ABSTRACTS PRESENTED AT THE

56TH ANNUAL PIEDMONT ORTHOPEDIC SOCIETY MEETING

AVENTURA, FLORIDA – MAY 7-11, 2008

2008 - TOTAL HIP REVISION ARTHROPLASTIES, Glen A. Barden, M.D., Watson Clinic LLP – Lakeland, Florida

Revisions of total hips present unique challenges and pitfalls. Attention to a number of specific aspects of the patient's presentation can result in acceptable results in this group of patients who are debilitated by their problem. These details include doing all possible to get the operative report of each surgical intervention which has been done previously on the involved hip. Along with this, the communication with representatives from the company manufacturing the implants is of major assistance to the operating room team. Many of these patients are very senior in age. This does not need to be a contraindication to proceeding with surgery, with attention being given to the physiologic status of the patient and to obtaining appropriate medical clearance prior to surgical intervention. Reasonable expectations must be a part of the surgeon and the patient as each enters into the surgery. Complications are common associated with the surgery. The anticipation of such with utilization of varying measures such as application of a cable around the proximal femur to decrease the chance of fracture along with adductor tenotomy in certain situations, all play a role in decreasing the potential of complications.

The use of multiple screws for stabilization of the acetabular liner and utilization of bone cement on occasion if needed for strength of the construct, especially at the acetabular area, can be of great value. The use of a cortical window in the femur for cement removal is commonly beneficial. Additionally the use of cables, bone bank cortical strut grafts, and trochanteric clamp devices are frequently needed for stabilization of the femur with the entire area being carefully visualized per the complex prior to closure being an important aspect of the revision. Intraoperative x-rays along with direct visualization are indicated if there is any question about penetration of the stem during the course of the revision of the femoral area.

Rewards in this subset of patients are not great, and patients' expectations as well as the expectations of the families are frequently not met. Rehabilitation is generally slower than all desire. Further surgeries may be needed along the way, and the patient may well proceed with surgery with a different treating orthopaedist. In view of this, encouragement is given to supply to the patient in the postoperative time frame a copy of the operative report. This assists the patient and any future treating orthopaedic surgeon to have the necessary details to assist in making any further intervention as optimal as possible.

KNEE SOCIETY FUNCTION SCORES MORE RELATED TO PAIN THAN FUNCTIONAL FORCE MEASURES, Christensen CP, Jacobs CA, Lexington Clinic, Lexington, KY

Introduction

The Knee Society Function Score (KFS) is commonly used to document patient-reported functional ability following knee arthroplasty. Other functional scoring systems, such as the WOMAC, have been reported to be more related to pain than the performance of clinical tests. The purpose of this study was to determine if the KFS was more related to pain or actual functional capacity of the surgical limb prior to and following knee arthroplasty.

Methods

Prior to and 12 weeks following TKA or UKA, 41 patients performed the step-up-and-over test on a dual force platform, with force data being collected on each limb individually. During functional testing, we recorded the lift-up index, which is a force measure normalized to the patient's body mass that is indicative of concentric ability of the surgical limb. In addition, patients answered questions necessary to calculate the KFS and the Pain subcomponent of the Knee Score. The Pain subcomponent was calculated from patients' responses to questions about pain at rest or elicited when walking or navigating stairs. Spearman's correlation coefficients (r) were used to determine the relationship between the three measures both prior to and following surgery.

Results

There were significant relationships between Pain and the KFS both preoperatively ($r=.56$, $p<.001$) and at the 12-week follow-up ($r=.40$, $p=.01$), whereas the lift-up index was not significantly related to the KFS either prior to ($r=.08$, $p=.67$) or following surgery ($r=.25$, $p=.16$).

Conclusions

Pain scores described a significant amount of the variance in both pre- and postoperative KFS; however, the objective functional measure utilized in this study did not. To better understand postoperative functional recovery, it is imperative to develop clinically meaningful functional measures.

GREATER PREVALENCE OF EARLY COMPLICATIONS WITH CERAMIC-ON-CERAMIC THAN WITH METAL-ON-METAL TOTAL HIP ARTHROPLASTIES, Christensen, CP, Jacobs, CA, Lexington Clinic, Lexington, Kentucky

Introduction: Hard bearings couples have demonstrated improved wear characteristics. Despite this, surgeons may be reluctant to utilize these bearings either due the risk of material fracture or squeak with ceramic-on-ceramic (C/C) hips, or the risk of complications stemming from the release of metal ions from metal-on-metal (M/M) hips. Additionally, there is a risk of less satisfactory outcomes or an increased risk of complication when a surgeon is utilizing a new implant. The purpose of this study was to determine if the respective learning curves associated with our initial experience with C/C and M/M bearings affected early complication rates and clinical outcomes.

Methods: We compared patient demographics, modified Harris Hip Scores, and complications occurring in the early postoperative period to determine if differences existed between our initial series of 75 C/C and 75 M/M hips.

Results: There were no differences in patient demographics or modified Harris Hip Scores. In the C/C group, titanium-encased liners were malseated in 6/75 hips (8%) and 7/75 (9.3%) of have been reported to squeak. Four C/C hips (5.3%) were revised; 1 for recurrent dislocation, 1 for posterior impingement, 1 for femoral loosening, and 1 for

acetabular loosening. In the M/M group, 1 hip (1.3%) was revised for femoral loosening. There was a significantly greater prevalence of technical complications with the C/C hips than M/M hips that have not required revised (12/71 vs. 0/74, $p<0.001$).
Conclusions: C/C hips demonstrated a significantly greater prevalence of technical complications in the early postoperative period compared to the M/M hips. The long-term benefit of improved wear characteristics of C/C hips may be overshadowed by inferior results in the early postoperative period.

LESSONS, H. Barrett Heywood, III, M.D., Guest of Honor, 56th Annual Piedmont Orthopedic Society meeting May 7-11, 2008 - Fairmont Turnberry Isle Resort & Club, Aventura, Florida

Voltaire, the 18th century author of the French enlightenment era stated, "Illusion is the first of all pleasures." I have accepted the illusion of being an honored guest of the Piedmont Society and have taken great pleasure in being such. May I start by thanking those responsible: Erich and Gary, their wives, Sharon and Lulie, Jim Urbaniak, Don Ferlic, and Penny who badgered me for my disclosure statement, and to you members of the Piedmont Orthopedic Society. I would like to praise my wife, Joan for her love and companionship over forty years and to my daughter and son Johanna and Robert, who have come from a far. When informed that an address was needed to thank this group, I groped for something useful. A friend once discussed the wisdom he had discovered on airport walls. I don't travel as much as he, so that was out of the question. Since I've retired, I've accepted the duty of occasional grocery shopping. While standing in the check out line, I glanced at the headlines on the news stand. Could there be wisdom there, no afraid not. However, I can recognize wisdom as I have studied from some outstanding teachers. Briefly, let us examine their wisdom.

How could we not start with Dr. Baker, Lenox Baker (by the way the portrait was commissioned by the Piedmont Society) Born in Texas in 1902, his family roots were in Sequatchie Valley, Tennessee, about 20 miles over the mountains from Chattanooga. Dr. Baker sent me into the valley to search for his ancestors when he got interested in his family genealogy. He told the story that he went to the University of Tennessee, where he worked as a student athletic trainer for a Mr. Mickey O'Brien, whom I knew. He then entered the initial class at Duke University Medical School. He made a patient presentation to a visiting professor, Dr. George Bennett, the Professor of Orthopedics at John Hopkins and a father of sports medicine. Dr Bennett was impressed by the student's presentation and offered him an orthopedic resident's position. After finishing his residency, he returned to Duke and remained till his retirement. Dr. Baker demanded the Duke way in case management, manners, dress and so on. If you watched him relate to the female personnel at the Cerebral Palsy Hospital, you would have thought they were princesses of England. After watching him, I copycatted and got where I could pull a chair out and seat a woman as well as anyone. The worst "chewing out" I received at Duke was one 8 o'clock grand rounds. After breaking out of an early morning trauma case, I arrived unshaven and shoes not shined. I was told very directly that I failed to meet the image of a Duke orthopedic resident. To try to explain or give an excuse to Dr. Baker was not smart. He stated that the Roman Catholics were right, "confession is good for the soul." To argue brought further diminution of your status. "I was wrong, I'm sorry and I'll do it right the next time", was the best and quickest route from this

