

2009 Scientific Program Abstracts — Thursday

(An asterisk (*) by an author's name indicates the presenter.)

Thursday, July 30, 2009

SYMPOSIUM I — ACUTE TRAUMA: SURVIVING THE NIGHT

Moderator: Sean E. Nork, MD

7:15–8:14am

Introduction (Damage Control Orthopaedics, Decision Making)

Sean E. Nork, MD

What to Send, What to Keep, How to Package it?

James C. Krieg, MD

Open Fractures and Compartmental Syndrome

Lisa A. Taitsman, MD, MPH

Temporary Spanning External Fixation

Dave P. Barei, MD

Pelvic Injuries: Acute Management

M. L. Chip Routt, MD

Discussion and Cases

Sean E. Nork, MD

Notes:

Thursday, July 30, 2009

GENERAL SESSION I — TRAUMA

Moderator: Patrick J. Halpin, MD

8:15–8:55am

8:15–8:21am

Locked Nailing of Two-Part Surgical Neck Proximal Humerus Fractures: A Multicenter Study

Armodios M. Hatzidakis, MD

Edward Fehringer, MD

Duane Fenton, PAC

Robert J. Nowinski, DO

Michael J. Shevlin, MD

Introduction: Intramedullary nailing (IMN) of proximal humerus fractures with unlocked proximal fixation has been associated with complications and variable outcomes. The purpose of this study is to report our experience with IMN and locked proximal fixation for 2-part surgical neck fractures.

Methods: Forty-nine patients with 49 Neer 2-part surgical neck fractures were treated with IMN and locked proximal fixation by 3 surgeons. An articular entry point was utilized for device insertion. Outcomes were quantified with Constant scores and standard radiographs.

Results: Ten patients were lost to follow up, 6 due to deaths unrelated to the procedures. 39 patients (29 female) with a mean age of 64 years were followed for at least 12 months (mean=20; range=12-48 months). All fractures healed primarily. Mean follow-up Constant Score was 71 (SD=12, range 37-88) with a mean age-adjusted Constant score of 97% (range=60-119%). Average Constant pain score was 13 (SD=2.2). Mean forward flexion was 134 degrees (SD=23 degrees). All but one fracture healed with a neck-shaft angle greater than or equal to 125 degrees. Five patients had additional surgery after fracture healing (hardware removal, manipulation, and heterotopic bone removal). Dynamic distal

interlocking was associated with controlled settling of the fracture site in all patients in whom it was employed (12/12).

Discussion and Conclusion: Intramedullary nailing of 2-part surgical neck proximal humerus fractures with locked proximal fixation leads to predictable fracture healing and favorable outcomes. An articular entry point may allow less rotator cuff insertion injury and, therefore, improved results.

Notes:

8:22-8:28am

Comparison of Open vs. Closed Reduction for Intramedullary Tibial Nailing

Brian D. Solberg, MD

Objective: To compare rate of infection, time to union and degree of malunion in closed tibial shaft fractures treated intramedullary nailing using open or closed reduction.

Methods: Ninety-eight patients with 105 tibial shaft fractures treated with intramedullary nailing were identified and patients were grouped by method of reduction (open vs. closed). OTA fracture types 42 A and B were included. Exclusion criteria were segmental or open fractures, OTA 42-C fractures or patients with less than 12 months clinical and radiographic follow-up. Rate of infection, time to radiographic union, presence of non-union and residual angular deformity in the sagittal and coronal planes at latest follow-up were compared.

Results: Sixty eight patients, 34 patients from each group were identified and met the inclusion criteria. There was no difference between the two groups with regard to age (30 vs. 31 years, $p=0.67$), sex (M/F: 25/9 vs. 23/11, $p=0.60$), fracture type (22A/12B vs. 20 A/14B, $p=0.47$) or average follow-up (19 vs.19 months, $p=0.78$). None of the patients undergoing closed reductions developed infections at the fracture site (0/34, 0%) vs. two (2/34, 6%) in the open reduction group ($p=0.16$). Infections at the hardware insertion sites developed in three patients (9%) in the closed reduction group; two in the open group (6%) ($p=0.65$). Two patients from each group (6%) developed hypertrophic non- unions and were treated with locking screw dynamization ($p=0.87$). Average time to union was 7.4 months for both groups ($p=0.94$). There was a

significant difference in the residual sagittal and coronal plane deformity (2.5o/2.6o vs. 0.8o/0.6o, $p<0.001$) for the closed and open groups respectively .

