Laser4surf

User case Laser4surf : Medical implants

Impact of laser texturation on implant osteointegration

Marilys Blanchy, R&D Project manager at RESCOLL
Marilys.blanchy@rescoll.fr

RESCOLL
Société de Recherche

EPIC Online Technology Meeting on Surface Structuring

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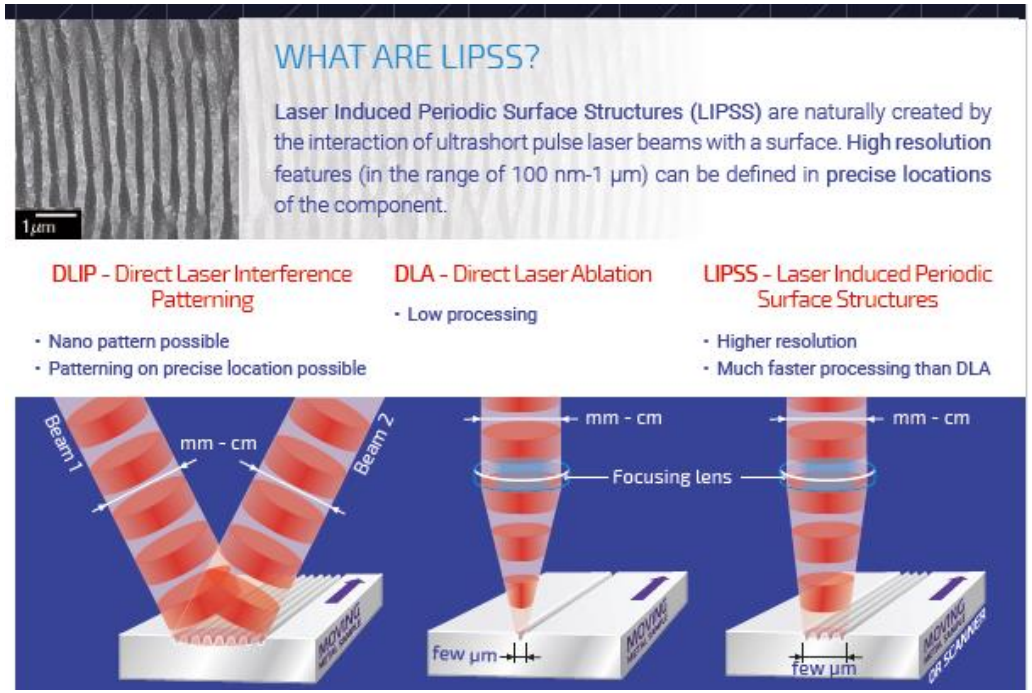
Laser4surf: Laser for mass production of functionalized metallic surfaces

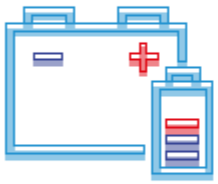
Laser4surf

Objective :
Development of a Laser texturation of metallic surface for 3 users cases : Medical implants, Batteries and Linear encoders



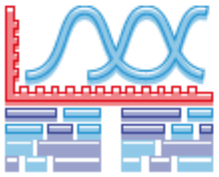
1) MEDICAL COMPONENTS

Antibacterial properties against mouth infections along with a surface enabling a good biological response by the surrounding tissues will deliver the **new generation of dental implants.**



2) ADVANCED BATTERIES

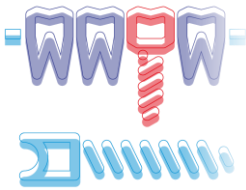
Enhanced adhesion and roughening of the current collector will allow controlled changes in the current collector surface in a **very cost-effective and fast way (0.1 min/cm2).** It will also **improve the electrochemical properties** of battery current collectors.



