CLINICAL ORTHOPAEDIC SOCIETY
101st Annual Meeting
BUFFALO NIAGARA
SEPTEMBER 19 - 21, 2013
Hyatt Regency Hotel
and Buffalo Niagara Convention Center
IN CONJUNCTION WITH THE NEW YORK STATE
SOCIETY OF ORTHOPAEDIC SURGEONS, INC.
EXHIBITORS

Gold Level
DePuy Synthes

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Stryker Orthopaedics

Bronze Level
Angiotech
Auxilium Pharmaceuticals
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ConforMIS, Inc.
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Orthofix, Inc.
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SANOFI Biosurgery
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SRSsoft
UBMD Orthopedics and Sports Medicine

Exhibitors
Cadence Pharmaceuticals, Inc.
Hapad, Inc
New York State Athletic Trainers’ Association
Planmed, Inc.
PolyGel

Refreshment Break Sponsor
Kaleida Health
# TABLE OF CONTENTS

- Officers .................................................................................................................. 4
- Committees ............................................................................................................... 5
- Past Presidents ......................................................................................................... 6
- Past Meetings ............................................................................................................ 7
- Dr. & Mrs. J. Elmer Nix Ethics Award ..................................................................... 8
- Mission Statement, Vision and Values ..................................................................... 9
- President’s Message ................................................................................................ 10
- Course Objectives and Accreditation .................................................................... 11
- Distinguished Invited Speakers ............................................................................ 13
- Faculty and Disclosures ......................................................................................... 14
- Scientific Program .................................................................................................. 18
- New Members ......................................................................................................... 153
- Necrology List ........................................................................................................ 154
- Directory, alphabetical listing ............................................................................... 159
- Directory, geographical listing ............................................................................. 211
- Bylaws .................................................................................................................... 217
- Exhibitors’ Product Descriptions ......................................................................... 230

# FUTURE MEETINGS

The Broadmoor, Colorado Springs, CO ...... September 11-13, 2014
2012-2013 OFFICERS & DIRECTORS

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Mark J. Anders, MD - Co-Chair
Matthew Phillips, MD - Co-Chair

CLINICAL ORTHOPAEDIC SOCIETY
ADMINISTRATIVE OFFICE
2209 Dickens Road • Richmond, VA 23230-2005
(804) 565-6366 • FAX: (804) 282-0090
E-mail: cos@societyhq.com • www.cosociety.org

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Animesh Agarwal, MD
Scott Hodges, DO
Holly Duck, MD
Pietro Tonino, MD

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John E. Garber, MD

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Holly Duck, MD
Thomas N. Joseph, MD

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William C. Warner, MD
Mark J. Anders, MD
Matthew Phillips, MD

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Robert M. Peroutka, MD
James A. Slough, MD - Ex Officio
L. Andrew Koman, MD - Ex Officio

BYLAWS COMMITTEE
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Robert M. Peroutka, MD
Frederick N. Meyer, MD

CONTINUING MEDICAL EDUCATION COMMITTEE
Bess E. Brackett, MD
Robert M. Peroutka, MD
Pietro Tonino, MD
James A. Slough, MD
Matthew Phillips, MD - Ex Officio
Mark J. Anders, MD - Ex Officio

VISITING PROFESSOR COMMITTEE
William C. Warner, MD
Robert M. Peroutka, MD
James A. Slough, MD

RESIDENT PAPER AWARD COMMITTEE
James A. Slough, MD
Frederick N. Meyer, MD
Robert M. Peroutka, MD
John E. Garber, MD
Mark J. Anders, MD - Ex Officio
Matthew Phillips, MD - Ex Officio

PLANNING AND DEVELOPMENT COMMITTEE
James A. Slough, MD - 2013 Program Chair
Mark Anders, MD - 2013 Scientific Co-Chair
Matthew Phillips, MD - 2013 Scientific Co-Chair
PAST PRESIDENTS