Conclusions: In this series complication rates, including infection and non union, for open vs. closed reduction of closed OTA Type 42 A and B tibial shaft fractures were comparable. There was statistically more residual angular deformity in the sagittal and coronal planes in the closed reduction group. The clinical significance of this residual deformity remains undetermined.

Notes:

8:29-8:35am

Alpine Skiing and Snowboarding Injuries in the United States

Michael A. Zacchilli, MD
J. Taylor Jobe
MAJ Brett D. Owens, MD

Introduction: Injury epidemiology associated with alpine skiing and snowboarding activities in the United States have not been well documented in the literature.

Methods: The National Electronic Injury Surveillance System (NEISS) is a probability sample of all injuries in the U.S. presenting to emergency rooms. The NEISS model was queried for injuries which were the result of alpine skiing or snowboarding during a five year period (2003-2008). Descriptive characteristics were analyzed for the combined and activity-specific populations with respect to patient demographics, region of injury, and type of injury.

Results: 4,884 alpine skiing injuries and 6,220 snowboarding injuries were documented in the NEISS sample during the defined period, representing an estimated 227,757 and 279,595, respectively. The mean age of injured snowboarders (19.0 years, range 1-80) was significantly younger than that of skiers (29.9; 1-92). The majority of patients were males (68%). Injuries to the upper and lower extremities accounted for the majority of injuries (45.5% and 24.9%), followed by injuries to the head/neck (16.9%) and trunk (12.5%). The ratio of upper to lower extremity injuries was significantly higher in snowboarders (3.51) than in skiers (0.93). The three most

common injury types were fractures (33.8%), strains/sprains (27.9%), and contusions/abrasions (14.2%). Fractures were the most common injuries in snowboarders (37.7%; 105,288 estimated cases), while sprains/strains predominated in skiers (31.7%; 72,233). Upper extremity fractures (117,606) accounted for 23.2% of all injuries and 68.6% of all fractures.

Discussion and Conclusion: The NEISS dataset utilized in this study represents the largest single sample population for skiing and snowboarding injuries in the medical literature. Injury prevention focused on upper extremity fractures, particularly in snowboarders, may substantially reduce the burden of ski and snowboard-related injuries on the U.S. healthcare system in the future.

Notes:

8:36–8:42am

Open Fractures Treated with Immediate Primary Closure and External Vacuum-Assisted Closure

Lorrin Siu King Lee, MD
Patrick C. Murray, MD

Introduction: The treatment of open fracture wound care continues to evolve with more support for early closure following adequate debridement. The development of negative pressure wound therapy has been shown to increase wound healing, decrease bacterial count, and decrease need for further soft tissue procedures. This study is a preliminary report presenting a novel use for negative pressure wound therapy to assist primary closure of open fracture wounds.

Methods: This is a retrospective review of patients between 2005 and 2008 presenting to a Level II trauma center with open fractures proximal to the carpus and tarsals. All fractures were treated with irrigation and debridement followed by fixation and primary closure. A Wound VAC was placed over all wounds after primary closure. VAC changes were done every 48 hours for an average of 6 days. Medical records and radiographic images were reviewed for evidence of infection, wound complications and bone healing.

Results: There were 67 patients with 72 open fractures that were included in this study. Gustilo grades included 2 I, 22 II,

and 48 IIIA. The overall incidence of superficial and deep infections was 18% and 14%, respectively. Superficial infections were 5 (7%) for II and 8 (11%) for IIIA. Deep infections were 3 (4%) for II and 7 (10%) for IIIA. There were 3 (4%) fractures with skin complications. A total of 65 (90%) fractures went on to bony union without difficulty.

