Biomimetic Cementless Coating Technology

Overview
Our advanced biomimetic calcium phosphate (CaP) coating has a microcrystalline structure which maintains substrate surface roughness providing a large area for bone integration. The biphasic composition of this coating (>70% brushite) has been shown to promote short and long term osseointegration while the bone like (biomimetic) coating morphology can provide a potent capillary effect which may help to accelerate the implant healing process.¹,²,³,⁴,⁵,⁶,⁷,⁸,⁹
Advanced biomimetic cementless coating technology with more than 20 years of clinical heritage\textsuperscript{5,6,9}
Bridging the gap

The room temperature electrolytic process results in the formation of a 20µm thin, needle-like, microcrystalline coating similar in morphology to natural bone tissue. This type of coating has been shown to seamlessly integrate into the bone tissue development process\textsuperscript{1,2,3,10,11}.

The needle-like CaP platelets, stacked parallel to each other, have a hydrophilic effect on blood which may be beneficial for the adsorption of growth factors and adhesion of bone cells\textsuperscript{2,4}.
No ordinary coating

Unlike conventional ‘line of sight’ plasma spraying processes, electrolysis allows for complete and uniform coverage of all exposed implant surfaces, whilst maintaining the surface roughness of the underlying titanium porous coated implant.²

- Provides a large area for bone deposition.
- May reduce the risk of coating delamination.
- May increase implant tolerance to micro-movements.

Advanced biomimetic CaP coating (top and bottom left) versus plasma-sprayed HA coating (top and bottom right) on a porous Ti-coated structure.
A step ahead

Advanced biomimetic CaP coatings have shown excellent clinical survivorship in various orthopaedic applications such as dental, spine, hip, knee and ankle, with approvals in most of the major global orthopaedic markets. Animal studies and clinical trials have provided impressive proof of efficacy for this type of coating with increased bone formation and improved mechanical anchorage being observed in the early post implantation period.
Over one million implants coated with microcrystalline calcium phosphate since 1995$^2$
Our advanced biphasic CaP coating contains a soluble brushite phase which gets resorbed rapidly with the potential for short-term bone synthesis\textsuperscript{2,3,7,8,9,10}. The highly crystalline HA phase on the other hand releases ions over a relatively long period which may help to provide long-term bone integration\textsuperscript{5,6,9}.

Unlike conventional, highly crystalline, HA coatings that provide long term benefits, the co-ordinated bioactivity exhibited by biphasic CaP coatings of this type may provide excellent short and long-term osseintegration\textsuperscript{1,3,5,6,7,8,9,10}.

Enhancing bioactivity
Accelerating bone integration

Advanced biomimetic coatings of this type have been shown to resorb into the joint space within 8-12 weeks of implantation, exposing the porous structure to rapidly deposited bone tissue. This may help to provide an improved mechanical interlock between the developing bone and underlying implant.  

Rapid osteoblast coverage and developing bone matrix has been seen within 30 hours of exposure in samples immersed in culture medium.  

Rapid osteoblast coverage and developing bone matrix has been seen within 30 hours of exposure in an advanced biomimetic CaP coating samples immersed in culture medium.
Pioneers in progressive technologies

Corin is dedicated to the use of advanced coating technologies to improve implant function and longevity. Our advanced biomimetic coating features on AMC™, Uniglide™, TriFit TS™, Trinity™ and Zenith™ implant ranges as an advanced cementless fixation option.

Retrieval analysis of a cementless Uniglide tibial plateau, from a patient who underwent five episodes of knee surgery prior to unicondylar knee replacement, showed excellent biological fixation.

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Achieving new heights in innovation
References:


