

Comparative study about the influence of the photodynamic antimicrobial therapy and mechanical removal of biofilm on periodontal disease induced in hamsters

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Periodontal diseases are directly related to the presence of dental biofilm. The purpose of this study was to evaluate the influence of photodynamic antimicrobial therapy (PAT) on disease induced in hamsters. Twenty nine female hamsters were used in this study. Two animals were euthanized before the induction of the disease to observe the normal histological characteristics of periodontal tissue. Twenty seven were fed with a high sucrose diet. On the 30th day, two animals were killed before intervention to observe the inflammatory characteristics of the periodontal tissue and twenty four were divided into three groups of eight animals each: PAT, control and biofilm mechanical removal (BMR). In the groups PAT and BMR, the treatment was carried out on the first and second mandibular molars. PAT group received the association of the photosensitizer methylene blue (0.01%) and a GaAlAs laser ($\lambda = 660 \text{ nm}$, $P=40\text{mW}$) with one minute of pre- irradiation time and fluence of 24.5 J/cm^2 . The BMR was done with a toothbrush by 10 movements in 45° angle with the teeth. Control group received no treatment. Diet was given for all groups until day 60. For histological analysis, two animals per group were killed on days 31, 38, 45 and 60 after the treatment. A score system was used to evaluate the periodontal inflammatory process histologically. After 24h of the treatment, the PAT group showed the best results on the reduction of inflammatory process compared to the others groups. The control group maintained the level of osteoclastic activity for all the experimental period while the PAT and BRM groups showed a reduction of osteoclasts. After 30 days, there was no difference between the groups. These results suggest that PAT reduces the inflammatory process in periodontal disease 24h following treatment. Moreover, both therapies inhibit osteoclastic activity 30 days after treatment.