



Article

Effects of Obesity on Bone Healing in Rats

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Abstract: Although the association between periodontitis and obesity is well explored, it is unclear whether obesity is associated with a worse therapeutic outcome after periodontal treatment. The aim of this study was to investigate the effects of obesity on bone healing with and without the application of regeneration-promoting molecules. A standardized bone fenestration-type defect was created over the root of the mandibular first molar in 15 Wistar rats. Ten animals received a high-fat, high-sucrose diet (HFSD), while the remaining five animals were fed a standard diet. During surgery, the fenestration defects from half of the HFSD-fed, i.e., obese animals, were treated with regeneration-promoting molecules (enamel matrix derivative; EMD). After four weeks, bone healing was evaluated by histomorphometry, TRAP staining and immunohistochemistry for RUNX2 and osteopontin. The analyses revealed that the spontaneous healing of the periodontal defects was compromised by obesity. Application of EMD partially compensated for the negative effect of obesity. Nevertheless, EMD-stimulated bone healing in obese animals was not better than the spontaneous healing in the obesity-free control group, indicating that obesity may also inhibit the stimulatory effects of regeneration-promoting molecules. Our results show that obesity can negatively influence bone healing and suggest that bone healing may be compromised in humans.

Keywords: periodontal regeneration; obesity; fenestration; animal; periodontitis

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Supplementary material

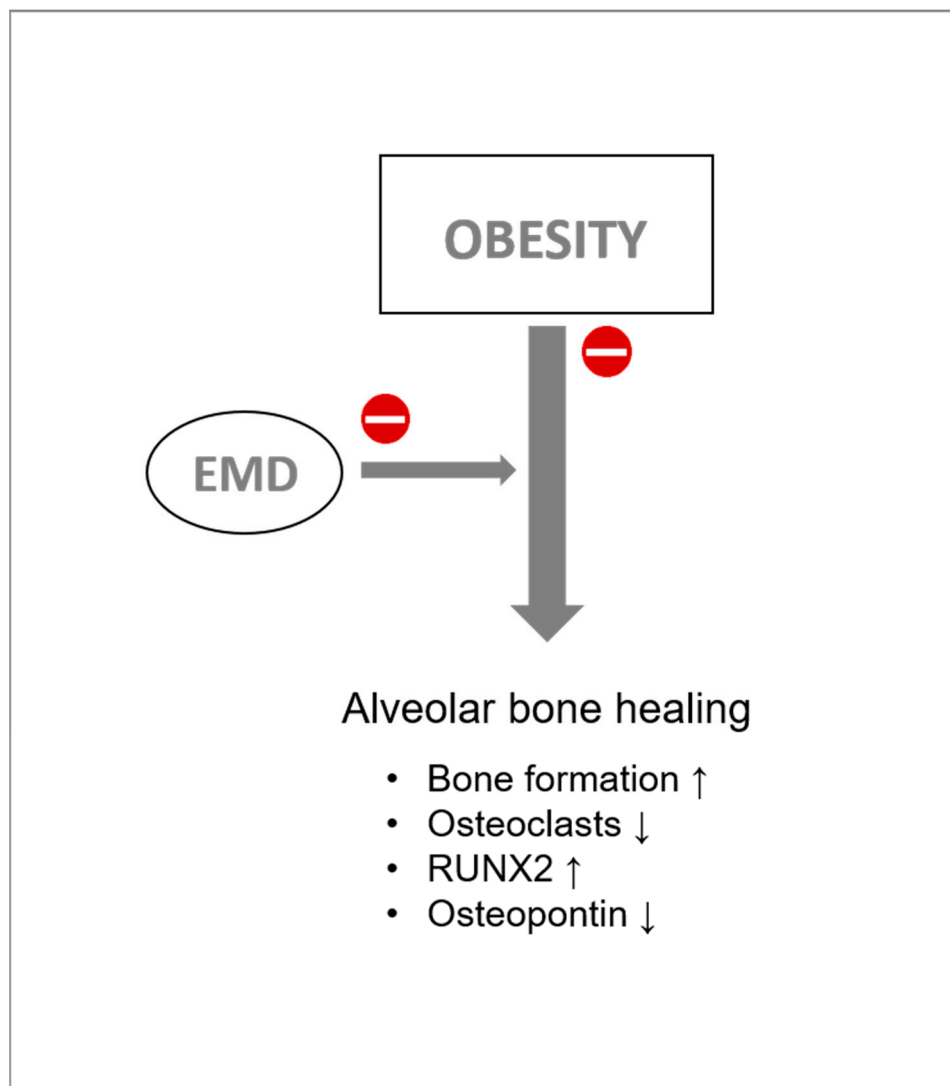


Figure S1. Scheme depicting the impact of obesity and/or EMD on alveolar bone healing in the present study.