fearful visage. Utilizing Duke, Dr. Roberts at Gastonia, Dr. Charles Irwin at Warm Springs, and Dr. Stelling and Meyers at Greenville he built a great orthopedic residency program.

My first great teacher was my father, my namesake, called Coach by most and Humpy by his friends. He was coach of my prep school football team; coach and father often became intertwined. In the 1940's and fifties when he coached, he was ahead of his time, organized practices, preseason training, scouting and situational substitution. He was insightful and almost always could find a way to allow a player to contribute to the team. When his players, students and especially his five children had rough spots in our lives he was supportive and compassionate. In 21 seasons he won 160 games, lost 20, and tied 8. Six of his players became college all-Americans, and dozens played college football. I quoted from a letter, "A boy couldn't have asked for more than which received from Humpy and the Baylor experience. As I reflect, I'm reminded so vividly of the laughs, the tears, the work and sweat, the achievements, the temporary failures-all failures were temporary, since Humpy wouldn't allow failures to endure, the lessons learned, the dreams, the close relationship and the unity of our teams." My only disagreements with him as a youth was when he wouldn't allow me to be someplace I wanted to be and he didn't want me to be there. In retrospect, his decisions were good. I'll pass on several thoughts he taught. When I turned 50 he stated the next 10 years were important for me to take good care of myself. He had observed that men who reached 60 would live much longer, but many 50 yr. olds didn't reach 60. An hour sleep before midnight is worth two after midnight. I've never been able to substantiate that factoid. The last is to always leave the table a little hungry.

Lyndon Johnson was the President of the United States, when he was Senator Johnson and had a near fatal myocardial infarction, his cardiologist was Dr. J. Willis Hurst. After his naval commitment at Bethesda, he returned to Emory to follow Dr. Eugene Stead as Chairman of the Department of Medicine. I listened to Dr. Hurst for four years, three as a student, and one as a medical service intern. He was extremely patient. Mostly he taught us auscultation of the heart, and he understood that for some it took longer to learn some medical skills, especially to hear certain murmurs, such as mitral insufficiency. Several years ago he addressed the 2000 class at Emory. The address came to my attention and it recalled Dr. Hurst's emphasis that doctoring implies that the individual takes care of patients with disease. He pleaded for confidence, communication and compassion with patients. At Grady Hospital in Atlanta, an intern was expected to admit, do and write up a history and physical, do the lab work and start treatment on each patient admitted to his service. This evening was heavy with several admissions, sick patients, and a death or two. About 11 o'clock I was called to the phone, it was Dr. Hurst asking how everything was, then he said, "If you need help, call me and I'll come. " I think all great teachers have said that to their students.

Now the ultimate teacher, Dr. J. Leonard Goldner my regret is while at Duke my association with Dr. Goldner was limited. He did give me the opportunity to take his CORECO camera pictures, and do his EMGs. Prior to my spending a year in Gastonia, he told me how to handle the year. I did what he said and was allowed to do numerous cases. After reading Jim Urbaniak's eulogy there is really nothing I can say about this great man. "Although he strongly believed perfection is the ideal goal, he appreciated that few of us achieve it." As a corollary, he had no favorites and we were all a part of his

