Marina Spine Center
Centinela Freeman Regional Medical Center

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Upcoming Events

COMMUNITY LECTURES

February 20, 2008
Hilton Pasadena
168 South Los Robles Ave
Pasadena CA 91101

February 27, 2008
Torrance Marriott
3635 Fashion Way
Torrance, CA 90503

March 19, 2008

March 26, 2008

PROFESSIONAL EDUCATION

Current Concepts in Spine Rehabilitation
March 29, 2008

Trainer and Coach Conference
June 7, 2008

Chiropractor Conference
September, 2008

SPONSORSHIPS

Second Annual Pasadena Triathlon
Saturday, March 8, 2008
Pasadena Rose Bowl
Join in the fun and meet the physicians
of the Marina Spine Center

For Information and Reservations Call:
1-888-600-5600

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SPINE LINE

DAVID CHANG, MD JOINS MARINA SPINE CENTER

Dr. David Chang has joined Drs Robert G. Watkins III, and Robert G. Watkins IV, at the Marina Spine Center in Marina del Rey. The Marina Spine Center is a state-of-the-art program using advanced diagnostics and surgical procedures.

Dr. David Chang is an orthopedic surgeon specializing in the surgical treatment of spinal disorders. After graduating from Princeton University, he received his medical degree from New York University. He completed his orthopedic surgical training at NYU-Hospital for Joint Diseases. He completed an advanced fellowship in orthopedic spinal surgery at The Los Angeles Spine Surgery Institute. Dr. Chang's interest lies in minimally invasive spinal surgery, artificial disc replacement technology and degenerative disorders of the cervical and lumbar spine.

David Chang, M.D.

COMPUTER NAVIGATION SYSTEM IMPROVES SPINE SURGERY

BY ROBERT WATKINS IV, M.D.

The doctors at the Marina Spine Center in Marina del Rey, CA are the first surgeons on the West Coast to perform Image-guided cervical and lumbar spine surgeries using BrainLAB's **NaviVision® 3D** navigation system.

BACKGROUND: Image-guided surgery using a **NaviVision® 3D** navigation system is a new surgical technique being used to treat cervical and lumbar spine diseases with a computer system supporting the surgeon during surgery. Previous navigation systems have either been only two dimensional images or relied on a preoperative CT scan. Now, a three-dimensional image on the operating room table is available. In contrast to a robotic form of surgery, the spinal surgeon is in full control during the operation while the computer offers visual support and guidance.

PROCEDURE: **NaviVision® 3D** navigation system provides the basis for computer-assisted or image guided surgery. The BrainLab system starts with a three-dimensional image of the spine acquired on the operating room table. One reference frame is placed on the patient's spine and the other reference frame is placed on the surgeon's instrument. The BrainLab system consists of two infrared cameras that detect the position of the surgeon's instrument in relation to the patient's spine. The surgeon's goal is to insert screws into the patient's spine while avoiding the spinal cord and nerves. The surgeon watches the screw being inserted on three-dimensional images on the BrainLab monitor. As the surgeon moves the instrument, the BrainLab system shows how the instrument is moving in relation to the spine in real time.

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MARINA SPINE CENTER

- Advanced Diagnostics
- Conservative Treatment
- Pain Management
- Surgical Treatment
- Rehabilitation
- Located in beautiful Marina del Rey

In This Issue

CERVICAL TOTAL DISC REPLACEMENT

BY: DR. DAVID CHANG

Fig 1
Stabilizing Plate

Fig 2

Fig 3
Cervical Disc Implant

Fig 4

Patients who are experiencing arm and neck pain will soon have a surgical alternative to the standard surgical practice of fusion. Total Cervical Disc Replacement (arthroplasty) is an emerging technology designed to preserve motion of the cervical spine (neck) The technology is currently undergoing an extensive evaluation in the United States as an alternative to fusion (arthrodesis) such as the Anterior Cervical Discectomy and Fusion (ACDF). In 2007 the FDA approved the first cervical disc replacement for public use in the U.S. It is called the PRESTIGE and is manufactured by Medtronic Sofamor Danek. There are several others that may come to market in the up coming years. These devices are being studied and are already utilized in the European market.

