

# Our Mission: to Redefine the Standard

We work hard to build a future designed to develop and produce innovative medical solutions to improve the health of patients all over the world, basing our commitment on passion and developing our expertise and know-how.

## THE ADVANTAGES OF EBM TECHNOLOGY

EBM is the acronym for Electron-Beam Melting and refers to a 3D printing technology in which a high-energy source (consisting of an opportunely concentrated beam of electrons) hits a bed of titanium powder causing it to melt.

## DESIGN FREEDOM

Topological optimization  
Design of trabecular structures  
Structures with a high resistance/weight ratio  
Structural continuity between solid and porous structures

## EXCELLENT MECHANICAL PROPERTIES

Compliant to ASTM international standards  
Microstructure comparable to traditional technologies

## HIGH PRODUCTIVITY

Completely recyclable materials  
Possibility of production with modular storage towers



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*Health. Innovation. Life.*

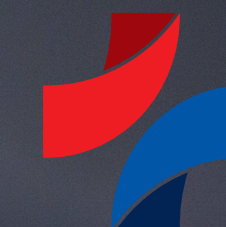
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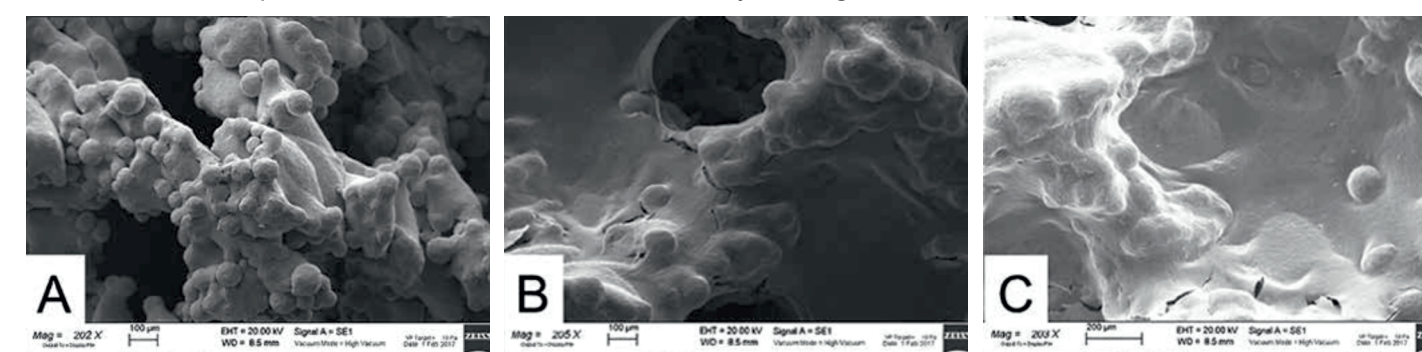
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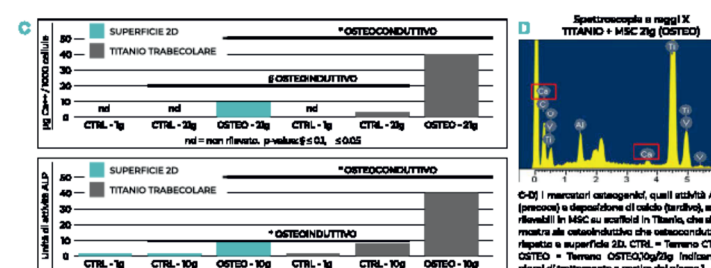
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# Ares-TR Redefining Chest Wall Reconstruction

The cavities of the porous trabecular structure are filled by cell regrowth.



Scan using the electronic microscope of the empty cage (A) and the cage in which hASCs were sown and cultivated in a growth medium (B) and an osteogenic medium (C) for 21 days.  
Magnifications: A:202x. B:205x. C:202x



An in vitro study was carried out at IRCCS Galeazzi Orthopaedic Institute in Milan in which mesenchymal stem cells (MSC) were cultivated isolated from subcutaneous adipose tissue (adipose-MSC, ASC) on a trabecular titanium scaffold made using our EBM technology. It was observed that in 21 days, the MSC colonized the entire scaffold and osteogenic markers were detected, such as ALP activity (early) and calcium deposition (late), showing its osteoinductive properties.