family. During my years at Duke, Dr. Goldner stepped away from his Sunday School Rounds. Each orthopedic patient in the hospital was visited. Using his usual Socratic method, he elicited from each resident all the information on a subject you knew. Then he added more. His depth was amazing. I recall the last patient at Duke to have acute poliomyelitis- this was 7 years after the vaccine. In detail each step in the care of the patient was described-how to make the patient comfortable, how to prevent contractions and maintain motion without complication, which might occur, and then the long term care. I was dumbstruck. Triple arthrodesis can be a difficult procedure. I had scrubbed in with Dr. Roberts, Dr. George Miller, Dr. Baker, and Dr. Clippinger. Dr. Goldner really made me understand why and what I was doing. Lastly, he always knew what you were thinking. Scrubbing with him on a bilateral clubfoot infant care (Being bilateral I knew he would let me do the 2nd one). This child was the son of a Fort Bragg doctor. My wife Joan was pregnant with our first child, he never stopped the case but said, "Don't worry Barry; it won't necessarily happen to your family." I was fun getting together this response. I felt good that I had had the opportunity to learn from these men.
They all were men who were compassionate, attentive to detail, well grounded in their knowledge, and very willing to pursue change, the foundation of all advances. When I was in residency Watanabe first reported on the arthroscope. We all laughed in journal club and the comment that the incandescent bulb was short lived. In about a decade fiber optics was available and so created sports medicine. There were no battery or air powered instruments. Harrington had just started his scoliosis instrumentation. Charnley was still in his lab with the total hip arthroplasty. There was no CT scan, MRI or image amplifier. Re-implantation was a gleam in investigators eye. In short 95% of the orthopedic surgical practice has changed in the past 40 years. It will again. The back round we received at Duke allows us to seek and accommodate to change. My favorite prayer comes from the Old Testament in Chronicles.

The Jabez prayer

And Jabez called on the God of Israel saying,
"Oh, that You would bless me indeed,
And enlarge my territory,
That your hand would be with me,
And that You would keep me from evil,
That I may not cause pain!"
So God granted him what he requested.
I Chronicles 4:10 (NKJV)

This is what I wish for the Duke Orthopedic Program and the Piedmont Society. Thank you for giving me this opportunity to be an honored guest.

DISTRACTION LOAD TO THE CERVICAL SPINE BY MECHANICAL VENTILATION, Marshall Armitage, MD, Alexandra Schonning, Ph.D., John S. Kirkpatrick, M.D. Jacksonville, Florida

Introduction:

Patients sustaining traumatic atlanto-axial and atlanto-occipital dislocations are increasingly surviving initial injury and transport to hospitals. These injuries result from rupture of many or all of the ligamentous structures about the craniocervical junction, alone, or in combination with fracture of the atlas, axis or basilar skull. Obviously, these injuries severely alter the stability of the upper cervical spine. Reports have suggested that longitudinal distraction through the supra-axial zone of injury can be seen during mechanical ventilation of these patients. The aim of this study was to quantify the magnitude of the force implemented on the cervical spine by mechanical ventilation.

Methods:

A digital force gauge (Imada Inc; Northbrook, IL) with minor modifications was used as a model cervical spine and hard palate. A mechanical ventilator and test lung (Michigan Instruments Inc; Grand Rapids, MI) were connected through an 8.0 endotrachael tube. Both pressure control (PC) and volume control (VC) modes of ventilation were studied. Ventilator settings were investigated at physiologic and supra-physiologic values. The model lung was used to adjust lung compliance from 10 to 50 mL/cmH_2O (normal physiologic values 60 – 100 mL/cm$H_2$0) and circuit resistance from 5 to 50 cmH_2O/L/s (Normal physiologic value 5 cmH_2O/L/s).. SW-1 (Imada Inc) software was used to record the force impacted upon the hard palate at one second intervals for 90 seconds per trial.