3) LINEAR ENCODERS

Tuning the reflection properties on the scale will make the encoder **less prone to misalignments.**

Osteointegration of medical implants



Clinical/medical Needs :
Avoid implantation failure due to wrong integration

Quality of osteointegration dependant of **chemical, mechanical** and **topographical** features

Macrotopographic features

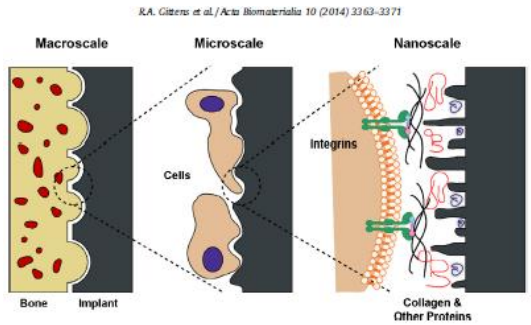
→ **Dependant of the design of the implant**

Microtopographic features

→ Mechanical anchorage

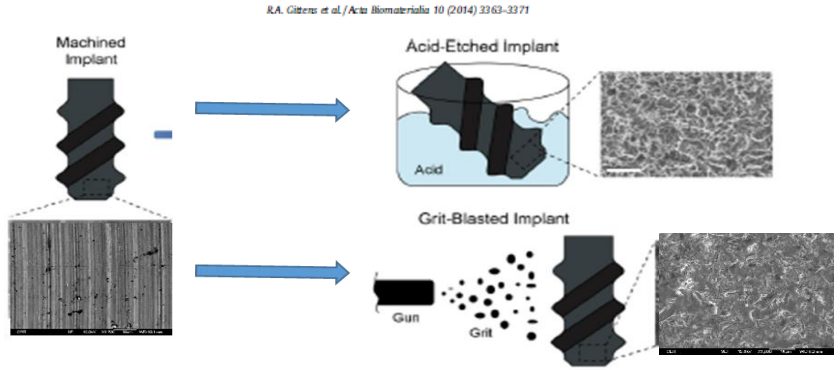
Nanotopographic features

→ interact with osteoblast



Several methods are used in industries:

- **Chemical surface modification** : acid-etching , anodization or else chemical coating
- **Physical modification**: sand or grit blasting

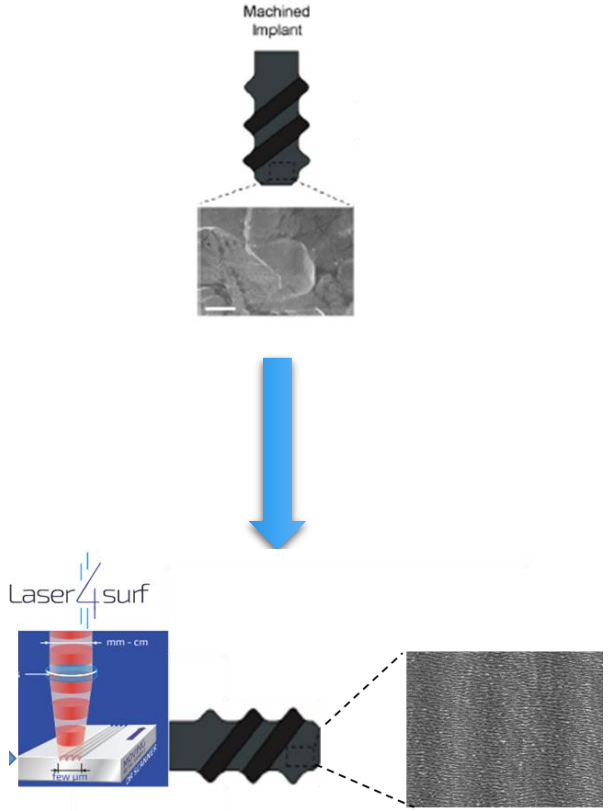


Objective of Laser4surf : Development of a Laser texturation of metallic surface for better osteointegration

Laser4surf: Laser texturation for the improvment of osteointegration

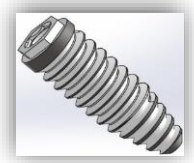
The objective of Laser4surf is to provide a new surface treatment to:

