DOI: http://dx.doi.org/10.21270/archi.v5i0.1334

Zer-005

Enhancement of bone healing and turnover on implant's osseointegration in osteoporotic rats treated with anti-resorptive drugs

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This study aimed to evaluate the peri-implant bone healing and turnover in osteoporotic rats treated with drugs of the class of bisphosphonates and selective estrogen receptor modulators. 96 female rats (n=8) were divided into four groups: sham with balanced diet (S), non-treated ovariectomized (N), ovariectomized treated with alendronate (A) and ovariectomized treated with raloxifene (R). One implant was installed on each tibia of rats and were sacrificed at 42 and 60 days. The decalcified sections were submitted to immunohistochemical analysis (OPG and RANKL), whereas the calcified peri-implant bone was analyzed by RT-PCR (OPG and RANKL), microtomography, bone turnover (calcein/alizarin area and mineral apposition rate - MAR), and histometric (Bone implant contact – BIC and New bone formation - NB). The peri-implant bone turnover (calcein/alizarin area and MAR), BIC and NB data were statistically higher in S and R compared to the other groups, in which both showed higher peri-implant bone area for alizarin red and lowest for calcein ($P<0.05$, Tukey test). There was no difference between S and R as well as between A and N ($P> 0.05$, ANOVA). OPG gene expression and immunolabeling were greater in group R, while RANKL protein was expressed in a greater quantity in group A, shown by the greater ratio of RANKL/OPG in group A ($P< 0.05$, Kruskal-Wallis). The microtomography parameters of bone volume (BV and BV/TV), trabecular thickness (Tr.Th), and trabecular separation (Tr.S) showed an increase in bone tissue quantity in Group A, in relation to the other groups ($P < 0.05$, Tukey test). Therefore, alendronate was a potent antiresorptive drug, whereas raloxifene improved bone healing and turnover in osteoporotic rats, closer to biological responses.

Descriptors: Osteoporosis; Dental Implants; Microscopy.

Acknowledgment: FAPESP #2012/15912-2