Results:

Common initial ventilator settings of VC with tidal volume 460 ml or PC with peak airway pressure <20 mmH_2O above PEEP and initial physiologic lung compliance of 50 mL/cmH_2O and resistance of 5 cmH_2O/L/s generated average loads of 0.35 and 0.45 N, respectively. The maximum axial load recorded across the model cervical spine was 2.0 N with settings of PC with peak airway pressure <35 mmH_2O above PEEP, compliance of 20 mL/cmH_2O and resistance of 20 cmH_2O/L/s. Generally, volume control produced greater forces than physiologic PC; supraphysiologic PC ventilation produced greater loads than physiologic ventilation settings for both PC and VC. A trend for increased compliance to decrease the load was found.

Discussion:

Vertical translation of the occipitocatlantoaxial junction in live humans is not a new concept. In 1863 Henke used the term “double threaded screw joint” to describe the motion caused by the biconvexity of the C1-C2 articulation. Later, Hohl and Hultkrantz reported that longitudinal motion was visible on cineradiography, yet it only occurred at the extremes of motion.

Our results show that mechanical ventilation can apply up to 2.0 N axial distraction loads to the post traumatic upper cervical spine. Our hypothesis was corroborated in that decreased compliance – as seen in acutely injured lungs – tended to increase this force. With the instability caused by such injuries, 2.0 N may be enough to create distraction through the injury. The clinical implication is twofold; vertical type supra-axial cervical spine injuries are extremely unstable and early fixation may decrease the risk of secondary neurological injury. Repeated distraction force across the spinal cord as a result of prolonged ventilation may contribute to neurological injury.

SECOND, THIRD CMC INJURIES OF THE WRIST: A FREQUENTLY MISSED INJURY WITH SIGNIFICANT SEQUELAE, Gary M. Lourie, M.D., Atlanta, GA

INTRODUCTION:

Dorsoradial wrist pain is a common complaint in the upper extremity surgeon's practice. The differential diagnosis includes dorsal carpal ganglion, tendonitis of the wrist extensors, scaphoid fractures, thumb basilar arthritis, carpal instability, Kienbock's, radiocarpal impaction vs. impingement, and entrapment of the posterior interosseous nerve. Injuries of the second, third CMC joint have been rarely described in the literature but can have significant sequelae because of missed or delay in diagnosis, inadequate diagnostic workup and inadequate treatment. The purpose of this paper is to retrospectively review a number of patients treated with second, third CMC joint injuries to highlight the importance of its accurate diagnosis and treatment. A specific maneuver on physical exam will be discussed along with a characteristic MOI not routinely documented in the past.

MATERIALS AND METHODS:

A retrospective review of 19 patients seen in a hand surgeon's practice between 9/1994-3/2005 are reviewed evaluating the mechanism of injury, delay in diagnosis, other diagnoses confounding the true injury, physical exam, conservative and ultimate surgical treatment. Long-term sequelae and morbidity was assessed.

RESULTS:

Of the 19 patients, there were eleven females and eight males, and the average age was 40.6 years. The mean time to diagnosis of CMC being the source of pain was 8 months (range 5 days to 3 years). The dominant hand was involved in 63% (twelve) of the cases. Eleven (57.9%) of the injuries were sustained due to gripping the steering wheel during a motor vehicle accident. On physical exam, 84% of patients had a positive Kleinman pinch documented.

DISCUSSION:

Injuries of the second, third CMC joint of the wrist are frequently missed and can result in significant morbidity. Delay and misinterpretation in diagnosis can occur often resulting in prolonged treatment and continued pain. A more common mechanism of injury not reported previous is motor vehicle accidents in which the driver grasps the steering wheel and at impact the wrist and hand is dorsiflexed resulting in a dorsally-directed injury pattern to the CMC joints. The constrained anatomy of the second, third CMC joint has been well-described and serves as the keystone of the hand in which movement occurs around this central post. Injury to this articulation will result in significant pain with not only light activities such as pinch but also in more heavy actions such as power grip, etc.

