

TITULO New intramedullary implant for bone prosthesis

DESCRIPTION OF TECHNOLOGY

Researchers from the Polytechnic University of Valencia and the Valencia University Hospital – INCLIVA have designed a new intramedullary implant that can be combined appropriately as the endomedullary component of a hip, knee, elbow or shoulder prosthesis. It can also be used as an intramedullary nail in the reconstruction of fractures or as a support for a post-amputation external prosthesis.

The implant, patented by the UPV and INCLIVA, has an extremely novel design composed of various expandable modules made from polymers that can be easily inserted into and extracted from bones. Thanks to its geometry, it can be customized to the needs of individual patients.

Most of the present implants are composed of a single piece inserted into the medullary canal using a mallet, which can be a traumatic process and the bone has been known to splinter. In addition, the stiffness of these implants provokes the loss of bone tissue (disuse osteoporosis) and may require a controlled fracture when the implant is removed (enlarged osteotomy).

The new device reduces the main disadvantages of the present implants: it can easily be introduced into the bone, it can be previously expanded to the appropriate size and stays in place by friction, allowing control of the stresses on the bone, especially important when these are weak. The implant then becomes osseointegrated and can stay in place over long periods. Being made of polymer it is easy to extract and reduces the risk of bone fractures.

The implant improves safety and facilitates surgical interventions and also makes the process less traumatic, as the surgeon has greater control of the operation, thus enhancing the patient's recovery.

Another fundamental aspect is that its stiffness is similar to that of cortical bone, so that the stresses on the implanted bone can be distributed similarly to those of a non-implanted bone, facilitating bone remodelling.

COMMERCIAL APPLICATIONS

- General: exo and endo-prostheses in extremities and fracture treatments.
- Specific:
 - Exo-prosthetics in extremities by DSA techniques.
 - Endo-prosthetics of long bone joints.
 - Treatment of long bone fractures.

TECHNICAL AND COMMERCIAL ADVANTAGES

- Initial safe and simple implanting and fixing of the nails to the medullary canal.
- Safe and simple extraction of nail avoiding controlled fractures.
- Avoids drilling screw holes in the bone aligned with the implant to fix the nail in place.
- Improves load transmissions to the bone and reduces the stress shielding effect.
- Adaptable to a wide variety of applications.
- Immediate effect without having to wait for the osseointegration of the nail to the canal.
- System can be customised and adapted to individual patient's needs.
- Behaviour similar to traction in the arm and compression in the leg.

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- When used in amputations of femur and humerus can be combined with a percutaneous collar - also designed by the UPV and INCLIVA research team – to improve the anchorage to the adjacent tissues and create a barrier to infection.

STATE OF THE TECHNOLOGY

The technology has been simulated by FEM on ANSYS software.

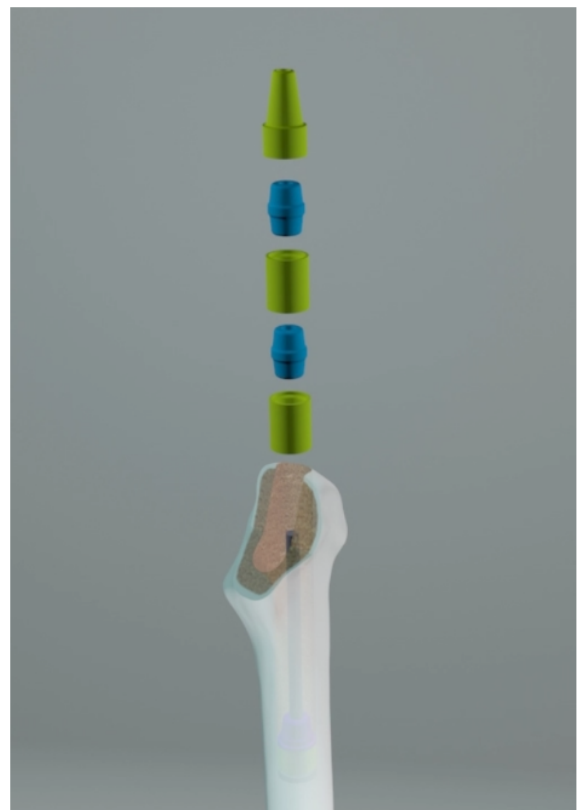
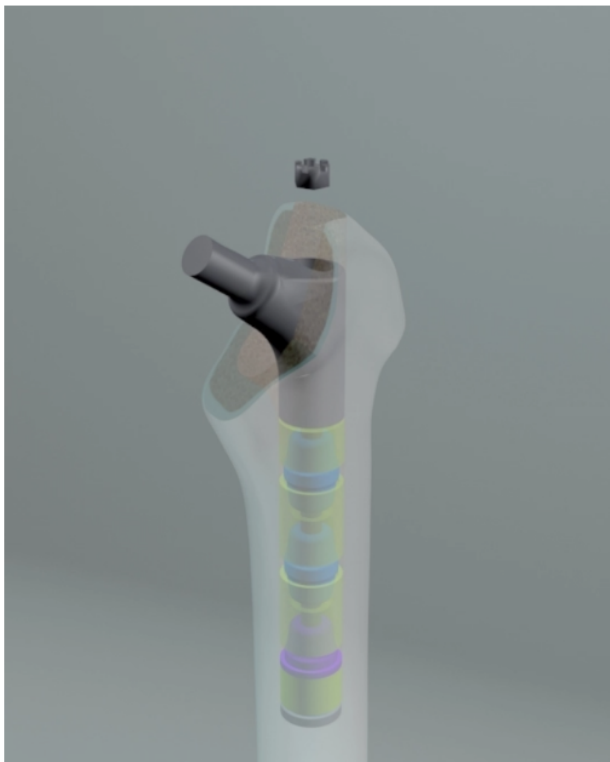
INDUSTRIAL AND INTELLECTUAL PPROPERTY

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COLLABORATION SOUGHT

Companies interested in reaching an agreement on a patent licence for production or marketing are invited to contact the developers.

VIEWS OF THE DEVICE



CONTACT INFORMATION

Technical:

José Albelda

Centro de Investigación en Ingeniería Mecánica

jalbelda@mcm.upv.es

Tel. 96 3877000 (Extensión:76214)

Commercial:

Elsa Domínguez Tortajada

I2T UPV

<http://www.i2t.upv.es>

eldotor@upv.es

Tel. 963877409