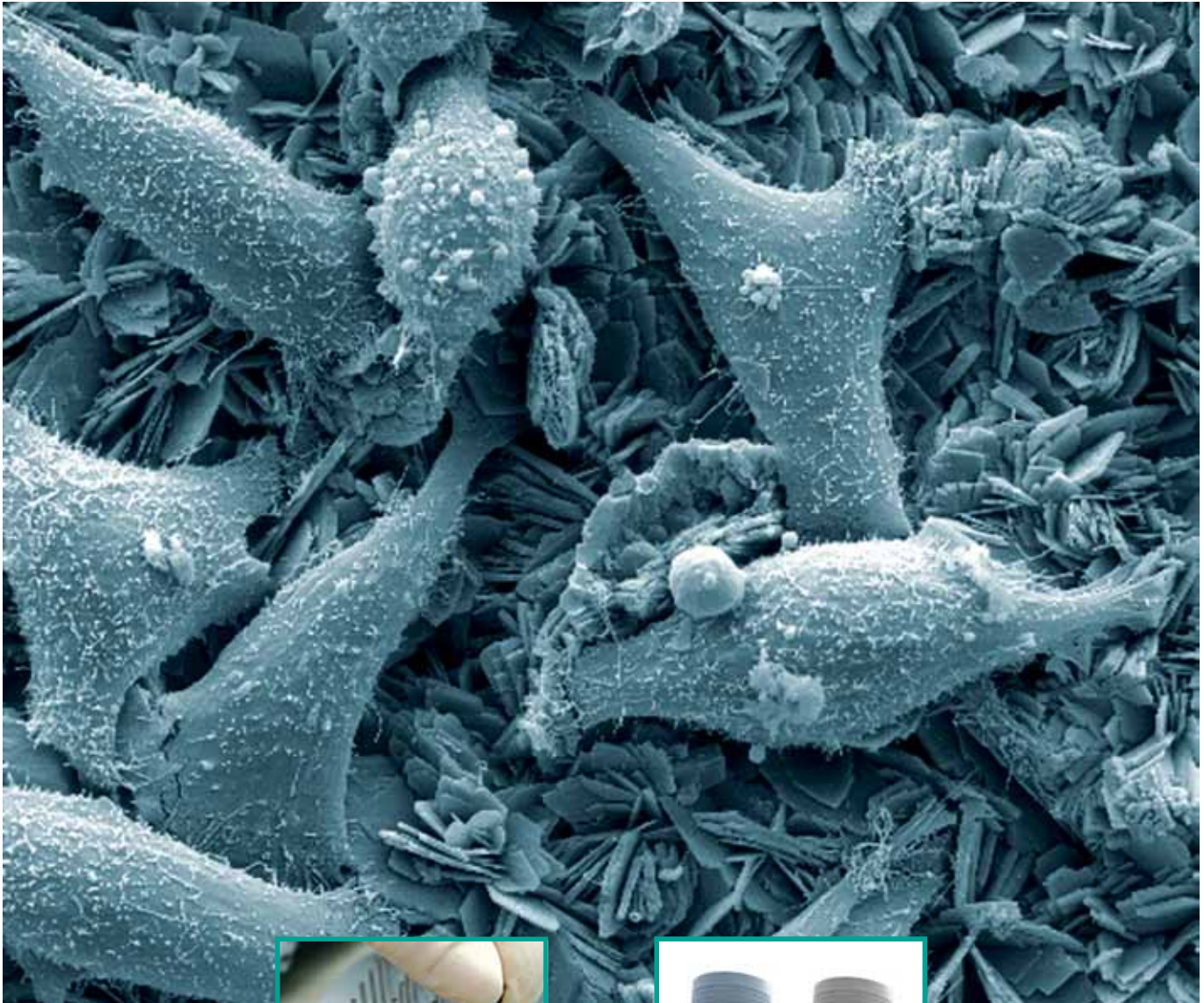


# Innovative Surface Treatments for Dental Implants



# One Source – Multiple Solutions

## Background

The long-term success of dental implants largely depends on rapid healing with safe integration into the jaw bone. Both requirements can be achieved by adequate surface functionalisation with different and complementary surface treatment processes. As a general rule, in a first step the surface is roughened by different blasting media. Where required it is further structured by an acid etching process, which is followed by the deposition of a bioactive Calciumphosphate coating. Such micro and nanostructured surfaces display a high degree of biocompatibility and promote the ongrowth of bone.

