3D PRINTED CUSTOMISABLE VASCULAR SIMULATOR

TECNOLOGÍA PATENTADA

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RESUMEN

The **Design in Engineering and Technological Development (DIDET)** group from the ArtefactosLAB laboratory of the University of Alicante has developed a modular system of interchangeable sections to simulate vascular anatomical models of arterial networks customisable for a patient. This invention, manufactured by **3D printing**, enables the preparation in greater detail of real interventions of different pathologies such as aneurysms or stenosis.

The group is looking for companies or institutions interested in continuing with this health innovation work by developing the system or in the design and manufacture of other new devices.

VENTAJAS Y ASPECTOS INNOVADORES

MAIN ADVANTAGES OF THE TECHNOLOGY

The present invention has great advantages:

- The modular system can partially configure a part of the anatomy (head, leg, arm, etc.) or the entire human body by joining the different modules together. This versatility makes it possible to cover different medical specialities.
- Quick assembly and disassembly of both the modules and the interchangeable sections allows, on the one hand, didactics in training workshops, and on the other hand, customisation of the device with real patient pathologies (aneurysms, stenosis, etc.). This increases the quality of medical training, promotes surgical planning and improves patient care, all of which leads to a reduction in operating theatre and hospitalisation times, with a consequent reduction in hospital costs.
- In terms of surgical planning, it provides significant value in the neuroradiology field, as it allows complex clinical cases to be analysed to create 3D biomodels based on medical imaging techniques of the patient.
- The interchangeable sections are made of transparent material, allowing the interventional physician to locate the position of the lesion or pathology and manoeuvre with the corresponding instruments along the arterial network in a visually direct manner. In addition, the material of the interchangeable sections is radiolucent, which allows them to be viewed by radiology equipment in the hospital environment.

INNOVATIVE ASPECTS

3D printing, together with the use of three-dimensional models, has become a productive alternative in the traditional industry. At present, they are offering solutions to technical problems in industry, healthcare and even those that affect people's quality of life. Particularly useful for short series as they offer great flexibility and the possibility of customisation. This is the case of the present invention which, within 3D printing, uses stereolithography (SL) technology to manufacture parts using high-performance resins that are stable, resistant, durable and with good precision.

After manufacturing, it is essential to carry out an exhaustive chemical washing of the interchangeable sections, inside and out, until the resin remains are completely eliminated from the sections, prior to curing by UV radiation. This guarantees the quality of the interchangeable sections produced.

Optionally, the modular system of interchangeable sections can form part of an augmented (or mixed) reality system that allows the patient's body to be virtually visualised together with all the digital information necessary for the clinical practice of the intervention. To this end, the base

incorporates an identification code (QR or other) on its surface that allows it to act as a marker in the augmented reality system.

Therefore, it is a manufacturing process that is characterised by the low cost of the materials and equipment required, as well as the possibility of being produced quickly anywhere in the world with the consequent savings in logistics and distribution.

APLICACIONES DE LA OFERTA

It is primarily aimed at the healthcare technology and innovation sector for the improvement of medical training and surgical planning.

3D printing or additive manufacturing is a technique that can be applied to satisfy any need, in any field, that a person may have. It is especially useful for people with functional diversity with very personal problems in fields such as medicine, education, work or mobility.

COLABORACIÓN BUSCADA

From ArtefactosLAB, the DIDET group is looking for companies or institutions interested in supporting the development of the system or in the design and manufacture of other new devices for social or health purposes.