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is funded
through an
educational grant.

Total Disc Replacement Surgery

TOTAL DISC REPLACEMENT SURGERY has recently been FDA approved as a technique to help reduce and eliminate back pain. There are several advantages of Disc replacement surgery over traditional fusion surgery.

- **Reduced pain.**
- **Restored mobility.**
- **Reduced adjacent level degeneration.**
- **Limit disability.**
- **Early return to work.**

The history of total disc replacement surgery dates back to the 1950s. Traditionally total disc replacement surgery was considered to be a formidable task. It required developing a device that would move in all planes. It would require a device that would tolerate wear very well and the concerns of complications were always very high.

The historic standard for dealing with discogenic back pain has always been a fusion if all conservative measures have failed.

Total disc replacement surgery will not replace all types of spinal surgery that are presently performed. Herniated discs will still be treated with a microdiscectomy. Stenosis will still be treated with a laminectomy. Spondylolisthesis or instability will still be treated with a fusion. Patients with discogenic back pain will now have a choice between disc replacement surgery and fusion surgery.

The first artificial disc was performed in 1984 at the Charite Hospital. Since then over 6,000 disc replacement devices have been implanted in over 30 countries in over a 15-year-period. The disc replacement surgery has advantages over traditional fusion surgery in that it reduces the load on the facet joint by 50%. It has a higher rate of satisfaction than anterior lumbar interbody fusion. Range of motion has returned to normal for the overwhelming majority of patients at 3 months and it is maintained at this near normal level for up to 2 years. The results of the surgery are correlated very highly with the accurate placement of the device. It has a lower instance of persistent radiculopathy than an anterior lumbar interbody fusion or an anterior and posterior fusion. It has a much faster return to work.

CONTINUED ON PAGE 2

Comparison of Traditional Instrumented Fusion to Total Disc Replacement



Figure 1. *Traditional Instrumented Fusion with Interbody Graft.*



Figure 2. *Total Disc Replacement.*

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The total disc replacement Charite design is a cobalt chromium end plate sandwiched around a polyethylene sliding core. It is a non-constrained device.

In 1999 a prospective study was performed in the United States that had a two-year follow up. Patients included in this study were ages 18 to 60. It was utilized on 266 patients for a single level degenerative disease at L4-5 or L5-S1. The results of this study indicated that there were

no device failures requiring revision, removal or re-operation. There was an absence of major complications, vascular or neurologic. There was maintenance of neurologic improvement with no permanent neurologic deficit. It had improvement of greater pain relief than a fusion operation. It had improvement above a fusion operation for function and return to prior level of function. It had an 81% overall excellent patient satisfaction rate.

Other European studies have indicated a 90% excellent to good satisfaction rate, and a 92% return to work rate. In June of 2004 the FDA unanimously approved this device for single level disease.



Figure 3. *Total Disc Replacement Device.*

The keys to the success of this device are to recognize the limits of the device and to recognize the strict indications for this device.

- There should be normal sagittal alignment of the lateral x-ray.
- There should be no evidence of any instability on flexion extension films.

- There should be no evidence of any spondylolisthesis or significant facet arthritis.
- Prior fusion surgery or adjacent level fusions are considered contraindications.
- Prior discectomy is not a contraindication.
- The device needs to be placed accurately.
- Patients falling outside of the 18 to 60 year old age group should not be considered for this device.
- It should only be considered in patients with single level disease.
- The technical skill of the surgery will have a large impact on the success of this operation. This operation should be performed by those physicians who have extensive training in anterior spinal surgery and are fellowship-trained specifically in spine surgery.

Properly performed, the return to work rate can be as high as 98% as was identified in Europe with very little complications.

Dr. Carl P. Giordano and Dr. Richard Nachwalter will host a regional training center for all surgeons in the area.



Figure 5. MRI of single level degenerative disc disease at L5-S1.

SURGICAL TECHNIQUE

- ❖ The entire disc is removed from an anterior approach through the abdomen.
- ❖ The disc space is distracted.
- ❖ The TDR device is inserted.



Figure 4a.
*TDR after insertion.
(Side View)*



Figure 4b.
*TDR after insertion.
(Front View)*

ABOUT ATLANTIC SPINE SPECIALISTS



CARL P. GIORDANO, M.D.

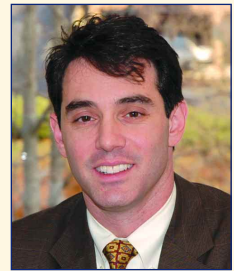
Charter Member of the American Board of Spine Surgeons, Fellow of the American Board of Orthopedic Surgery

Dr. Giordano is a board certified spine surgeon. He received his orthopedic training at the Hospital for Joint Diseases in New York City and then completed a fellowship in spinal reconstructive surgery also at the Hospital for Joint Diseases. Dr. Giordano received additional training in the management of spinal trauma in Seattle, Washington. Dr. Giordano is the recipient of teaching awards, research grants, and research awards. He has authored several chapters in leading authoritative spinal textbooks. He has published numerous articles in national journals and has presented numerous papers at national meetings.

Dr. Giordano sits on the educational research and design panels of several spinal instrumentation companies.

RICHARD NACHWALTER, M.D., *Fellow of the American Board of Orthopedic Surgery*

Dr. Nachwalter is Board Certified by the American Board of Orthopedic Surgery. He received his orthopedic training at the State University of New York at Stony Brook. Dr. Nachwalter also completed a fellowship in reconstructive spinal surgery and spinal trauma at Thomas Jefferson University Hospital, the regional spinal cord injury center for the Delaware Valley. He has written several chapters for text books on spinal surgery and published numerous articles in peer reviewed journals. He has presented papers and served as course faculty and instructor at numerous national meetings. Dr. Nachwalter serves as a consultant for several spinal instrumentation companies.



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