The primary surgical goal of most spine surgeries, including cervical spine surgery, is to thoroughly decompress the nerves either directly by removing bone spurs (osteophytes) or indirectly by disc space distraction. The one principle difference between replacement and fusion is that with a solid fusion, resorption (recession) of the bone spurs can further enhance the decompression by enlarging the tunnel (foramen) where the nerves exit the spine. This method also reduces the motion of the nerve across the segment that is fused which further helps to decrease the irritation of the nerve. In contrast, with motion preserving arthroplasty, bone spur resorption probably will not occur. It is unknown whether preservation of motion across the segment with the arthroplasty will have an equal ability to allow the irritation and inflammation of the nerve to resolve.

The primary rationale for disc replacement is motion preservation with the theoretical advantage of avoiding adjacent segment degeneration. Most authorities agree that this adjacent segment degeneration around a fusion does occur and at a rate of 2.9% per year [Hilibrand et al]. However, it is unclear if it is the result of the adverse mechanical effect of the fusion versus the natural history of degenerative disc disease. It is common to find degenerative changes after age fifty. By age sixty, 95% of males and 65% of females have degenerative changes [Gore et al.]. Nevertheless, it is hoped that the motion preservation would allow less activity restriction and earlier return to activities, such as work and driving.

An ACDF procedure involves removing the disc at a functional spinal unit (disc joint , facet joints, and ligaments between two successive vertebrae), placing an intervening graft (bone, polymer, metal), and then stabilizing it in the front of the spine (anterior) with a plate and screw construct. Figure 1 is an illustration of a head on view of the plate spanning two spinal units. Figure 2 shows an x-ray from the side view of the plate and screws spanning two spinal units.

A cervical disc replacement involves removing the degenerated disc and placing the implant in the intervertebral space without a plate in the front. Figure 3 shows the actual Prestige cervical disc replacement implant with a stainless steel ball and trough joint. Figure 4 is of an x-ray from a side view of the device implanted in a patient's neck.

The size of the plate/screws for the fusion and the Prestige cervical disc device

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Computer Navigation continued from page 1

BENEFITS: This technology helps the surgeon see where his/her instruments are in relation to critical structures that are hard to recognize with the naked eye. The visualization provided by NaviVision® 3D minimizes risks of damaging sensitive structures like the spinal cord and nerve roots. Additionally accurate screw placement is important for a successful fusion operation. Traditional pedicle screw insertion techniques have a 20-30% misplaced screw rate and 3-4% rate of nerve injury. Over a six month period, more than 150 screws have been inserted with NaviVision®. The results are very promising with precise pedicle screw placement and no reports of nerve injury.

Total Cervical Disc Replacement continued from page 2

are similar. While the Prestige cervical disc allows for motion through the ball and trough design, it still requires screws at the top and bottom of each vertebra. These screws provide immediate stability but limit the devices use in a multi-level situation because the screws of the first implant would block the screws of a second device. For this and other reasons, the FDA has not approved the Prestige for multi-level usage. Other cervical disc replacement designs that are currently being studied are lower in profile, do not require the screws above and below, and will be intended for multi-level usage.

In clinical studies, both procedures, ACDF and cervical disc replacement, have proven effective in reducing pain in the neck and arm. There are most certainly benefits to cervical disc replacement including potential lack of post-operative immobilization with collars and earlier return to activity. The device is a new technology that will add to a spine surgeon's armamentarium to help patients. This is not to say that every patient will be a candidate for the cervical disc replacement. Sometimes there are contra indications that would preclude this particular approach. Ultimately, the surgeon and patient will come to a surgical treatment plan that incorporates the patients' symptoms, his goals for recovery, and understanding of the potential risks and benefits to either procedure.

With further research and development of more low profile cervical disc implants, cervical disc replacement may prove superior to fusion and become more universal. Stay tuned.

Reference:
Hilibrand AS, Carlson GD, Palumbo MA, Jones PK, Bohlman HH. Radiculopathy and myelopathy at segments adjacent to the site of previous anterior cervical arthrodesis. J Bone Joint Surg Am 1999; 81:519-528.

Gore Dr, Sepic SB, Gardner GM. Roentgenographic findings of the cervical spine in asymptomatic people. Spine 1986; 11:521-524.

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OUR MISSION

Our goal is to be the best:

The best surgeons by helping our patients decide which of the latest surgical techniques and nonoperative treatments are best for them;

The best doctors by building compassionate longterm relationships with our patients and colleagues;

The best people by treating all of our patients with the same consideration and attention as we do for our professional athletes and family members.