STABILIZED SCAPHOID PARTIAL PROSTHESIS

DESCRIPTION OF THE TECHNOLOGY

After an impact on the hand or wrist, fractures of the scaphoid bone are the most common, accounting for 80% of carpal fractures. The importance of correct diagnosis and treatment in the acute phase is fundamental for prognosis and evolution, since injuries to this bone that are not treated or incorrectly managed will have long-term complications such as the absence of consolidation or pseudoarthrosis, avascular necrosis (in up to 50% of cases) or chronic instability that will progressively lead to the development of carpal osteoarthritis. In those cases where the standard interventions with bone grafts have failed, there is only the possibility of a salvage intervention where the wrist is fixed but the carpal kinematics are completely sacrificed.

Research staff from FISABIO (Foundation for the Promotion of Health and Biomedical Research of Valencia Region) and the University of Valencia (UV) have designed a partial prosthesis model of scaphoids that replaces only the proximal necrotic part, preserving the distal third of the scaphoid. With this design, the distal fragment of scaphoid bone serves as the proximal anchorage of the implant and allows the reconstruction of the dorsal and palmar scapho-lunar ligament.

The new prosthesis simulates the dimensions and morphology of the anatomical scaphoid and has been designed in three sizes that adapt to any patient with the aim of relieving pain and maintaining the widest range of mobility and strength possible, and therefore will not lead in the future to collapse and carpal arthrosis.

The indication for this arthroplasty in clinical practice would be in cases of recalcitrant pseudoarthrosis of the scaphoid, avascular necrosis of the same, Preiser's disease, some acute fractures with great comminution or displacement where it is impossible to perform an anatomical reduction and primary osteosynthesis or in cases of incipient arthrosis of the secondary wrist to an advanced collapse by scaphoid pseudoarthrosis (SNAC).

MARKET APPLICATION SECTORS

Companies working in the area of traumatology and orthopedics with the capacity of biocompatible material manufacturing.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- Three sizes available that adapt to all anatomies and therefore manufacture can be standardized.
- The surgical procedure to be used is the common one so its implantation in clinical practice would be simple.
- The new anatomical prosthesis, unlike those that now exist, takes into account the rest of the carpal bones with which the scaphoid articulates maintaining dimensions and a correct articular congruence.
- It allows a wide range of movements and strength. Therefore, it avoids collapse and carpal arthritis caused by lack of mobility.
- Since the new design does not imply completely replacement of the scaphoid, it respects the extrinsic ligaments of the wrist which play an important role in the carpal kinematics during the different movements, especially in the movement of throwing darts.
- By anchoring the prosthesis to the scaphoid itself, it acts as a singel unit allowing the previous movement of the scaphoid.

  The prothesis avoids second surgical interventions. Many prostheses act as spacers, i.e., they are placed where the damaged bone was previously and fill in the space to avoid collapse. As these

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systems are not fixed to other carpal bones, they tend to flex and sublux dorsally, forcing a second surgical intervention to remove them.

CURRENT STATE OF DEVELOPMENT

Prototypes are available in three sizes and both lateralities, left and right sided, to cover all population variability. The prototypes have been successfully validated in corpses by a complete kinetic and kinematic test in which the functional behavior of the carpus has been studied through the analysis of the scaphoids movements, radius, and large bone.

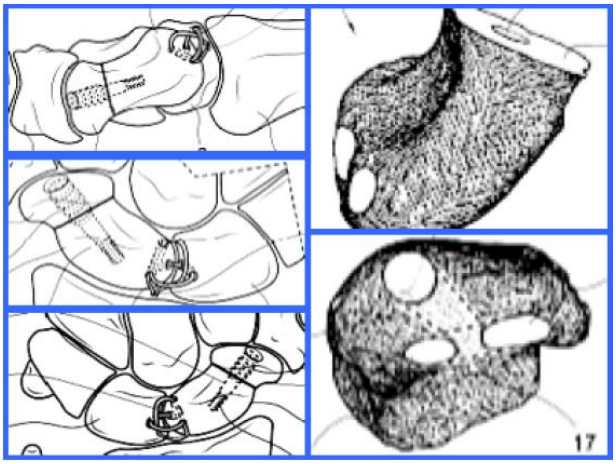
INTELLECTUAL PROPERTY RIGHTS

Patent filed at the Spanish Patent and Trademark Office with registration number P20190102 and priority date February 8, 2019. In the period of the year of priority the international extension via PCT is foreseen.

COLLABORATION SOUGHT

Companies interested in a license agreement to commercialize the technology or a technical cooperation agreement to continue the development of the technology.

RELATED IMAGES



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