Discussion and Conclusion: Our experience compares favorably with previously published data. Early closure of soft tissues helps to prevent complications associated with traditional management of open fracture wounds. The novel use of this device provides another therapeutic option to treat soft tissue problems associated with open fracture wounds.

Notes:

Thursday, July 30, 2009

SYMPOSIUM II — DIFFICULT FRACTURE PATTERNS: REDUCTION TECHNIQUES

Moderator: Sean E. Nork, MD

9:35-10:35am

Femoral Neck Fractures

Sean E. Nork, MD

Talus Fractures

Steve Benirschke, MD

Nailing Tips: Femur and Tibia

Lisa A. Taitzman, MD, MPH

Pilon Fractures

Robert P. Dunbar, MD

Periprosthetic Femoral Fractures

James C. Krieg, MD

Notes:

Thursday, July 30, 2009

**GENERAL SESSION II —
PRESENTATIONS**

Moderator: Linda J. Rasmussen, MD

10:55am-12:00pm

10:55–11:15am

Stress Management

John D. Kelly IV, MD

Notes:

11:15am–12:00pm

Howard H. Steel Lecture

Memoirs of a Mountain Guide

Lou Whittaker

Notes:

2009 Scientific Program Abstracts — Friday

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Friday, July 31, 2009

SYMPOSIUM III — SHOULDER

Moderator: Galen S. Kam, MD

7:00–8:15am

Reverse Shoulder Arthroplasty

James D. Kelly II, MD
Armodios M. Hatzidakis, MD
Michael Pearl, MD

Notes:

Friday, July 31, 2009

CONCURRENT SESSION I – GENERAL ORTHOPAEDICS

Moderator: Galen S. Kam, MD

8:35–9:30am

8:35–8:41am

Risk Factors for Osteonecrosis of the Humeral Head Following Repair in Elderly Patients

Brian D. Solberg, MD

Introduction: Osteonecrosis (ON) of the humeral head is a potentially devastating complication following surgical repair of proximal humeral fractures. Aside from dislocation, risk factors in older patients undergoing surgical repair have not been clearly defined. The purpose of this report was to

describe the risk factors associated with the development of ON in patients over 55 undergoing surgical repair of 3- and 4-part proximal humerus fractures with a locked plate.

Methods: Eighty-five (85) patients over age 55 undergoing locked plate fixation for Neer 3- or 4-part proximal humerus fractures were studied retrospectively over a 6 year period. All patients had radiographic and clinical follow-up for a minimum of 18 months. Radiographic measurements included fracture pattern, dislocation and the amount of metaphyseal bone that remained attached to the displaced humeral head fragment at the calcar. Radiographic parameters were correlated with the development of ON. Clinical outcomes measured Constant scores (CS) using active range of motion at latest follow-up.

Results: Average age was 68 years, with 20 men and 65 women. The average follow-up was 40 (18-65) months. There were 52 3-part fractures and 33 4-part fractures; 28 had initial varus displacement and 57 were valgus impacted fractures. ON developed in 15 patients (18%). There were no differences between the ON group and non-ON group with regard to age, sex or Neer fracture pattern ($p>0.5$). Twelve patients (12/15, 80%) had radiographic evidence of ON within 8 months, 2/15 (13%) developed ON between 8 and 15 months and 1/15 (7%) developed ON at 21 months post surgery. No patient developed ON more than 21 months post-operatively. Dislocation was present in seven (7/15, 47%) of the ON patients vs. 8/70 (11 %) in the non-ON group ($p=0.03$). However, ON developed in all patients (15/15, 100%) with an initial metaphyseal attachment of less than 2 mm and this was independent of fracture pattern or dislocation ($p<0.001$). All components of the Constant score were significantly different between ON and non-ON patients ($p<0.05$).

Conclusions: Risk factors for the development of ON after repair of 3- and 4-part fractures in patients over 55 were gleno-humeral dislocation and length of metaphyseal bone remaining attached to the humeral head at the calcar. All patients with less than 2 mm of metaphyseal bone attachment to the head developed ON regardless of fracture type or presence of dislocation whereas roughly half of patients with dislocation developed ON. Although patients who developed ON had clinically worse outcomes than non-ON patients, the con-

dition was relatively well tolerated in this population and comparable in outcome to hemiarthroplasty.

