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# FIXATION IMPLANTS

## Ceramic implant screws for medical applications (UN491)

### THE PROBLEM

Metallic implants, like screws which are used in the treatment of bone fractures or torn ligaments, might induce allergies or even rejection reactions. For precautionary reasons, metal-based screws are therefore often removed after reconstruction. This makes a second surgical intervention necessary and is strainful to both the patient and the healthcare system. Medical implants which possess a better physical compatibility and are even resorbable, i.e. coalesce with the bone, can now overcome these disadvantages.

The ceramic material hydroxyapatite is excellently suited to be built into bone, as it matches the major inorganic constituent of bone almost to completion. Medical implants made of hydroxyapatite not only better tolerated, but they can also remain in the bone where they solidly grow together with natural bone material. As yet, however, it has not been possible to manufacture ceramic implant screws possessing sufficient mechanical stability.

### THE SOLUTION

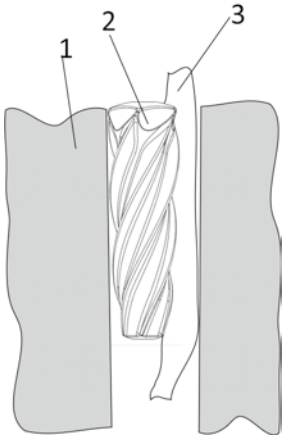
Material researchers in Bremen, Germany, have developed an interference screw for the reconstruction of a ruptured cruciate ligament. It has a special design based on hydroxyapatite and disposes of sufficient hardness. The new ceramic-compatible geometry of the screw makes it possible to drive it into bone simply by exerting pressure. The special swirl thread profile permits minimizing the tensile strengths which sometimes account for the failure of a ceramic. Prototypes which are being tested on an animal model in the scope of a research project, exist.

### ADVANCES AND APPLICATIONS

- The new bone screw based on hydroxyapatite consist of a material that is similar to bone.
- The new geometry of the screw permits avoiding torques and thus gives the ceramic screw a better material strength.
- Handling during surgical intervention is made easy.

Benefits

- The geometry according to invention makes ceramic screws based on hydroxyapatite available to applications in medicine, e.g. fixation of ligaments.
- The material similar to that of natural bone gives the screw a better physical compatibility and assures that the screw will grow together with the bone (osseointegration).




**FIELD OF APPLICATION**
Bone replacement material

**KEYWORDS**
Bioceramic implants, hydroxyapatite

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**AN INVENTION OF**
University of Bremen, Germany

Universität Bremen

InnoWi GmbH
Fahrenheitstraße 1
28359 Bremen
Germany
Tel.: 0421- 96 00 7 - 0
mail@innowi.de
www.innowi.de