

Does the Machined Surface Really Preserve Dental Implants from the Plaque Accumulation?

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Rec Date: September 28, 2017; Acc Date: September 30, 2017; Pub Date: October 04, 2017

Citation: Conserva E (2017) Does the Machined Surface Really Preserve Dental Implants from the Plaque Accumulation? J Biol Med Res. Vol. 1 No.1: 3.

Editorial

In the last decades the Implantology has known a continuous growth because of the high predictability, survival and success rate of the implant therapy rehabilitations. Reported implant survival rate after 5 and 10 years of follow-up is respectively 95.7% and 92.8% [1]. Despite these high survival rates, a small part of implants can fail. The main problems of Osseo integrated implants are the peri-implant diseases. Peri-implantitis has been defined as an infectious disease that can be diagnosed as a mucosal lesion often associated with bleeding, suppuration and deep pockets and always accompanied by loss of supporting marginal bone [2]. The outcomes of studies on animals and humans indicate that experimental plaque accumulation leads to a higher frequency of bleeding sites around implants [3]. The sequence of microbial colonization of implants is like that of teeth in the same oral cavity. In a recent review of the literature, Subramani et al. stated that implant surface characteristics have a significant influence on the pathogenicity of the peri-implant microbiota. They concluded that increases in surface roughness and surface free energy facilitate plaque formation on dental implant and abutment surfaces [4]. Berglund et al. in an experimental study in dogs concluded that peri-implantitis has more progression on rough surfaces compared to machined one [5]. For these reasons, it is often suggested to use implants with smooth collar or completely machined implants. Different implant surface modifications have been introduced to enhance the osseointegration processes: the most used strategy to promote rapid osseointegration and to improve the bone-to-implant contact (BIC) is to increase the implant surface roughness [6]. In a recent review Feller et al. [7] reported that cellular adhesion, proliferation, migration and differentiation is affected by the material properties of titanium implants, including their surface microstructural topography and their surface chemistry or surface energy/wettability. Further studies supported this statement and concluded that moderately rough surfaces give rise to faster osseointegration than turned implant surfaces [8,9]. Conserva et al. [10,11] concluded that the sandblasted surfaces showed quick cell adhesion and proliferation as well the GBAE surfaces and that all the rough surfaces induced an early level of osteoblast differentiation. The machined surfaces were competitive but showed a slowdown of all the biological

processes. For these reasons implants with moderately rough surfaces ($Ra > 0.2 \mu$) are today widely used; they are most efficient from a biological point of view allowing a more rapid adhesion, spreading, cell proliferation and differentiation compared to smooth ones. So, there is a great confusion about this topic. Rough or not rough, this is the question. Fortunately, in the last five years several scientific articles demonstrated that plaque formation, occurred regardless of the degree of surface roughness. As reported by Wennerberg et al. [12] and Renvert and Polyzois [13] a specific design and surface roughness of implant or abutment systems does not seem to be associated with peri-implant mucositis. In a clinical study over a period of 13 years, Renvert et al. [14] found no difference in the incidence of peri-implantitis between 3 implant systems with different implant surfaces compared to a machined surface. Ferreira Ribeiro et al. and Conserva et al. investigated the initial oral biofilm formation on titanium implants with different surface treatments and they came to the same conclusions [15,16].

What can we conclude from this editorial? First, that the extreme positions must be avoided and secondly that we should always use common sense and especially the knowledge of biology as well as the clinic.

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