Notes:

8:42–8:48am

Enhancing SLAP Repairs with Fibrin-PRP Clots

Alan M. Hirahara, MD, FRCSC
 Russ Dunning, MSPT
 Kyle Yamashiro, PT

Introduction: To evaluate the failure rates of SLAP repairs with and without a fibrin platelet-rich plasma (PRP) clot.

Methods: 141 patients received a fibrin-PRP clot, placed arthroscopically between the labrum and bone prior to tying our sutures in repairing the SLAP lesion. Thirty-nine patients were repaired without use of a fibrin-PRP clot. Arthroscopic fixation was performed using a bioabsorbable suture anchor. The fibrin-PRP clot was made from autologous blood. We did not exclude patients who had associated pathology. Patients were evaluated with ASES scores, range of motion, time to discharge, and time to return to work. Repeat MRA or surgery was performed for patients with complaints four months post-operatively to evaluate healing

Results: Four out of thirty-nine (10.3%) control patients failed to heal while zero out of 141 (0%) study patients failed to heal. ASES society scores increased from pre-op to 1 month to 3 months to 6 months in both the control (33.7 to 35.2 to 54.6 to 71.4) and study (43.0 to 44.7 to 70.5 to 82.3) groups. The study group's ASES scores were significantly improved at 3 months. The average days to discharge in the study group was significantly improved at 121.1 days from 213.5 in the control group. Time to return to work decreased from 124.6 days to 61.1. ROM increased in both groups non-significantly from pre-op to 3 months follow up.

Discussion and Conclusion: The fibrin-PRP clot enhances healing of the labrum to the glenoid. We have significantly fewer failures, quicker time to discharge, earlier return to work, and faster functional recovery, as reflected in the ASES scores significantly higher at 3 months as compared to the

control group. By suturing a fibrin-PRP clot between the labrum and glenoid, recovery and healing of the tear occurs quicker and more reliably.

**The FDA has not cleared this drug and/or medical device for the use described in the presentation. (Refer to Page 32.)*

Notes:

8:49–8:55am

A Biomechanical Analysis of a Tensioned Suture Device in the Fixation of the Ligamentous Lisfranc Injury

Christopher Pelt, MD
 Kent Bachus, PhD
 Timothy C. Beals, MD
 Richard Vance, BS

Introduction: The ligamentous Lisfranc injury continues to challenge physicians and controversy continues regarding optimum management. Using a cadaveric model, we tested the hypothesis that when treating transverse ligamentous Lisfranc disruptions, the use of a rigid screw fixation construct maintains an anatomic reduction while constraining motion of the Lisfranc complex to a greater degree than a tensioned suture-button device in both axial and abduction loading conditions.

Methods: Utilizing an optical motion capture device, three-dimensional motion between the medial cuneiform (MC1) and the base of the second metatarsal (MT2) was measured in five matched fresh frozen pairs of human cadaveric feet. Specimens were tested prior to injury and following a transverse ligamentous injury of the Lisfranc complex. Axial loads (300N) then abduction loads (55N) were applied to each specimen while motion was recorded for each of these four conditions.

Results: With axial loading, no statistically significant differences were detected for the pre-injury motion post-injury motion screw fixation, or suture-button fixation. With abduction loads, a statistically significant difference was demonstrated between pre-injury motion and post-injury. No statistically significant difference was measurable between screw fixation and suture-button fixation. In abduction, both

fixation methods were not statistically different than the pre-injury motion but both had significantly less motion than the post-injury motion.

Conclusion and Discussion: Our results indicate that no significant difference in motion is created between pre-injury, post-injury and either fixation technique with axial load. With abduction stress, however, we were able to show a significant difference between pre-and post-injury motion and the ability of either the screw or the suture-button fixation to restore motion to pre-injury levels. We have shown that with abduction stress testing, suture-button fixation is as effective as screw fixation in restoring the motion to preinjury levels between the medial cuneiform and the base of the second metatarsal.