The exam of the wrist will often overlook this area; however compression of the base of the second CMC joint against the fifth CMC joint will confirm the diagnosis. X-rays are usually negative as subluxation often will not be present. Later post-degenerative changes such as a CMC boss may show on special projections, i.e. CMC boss view. Three-phase bone scan is often accurate in the delayed phase showing increased uptake at this articulation. Initial treatment with early diagnosis may provide relief with immobilization, NSAID and often judicious use of corticosteroid injection. Ultimately if the patient presents late or has continued pain unresponsive to conservative treatment,

excision of the CMC boss may be helpful, however if degenerative changes or instability is present, then a second, third CMC joint fusion can achieve lasting relief.

LONG –TERM OUTCOME OF TRAPEZIOMETACARPAL ARTHRODESIS IN THE MANAGEMETN OF BASILAR THUMB PATHOLOGY, Marco Rizzo, Mayo Clinic, Rochester, Minnesota

Introduction: When successful, trapeziometacarpal (TM) arthrodesis effectively eliminates pain and affords stability of the thumb. However, outcomes have been conflicting. The purpose of this paper is to review the long term results of thumb trapeziometacarpal arthrodesis for thumb arthritis with respect to clinical outcomes, union and complications.

Methods: A retrospective review of TM arthrodeses performed between 1970 and 2003 was undertaken. There were 126 thumbs in 114 patients (79 female, 35 male) included in the cohort. Pre- and postoperative clinical and radiographic data was reviewed. The average age was 56.6 years (range 32 - 77). The dominant hand was involved in 76 cases. Fixation utilized included k-wires (101 thumbs), tension band with/without wires (11), staples (8), plate and screws (3), compression screws (2) and none (1). Supplemental bone graft was utilized in 90 thumbs. Pre-operative appositional pinch, oppositional pinch, and grip strengths were 3.0 kg, 2.7 kg and 14 kg respectively. The average pain score on a scale of 0 – 10 was 6.6 (range 4 – 10). The average follow-up was 11.2 years (range 2.5 – 28).

Results: There were 17 (13.5%) nonunions. No correlation existed between the incidence of nonunion and use of bone graft or type of fixation. Nine of 17 thumbs underwent re-operation. The appositional pinch, oppositional pinch and grip strengths improved to 5.9 kg, 5.4 kg and 23 kg respectively ($p < 0.01$). The average pain score improved to 0.4 ($p < 0.01$). Radiographic progression of scaphotrapezialtrapezoid (STT) arthritis occurred in 39 cases; however only 8 of these were symptomatic. Metacarpophalangeal (MP) arthritis progressed in 16 thumbs.

Conclusion: TM arthrodesis affords most patients with improved pain and function and excellent overall patient satisfaction. Despite the presence of MP and STT joint arthritis, intervention was rarely warranted.

THE DYNAMIC PHASES OF PERONEAL AND TIBIAL INTRANEURAL GANGLION FORMATION: A NEW DIMENSION ADDED TO THE UNIFYING ARTICULAR THEORY, SPINNER, Robert J., Kimberly K. AMRAMI, Huan WANG, Bernd W. SCHEITHAUER, and Stephen W. CARMICHAEL. Mayo Clinic School of Medicine, Departments of Neurologic Surgery, Orthopedics, Anatomy, Radiology and Laboratory Medicine, Rochester, Minnesota

Object. The pathogenesis of intraneural ganglia has been controversial for more than a century. Recently we have identified a stereotypic pattern of occurrence of peroneal and tibial intraneural ganglia and based on an understanding of their pathogenesis, provided a unifying explanation. Atypical features occasionally observed have offered an opportunity to further verify and expand upon our proposed theory.

