Latest Trends in Surface Modification for Dental Implantology: Innovative Developments and Analytical Applications

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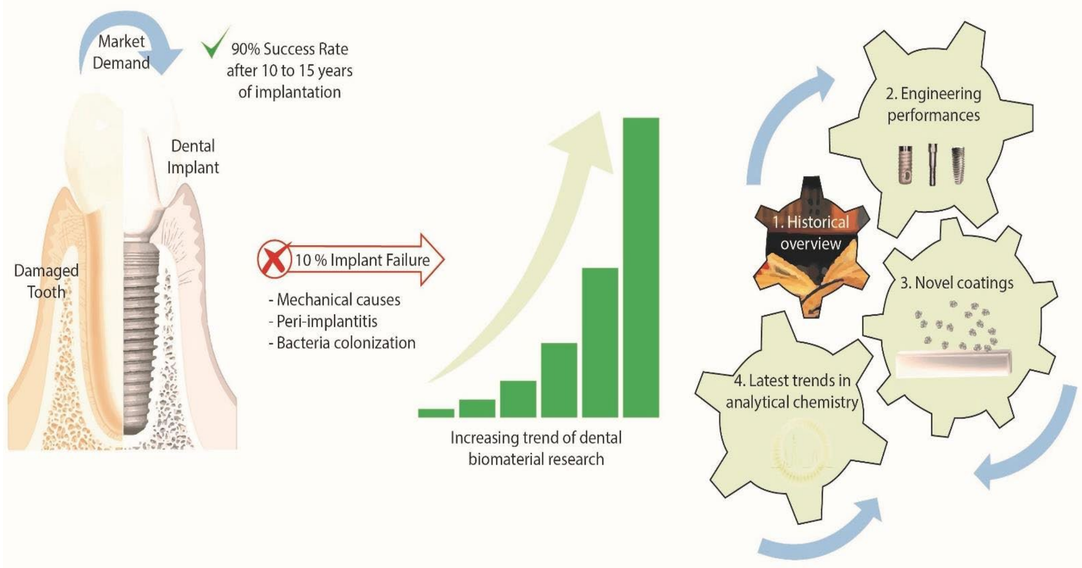
INTRODUCTION

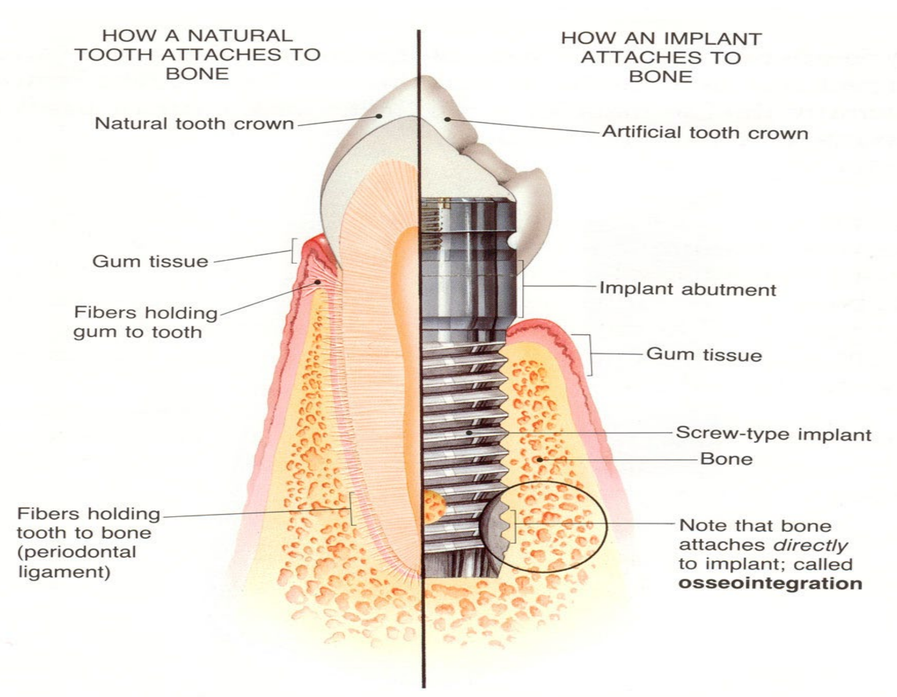
Research on engineering strategies for dental implants has focused on the implant material composition, geometry and surrounding tissues. In the same way, a special interest has been created in the inclusion of superficial coatings since they improve osteointegration and minimize the appearance of peri-implantitis and associated risks.



PERI-IMPLANTITIS -OSSEOINTEGRATION

Peri-implantitis is defined as a pathological condition associated with plaque that occurs in the tissues around dental implants, characterized by inflammation in the peri-implant mucosa and subsequent progressive loss of supporting bone

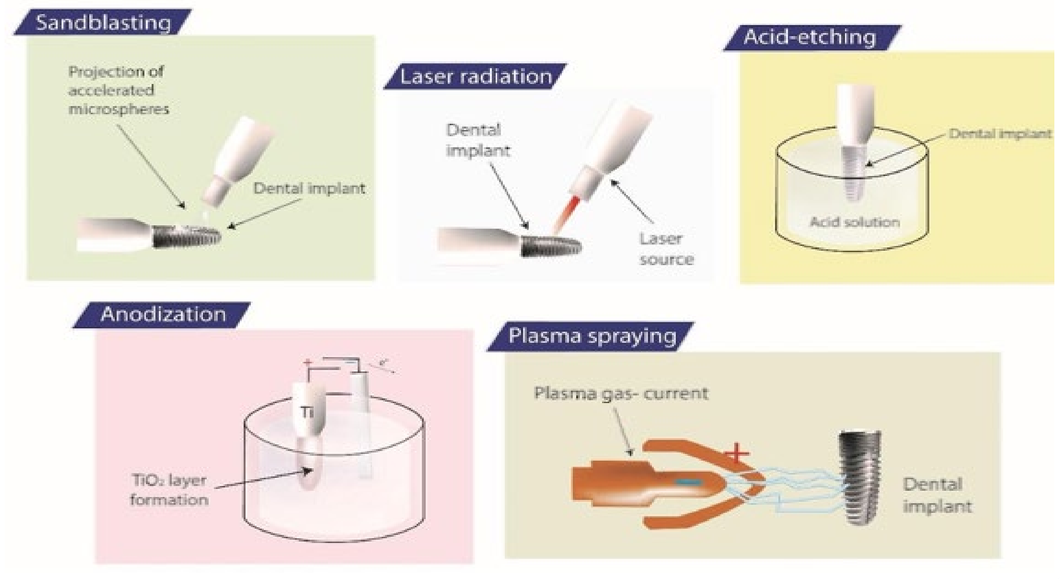
Osteointegration is triggered by a cascade mechanism starting with interfacial reactions between the implant surface, the blood cells and connective tissue to end in bone remodeling and new bone formation.



BIOMATERIALS COMPOSITION

The most important properties of an implant biomaterial are: The modulus of elasticity, tensile, compressive and shared strength, ductility, surface tension, surface energy and superficial roughness. Metals,caramics and polymers have represented the materials of dental choice.

SURFACE MODIFICATION



CONCLUSIONS

1. Bioglass has the best characteristics compared to other materials, which improve osseointegration, drug delivery, biofunctionality and a faster healing of the bone.

2. The composition of the biomaterial of the implant, the surface and geometry allows to achieve osteointegration after an implantation surgery.

3. The best strategy to obtain bioactive topographies is the combination of laser radiation and acid etching, it helps to generate antibacterial surfaces, corrosive resistance, cell recruiting, and faster healing bone.

COATINGS