John Lincoln Porter* .................................. 1912
Albert H. Freiberg* .................................. 1913
Edwin W. Ryerson* .................................. 1914
Emil Geist* ............................................ 1915
John Prentiss Lord* .................................. 1916
H. Winnett Orr* (April) ................................ 1920
Melvin S. Henderson* (November) .................... 1920
Frederick C. Kidner* .................................. 1921
Arthur Steindler* ..................................... 1922
Frank D. Dickson* ..................................... 1923
Frederick J. Gaenslen* ................................ 1924
W. H. Cole* ............................................ 1925
Henry W. Meyerding* .................................. 1926
Willis C. Campbell* .................................... 1927
Walter G. Stern* ....................................... 1928
Robert D. Schrock* .................................... 1929
Robert B. Cofield* ..................................... 1930
W. Barnett Own* ....................................... 1931
Rex L. Diveley* (January) .............................. 1933
E. Bishop Mumford* .................................... 1934
Edward S. Hatch* ...................................... 1935
William B. Carrel* ..................................... 1936
J.F.M. Thomson* ........................................ 1937
James A. Dickson* ...................................... 1938
R. Wallace Billington* .................................. 1939
H. Earle Conwell* ..................................... 1940
Fremont A. Chandler* ................................... 1941
Ralph K. Ghomley* (January) .......................... 1943
Myron O. Henry* (January) ............................ 1944
J. S. Speed* (October) ................................... 1944
Joseph A. Freiberg* .................................... 1945
Walter P. Blount* ....................................... 1946
Herman F. Johnson* .................................... 1947
George J. Garceau* ..................................... 1948
Robert E. Burns* ....................................... 1949
C. R. Routledge* ....................................... 1950
George W. N. Eggers* .................................. 1951
Claude N. Lambert* ..................................... 1952
Edward I. Evans* ....................................... 1953
C. Leslie Mitchell ....................................... 1954
John H. Moe* .......................................... 1955
I. S. McReynolds* ...................................... 1956
J. Neill Garber* ........................................ 1957
Marcus J. Stewart* ...................................... 1958
Atha Thomas* .......................................... 1959
Fred C. Reynolds* ...................................... 1960
Charles H. Frantz* ..................................... 1961
Paul C. Williams* ...................................... 1962
Rufus H. Aldredge* ..................................... 1963
Lyman Smith* .......................................... 1964
H. Herman Young* ...................................... 1965
S. Benjamin Fowler* ................................... 1966
K. Armand Fischer* ..................................... 1967
Joseph E. Brown* ....................................... 1968
Jerome G. Finder* ....................................... 1969
Jack K. Wickstrom* ..................................... 1970
William H. Blodgett* ................................... 1971
Lee T. Ford* ............................................ 1972
Sam W. Banks* ......................................... 1973
Joe W. King* ............................................ 1974
Barry A. Friedman* ..................................... 1975
Mark B. Coventry* ...................................... 1976
Worth M. Gross ......................................... 1977
Mack L. Clayton* ........................................ 1978
Ralph T. Lidge .......................................... 1979
William S. Smith* ...................................... 1980
Bruce J. Brewer* ....................................... 1981
Louis J. Levy* .......................................... 1982
George E. Spencer, Jr. .................................. 1983
Einer W. Johnson, Jr.* .................................. 1984
Richard H. Eppright* ................................... 1985
James C. Amspacher* ................................... 1986
Kurt M.W. Niemann* .................................... 1987
James P. Ashstrom, Jr. ................................... 1988
Norman L. Dunitz ........................................ 1989
F. Robert Brueckmann ................................... 1990
John S. Gould .......................................... 1991
E. Crampton Harris* .................................... 1992
Frank B. Throop* ....................................... 1993
Robert G. Chuiard ....................................... 1994
Lorence W. Trick ........................................ 1995
J. Elmer Nix ............................................. 1996
Raoul P. Rodriguez ....................................... 1997
W. Malcolm Granberry ................................... 1998
Joseph C. DeFiore, Jr. .................................. 1999
E. Boone Brackett, III ................................... 2000
Stephen K. Bubb ........................................ 2001
Robert H. Haralson, III .................................. 2002
J. Donald Opgrande ...................................... 2003
G. James Sammarco ..................................... 2004
Robert M. Campbell, Jr. ................................ 2005
James J. Hamilton ....................................... 2006
Kenneth L. Moore ....................................... 2007
Angus M. McBryde, Jr. .................................. 2008
Dabney Y. Hofmann ...................................... 2009
Frederick N. Meyer ..................................... 2010
L. Andrew Koman ........................................ 2011
Bess E Brackett .......................................... 2012

* Deceased
# PAST MEETINGS

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<td>2011</td>
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2013 HONOREE

William G. Hamilton, MD
Clinical Professor of Orthopaedic Surgery
Columbia University College of Physicians and Surgeons
New York, NY

Lecture
Orthopaedic Aspects of Classical Ballet

Past Recipients

2000.................. Dr. Raoul Rodriguez
2001.................. Dr. Marc Asher
2002........... Dr. Augustus White
2003......... Dr. Edward Henderson
2004........... Dr. Leonard Goldner
2005................. Dr. Dean McEwen
2006.................. Dr. Paul DeRosa
2007.................. Dr. Terry Canale
2008........... Dr. Augusto Sarmiento
2009............... Dr. Bernard Morrey
2010............. Dr. Lewis G. Zirkle
2011........... Dr. Chitranjan S. Ranawat
2012........ Dr. Charles A. Rockwood, Jr.
MISSION STATEMENT

Founded in 1912, the mission of the Clinical Orthopaedic Society is to optimize the science of the physical examination as the central component in the diagnosis and management of musculoskeletal conditions and to educate society on orthopaedic issues impacting patient care.