Methods: Ten unusual cases are reviewed to introduce the dynamic features of peroneal and tibial intraneural ganglia. In part I, we analyzed 2 of our own patients who shared the essential principles common to peroneal intraneural ganglia: namely a) connections to

the anterior portion of the superior tibiofibular joint, and b) intraepineurial dissection of the cyst along the articular branch of the peroneal nerve and proximally. These patients also demonstrated unusual MRI findings: a) the presence of a cyst within the tibial and sural nerves in the popliteal fossa region, and b) spontaneous regression of the cysts on serial examinations performed weeks apart. We then identified a clinical outlier that could not be understood in terms of our previously reported unified theory. Reported 32 years ago, this patient had a tibial neuropathy and was found to have tibial, peroneal and sciatic intraneural cysts without a joint connection at operation. Our hypothesis, based on our initial experience was that this reported patient had a primary tibial intraneural ganglion with proximal extension, sciatic cross-over and then distal descent, and that a joint connection to the posterior aspect of the superior tibiofibular joint with remnant cyst within the articular branch would be present, a finding that would help us explain the formation of the different cysts by a single mechanism. We proved this by careful inspection of a recently obtained postoperative MRI. In part II, we retrospectively reviewed 20 additional cases of our own and identified 7 examples with subtle unrecognized MRI features of sciatic cross-over (as well as several examples in the literature).
Conclusions. These cases provide firm evidence for mechanisms underlying intraneural ganglia formation and allow us to expand our unified articular theory to elucidate unusual presentations of intraneural cysts. Whereas an articular connection and fluid following the path of least resistance was pivotal, we now incorporate dynamic aspects of cyst formation due to pressure fluxes. These principles explain new patterns of primary ascent, sciatic cross-over and terminal branch descent when cyst fills the sciatic nerve's common epineurial sheath.

THE HANDSHAKE, James R. Urbaniak, M.D., Duke University Medical Center, Durham, NC

The hand shake, an every day trite ritual has been accepted as American cliche. However, most of us are unaware of its history and how this somewhat empty social custom all began. Actually shaking hands is a relic of the past. Although it is our most common form of greeting, it is the least understood act we perform daily. The origin and history of the handshake will be based on the study of many relics and art forms from antiquities and not based on folk lore. The history of the hand shake has become socialized, romanticized, democratized and trivialized as the presenter hopes to demonstrate.

THE MISINTERPRETATION OF LUMBAR MRI FORAMINAL ANATOMY
David C. Urquia MD, Richmond, Virginia

This is an MRI-anatomical study, presenting a precise and accurate definition of lumbar foraminal anatomy. The true lumbar foramen is defined as a "foraminal zone" in "Story II" of the individual vertebral segment. The foramen sagital boundaries are the medial and lateral border of its pedicle, within Story II.

This presentation defined the purpose and format for an examination that will be sent out to the entire Piedmont Orthopaedic Society membership in 2008, testing the ability of Orthopaedic surgeons to accurately recognize foraminal pathology on MRI examples. This data will be collected and reported at future academic meetings.

We presented clinical examples of correct and incorrect readings from recent lumbar MRI's for the presence or absence of foraminal compression of lumbar nerve roots. The MRI scans used in the examination were independently reviewed by the author and two musculoskeletal radiologists for a consensus interpretation.

This project may form the basis for a much broader anatomic study of lumbar anatomy and national data collection effort.

ANTERIOR SCOLIOSIS ROD MIGRATION TO THE LOWER EXTREMITY,

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Background Context:
Scoliosis rod migration has been reported rarely in the literature. We present a case study on three patients with distant migration of anterior scoliosis rod implants.

Purpose:
To report an unusual complication of rod migration of anterior retroperitoneally implanted scoliosis rods in three patients.

Study Design/Setting:
A retrospective case report.

Methods:
Radiographic analysis.

Results:
Asymptomatic rod migration occurred from the anterior spine to the lower extremity in two cases and to the retroperitoneal space in the third case. The rod fragment appeared in the lower extremity in two cases and was removed through a small skin incision in the extremity. The average time from scoliosis surgery until the rods were found at a distant site was nine years.

Conclusions:
The scoliosis surgery was effective in preventing further deformity; however, in two cases there was nonunion at one or two levels. Patients are asymptomatic at the present time and followed at regular intervals to see if further surgery is necessary to correct areas of nonunion.

Keywords: Hardware migration; Spinal instrumentation complications; Scoliosis