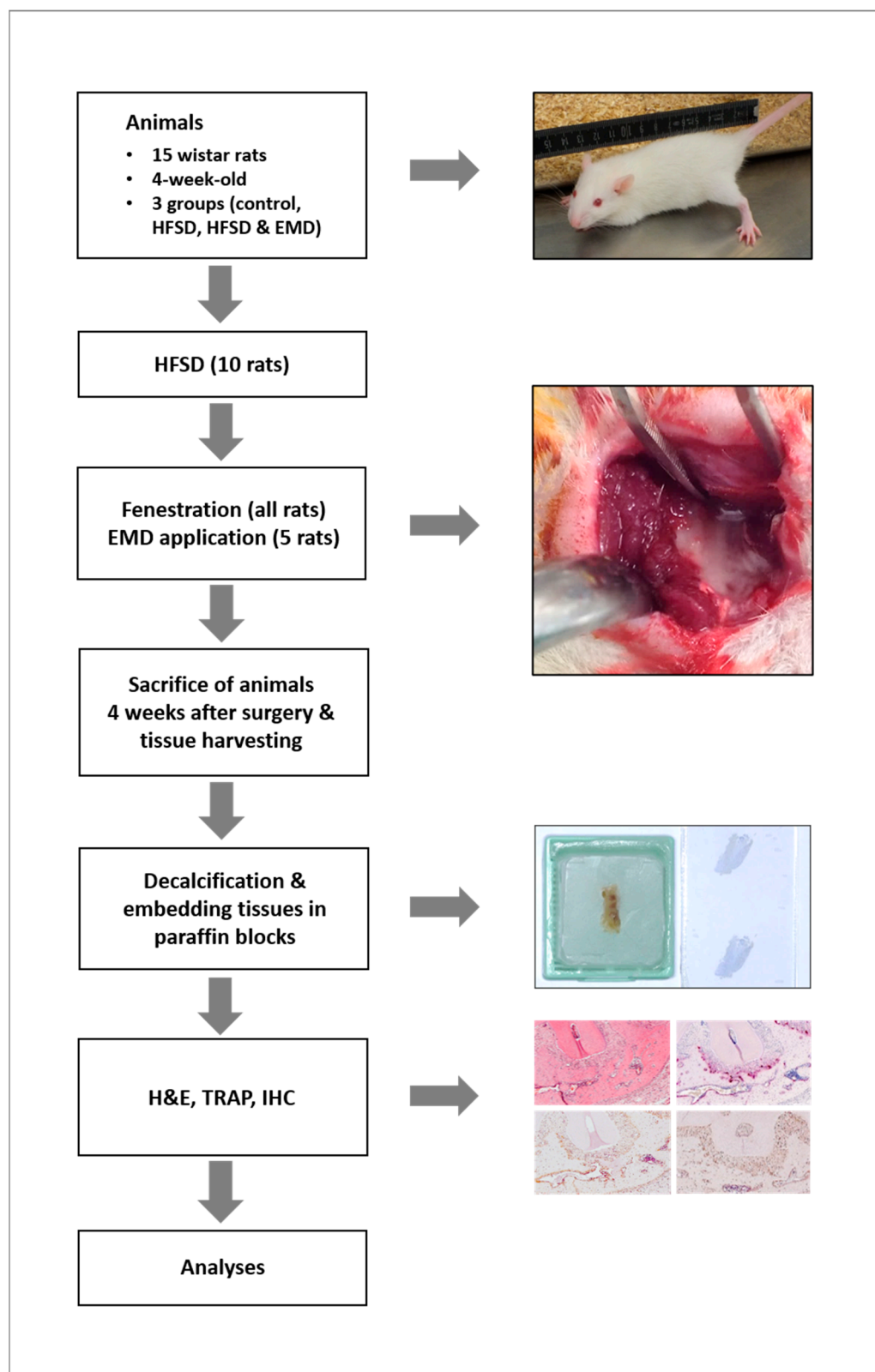


Figure S2. Scheme of the experimental protocol.