone morphogenic protein -2 employment the stem cells in the healing of the bone, through their differentiation in to osteoblasts.

Aim: Evaluation the effects of local application of grape seeds oil in dental socket after tooth extraction by histological assessment and immunohistochemical estimation for Bone Morphogenic Protein-2

Materials and methods: Thirty six Newzeland male rabbits were used in this study, the upper right central incisor was extracted from each rabbit, then they were divided randomly into 3 main groups

1- Control group:- 12 rabbits, the socket heal spontaneously.
2- Sponge group:-12 rabbits, the socket treated with absorbable hemostatic sponge.
3- Grape seed oil and sponge group:-12 rabbits, the socket treated with local application of 0.5 ml of B.W. grape seeds oil fixed by absorbable hemostatic sponge.

Each group was divided into two sub groups according to the healing intervals 2 and 4 week (6 rabbits from each group).

Histological evaluation performed by section stained with hematoxylin and eosin (H&E), and histomorphometric analysis for the assessment of osteoblasts, osteoclasts, osteocytes, trabecular area, trabecular number, and bone marrow space area by using Image J. software. Immunohistochemical localization of Bone morphogenic protein -2 were done by using mouse monoclonal antibody against Bone morphogenic protein -2 secreted type for all groups in both healing intervals.

Results: The histological and histomorphometric results of the present study revealed the enhancement of healing process of tooth socket after 2 week from extraction in grape seeds oil and sponge group by the activation of large number of osteoblasts, osteocytes and osteoclasts that started from apical part, then middle part finally in coronal part of the socket. The activation of these cells increase the remodeling process and assist the formation of large number of new bone trabeculae with a large bone marrow space area at 2 weeks duration in grape seed oil and sponge group when compared to the sponge and control group. Whereas, at 4 weeks duration the results showed thick and mature bone with decrease in the bone marrow space area also in grape seed oil with sponge group when compared to other groups.

Immunohistochemical result showed strong positive expression for bone morphogenic protein-2 in osteoblasts especially in the apical and middle parts of the socket at 2 weeks duration in grape seed oil and sponge group than other groups. Also, the result revealed a strong positive expression for Bone morphogenic protein -2 in osteocytes in the apical and middle parts of the socket of sponge group at 2 weeks durations.

Conclusion: Grape seed oil accelerates the healing process and enhance new bone formation when locally treated the socket after tooth extraction which assessed through increased positive expression of Bone morphogenic protein-2 in the new bone cells in grape seeds oil and sponge treated group.