VISION

The Clinical Orthopaedic Society, Inc., will be the organization of choice for the experienced, clinical orthopaedist.

VALUES

- Education
- Fellowship
- Constructive Criticism
- Professionalism
- Honesty
- Integrity
- Ethics
- Community
On behalf of the Board of Directors of the Clinical Orthopaedic Society, I am delighted to welcome the New York State Society of Orthopaedic Surgeons, our members, guests, and other regional Society Presidents to Buffalo, New York for the 101st Annual Meeting.

This is going to be a great meeting as our organization moves into its second century. Our program chairmen, Drs. Matthew Phillips and Mark Anders along with our local host, Dr. James Slough, have put together an exceptional educational and social program. This year’s program will provide 17.25 CME credit hours for our attendees. We are fortunate to have Drs. Tony Herring, Felix (Buddy) Savoie and Ben Kibler as our three presidential guest speakers. Dr. William Hamilton will be the recipient of the J. Elmer Nix Ethics Award.

Be sure to not miss their lectures and the live patient presentations which have always been a highlight of COS meeting.

September will be a great time to visit the sites around Buffalo and Niagara Falls. Join us for the President’s Reception at the Pierce Arrow Museum on Thursday, September 19th. The Pierce Arrow Motor Company produced some of the finest automobiles made, and for over 20 years, supplied cars to the White House for use by the President. Come see this world-class collection of cars, motorcycles, bicycles and memorabilia. The Friday night reception will be held at Templeton Landing.

A special thanks goes to James Slough for making these opportunities possible in Buffalo.

Thanks for joining us for our 101st Annual Meeting and being a part of the Clinical Orthopaedic Society.
COURSE OBJECTIVES

Spine
Outline the most recent techniques and treatment options in pediatric and adult spine. Understand the most common treatments for spine trauma and spine conditions.

Pediatrics
Define the most up-to-date trends in the evaluation and treatment of SCFE, Legg-Perthes disease, adolescent clavicle fractures, and pediatric hip disorders.

Tumor
Describe current management of common tumors seen by orthopaedic surgeons. Enhance recognition and appropriate referral of tumors. Identify the types of treatments available.

Trauma
Assess the most recent treatment of common orthopedic trauma cases. Understand how to optimize treatment of fractures in the elderly and the advantage of an integrated care model in geriatric fracture cases. Clavicle fractures and the role of scapular positioning and control will be discussed.

Arthroplasty
Understand how to deal with complex arthroplasty conditions of the hip, knee and shoulder including minimally invasive options and how to stay out of trouble. Learn about alternate bearings in total hip arthroplasty and modular femoral stem options and shoulder arthroplasty options including Reverse Total Shoulder Arthroplasty.

Sports and Arthroscopy
Identify causes of hip and groin pain along with lower abdominal pain. Learn current arthroscopic and open treatment of common hip conditions and hip dysplasia. Review current updates to treatment of meniscal injuries. Learn how to evaluate and treat common throwing injuries. Understand the role of the scapula in shoulder problems. Discuss techniques to improve rotator cuff surgery. Understand indications and enhanced techniques for elbow arthroscopy.

Foot and Ankle
Identify causes of hip and groin pain along with lower abdominal pain. Learn current arthroscopic and open treatment of common hip conditions and hip dysplasia. Review current updates to treatment of meniscal injuries. Learn how to evaluate and treat common throwing injuries. Understand the role of the scapula in shoulder problems. Discuss techniques to improve rotator cuff surgery. Understand indications and enhanced techniques for elbow arthroscopy.

