ABSTRACT

Background. Few studies have investigated the influence of drilling on bone healing. After the drilling of bone and placement of dental implants a sequence begins of cellular and molecular events which represents a combined response of wound healing. The bone healing around dental implants is a complex phenomenon and influences the proliferation and differentiation of pre-osteoblasts into osteoblasts, together with the activation of periosteal and endosteal lining cells, and initiates the production and mineralization of osteoid matrix followed by the organization of the bone-implant interface. The objective of this study is to quantify the temperature changes in cortical bone and marrow spaces during implant site preparation in bovine rib bone. A total 10 harvested bovine ribs and 6 10.5 x 3.5 new drills for implant insertion with external irrigation (Bone System, Milano, Italy) were used in this study. The implant sites were prepared with 10 mm long drills at 500 rpm under abundant external irrigation with saline solution at 37 degrees C. Each drill was used for 10, 30, 60, 90 and 120 implant site preparations; each drill was then observed under SEM for evaluation of the damage of the cutting edge after 10, 30, 60, 90 and 120 preparations. There was an higher and statistically significant increase in the temperature in cortical bone; this increase in temperature increases with the number of the times of drill use. The drill wear seemed to play a major role in heat production and could explain the observed increased temperature of the bone.


Scarano A, Carinci F, Quaranta A, Di Iorio D, Assenza B, Piattelli A.