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# Ares-TR Strenght in Every Breath

Adaptia partnership with MT Ortho Srl Italy provide a range of customized surgical implants for supportive treatment of deformities, fractures and defects of the chest wall.

With the aid of the ARES-TR implants, osseous structures (sternum, ribs, etc.) can be re-fixed after surgical transaction, fractures can be stabilised, an Our expertise originates from a long experience in studying challenging bone and joint conditions and looking for the most suitable tailored solutions to treat them.

Every clinical case is unique because every patient is unique. As far as we can, we will provide surgeons with the most specific solution for each patient.

Additionally, the human body has outstanding self-healing capabilities. We will always choose less invasive, tissue sparing surgical solutions, provided that such solutions are safe and effective. When standardized solutions cannot guarantee optimal treatment, Adaptia can help identify, design and manufacture a custom-made solution for each patient.

With our partnership with MT Ortho Srl Italy we design and manufacture clinically validated, high-quality, cost-effective patient-specific solutions for thoracic surgery.

Our technical background and clinical expertise allow us to use porous metal and biopolymer 3D printing to support surgeons in finding patient-specific solutions in a wide variety of challenging medical conditions.

## Ares TR System Vs. Common Implants

The procedural complexity of chest wall reconstruction has led to a variety of solutions, none of which, however, has proven to be optimal. Conventional solutions have weaknesses, which, to different extents, make their advantages less attractive.

### Common implant drawbacks include:

- incomplete protection (lack of rigidity/stability)
- paradoxical breathing (lack of rigidity/stability)
- respiratory distress (excessive rigidity)
- post-operative pain (rigidity, insufficient permeability)
- implant breakage (inadequate mechanical resistance)

### Adaptia offers customized implants based on a patient's CT scan and designed in collaboration with surgeons:

- implants are made of titanium alloy, 3D printed with EBM technology by our partner MT Ortho Srl Italy.
- size can range from a single rib to sternum with multiple ribs
- solid and stable structure to avoid paradoxical chest motion and protect internal organs
- flexible and extensible ribs to allow for normal respiratory mechanics
- shape mimics sound rib cage to minimize deformity
- implant options can include detachable sternum-rib connections
- prosthetic ribs can be fixed to resected ribs with claw-type fixation or cerclages in a wide variety of challenging medical conditions.

# Bone Blast, the Technological Evolution that Makes Devices Osteoinductive.

In vitro studies on the genic expression of human cells similar to osteoblasts have shown that the trabecular structure in question is effectively capable of stimulating the proliferation and differentiation of the osteoblasts. It has also been shown that this material (Ti6Al4V) is able to encourage the down-regulation of the numerous genes involved in inflammatory processes and to modulate the genes that govern the immune system.

Adult human adipose tissue-derived stem cells (hASCs) cultivated on a trabecular titanium scaffold were able to join together with the net, proliferate and differentiate in a phenotype similar to an osteoblast, with the subsequent production of a mineralized extracellular matrix. The quality and quantity of the extracellular matrix are of fundamental important in determining the effective osseointegration of a material and as a result, the resistance and survival of a prosthetic implant.

### SCIENTIFIC EVIDENCE

At the University of Pavia in vitro tests were also carried out on a trabecular titanium scaffold to assess the osteoinductive properties of the material in contact with biological tissue. Mesenchymal stem cells were extracted from the fatty tissue and cultivated in a controlled environment on a scaffold with a porosity of 650  $\mu\text{m}$ . At different time intervals, analyses were carried out using an electronic scanning microscope to assess the adhesion and proliferation of the cells cultivated.



Ares-TR is a system for Thoracic Reconstruction with minimally invasive procedure.

