Artificial Intervertebral Disc
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Abstract
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Back pain is very common among people. Being one of the most common medical problems it affects at some point 8 out of 10 people. Back pain may result from: trauma, injury, or degeneration. These malfunctions may lead to: muscle strain, herniated disc, spinal stenosis, sciatica, sacroiliac joint inflammation, included within degenerative disc disease.

Degenerative disc disease is the most common imparity the artificial spinal disc is applied to. This disease affects the nucleus palposus of the intervertebral disc. It is composed of water giving it the ability to absorb shock to the spine. The nucleus palposus loses water content causing bulging of the disc leading to pinched nerves and discogenic pain. Tears form within the annulus which weakens the ligament material. Common symptoms include pain in the lower back that spreads to the buttocks and upper thighs. Treatment begins with conservative treatment with the option of receiving an artificial disc replacement. It effects between 200,000 and 400,000 people in the United States each year.

Orthopedics was revolutionized by a man named Sir John Charley in the 1960's with the advent of the total hip replacement. Back pain was initially treated by metal ball implants and synthetic intervertebral disc spacers which had excellent short term effects but broke down after a longer period of time. Also subsidence was discovered by this method due to the lack of contact between the implant and bone. This method helped to improve, at the time, developing spinal prosthetics. This sparked more research to be done in the area of spinal disc replacement yet spinal fusion was still widely accepted. Due to complications involved in spinal fusion, artificial disc replacement research was renewed in the 1990's. Models were developed and were tested mainly in Europe.

The CHARITE III was developed which revolutionized spinal prosthetics. This model was a refinement of the previous two models with the cooperation of a medical device manufacturing company called Waldemar Link GmbH. After several clinical tests the FDA approved CHARITE III in October of 2004. This replacement consists of two metal plates with teeth incorporated on the anterior and posterior sides of the plate to anchor the implant between the bones or vertebral bodies. Between the two metal plates is a rubber core composed of polyethylene that allows a necessary range of motion for the recipient. The plates are primarily composed of cobalt-chromium-molybdenum alloy, porous coated titanium and a layer of calcium phosphate to improve body's acceptance of bone contact.

- **History and evolution of disc replacement.**
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