Moses O, Eliezer M, Nemcovsky C, Tal H, **Weinreb M**. Accelerated degradation of collagen membranes in diabetic rats is associated with increased infiltration of macrophages and blood vessels. Clin Oral Investig. 2016 Sep;20(7):1589-96.

Abstract

OBJECTIVES: Increased collagenolytic activity in diabetes may compromise collagen membrane (CM) survival. Tetracycline (TTC) possesses anti-collagenolytic properties and delays CM degradation. This study evaluated macrophage and capillary infiltration within CMs in diabetic rats.

MATERIALS AND METHODS: Diabetes was induced in 20 Wistar rats by streptozotocin and 20 served as controls. Biotin-labeled CM discs were immersed in either TTC (50 mg/ml) or PBS. In each animal, 2 discs (TTC and control) were implanted under the parietal periosteum and rats were sacrificed at 2 or 4 weeks post-implantation. The area and thickness of the residual disc collagen were measured following staining with streptavidin, and the number of macrophages and blood vessels within the membranes was determined using specific antibodies (to CD68 and transglutaminase II, respectively).

RESULTS: Diabetes significantly reduced the area and thickness of the CMs, while TTC increased CM thickness significantly in both groups of rats at 2 and 4 weeks. Diabetes increased the number of macrophages (~eightfold at 2 weeks and ~fourfold at 4 weeks), but TTC had no significant effect. Finally, diabetes increased the number of blood vessels within the discs (~threefold at 2 weeks and ~twofold at 4 weeks), while TTC had no effect.

CONCLUSIONS: Diabetes increases degradation of native CMs and the number of blood vessels and macrophages within them. TTC immersion delays CM degradation without an apparent effect on macrophage and blood vessel penetration.

CLINICAL RELEVANCE: Enhanced CM degradation in diabetic conditions which impair guided regenerative procedure outcome is apparently related to increased blood vessel formation and macrophage infiltration.