

Archus Orthopedics

Biomedical

U.S.A.

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ANSYS® Mechanical™

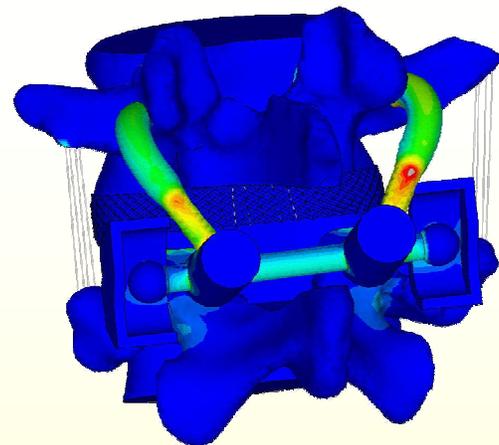
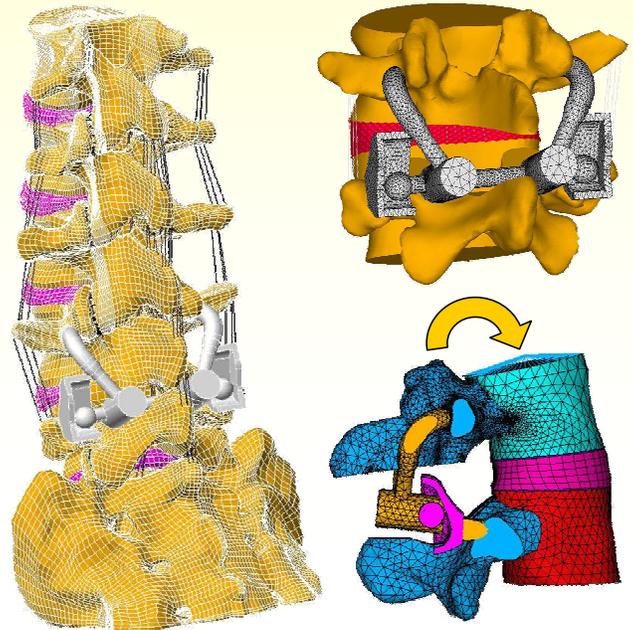
Overview

Founded in July 2001, Archus Orthopedics is a privately held company developing a family of reconstructive implants to treat a variety of spine disorders that result from degenerative changes in the facet joints. Archus Orthopedics began U.S. clinical trials of its Total Facet Arthroplasty System™ (TFAS®) in August 2005. The TFAS® is a novel, patented spinal implant designed to treat spinal stenosis, a condition in which degenerative changes in the facet joints result in compression of spinal nerves producing neurological symptoms in the legs. Traditionally, patients with spinal stenosis undergo decompressive laminectomy surgery, which often is accompanied by spinal fusion. The TFAS® replaces the degenerative facet joints with a prosthetic joint implant intended to restore stability and normal motion to the spine, eliminating the need for fusion.

Testimonial

“We are experiencing a shift in spine care from fusion to motion restoration and joint replacement. Simulating the natural, nonlinear motion of the spine with an implant is a very challenging problem. By using an anisotropic hyperelastic material model in ANSYS Mechanical we are able to accurately predict the quality of motion of the natural and the implanted spine. Using ANSYS software allows us to perform hundreds of design iterations in the same amount of time it would take to run a single cadaveric test.”

Jorge A. Ochoa, Ph.D., P.E.
 Vice President, Research & Development
 Chief Technology Officer



Challenge

The natural nonlinear motion of the spine with an implant is difficult to predict; it is typically determined through cadaveric testing. This is a time consuming process and not an effective way to perform design iterations on new motion restoring spinal implant designs.

Solution

ANSYS Mechanical was used to simulate the quality of motion of the natural spine and accurately predict the nonlinear motion of the spine outfitted with an implant by using an anisotropic hyperelastic material model for the intervertebral disc tissues. To improve the simulation efficiency of the full spine model ANSYS AI*Environment was used to create an all hexahedral mesh of the spine.

Benefits

By using ANSYS Mechanical, Archus Orthopedics is able to accelerate the development of new spinal implants. Using anisotropic hyperelasticity allows for the accurate simulation of the naturally nonlinear quality of motion of the spine. This results in good correlation with physical test data and reduces the amount of cadaveric testing required.