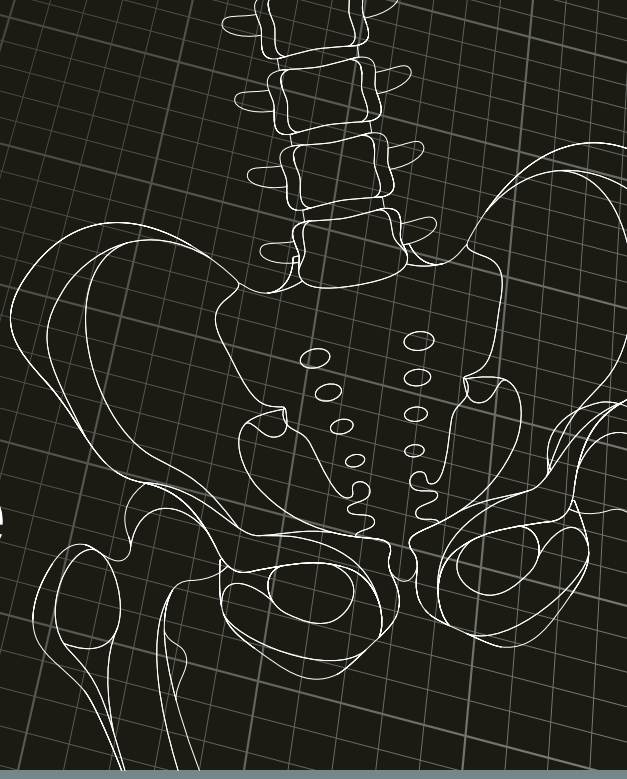
FATHOM
DIGITAL MANUFACTURING. **REIMAGINED.**



Case Study //

Medical Device Redesign

Engineering experts from Fathom helped a medical manufacturing company **improve the functionality and manufacturability** of a surgical device used by orthopedic surgeons.

Part Consolidation //

35%

FEWER PARTS

Problem //

DePuy Synthes, a leading manufacturer of orthopedic devices, wanted to improve the functionality of its first-generation reamer irrigator aspirator (RIA). Used to treat traumatic leg injuries, the RIA drills into the center of a femur bone to remove debris and create a channel in preparation for a marrow transplant or a metal rod implant.

This tool consists of a steel drill head, which cuts and removes material from inside the femur, a flexible drive shaft that can conform to the shape of the marrow canal and a drill, which rotates the shaft and drill head. The cutting head and shaft are cannulated to enable the transport of the debris from the cutting head to the drill.

The interchangeable steel drill head enables surgeons to match the size of the cutting tool to the patient's femur. The reusable drive shaft is made of nitinol, a flexible nickel-titanium alloy, with steel ends that can withstand the torque of the drill.

For the second-generation RIA, the manufacturer sought to improve the flow of aspirated tissue

and bone debris. Also, the disposable cutting head needed to be redesigned so it would attach more reliably to the shaft and wouldn't come loose during surgery.

Solution //

Fathom Recommends Design Improvements

Part Reduction // Fathom experts worked with the manufacturer's engineers to address their functionality improvements but also recommended design changes that would improve manufacturability, reduce the number of parts and help reduce the cost of the second-generation RIA.

Improved Reliability // Fathom engineers identified a concern with the existing pin system used to secure the drill head tangs to the drive shaft. Instead of press-fitting the pins in place, Fathom suggested welding them and modifying their locations to better grip the drill and improve the tool's durability.

Results //

Increased Device Durability // By switching to laser welding, the drill head has a tighter snap-fit to keep it securely attached during surgery.

Simpler Operation for Surgeons // The RIA removes tissue more thoroughly, so doctors have greater confidence in using it.

Optimized Manufacturability // Fewer parts and more durable weld points help keep manufacturing costs under control.

Reduced

- The incidence of cutting heads coming loose during surgery
- Manufacturing costs

Increased

- Device durability
- Its efficiency when removing tissue from the center of the femur
- Surgeons' confidence in using it because of its improved design

Services Used //

Design & Engineering Support

Laser Welding

Medical CNC Machining

Talk to an Expert //

Working with Fathom means easy access to Additive and Advanced manufacturing experts. Contact us today, and let's transform the future of manufacturing together!

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