J0885D

The Journal of

Spinal Cord Medicine

Spring 2000
Volume 23
Supplement 1

A publication of the American Paraplegia Society

American Spinal Injury Association Twenty-Sixth Annual Meeting
April 14–16, 2000, Chicago, IL, USA

2 **General Session Abstracts**

2 Basic Science

5 GU

9 Psychosocial

12 Medical

15 Prevention

19 Nursing

22 International

24 Spine

27 Outcomes/Cost

30 Mixed Topics

34 **Poster Presentations**

34 SCI Nursing and Rehabilitation Therapies

38 Spine Topics

42 Urology/Fertility/Gynecology

47 Medical and Neurological Topics

55 Psychosocial Topics

60 SCI Outcomes/Costs/Administration

#3 AN *IN VITRO* BIOMECHANICAL INVESTIGATION OF SPINAL INTERBODY FUSION DEVICES

Thomas R. Haher, MD; Andrew A. Merola, MD; Amy W. Yeung, MEng; Steven A. Caruso, MSII; Craig Nicholson, MSIII; Phil Ludmer, MD; Dennis Lee, BEng; Anjali Ratnathicam, BA; Babak Litkouhi, MD

Saint Vincent's Hospital and Medical Center, New York, NY

Achieving solid fusion in the lumbar spine can be a challenging task. Metal threaded fusion cages are commonly used. Similar devices, manufactured from cortical bone, provide built-in lordosis and end-plate-gripping "teeth." The purpose of this study is to quantify the biomechanical properties of several different lumbar intervertebral load-sharing fusion devices in a human cadaveric model. Sixteen human cadaveric lumbo-sacral spines (41–76 years old, avg. 59 years old) were used. They were dissected free of all extraneous soft tissue. Pre-assay P-A and lateral plane radiographs were obtained. The spines were randomly divided into 4 groups. Each spine was tested: intact, with implant, with implant and posterior constructs. Posterior constructs were then removed and the specimen was compressed to failure. The 1st Group was tested with *Synthes* FRA Spacer, the 2nd Group with *SpineTech* BAK cage, the 3rd Group with *Surgical Dynamics* Ray Threaded Fusion cage, and the 4th Group with *Sofamor Danek* Threaded Cortical Bone Dowel. All implants were inserted between L-5 and S-1, as per the manufacturers' specifications. All tests were performed using a MTS (Eden Prairie, MN) 858 Mini-Bionix servo-hydraulic materials testing apparatus to apply physiological loads. Data were downloaded for analysis. All four interbody fusion devices provided at least 60% of the global intact stiffness irrespective of the loading mode. All devices performed consistently in increasing local intact stiffness in *flexion*; Bone dowels and FRA Spacers increased local stiffness by 970% and 599%, while Ray increased by 253% and BAK increased by 96%. For *extension*, Bone dowels increased the local intact stiffness by 166%, while BAK, FRA, and Ray cages provided 71%, 62%, and 56% of the local intact stiffness, respectively. For *compression*, FRA Spacers increased the local intact stiffness by 274%, while the Ray cages, BAK cages and Bone dowels decreased the intact stiffness by 6%, 10%, 36%, respectively. In *torsion*, Ray cages decreased the global intact stiffness by approximately 5%, FRA Spacers maintained intact stiffness, and BAK cages and bone dowels increased intact stiffness by 20%. Bone dowels increased intact stiffness by 91% under *lateral bending*, while the other three fusion devices maintained the intact stiffness. With posterior constructs, all implants increased their stiffness by approximately 17% to 410%, irrespective of the loading mode. For the compressive failure test, failures occurred between 800 and 4300 N. It is important to note that none of the implants fractured during failure tests. All four fusion devices seemed to provide adequate initial biomechanical stability. The FRA was the only construct that increased compression stiffness and maintained intact stiffness in lateral bending and torsion.

#4 CONTINENT LOWER URINARY TRACT RECONSTRUCTION IN THE CERVICAL SPINAL CORD INJURY POPULATION.

D. A. Ginsberg, MD; J. N. Zommick, MD; A. R. Simoneau, MD; B. Stowe-Nat, RN

Rancho Los Amigos Medical Center, Downey, CA

To determine the success and patient satisfaction of lower urinary tract (LUT) reconstruction, with the need for long term intermittent catheterization (IC), in patients with cervical level spinal cord injury (SCI) and potential limited upper extremity function.

Charts of appropriate patients were reviewed and patients contacted by an independent reviewer to ascertain patient satisfaction and quality of life.

Between May 1988 and November 1996, 27 patients with cervical level SCI underwent LUT reconstruction. Post-op information was obtained on 15 patients with an average follow-up of 54 months. All patients involved underwent LUT reconstruction requiring IC: bladder augmentation (3), Indiana pouch (3), Mitrofanoff (4) and Kock pouch (5).

Catheterization is regularly performed by 14 of the 15 patients (93%). Eight (57%) patients perform IC themselves and 6 (43%) rely on an attendant or family member. Eleven (73%) patients report an improved quality of life since reconstruction citing reasons such as lack of need for urinary bags, more freedom and an