ACCREDITATION & DESIGNATION

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American Academy of Orthopaedic Surgeons and the Clinical Orthopaedic Society. The American Academy of Orthopaedic Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AAOS Accreditation Statement
The American Academy of Orthopaedic Surgeons designates this live activity for a maximum of 17.25 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

BOC Accreditation Statement
The Clinical Orthopaedic Society is recognized by the Board of Certification, Inc., to offer continuing education for Certified Athletic Trainers. This program has been approved for a maximum of 17.25 Category A hours of continuing education. Certified Athletic Trainers should claim only those hours actually spent participating in the continuing education activity.
CLINICAL ORTHOPAEDIC SOCIETY
NEW YORK STATE SOCIETY OF ORTHOPAEDIC SURGEONS, INC.
101st Annual Meeting
September 19 - 21, 2013
Buffalo Niagara, NY

William E. Warner, Jr., MD
COS President

James A. Slough, MD
Annual Meeting Program Chair

Mark J. Anders, MD
Annual Meeting Program Co-Chair

Matthew Phillips, MD
Annual Meeting Program Co-Chair
PRESIDENTIAL GUEST SPEAKERS

John A. Herring, MD
Texas Scottish Rite Hospital
Dallas, TX

W. Benjamin Kibler, MD
Shoulder Center of Kentucky
Lexington Clinic
Lexington, KY

Peter J. Mandell, MD
University of California
San Francisco
Burlingame, CA

Felix H. Savoie III, MD
Tulane University School of Medicine
New Orleans, LA
Michael Alaia, MD  
Assistant Professor of Orthopaedic Surgery  
New York University Hospital for Joint Diseases  
New York, NY

Mark Anders, MD  
Associate Clinical Professor  
University at Buffalo, State University of New York  
Buffalo, NY

Leslie J. Bisson, MD  
Associate Professor  
University of Buffalo  
Amherst, NY

John J. Callahan, MD  
Clinical Assistant Professor  
Excelsior Orthopaedics, LLP  
Amherst, NY

P. Christopher Cook, MD, FRCS(c)  
Associate Professor of Orthopaedics and Pediatrics  
University of Rochester, Golisano Children's Hospital  
Rochester, NY

Kenneth DeHaven, MD  
Emeritus Professor of Orthopaedics  
University of Rochester Medical Center  
Rochester, NY

John A. DiPreta, MD  
Clinical Associate Professor  
Albany Medical Center  
Albany, NY

Ronald E. Femia, MD  
Radiologist  
Excelsior Orthopaedics/Buffalo MRI  
Williamsville, NY

Michael R. Ferrick, MD  
Associate Professor  
University at Buffalo, State University of New York  
Buffalo, NY

A. Samuel Flemister, Jr., MD  
Professor of Orthopaedics  
University of Rochester Medical Center  
Rochester, NY

Robert D. Galpin, MD  
Clinical Professor, Chief of Orthopaedics  
Women and Children's Hospital of Buffalo  
Amherst, NY

Christopher Hamill, MD  
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                                             Stryker Orthopaedics .............................. 6
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John J. Callahan, MD............................. 1
P. Christopher Cook, MD, FRCSc.............. 1
Kenneth DeHaven, MD............................. 1
John A. Dipreta, MD............................... 1
Ronald E. Femia, MD.............................. 1
Michael R. Ferrick, MD........................... 1
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   Biometrics ........................................ 2, 5
Robert D. Galpin, MD............................ 1
Christopher Hamill, MD........................... 1
William G. Hamilton, MD....................... 1
Warren C. Hammer, MD............................ 1
John A. Herring, MD
   Medtronic .......................................... 7
   Orthopediatrics .................................... 5
   Tachdjian Textbook ................................. 2
Stephen L. Kates, MD
   Intramed Education ............................... 5
   Synthes ............................................ 2
   Sage Publications ................................ 7
W. Benjamin Kibler, MD....................... 1
Joseph Kowalski, MD............................. 1
Kenneth A. Krackow, MD
   Stryker Orthopaedics ............................ 2, 5, 6
Peter J. Mandell, MD............................. 1
John M. Marzo, MD................................ 1
Timothy V. McGrath, MD....................... 1
Owen J. Moy, MD.................................. 1
John M. Olsewski, MD, FACS................... 1
Robert C. O’Malley, MEd, ATC, CES........... 1
Michael L. Parks, MD............................ 6
Zimmer, Inc........................................ 2, 5, 6
   Pfizer ............................................. 6
   Johnson & Johnson ............................... 6
   Metch ............................................. 6
Paul D. Paterson, MD
   Integra ........................................... 2, 6
   Arthrex .......................................... 2, 5
   DJO .............................................. 2
Robert M. Peroutka, MD........................ 1
Matthew Phillips, MD*
   Stryker Orthopaedics ............................ 2, 5
Sridhar R. Rachala, MD........................ 1
John A. Repicci, MD, DDS
   BioMet ............................................ 7
Christopher Ritter, MD........................... 1
Felix H. Savoie III, MD
   Smith & Nephew ................................ 2, 3, 5
   DePuy Mitek ..................................... 2, 5
   Exactech .......................................... 5
   Cayenne Medical ................................ 5
   AMP .............................................. 2
James A. Slough, MD*
   Johnson & Johnson ............................... 6
   Stryker ........................................... 6
   Teva ............................................. 6
Robert J. Smolinski, MD
   Arthrex ........................................... 3
William C. Warner, Jr., MD................... 1
Steven Weinfield, MD............................. 1
David R. Wheeler, MD............................. 1
* Program Committee