Notes:

8:56–9:02am

Arthroscopic Management of Glenohumeral Degenerative Disease

Mark Slabaugh, MD

*Neil S. Ghodadra, MD

Brian Cole

Rachel M. Frank, BS

Anthony A. Romeo, MD

Steve Sheehan, BS

Geoffrey S. Van Thiel, MD, MBA

Nikhil N. Verma, MD

Introduction: Degenerative disease of the glenohumeral joint is a significant problem that affects a large segment of the aging population. Initial treatment consists of conservative management, however, failure of these measures leaves the surgeon with relatively few options. Shoulder arthroplasty provides good pain relief, but has significant risks with post-operative limitations. Arthroscopic debridement may provide a less invasive option for providing pain relief and functional improvement while delaying the need for shoulder arthroplasty. The purpose of this study was to review the outcomes of patients who have undergone arthroscopic debridement procedures for isolated glenohumeral degenerative joint disease.

Methods: Patients that had an arthroscopic debridement for glenohumeral joint disease, including capsular release, microfracture, or subacromial decompression performed by one of four surgeons at a single institution were retrospectively identified. Patients who had concomitant labral or rotator cuff repair were excluded. Patients were contacted and returned for a follow up examination. All patients were confirmed to have significant (at least grade 3) articular damage of the humerus and/or glenoid at the time of surgery. Preoperative and post-operative simple shoulder test and ASES scores, as well as post-operative constant score and physical examination were reported.

Results: 90 patients were retrospectively identified and 72 (80%) were available for follow up. The average follow up was 33 months (24 – 90 months). Of the 72 patients 17 (23.6%) had gone on to a total shoulder replacement at an average of 10.2 months. In patients that did not progress to arthroplasty; simple shoulder test (SST) scores improved from a mean of 6.0 preoperatively to 9.0 postoperatively ($P < 0.001$), ASES improved from 52.0 to 76.2 ($P < 0.001$). The average postoperative constant score was 72.4, and 80% of the patients stated that they were satisfied with the surgery and would do it again.

Conclusions: Degenerative disease in the glenohumeral joint affects many patients. This study shows that arthroscopic debridement is an option that has the potential to delay more extensive procedures and provide a significant amount of pain relief. 76% of patients experienced significant increases in function and significant decreases in pain and did not require further surgery. More importantly, 80% of the sample population stated that they were satisfied with the result and would undergo the procedure again.

Notes:

9:03-9:09am

Ten-Year Clinical Outcomes of Twenty-One Meniscal Allografts

Samuel K. Tabet, MD

Introduction: Subtotal meniscectomy is associated with early degeneration of the knee. Meniscus transplant is one approach to this problem.

Purpose: This is an evaluation of ten-year clinical outcomes of twenty-two meniscal allografts.

Methods: Records of twenty-one patients with twenty-two meniscal allografts were reviewed. Maximum follow-up time is 13.25 years and the minimum is 9.85 years. Lysholm scores were recorded for pre-op, best ever and present level of function. Patients were followed in clinic or by telephone interview by a person independent of the care team. Joint space on x-rays was evaluated using the non-operative side as a control if asymptomatic.

Results: Lysholm scores were available for nineteen patients. Comparison of Lysholm scores showed significant improvement. Two patients were not significantly improved. Three patients progressed to unicompartmental arthroplasty at ten years or greater post transplant. Two have poor Lysholm scores and fourteen have good to excellent scores. X-ray data were available for fourteen of the nineteen patients. Difference in joint space in these fourteen was 1.2 mm. Six patients had second looks. One meniscus failed primarily and was successfully re-implanted. There were 3 re-tears and 3 had increasing chondromalacia. The majority of patients continue to do well. Workers comp outcomes show they did equally well.

Discussion and Conclusion: Meniscal allograft prolongs the functional life of meniscus minus knee by being chondroprotective. Degree of chondromalacia at the time of implant is prognostic of longevity. The three patients who went on to unicompartmental arthroplasty all returned to work and had significant periods of improvement before failure.