DOT offers State-of-the-Art surface treatment solutions for dental implants in first grade quality. Generally DOT surface enhancements can be supplied for all dental implant systems, independent of individual geometry.

Dental implants with functional DOT surface treatments have received CE and KFDA approvals.

DOT has provided surface treatments for more than 250.000 dental implants during the past years.

Apart from the functional surface treatments for dental implants, DOT offers solutions for the anodisation of implant components and implant related instruments. Also, DOT is servicing PVD coatings for cosmetic applications and for wear reduction of rotating dental instruments.

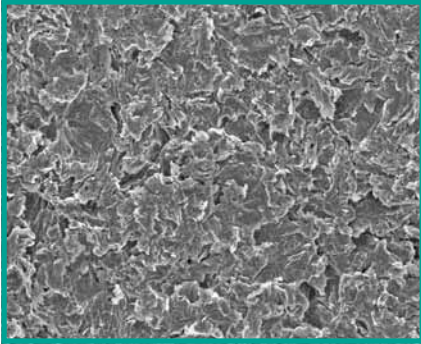
In a time where the combined application of several surface treatments becomes a key success factor for dental implant systems, OEMs can substantially benefit from a supplier, who is servicing the whole range of surface treatments. As the "one" source offering multiple surface enhancement options, DOT helps to cut production lead time and thus to speed up time to market.

DOT offers the following combined or single surface treatments for dental implant systems and instruments:



Surface Treatment Options				
	Corundum blasting		CaP coating (BONIT®)	
	HA blasting		CaP coating (BONIT®)	
1.	HA blasting	Double acid etching		DUOTex®
2.	HA blasting	Double acid etching	CaP coating (BONIT®)	BONITex®
3.	Corundum blasting	Acid etching		CELLTex®
4.	Corundum blasting	Acid etching	CaP coating (BONIT®)	CELLBIOTex®
5.	PVD coating (TiN, ZrN)			
6.	Anodisation type II ( DOTIZE®)			
7.	Anodisation type III (Colouring)			
8.	DLC coating			

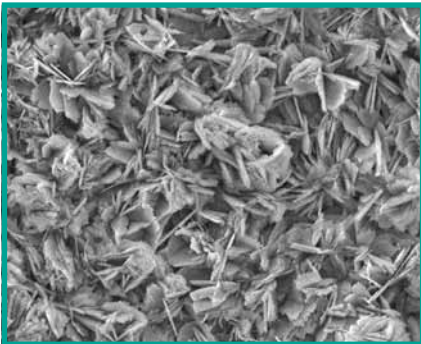
# DOT surface treatment options for dental implants



## 1. HA blasting/Double acid etching DUOTex®

DUOTex® is a subtractive surface which is created by HA blasting and a double acid etching process. Due to the microstructured topography, the surface shows a roughness of approx.  $R_a = 1,1 \pm 0,5 \mu\text{m}$ . The high capillarity of the surface also

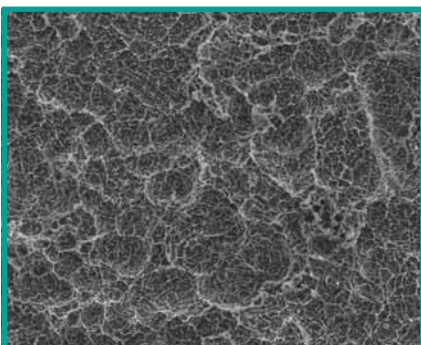
results in a high wettability for body fluids. The DUOTex® surface shows good biocompatibility and osteoconductivity and therefore support osseointegration of dental implants.



