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Surface Modifications for Dental Implants

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Dental implants have been widely used in dentistry. The surface properties of dental implants (titanium and zirconia) play an important role in the osseointegration of the implant. Therefore, proper surface modification is essential for titanium and zirconia dental implants, which usually have biologically inert surface character. In my talk, I will first introduce the background and some current status of dental implants. Then, I will focus on surface modifications of titanium and zirconia dental implants. Depending on the cross-sectional morphology, surface modifications will be categorized into three groups, including (1) concave surfaces (meso-/nano-/submicron-/micron-scaled porous oxide on rough surfaces), (2) convex surfaces (multifunctional biomolecule immobilization on rough surfaces), and (3) smooth surfaces (ionic implantation on smooth surfaces). In general, surface modifications, including mechanical, chemical/electrochemical, and/or biological methods, can be used to improve osseointegration of dental implants, with considerations being the use of simple, rapid, cost-effective, and/or environmentally friendly processes.