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Editorial

Testing the Efficiency of Titanium Implants

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Introduction

Patients with neoplasms of the head and neck can be treated with surgical excision, chemotherapy, radiation, or a combination of these techniques. While these treatments improve survival, they frequently have aesthetic and functional side effects that must be addressed in order for the patient to be recovered and have a higher quality of life. This leads us to consider resources that can help improve healing and reconstruction processes for patients who require face skull prosthesis, such as those who require tissue or dental rehabilitation using implant prostheses.

Ionizing radiation causes hypocellularity, hypoxia, and hypovascularity in tissues, which has stymied rehabilitation efforts for years.As a result, our research confirmed the effect of ionising radiation on the contact between bone and implants implanted in wistar rats' tibias that had been exposed to ionising radiation.

We employed 24 male rats of the species Rattus norvegicus, albines of the wistar lineage, ranging in age from 90 to 120 days and weighing between 350 and 400g. All animals got a 30Gy dosage of radiation in the right tibia, as proposed by Ohrnell et al 1997.The left tibia was not treated with radiation. They were exposed to the Irradiation Simulator (Varian Acuity model apparatus (digital type with escort and RX) prior to irradiation to measure the irradiation field and the arrangement of the tibias with the monitor to ensure a uniform dosage of radiation.

They were given a 30 Gy dose rate with an average dose of 1,428 Gy.min-1 in a central field of 26x16cm and an 80cm distance from the source to the skin. The animals were randomly separated into two groups thirty days after the radiation operation. On each tibia of 12 animals, a surface implant was treated with a twofold acid attack (irradiated right and left non-irradiated). Six animals from each group were sacrificed after 28 days. After 84 days, the remaining six animals in each group were sacrificed.

When acute reactions to irradiation were no longer detected, surgical operations for implant installation were done 30 days following the date of irradiation at a dose of 30 Gy (i.e. skin erythema, edoema or flaking). Following the perforations, the implants were implanted in the animals' tibia bones using a 0.9 mm digital hexagon key until the full length reached intraosseous, at which point the implant was terminated by clinical examination. Conexo Implantes – So Paulo – Brazil designed the implants specifically for this study, measuring 2.5 mm wide by 3.0 mm in grade 4 titanium length. Nitric acid and sulfuric acid were used to assault the treated surface implant twice (Porous Connection surface).

In both experimental models and human observational studies, the period between radiotherapy and implant installation, as well as osseointegration rates and clinical success, should be monitored. Biomaterials and growth factors should be assessed surrounding implants and bone healing, especially in cases where bones are undergoing radiotherapy or where implants must be implanted on bone with sparse trabeculae. After a period of 84 days, implants with treated surfaces showed greater contact between bone and implant in non-irradiated bone than in irradiated bone.