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Disclosure Key

1. Nothing to disclose
2. Research support
3. Speaker's Bureau
4. Board Members
5. Consultant
6. Shareholder
7. Other Financial Support
8. Large Gift(s)
ABSTRACT AND POSTER
PRESENTER DISCLOSURES

Michael H. Amini, MD........................................ 1
Frederick M. Azar, MD AAOS........................................... 4
Campbell Foundation ........................................... 4
St. Jude's Children Research Hospital ......................... 4
Saunders/Mosby-Elsevier .................................. 7
Pfizer ................................................................. 6
B. Sonny Bal, MD, MBA, JD
Amedica ...........................................................4, 5
BoneSmart.org ...................................................4
OrthoMind.com ..................................................4
Zimmer ...............................................................5
Salient ...............................................................5
ConforMIS ..........................................................5
James H. Beaty, MD
JBJS .................................................................4
Saunders/Mosby-Elsevier .................................. 7
OREF .................................................................4
Clayton C. Bettin, MD, PGY-3 ............................. 1
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DePuy Synthes Mitek Sports Medicine ............ 2
Stephen K. Bubb, MD
KCI .................................................................2, 7
Wright Medical ..................................................2
Brian D. Busconi, MD ...........................................1
S. Terry Canale, MD
Campbell's Operative ...................................... 4
AAOS Now .........................................................4
AAOS .................................................................4
Bioworks ............................................................4
Saunders/Mosby-Elsevier .................................. 7
Campbell Foundation ......................................... 4
OREF .................................................................4
Jeffrey M. DeLong, BS ...........................................1
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Guy Foulkes, MD
Zimmer ...............................................................5
Bethany Grant, MS
DePuy Synthes Mitek Sports Medicine ............ 2
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DePuy Synthes Mitek Sports Medicine ............ 2
Lindsey Hagstrom, MD ........................................ 1
Bryan T. Hanypsiak, MD
Arthrex, Inc. ......................................................2
Joshua G. Hunter, MD ...........................................1
Kenneth A. Krackow, MD
Stryker ...............................................................5
Michael S. Mafilios, MD
Health Economics Associates, LLC .................. 5
Benjamin M. Mauck, MD .................................... 1
Amir Moinfar, MD
Mitek .................................................................5
Scott R. Nodzo, MD ............................................ 1
Stephen T. Olson, MD ............................................1
Vinayak S. Perake, MD ........................................ 1
Matthew J. Phillips, MD
Stryker ...............................................................5
Elizabeth M. Polfer, MD .........................................1
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Mitek .................................................................5
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David B. Spenciner, PE, ScM, MBA
Mitek .................................................................7
Joshua B. Sykes, MD ...............................................1
Thomas W. Throckmorton, MD
BioMet ..............................................................2, 3, 5
AAOS .................................................................4
MAOA .................................................................4
Benjamin Wilson, MS .......................................... 1
J. Grant Zarzour, MD ............................................ 1

17
101st ANNIVERSARY MEETING PROGRAM

THURSDAY, SEPTEMBER 19, 2013

6:30 am - 1:45 pm  Registration
6:30 am - 7:00 am  Breakfast with Exhibitors
7:00 am - 7:15 am  Welcome and Opening Remarks - William C. Warner, Jr., MD
7:15 am - 7:30 am  Welcome: New York State Society of Orthopaedic Surgeons - Michael L. Parks, MD

PEDIATRIC SESSION – Moderator: William C. Warner, Jr., MD

7:30 am - 7:45 am  Pediatric Elbow Fractures: Management and Complications - Robert D. Galpin, MD
7:45 am - 8:00 am  Assessment of Adolescent and Young Adult Hip Disorders - P. Christopher Cook, MD, FRCS(c)
8:00 am - 8:15 am  Current Trends in Management of Adolescent Clavicle Fractures - Michael R. Ferrick, MD
8:15 am - 8:25 am  Legg-Calve-Perthes: MRI studies - John A. Herring, MD

