OsteoBiol® by Tecnoss

The effect of gamma and microwave radiation sterilization on periodontological grafts for microbiological evaluation

LABORATORY TESTS

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ABSTRACT

Due to their specific application field, the sterilization of periodontal grafts before implanting to the patient is of paramount importance in order to avoid any disease transmission from the animal or human source of the grafting material to the patient. Sterilization of grafts performed by different methods, such as irradiation with gamma ray, microwave, ethylene oxide, autoclave and stove, is considered the best way of blocking the transmission and recently sterilization by gamma radiation has become accepted as the most reliable sterilization method. However, microwave application for controlling bacterial reproduction seems to be particularly interesting for the biomedical industry because of its effectiveness and low cost. In thiss study, the authors aimed to evaluate gamma radiation and microwave sterilization processes from microbiological and sterility perspectives and to compare their effectiveness on GTR and GBR biomaterials from two different sources: animal (equine and porcine) and human. The biomaterials were: OsteoBiol® *Derma* (Tecnoss®, Giaveno, Italy - porcine derma, coded as PDG1); OsteoBiol® *Sp-Block* (Tecnoss® - equine collagenated bone, coded as HBG1); OsteoBiol® *Dual-Block* (Tecnoss® - porcine collagenated bone, coded as PBG1); OsteoBiol® *Lamina*® (Tecnoss® - equine collagenated bone, coded as HL1); Alloderm (Biohorizons, UK ® human dermal collagen, coded as MDG2); Mucoderm (Botiss, Germany - porcine dermal collagen, coded as PDG3) and Maxgraft (Botiss, Germany - human bone collagen, coded as MBG3). All periodontal grafts were irradiated with 2, 4, 5, 10, 25 and 50 kGy doses of gamma radiation. Another group of same materials was irradiated by microwave for 1, 2, 3 and 4 min at 24,500 MHz and 900 W. Gamma radiation and microwave sterilization methods showed to be successful at minimum doses as 5 kGy and 3 min, respectively. With both methods, a significant reduction in microbiological load was observed for all periodontal grafts.

CONCLUSIONS

In their conclusions, the authors underline that "*gamma and microwave radiation sterilization can be considered as two successful sterilization methods, even at low radiation doses and times. (…) We observed that gamma radiation sterilization can be approved as effective, even at very low radiation doses such as 5 kGy. Moreover, microwave irradiation can be taken into consideration as a valuable and promising sterilization technique on periodontological grafts and a valuable alternative to gamma radiation sterilization*".

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Material tested

BONE SUBSTITUTE
OsteoBiol® *Sp-Block*
OsteoBiol® *Dual-Block*
OsteoBiol® *Lamina*®

MEMBRANE
OsteoBiol® *Derma*

LAB