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6. Project Title: Effect of Increased Size of the Artificial Disc on the Facet Joint of the Lumbar Spine.

7. Project Description: Background: Intervertebral disc replacement was approved by the FDA in October 2005. This procedure has superseded the older practice of spinal fusion, and has done so due to the possible advantages such as pain relief and normalcy of function. While in most cases artificial disc replacement has been successful, there are numerous other cases where patients did not feel pain relief. Other studies have shown that some patients had an increase in pain, the actual reason not being clear.

In real clinical practice, spinal surgeons think that increased artificial disc size will help to stabilize the artificial disc. We hypothesize the increased artificial disc may cause the changing of the facet joint biomechanical state, and thus may lead to the pain which some patients feel. There have been no biomechanical studies that show the relation between artificial disc sizes on facet joint.

Specific Aim: The aim of the student's project will be to quantify any alterations on angular displacement and facet load resulting from different heights of artificial disc space.

Methodology: A previously validated 3-dimensional, non-linear finite element model of an intact L3-S1 segment will be used to simulate a artificial disc replacement at the L4-L5 level. Angular displacement and facet load were measured in each of the six modes of angular rotation.

8. Student's Role and Responsibility: The student's role will be as research assistant. As research assistant, under our supervision, the student will learn to do a literature review, study design, perform test, collect data, analyze the findings, and help in writing a paper. Through this procedure, we want to give the student the ability to creatively think in clinical research and practice, and increase student's interest in research to make them well qualified physicians.

9. Special Qualifications: No special qualifications required.