SPORTS & ARTHROSCOPY SESSION – Moderator: Robert J. Smolinski, MD

8:25 am - 8:40 am  Hip Arthroscopy Update FAI and Labral Pathology - Peter L. Gambacorta, DO
8:40 am - 8:55 am  Non-Hip Causes of Groin and Lower Abdominal Pain in Athletes - Leslie J. Bisson, MD
8:55 am - 9:10 am  The Functional Path (ADL and Sports Training Techniques) - Robert O’Malley, MEd, ATC, CES
9:10 am - 9:25 am  Update on Meniscus Surgery - John M. Marzo, MD
9:25 am - 10:00 am  Break with Exhibitors
10:00 am - 10:15 am  PRESIDENTIAL GUEST LECTURE - Elbow Arthroscopy: Indications and Options - Felix H. Savoie III, MD
10:15 am - 10:30 am  Current ACL Concepts - Michael Alaia, MD
10:30 am - 11:00 am  Knee Surgery: From dissections in the back yard to today’s multi-specialists - Kenneth DeHaven, MD
11:00 am - 11:30 am  PRESIDENTIAL GUEST LECTURE - Film Making 101: No Experience Necessary - John A. Herring, MD
11:30 am - 11:55 am  Live Patient Presentation
101st ANNIVERSARY MEETING PROGRAM

11:55 am - 12:15 pm  PRESIDENTIAL GUEST LECTURE - Improving Outcomes in Rotator Cuff Surgery - Felix H. Savoie III, MD
12:15 pm - 1:15 pm  Exhibitor Lunch

TRAUMA SESSION – Moderator: Mark Anders, MD

1:15 pm - 1:30 pm  Soft Tissue Suture Options: Krackow stitch and cable options - Kenneth A. Krackow, MD
1:30 pm - 1:45 pm  Hip Fracture Coordination Models - Stephen L. Kates, MD
1:45 pm - 2:00 pm  Osteoporosis and Fragility Fractures - Stephen L. Kates, MD
2:00 pm - 2:15 pm  Trauma Update - Mark J. Anders, MD
2:15 pm - 2:35 pm  Relevance in Orthopaedics - Kenneth DeHaven, MD
2:35 pm - 2:50 pm  Adult Spinal Deformity - Christopher Hamill, MD
2:50 pm - 3:30 pm  Live Patient Presentation
3:30 pm  Meeting Adjourns
6:30 pm  President's Welcome Reception - Pierce Arrow Museum

FRIDAY - SEPTEMBER 20, 2013

7:15 am - 1:15 pm  Registration
7:15 am - 8:15 am  Breakfast with Exhibitors

PAPERS WITH DISCUSSION – Moderator: Kenneth A. Krackow, MD

8:15 am - 8:21 am  Neurovascular Injuries in Acute Knee Dislocations: A retrospective review of initial vascular evaluation utilizing a selective angiography algorithm – Troy Roberson, MD
8:21 am - 8:27 am  Is Total Elbow Arthroplasty Safe as an Outpatient Procedure? – Guy Foulkes, MD
8:27 am - 8:33 am  A PCR-Based Protocol for Testing for Methicillin-Resistant Staphylococcus Aureus (MRSA) Colonization in Orthopaedic Trauma Patients – Richard D. Southgate, MD
8:33 am - 8:39 am  Comparison of Outcomes and Costs of Tension Band Versus Plate Osteosynthesis in Transverse Olecranon Fractures: A matched cohort study – Michael H. Amini, MD
8:39 am - 8:45 am  Neurovascular Entropment Due to Combat-Related Heterotopic Ossification – Elizabeth M. Polfer, MD
# 101st ANNIVERSARY MEETING PROGRAM

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45 am - 8:51 am</td>
<td>Split-Thickness Skin Grafts for Residual Limb Coverage and Preservation of Amputation Length – Elizabeth M. Polfer, MD</td>
</tr>
<tr>
<td>8:51 am - 8:57 am</td>
<td>Duration of Fracture Fixation Surgery in Multi-trauma Patients – Lars M. Qvick, MD</td>
</tr>
<tr>
<td>8:57 am - 9:03 am</td>
<td>Volume of Lung Contusion as a Predictor of ARS in the Multiple Trauma Patient – Lars M. Qvick, MD</td>
</tr>
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<td>9:03 am - 9:09 am</td>
<td>rhBMP-2 in Revision Total Hip Arthroplasty with Large Acetabular Defects – Scott R. Nodzo, MD</td>
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<tr>
<td>9:09 am - 9:15 am</td>
<td>Minimum Two-Year Follow Up of Hydroxyapatite Coated Metal Backed Patella – Scott R. Nodzo, MD</td>
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<tr>
<td>9:15 am - 9:21 am</td>
<td>Negative Pressure Improves Tissue Adhesion to Porous Titanium Implant Material – Stephen K. Bubb, MD</td>
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<tr>
<td>9:27 am - 9:33 am</td>
<td>18 Years of Knee Navigation – Kenneth A. Krackow, MD</td>
</tr>
<tr>
<td>9:33 am - 9:45 am</td>
<td>Question and Answer</td>
</tr>
</tbody>
</table>

