Abstract

Lumbar interbody fusion is a lumbar surgery that consists on replacing the intervertebral disk with a prosthesis. The fusion cage is able to accommodate new bone in its interior. Also it favors the bone’s growth and it joins two vertebral bodies into one. Often this kind of surgery is the only possibility when disk diseases are severe. Indeed, the behavior of the new configuration has to be known.

In 2005 a degree thesis was presented in the ETSECCPB. It was titled: "Biomechanical analysis of the embody fusion". In that analysis a geometrical model of the vertebra L5 and S1 and the prosthesis was performed. It was built by radiological images. Several load conditions were set and a finite elements calculation was done. Moreover, the mechanical behavior of two different cages was compared.

In this thesis, which follows the other one, our group have collaborated with Doctor Antonio Molina and with LaBS —Laboratorio di Mecánica delle Strutture Biologiche— in Milano. Basically, in the analysis a new numerical model has been developed. This model is able to compute shell forces from a prism mesh.

From the classical stress and displacement finite element analysis the behavior of the cortical tissue as a shell has been checked. And according to the new results the most critical areas have been identified.