- Improve osteointegration with pre-defined topographic features
- Be clean and environment friendly
- Be fast and cost effective
- Meet regulatory standard
- Be applicable on small and complex shape



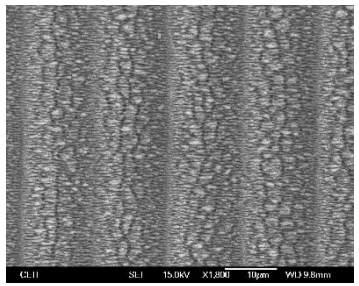
DENTAL SCREW

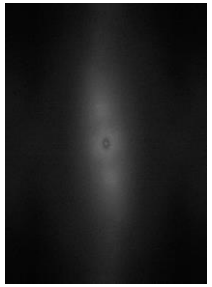
TEXTURIZED DENTAL SCREW

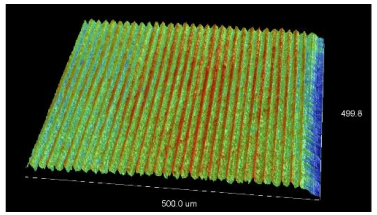


Results

Quality of surface

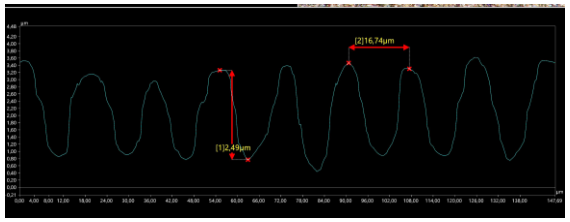


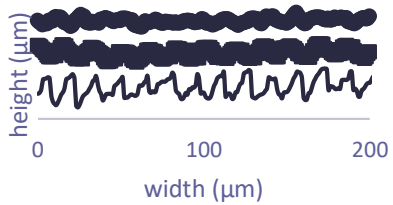




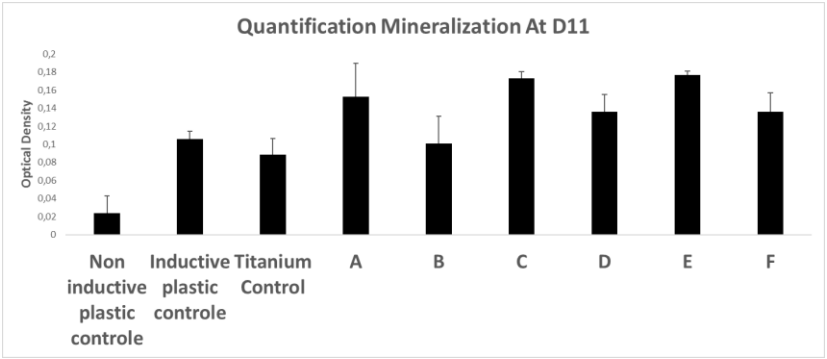
Homogeneous surface with control of the roughness

Controlled topography



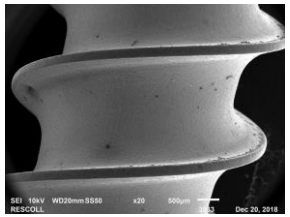


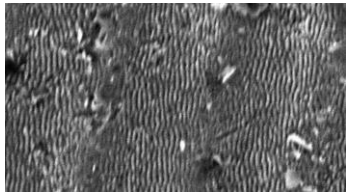
Improvement of cell functionalization

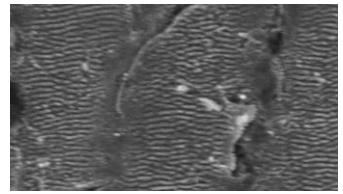


Mineralization X2 greater
Control of cell orientation

Applicable to complex shape







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https://www.laser4surf.eu/

RESCOLL

Mathilde Napolitan
Florent Deliane
Konstantin Sipos
Marilys Blanchy

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Marlène Durand
Martine Renard
Reine Bareille

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Aldara Pan
Noemi Casquero
Miguel Martínez
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Liliana Cangueiro
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