## 2. HA blasting/Double acid etching/CaP coating BONITex®

The BONITex® surface is generated by HA blasting, double acid etching followed by adding a very thin CaP-layer (BONIT®). Therefore BONITex® is a combination of an optimal roughness and surface topography with a very thin CaP-layer

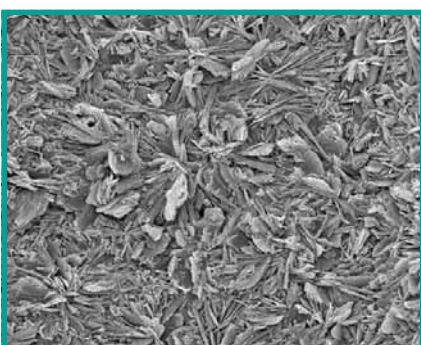
that comprises all features to allow for high primary stability and rapid bone on-growth.



## 3. Corundum blasting/Acid etching CELLTex®

The CELLTex® surface is a macro- and microstructured surface obtained by a corundum blasting and acid etching process. Due to its topography the surface shows an osteoconductive effect and therefore supports osseointegration of

enossal dental implants. The roughness of the surface is  $R_a = 3,0 \pm 1,5 \mu\text{m}$ . CELLTex® is only available for pure titanium implants.



## 4. Corundum blasting/Acid etching/CaP coating CELLBIOTex®

The CELLBIOTex® surface is generated by corundum blasting, acid etching and coating with a very thin layer of CaP (BONIT®). Due to the corundum blasting and acid etching process the surface shows a macro- and micro structured

surface topography. The very thin, resorbable CaP coating (BONIT®) comprises all features for enhanced bone ongrowth followed by a reduction in healing time. CELLBIOTex® is only available for pure titanium implants.



## 5. PVD coating (TiN, ZrN)

PVD (Physical Vapour Deposition) coatings, such as Titanium Nitride or Zirconium Nitride are applied for cosmetic reasons on dental implant collars and abutments or for reasons of wear protection on rotating dental instruments. TiN

ceramic hard coatings with a thickness of  $\sim 2 \mu\text{m}$  enhance the product life span of instruments and can avoid potential contaminations due to their proven biocompatibility.



## 6. Anodisation type II DOTIZE®

Anodisation type II surface treatments with a thickness of max.  $3 \mu\text{m}$  are produced by an electro-chemical process on prosthetic screws with the aim to reduce cold welding and allow for easy screw removal, if necessary. The DOTIZE®

procedure conforms to the standard AMS 2488.



## 7. Anodisation type III Colouring

To have optimal working conditions during surgical procedures, anodisation type III electro-chemically treated surfaces are used for the colour coding of dental implant abutments or temporary implant components, such as cover screws. De-

pending upon the selected colour the layer thickness is  $20\text{--}200 \mu\text{m}$ . DOT services a broad variety of colours.



## 8. DLC coating

DLC coatings are metal-containing, amorphous carbon coatings consisting of the elements chromium and carbon. Through a PVD process both elements are converted into the requested DLC hard layer. The coating thickness of the DLC

layer is  $0.8 \pm 0.3 \mu\text{m}$ . DLC coatings display a very high adhesive strength combined with high micro hardness. Due to a very low friction coefficient, DLC coatings reduce wear and therefore lead to an extended lifetime of tools and instruments.

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**DOT**  
medical implant solutions

DOT is one of Europe's leading providers of medical coating solutions for orthopedic and dental implants and instruments and also their cleanroom packaging.

We also develop and manufacture products for regenerative medicine for dental and orthopedic applications.

Our comprehensive supply chain concept makes us an ideal medical technology partner. Our activities help restore the health of patients worldwide and thus make a major contribution to the improvement of their quality of life.