## ARTHROPLASTY SESSION – Moderator: Matthew Phillips, MD

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:45 am - 10:00 am</td>
<td>Arthroplasty Innovations - Kenneth A. Krackow, MD</td>
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<tr>
<td>10:00 am - 10:15 am</td>
<td>Unicompartmental Knee Replacement: Past, present and future - John A. Repicci, MD, DDS</td>
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<td>10:15 am - 10:30 am</td>
<td>Reverse Shoulder Arthroplasty: Instrument of the Devil? - Paul D. Paterson, MD</td>
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<tr>
<td>10:30 am - 10:50 am</td>
<td>Break with Exhibitors</td>
</tr>
<tr>
<td>10:50 am - 11:05 am</td>
<td>Outpatient Hip and Knee Replacements - John A. Repicci, MD, DDS</td>
</tr>
<tr>
<td>11:05 am - 11:20 am</td>
<td>Modular Femoral Components in Primary and Revision Hip Replacement - Sridhar Rachala, MD</td>
</tr>
<tr>
<td>11:20 am - 11:40 am</td>
<td><strong>PRESIDENTIAL GUEST LECTURE</strong> - What Does That Bone Do Anyway? The Role of the Scapula in Shoulder Function and Shoulder Injury - W. Benjamin Kibler, MD</td>
</tr>
<tr>
<td>11:40 am - 12:00 pm</td>
<td>COS Business Meeting</td>
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<tr>
<td>12:00 pm - 1:00 pm</td>
<td>Lunch</td>
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<tr>
<td>1:00 pm - 1:30 pm</td>
<td>Dr. and Mrs. J. Elmer Nix Presentation and Lecture: Orthopaedic Aspects of Classical Ballet - William G. Hamilton, MD</td>
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</tbody>
</table>
## 101st Anniversary Meeting Program

**1:30 pm - 1:50 pm**
**Presidential Guest Lecture** - Adventures with Arthur and Charlie in the Third Dimension: A review of the mechanics and pathophysiology of A-C joint and clavicle injuries  
- W. Benjamin Kibler, MD

**1:50 pm - 2:15 pm**
**Live Patient Presentation**

### Advocacy & Safety Session – Moderator: James A. Slough, MD

**2:15 pm - 2:45 pm**
**Presidential Guest Lecture** - AAOS, PAC, and Advocacy Update - Peter J. Mandell, MD

**2:45 pm - 3:00 pm**
NYS Workers’ Compensation Medical Treatment Guidelines: Variance Tracking and Guidelines Amendment Program  
- John M. Olsewski, MD, FACS

**3:00 pm - 3:15 pm**
Patient Safety - Michael Alaia, MD

### Spine Session – Moderator: Robert M. Peroutka, MD

**3:15 pm - 3:30 pm**
Cervical Spine Injuries - Joseph Kowalski, MD

**3:30 pm - 3:45 pm**
Ischiofemoral Impingement Overview - Ronald E. Femia, MD

**3:45 pm - 4:00 pm**
Academic Practice to Private Practice to Academic Practice to Private Practice to Hospital Based Practice - John Olsewski, MD, FACS

**4:00 pm**
Meeting Adjourns

**6:30 pm**
Reception at Templeton Landing

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### Saturday - September 21, 2013

**6:30 am - 10:30 am**
Registration

**6:30 am - 7:30 am**
Continental Breakfast

### Papers with Discussion – Moderator: William C. Warner, Jr., MD

**7:30 am - 7:36 am**
Biomechanical Properties of a Bio-absorbable Suture Anchor Using an in vivo Ovine Model – David Spenciner, PC, ScM, MBA

**7:36 am - 7:42 am**
Can Initial Serologic and Arthrocentesis Data be Used to Help Predict Surgical Intervention Requirements for Acute Septic Arthritis? – John G. Hunter, MD

**7:42 am - 7:48 am**
Collagenase Injection for the Treatment of Dupuytren’s Contracture – Grant Zarzour, MD
7:48 am - 7:54 am  Arthroscopic Assisted Glenoid Bone Block Procedure – Ramin Sadeghpour, MD, PGY-3

7:54 am - 8:00 am  Outcomes of Non-Operative Versus Operative Treatment of Displaced Pediatric Clavicle Fractures – Lindsey Hagstrom, MD

