

**Ministry of Higher Education
& Scientific Research
Baghdad University
College of Dentistry**



**Evaluation the Effect of Hyaluronic Acid
on Bone Healing Process in Rabbits
(Histological, Histomorphometrical and
Immunohistochemical study for Expression of TGF- β)**

A Thesis

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By

Ibtihal Hashim Radhi

B.D.S.

Supervised by:

Assist. Prof. Dr. Nada M. Hassan Al-Ghaban

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

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Abstract

Background: Bone augmentation techniques are commonly employed in orthopedics, neurosurgery as well as oral and maxillofacial surgery. It is highly attractive to develop a biomaterial system that is readily available, easily applicable by minimally-invasive technique, and able to release an osteoinductive growth factor. Such a system will be able to engineer new bone formation locally at the site of injection. One of these naturally-derived polymers biomaterial is Hyaluronic acid .It has osteogenic potential that can be exploited not only for repairing bone defects but also for providing transplantable bone for the reconstruction of a variety of bone defects.

Aims of study: To evaluate the effects of Hyaluronic acid gel on bone healing of artificially created intra bony defect in rabbit's upper diastema histologically, immunohistochemically and histomorphometrically.

Materials and methods: Thirty two New Zealand male rabbits were used in this study .Two Intra bony holes were made for each rabbits on the right and left buccal side of the upper diastema, their size approximately 2mm in diameter and (2-3mm) in depth. The right hole was filled with Hyaluronic acid gel (experimental one), while the left hole was left for normal healing (control one). The rabbits were randomly divided and sacrificed at 1, 2, 3 and 6 weeks interval post operatively.

Histological examination was performed under light microscope for all bone section stained with Haematoxylin and Eosin with assessment of histomorphometric analysis include counting of bone cells (osteoblasts, osteocytes and osteoclasts), cortical width, trabecular width, trabecular number and blood vessels number. Also immunohistochemical test for the expression of TGF β 3 were performed on bone specimens of both control and experimental groups at 1, 2, 3 and 6 weeks interval.

Results:

Histological finding of the present study showed that hyaluronic acid treatment induced earlier bone formation, mineralization and maturation in experimental group when compared to control one.

Immunohistochemical examination of this study revealed that the hyaluronic acid treatment increased the positive expression of Transforming Growth Factor-Beta by osteoblasts, osteocytes and bone marrow stromal cells especially in 1 and 2 weeks intervals than that observed in control one.

Histomorphometric analysis for all bone parameters that examined in this study, showed highly significant difference between control and experimental groups in all healing intervals.

Conclusion: The present study illustrated that the Hyaluronic acid was osteoconductive material that enhance osteogenesis and accelerated the healing process in the intra bony defect in comparison to the normal physiological healing process.