

## The SB Charité III Disc Replacement

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### Spinal Injury

- The disc that acts as a shock absorber between two vertebrae may become damaged. Damage begins with a tear in the wall, which leads to the nucleus of the sack bursting. The lack of cushioning causes bone spurs to grow along the vertebrae base and along the facet joints. This causes severe pain in the lower back and pinches the nerves running down the legs. This also causes severe pain.

### Why a Replacement?

- One common cause of low lumbar back pain is "degenerative disc disease" also known as "DDD". The condition may take the form of a herniated disc, a collapsed disc, et cetera. Any of these conditions can result from a disc that has lost its proper form and therefore does not function properly. This causes significant pain when attempting to perform normal daily activities. The purpose, then, of any spinal surgery or disc surgery is to relieve this recurring back pain. Surgery is only performed when the disc is beyond repair, or the patient has not responded at all to 6 months or more of therapy.

### Disc Nucleus Replacement

- Disc Nucleus replacement replaces the soft jelly center of the disc with a gel sac. This alleviates pain and further damage by using a shock absorber that does not break and put pressure on the nerves. This allows the cartilage surrounding the nucleus to heal, and the patient can resume normal activity.

### Complete Disc Replacement, the SB Charité III

- Sometimes the whole disc is beyond repair, and a complete disc replacement is necessary. The SB Charité III is composed of two endplates of high quality cobalt chromium alloy commonly found in many other implants. The endplates are coated with titanium and hydroxyapatite porous coating to enhance bone fixation (osteointegration). The endplates are then fixated to the vertebrae. The disc is able to remain stationary through the anchoring teeth along the edges of the plates. The natural movement of the disc is made possible with the extremely dense polyethylene sliding core placed between endplates.

### SB Charité III Advantages and Draw-Backs

- The SB Charité III (unlike a nuclear replacement) maintains the distance between the two vertebrae and does not allow collapse of the spinal column. The SB Charité III (unlike Bone Fusion) does not require grafts and it allows movement and pressure sharing of the joint. Reducing chances of further injury to the spine. The life of the SB Charité III is 40 years. Which, in most cases, may be longer than the life of the patient.
- Wear debris, a concern with polyethylene implants in the peripheral joints, has been studied in the SB Charité III, given the implant's proximity to the

spinal canal and nerve roots. In a long-term laboratory test of cyclical motion simulating > 11 years of use, no wear debris particles were identified. There is minimal deformation of the core, with less than 8% height loss expected in 10 years of use. The risks of an anterior retroperitoneal (from the front of the abdomen but staying outside the intestinal sac) approach to the spine. Similar to the reported complications of anterior retroperitoneal BAK fusion, these operative complications include vascular injury, retrograde ejaculation in males (< 4%), infection, and having to redo the surgery due to migration of the prosthesis (< 1%).

### SB Charité III Trials and Results

- The first SB Charité III implant was performed in 1983. The two original surgeons were Dr. Kurt Schellnack and Dr. Karin Buttner-Janzen. Since then, over 3000 European, and 4000 world wide Disc Replacements have occurred.

• **European Results:** 1997 Study published in France by Dr. J. P. Lemaire et al performed on 105 cases undergoing SB Charité III replacement at an average 8 year follow-up

- \*No failures
- \*79% Had excellent results
- \*87% Returned to work

• **US Results:** 1997 First independent study at Texas Back Institute by Alexis Shelekov, M.D. and Jeanette Aherns, Ph.D. Analyzed 91 SB Charité implants. Average patient age was 42 with 6 year post-operative follow-up.

\*70% Patients decreased or stopped using their pain medication after ward

- \*46% Reported increase in activity level
- \*67% Returned to work at same or modified physical level
- \*7% Had device related complications

### The SB Charité III Future

- The SB Charité III is undergoing FDA approval for usage in the United States. If all goes well, the SB Charité III can be put into use in 2004. Link Spine (the company that produces the SB Charité III) already distributes the implant to much of the world.

### Resources

Lemaire, JP et al.: Intervertebral Disc Prosthesis: Results and Prospects for the Year 2000. Clinical Orthopaedics and Related Research 337:64-76, 1997.

<http://www.spineuniverse.com/displayarticle.php/article1671.html>

<http://bms.brown.edu/curriculum/b108/discs/Charite.htm>

<http://www.spine-health.com/research/discupdate/discupdate01.html>

<http://orthopedics.about.com/cs/spinesurgery/>

[www.linkspine.com](http://www.linkspine.com)