Notes:

9:10-9:16am

Treatment of Severe Hallux Valgus Without Osteotomy or Arthrodesis, Clinical and Radiographic Analysis

Faruk Hatipoglu, MD

Todd Kile, MD

Nick E. Probst

Introduction: The modified McBride distal soft tissue procedure is indicated for repair of hallux valgus deformity with a HV angle of more than 30 degrees and an incongruent joint. When the intermetatarsal angle is greater than 13 degrees another procedure becomes necessary, such as a proximal metatarsal osteotomy (crescentic, chevron, scarf, ludloff) or an arthrodesis of the first metatarsal cuneiform joint (lapidus procedure). We describe our results with a method to correct the intermetatarsal abnormality without utilizing osteotomies or arthrodesis.

Materials and Methods: 41 consecutive patients (37 female, 4 male) 49 feet Follow up ranged from 4 – 91 months Average follow up greater than 2 years Following the standard distal soft tissue procedure and modified McBride bunionectomy, the first metatarsal is manually reduced and brought parallel to the second. It is held temporarily with a K-wire and position assessed to ensure the first and second metatarsal heads are in the same transverse plane to prevent relative plantar or dorsiflexion of the first ray. A bioabsorbable screw is placed obliquely from the base of the first into the bases of the second and third metatarsals. Patients were assessed for overall clinical outcome, complications and radiographic evaluations for measurement of correction of the hallux valgus and intermetatarsal angles and any progression or change over time.

Results: This procedure allows for significant correction of moderate and severe hallux valgus deformities with little radiographic evidence of loss of reduction over time. Patient satisfaction remains high with comparable results to other procedures mentioned. Complications were few including failure of metal screws (prior to use of absorbable screws), stress fracture at base of second metatarsal in 2 feet which healed with further immobilization, and loss of reduction IM angle requiring revision to a lapidus procedure in one pt.

Conclusion: When combined with modified McBride bunionectomy and distal soft tissue procedure, this proximal metatarsal realignment procedure provides a simple and effective method for treatment of severe and moderate hallux valgus deformities. This procedure is simple to perform, easier to

teach residents and fellows and does not “burn any bridges” with regards to salvage procedures.

Notes:

9:17–9:23am

Characterization of Glenoid and Distal Tibia Cartilage: Implications

Neil S. Ghodadra, MD
Bernard R. Bach Jr., MD
LCDR Matthew T. Provencher, MD, MC, USN
Anthony A. Romeo, MD
Geoffrey S. Van Thiel, MD, MBA

Introduction: Although bony augmentation procedures for glenoid bone deficiency in recurrent shoulder instability have long been advocated, arthrosis remains a concern as the articular conformity and volume of cartilage loss after bone grafting procedures for glenoid deficiency remains poorly defined. The purposes of this study are to: 1) determine the thickness of glenoid and distal tibia articular cartilage, 2) to determine the volume of cartilage loss in a clinically relevant glenoid bone loss anterior instability model, 3) to determine the optimal bony configuration for distal tibia allograft matching to the glenoid.

Methods: Ten fresh frozen glenoids and distal tibias with no evidence of arthrosis were topographically analyzed with a Smartscribe device which mapped the surface anatomy of the specimen. A validated software program was used to recreate the 3D surface anatomy of the glenoid and distal tibia and overlay the tracings of the glenoid on the distal tibia and measure the differences in surface anatomy. The software program was then used to construct a 3D image of a clinically significant 30% glenoid defect and subsequent glenoid bone augmentation with various segments of the distal tibia. These reconstructions were analyzed at various coordinates in order to determine the “best-fit” surface anatomy with various segments of the distal tibia. Then, the glenoid face and distal tibia articular surface were sectioned at 1.5mm intervals parallel to the long axis of the glenoid, to simulate clinical glenoid bone loss. After histologic staining, digital images were taken and analyzed with the Scion computer software program accord-

ing to a previously validated technique to allow for accurate measurement of articular cartilage thickness. The actual percentage of cartilage loss was determined at both 15% and 30% of glenoid bone loss.

