

# Additive Manufacturing of Orthopedic Implants

Additive manufacturing or 3D printing continues to gain adoption in orthopedics due to its enhanced capabilities, processes and overall patient benefit. We look at how and why it's being used and what growth is expected.

## AM Types Used in Orthopedics

Powder bed fusion (PBF) is the primary type of additive manufacturing used for orthopedic implants. PBF uses a laser or electron beam to directly and selectively melt or sinter layers of powdered materials together to form a solid part. PBF includes:

- Electron Beam Melting (EBM)
- Direct Metal Laser Sintering (DMLS)
- Select Laser Melting (SLM)
- Select Laser Sintering (SLM)

These processes use metals, like titanium, stainless steel and cobalt chrome, as well as polymers to make orthopedic parts.



## AM Applications in Orthopedics

While orthopedic companies are expanding their applications that use additive manufacturing, the technology is primarily seen in spine, ajoint replacement and CMF implants.



- Spine Cages



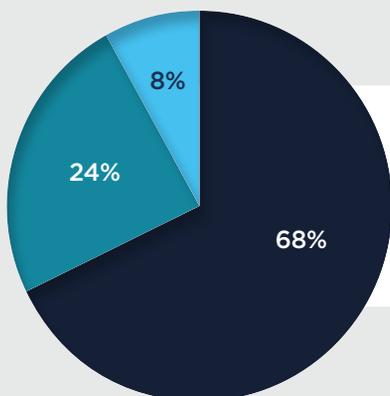
- Hip Cups



- Femoral and Tibial Components



- Craniomaxillofacial



**10%** of the 232 orthopedic FDA 510(k) clearances in 1H22 used additive manufacturing, the majority of which were for spine.

- Spine
- Joint Replacement
- Trauma

# AM Benefits in Orthopedics

Numerous benefits are often noted when orthopedic companies talk about additive manufacturing.



## Design Freedom

AM allows companies to design more intricate and complex shapes



## Easy Customization

AM processes are more compatible with small manufacturing runs like custom and patient-specific implants



## Reduction in Manufacturing

AM machines can produce many different designs, eliminating some machining set up and additional tooling



## Patient Benefit

AM designs reportedly offer better fusion and bone growth

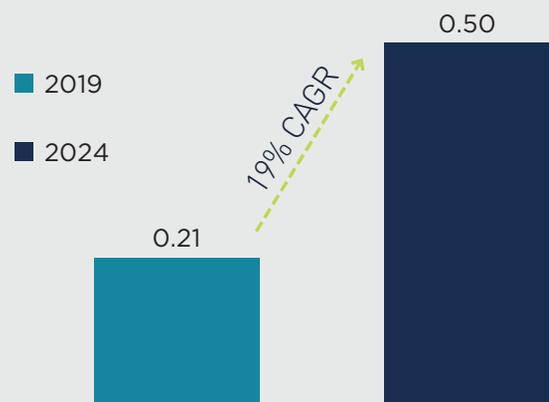
## AM Growth

Multiple indicators can define the growth of a technology.

A survey of suppliers — people selling machines, materials and software — and buyers — orthopedic device companies and contract manufacturers — projected the market to have a compound annual growth rate (CAGR) of +20% from 2019 to 2024.

The survey was conducted by AMPOWER, an additive manufacturing consulting agency.

System sales revenue in medical, dental industry in 2019 and supplier forecast 2024 (EUR billion)



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