Histological Assessment of the Effect of Teriparatide Treatment on Mandibular Bone Defect Healing in Rats

ABSTRACT:

Introduction: After injuries, infections, or tumor removal, bone rebuilding is necessary for endogenous healing. Among the several induced ways for repairing bone defects are the allogenic, synthetic, and autologous membrane techniques. However, surgical implantation of bone graft and bone infill materials at the bone defect location may cause edema, infection, and heterotopic bone growth. Therefore, osteogenic systemic medications will be an outstanding treatment of bone lesions.
Aim of the Study: This work aimed at evaluating the systemic effect of teriparatide on bone healing after surgical induction of bony defects in rats' mandibles.

Materials and Methods: In this study, 40 albino rats were separated into two groups (control and treatment groups) each including 20 rats. The same surgical procedure was performed on all rats. A hole was made in the mandible (3 mm in diameter and 3 mm in depth) and were left empty. Teriparatide was administered in a dosage of (10μg/kg) daily subcutaneous injection for the treated group. Animals were euthanized at four-time intervals (7, 14, 21 and 28) days. The mandibles were separated, sectioned preserved, and processed for histological analysis.

Results: The results revealed that there was an increase in new bone formation in short healing time in the teriparatide-treated group on the 7th day and 14th day of the experiment. The group treated with parathyroid hormone significantly exceeded the control group in the mean ranks of each osteoblast presence, osteoid matrix density and osteoid matrix mineralization. Also the treated group was significantly superior to the control group in woven bone islets formation on the 14th, 21st, and 28th days of the experiment.

Conclusion: Rats that were treated with teriparatide exhibited enhanced bone production and maturation, as well as a reduced healing time, in comparison to the control rats, in relation to bone defects.