Results: The topographical color map and formula for height difference sum of squares was optimal for the superimposed anterior 30% glenoid and lateral 30% tibia. There was no statistically significant difference in cartilage thickness between the anterior 30% glenoid and lateral 30% tibia. Anterior glenoid bone loss of 15% and 30% corresponded to a cartilage volume loss of 12% and 31%. Replacement of anterior 30% glenoid bone loss with lateral aspect of distal tibia restored cartilage volume to 91% of intact glenoid. Mean glenoid width and height measured 27.8 +/- 1.3mm and 35.8 +/- 1.8mm. Glenoid surface area values with and without labrum were 9.01 +/- 2.76cm² and 7.05 +/- 2.01cm². The mean glenoid vault volume with respect to surface area was 1.44 +/- 0.19 cm³/cm² (range, 1.15-1.88 cm³/cm²). The radius of curvature of the glenoid cartilage measured 25.89 +/- 2.10 mm versus 28.10 +/- 2.31 mm for distal tibia cartilage.

Conclusions: A clinically relevant anterior glenoid bone loss of 30% leads to a 30% loss in cartilage volume. Our data reveals similar thickness of anterior glenoid and lateral tibia cartilage. To anatomically reconstruct native glenoid anatomy and restore cartilage volume, the lateral 30% of a fresh osteochondral distal tibia allograft provides the best anatomical fit to the anterior glenoid. These findings may favor the potential clinical utility of fresh osteochondral distal tibia allograft for reconstruction of glenoid bone anatomy and cartilage loss.

Notes:

Friday, July 31, 2009

**CONCURRENT SESSION II —
PEDIATRICS AND SPINE**

Moderators: Ellen M. Raney, MD
Nicholas Rajacich, MD

8:35–9:30am

8:35–8:41am

Hip Arthrodesis: Failure in Overweight Adolescents

Christopher R. Costa, MD
Ellen M. Raney, MD

Introduction: Hip arthrodesis, though not commonly indicated, can still be a good option for young active patients with debilitating hip disease. Etiology of hip disease and change in treatment methods over time raises question of hip arthrodesis efficacy as treatment choice. We compared our Pacific Island/Pan-Asian population to current reported success rates of hip fusion.

Methods: Medical records and radiographs of patients with arthrodesis of the hip years 1977 to 2006 were reviewed. Fused hip angle abduction position was obtained from radiographs, radiographic dictations and clinical dictation. Most recent visit was used to measure length of follow-up.

Results: 34 arthrodesis procedures on 27 patients: 11 female, 16 male. Ten patients had septic arthritis secondary to infection; 4 TB of the hip; 4 AVN secondary to trauma; 6 SCFE which progressed to AVN; 1 congenital hip dysplasia; 1 juvenile onset ankylosing spondylitis; and 1 poliomyelitis. There were 24 fusions and 10 pseudoarthrosis (5M:5F). Ave. age of onset of disease: 10.7 (range 1-16). Ave. age of fusion: 14.8 (range 9-21). Ave. time of follow-up: 2.52 years (range 0.13 - 11.11). 8/10 patients with subsequent pseudoarthrosis had a BMI for age percentile at or above 85%. All patients were of Pacific Island or Pan Asian ethnicity.

Discussion and Conclusions: Hip arthrodesis failure rate in our population was higher than previously reported fusion rates. Etiology and indications for hip arthrodesis is now seen more frequently in overweight related disease (SCFE). 8/10 of our pseudoarthrosis patients had a BMI for age percentile above the 85% — which may pose significant risk for failure. There was no significant correlation between hip arthrodesis

success and fused position in the failed group of patients. Patients should be advised that a BMI for age percentile above 85% is a major risk for failure of arthrodesis.

Notes:

8:42–8:48am

Arthroscopic Surgery for Femoroacetabular Impingement: A Perspective From Both Sides of the Scalpel

Dean K. Matsuda, MD

Introduction: Femoroacetabular impingement is a topic of growing relevance and discussion, especially as it relates to generally athletic young adult patients. The arthroscopic management of this condition is attractive in several regards, but critics have voiced concern over the inability to perform comprehensive arthroscopic management of this condition.

