



Success Story / **Design accompanying calculations**

Ulrich Medical strengthens doctor's back

Screws in the human spine and other bones are subject to the most demanding requirements. ulrich medical meets them perfectly - and uses simulation solutions from Simq to do so.

„We rarely have simple issues. In most cases, there are multiple issues to consider, such as contacts, friction, clamping and the like, so a wide variety of questions need to be addressed with simulation. This is where we turn to Simq and their expertise to advise on the next steps and find a safe solution.“

Stefan Middelhoff /

Leiter Entwicklung Wirbelsäulensysteme / Ulrich Medical

The task

The direct interaction of Ulrich Medical's medical technology products with the human body requires the highest degree of precision in development and consideration of the special properties of biomechanical processes. However, as with all development processes, an unknown remains in the creation of innovative medical devices: Any potential problem areas could be identified too late, resulting in complex corrections.

The solution

The Ulm-based long-established company reduces this risk with simulations that accompany development and are carried out with Ansys and, if necessary, backed up with advice and support from Simq. Surgeon and patient must be able to rely on the optimal design of an implant or screw system. For titanium screws, for example, Ansys is used to calculate exactly the force with which they can be screwed in without the pin twisting or breaking due to friction or clamping (**Figure 1**).



Figure 1: ADDplus™ Distractible vertebral body replacement with fixed plates for the ventral, cervical and cervicothoracic spine

The result

The static-mechanical FE analysis was able to prove the safety of the product in silico.

Under the given assumptions, the FE analysis showed that the stresses and strains at the screw neck do not differ when changing the screw angle from 0° to 25°.

Likewise, the stresses and strains do not change significantly when the tulip edge is in contact with the screw neck.

Thus, Ulrich Medical was able to virtually eliminate the risk of necessary corrections and the associated time and expense during development, to the benefit of surgeons and patients.

Your contact



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About the customer

Medical technology has been the focus of the Ulrich Medical family business in Ulm for 100 years. One of the company's four divisions deals with the development and production of spinal systems. These include implants, but also rod-screw systems for fixation, stabilization or correction of the spine, which are mainly made of titanium. Titanium has the great advantage that it is particularly well tolerated by human tissue.



About Simq

The company was founded in 2014 and is part of the CADFEM Group. Simq's products and services enable medical device manufacturers, clinicians and medical staff to practically apply numerical simulation and use it for more effective and safer patient care.

Simq is committed to the standardization and broader application of in silico medicine as part of the Avicenna Alliance, thereby ensuring safe, affordable and cost-effective healthcare.



Simq is a certified simulation service provider and software manufacturer in the field of medicine and medical technology and is one of the pioneers of in silico medicine.