A Radiographic, Radionuclide and Histopathologic Study of Healing in Induced Mandibular Fractures.

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Summary: Healing may occur by either primary, secondary or third intention depending upon the type of fixation (rigid or semirigid fixation) and the presence or absence of infection.

Thirty adult male healthy dogs were used in this study. A unilateral mandibular body fracture was induced in all the animals and reduced by intra-osseous wiring. All animals were subjected to conventional radiography, bone scan and histopathological studies. These procedures were performed at 3, 6 and 12 week intervals following fracture and treatment.

Animals were classified into tow main groups: in the first group, healing was left for the animals own healing power. But, in the second group healing was stimulated by a low grade direct current applied to the fractured segments.

The source of electric current was in the form of silver oxide watch battery which was previously prepared to produce a direct electric current of 5μA.

The result of this work revealed that conventional radiography is of a limited value in assessing the healing of fracture throughout the twelve weeks of the study.

Imaging and quantitative radionuclide skeletal scanning are of supreme diagnostic value in follow up the healing process of fracture especially after 6 weeks.

A low grade direct electric current enhances bone healing following fracture. This has been clarified by both Histopathologic and bone scan studies.

Conclusions: From the results of this study, it could be concluded that:

1. Conventional radiography is of a limited value in assessment of healing of fracture up to 12 weeks in both unstimulated and stimulated fractures.
2. Despite the limitation of conventional radiography in detecting healing up to 12 weeks, yet smoothening and widening of fracture lines were evident radiographically in both unstimulated and stimulated fractures.
3. Imaging and quantitative radionuclide scanning are if supreme diagnostic value in follow up the healing process of fracture.
4. Early soft tissue phas has proved its value in detecting the amount of inflammation which may affect the healing process.
5. One of the main advantages of bone phase is that, it provides a quantitative measurement of healing specially at four hours following fracture. This measurement could not be offered by conventional radiography especially in the early stages of the healing process.
6. Bone scanning was most valiable after 6 weeks of fracture and stimulation. However, a reduction of its value was observed 12 weeks especially in the unstimulated fractures.
7. A low grade direct electric current enhances bone healing following fracture. This clarified by both Histopathologic and skeletal scintigraphic evaluation.