Methods: This presentation was given at the 2008 WOA annual meeting but will be significantly updated with rapidly evolving data and techniques. The author gives his updated impressions based on over four year's experience performing high volume arthroscopic surgery for femoroacetabular impingement. He describes the latest techniques showing excerpts from two DVDs that are being shown at the 2009 AAOS Annual Meeting as well as being sold as part of the AAOS Surgical Video Library. Highlights include the comprehensive dual-portal arthroscopic procedure including rim trimming using an innovative fluoroscopic templating technique for added precision, labral refixation using a knotless suture anchor system, and precision femoral head-neck resection osteoplasty. Professional animations along with technical pitfalls and pearls are included.

Results: A comprehensive review of the most current literature relevant to arthroscopic FAI surgery is presented, showing comparable short-term (2-4 year minimum) outcomes of pain and activity level improvement using multiple hip outcome instruments and fewer reported complications when compared to the open dislocation procedure. A brief presentation of the surgeon-author's personal experience with bilateral arthroscopic FAI surgery is presented.

Discussion and Conclusion: Comprehensive arthroscopic dual-portal surgery has similar successful outcomes and fewer complications compared to the open procedure. Advantages of the former include truly outpatient minimally invasive surgery, minimal intraoperative blood loss, quicker rehabilitation, absence of trochanteric osteotomy related complications, and outstanding cosmesis.

Notes:

8:49–8:55am

The Effect of Bilateral Laminotomy vs. Laminectomy on the Motion and Stiffness of the Human Lumbar Spine

Michael J. Lee, MD
Rick M. Bransford, MD
Jens R. Chapman, MD
Randal P. Ching, PhD
Amy M. Cohen, MME
Richard M. Harrington, MS

Introduction: The most common surgical treatment of central lumbar stenosis is a laminectomy with partial medial facetectomies. Previous studies have reported that excessive facet resection can result in instability of the spine. Despite efforts to maintain facet integrity by resecting no more than 50% of each facet, rates of post-laminectomy spondylolisthesis have been reported to range from 8 to 31%. Bilateral laminotomies have been shown to be effective in decompressing the spine, without resection of the posterior osteo-ligamentous complex (spinous process, interspinous ligament, supra-spinous ligament). The posterior osteo-ligamentous complex act as a tension band to limit excessive flexion and as a mechanical block to limit excessive extension. Excessive iatrogenic hyper-mobility may be a predisposing factor to developing instability. We hypothesize that bilateral laminotomies induce significantly less iatrogenic hyper-mobility and less stiffness reduction than a complete laminectomy in the lumbar spine.

Methods: Five fresh frozen human cadaveric lumbar spines (L1-L5) were mounted into a spine motion simulator for testing. With application of a physiologic follower pre-load (400N), flexion-extension (8N-m/6N-m), lateral bending

(±6N-m), and axial rotation (±5N-m) moments were applied to the lumbar spine in three trials: 1) Trial 1: Intact lumbar spine – no surgery, 2) Trial 2: Lumbar spine after bilateral lumbar laminotomies at L2-5, 3) Trial 3: Lumbar spine after full laminectomies at L2-5. The lumbar spine kinematics (total and segmental) were measured using a Vicon motion tracking system. Total and segmental ROM and spine stiffness were recorded.

Results: In flexion and extension, bilateral laminotomies resulted in an average increase in L2-5 range of flexion-extension motion of 17.49% whereas a full laminectomy resulted in an increase of 36.76% ($p < 0.05$). Analysis per level demonstrated roughly two-fold increase in motion with laminectomy compared to bilateral laminotomies ($p > < 0.05$ at every treated level). Analysis of motion in axial rotation or lateral bending did not yield statistically significant changes after bilateral laminotomies or laminectomy. Stiffness was decreased by an average of 11% after the three-level-laminotomies. After three-level-laminectomy, the stiffness was reduced by 27% ($p > < 0.05$).

Discussion: These data demonstrate that bilateral laminotomies induce significantly less hyper-mobility and less stiffness reduction compared to a full laminectomy. The preservation of the central posterior osteo-ligamentous structures may provide a stabilizing effect in preventing post-decompression spondylolisthesis.

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