8:00 am - 8:06 am  The Role of the Biceps Brachii in Overhead Throwing: a Biomechanical Study – Bryan T. Hanypsiak, MD

8:06 am - 8:12 am  Short to Mid-Term Clinical Evaluation of a Cementless Mobile Bearing Total Ankle Prosthesis – Scott R. Nodzo, MD

8:12 am - 8:18 am  Simple Versus Horizontal Suture for Bankart Repair: Which Better Restores Labral Height? – Lindsey Hagstrom, MD

8:18 am - 8:24 am  Two-Year Clinical and Radiologic Outcome after Pedicle Subtraction Osteotomy – David Feiner, MD

8:24 am - 8:30 am  Precision and Accuracy of Identify Anatomic Surface Landmarks Amongst 30 Expert Hip Arthroscopists - Jeffrey M. DeLong, BS

8:30 am - 8:36 am  Late Complications Following Calcaneus Fractures – Raoul P. Rodriguez MD

8:36 am - 8:42 am  Biomechanical Evaluation of High Performance Blades Used in Hip Arthroscopy – Bethany Grant, MD

8:42 am - 8:48 am  The Effect of Cigarette Smoking on Forefoot Procedures – Clayton C. Bettin, MD

8:48 am - 8:54 am  A Novel Technique for Partial Transphyseal Anterior Cruciate Ligament Reconstruction in the Skeletally Immature: Surgical technique and review of outcomes – Clayton C. Bettin, MD

8:54 am - 9:00 am  Question and Answer

FOOT/ANKLE SESSION – Moderator: Christopher Ritter, MD

9:00 am - 9:15 am  Total Ankle Arthroplasty - Steven Weinfeld, MD

9:15 am - 9:30 am  Difficult Pilon Fractures - Christopher Ritter, MD

9:30 am - 9:45 am  Forefoot / Midfoot Problems - John A. DiPreta, MD

9:45 am - 10:00 am  Posterior Tibial Tendon Problems - A. Samuel Flemister, Jr., MD

10:00 am - 10:15 am  Coffee Break

10:15 am - 10:45 am  Specialists and Health Reform: What Can We Expect? - Nancy H. Nielsen*MD, PhD

HAND SESSION – Moderator: John J. Callahan, MD

10:45 am - 11:00 am  Distal Radius Fractures – Dale W. Wheeler, MD

11:00 am - 11:15 am  Wrist Instability: Scapholunate Tears and Reconstruction - Timothy V. McGrath, MD

11:15 am - 11:30 am  First CMC Arthritis - Owen J. Moy, MD
11:30 am - 11:45 am  Soft Tissue Coverage of the Hand and Wrist  
- Warren C. Hammert, MD
11:45 am - 12:00 pm  Wrist Arthroscopy - Timothy V. McGrath, MD
12:00 pm - 12:30 pm  Presidential Address / Passing of the Presidential Gavel
12:30 pm  Meeting Adjourns

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**Mobile Lab Times**

**Wednesday, September 18**
12:00 pm - 6:00 pm

**Thursday, September 19**
3:30 pm - 6:00 pm

**Friday, September 20**
4:00 pm - 6:00 pm
Pediatric Elbow Fractures: Management and Complications

Robert D. Galpin, MD
**Assessment of Adolescent and Young Adult Hip Disorders**

*P. Christopher Cook, MD, FRCS(c)*  
*Associate Professor of Orthopaedics and Pediatrics, University of Rochester Medical Center, Golisano Children’s Hospital*

Objectives:

1) To gain knowledge of hip disorders that may affect adolescents and young adults.

2) To learn pertinent points of history and physical examination techniques.

3) To determine the best imaging and other test to use and to be able to interpret their results.

4) To be able to create some organization to the assessment of these disorders.

Our knowledge of the pathophysiology of the hip in adolescents and young adults has expanded considerably over the last 10-20 years. This has resulted in not only more questions but also new pathologies identified and new treatments devised.

There are several pathological entities that are now the emphasis of hip treatment:

- Sports injuries and overuse conditions
- Femoroacetabular Impingement (FAI)
- Slipped Capital Femoral Epiphysis (Acute/Severe and Chronic Residual Deformity)
- Legg-Calve-Perthes Disease Residual Deformity
- Hip Dysplasia.

In response to these issues we have devised numerous treatments:

- Hip Arthroscopy
- Surgical Hip dislocation
- Labral repair, debridement, replacement
- Osteochondroplasty
- Femoral Head debridement and/or reduction
- Relative femoral neck lengthening
- Osteotomies: Periacetabular, rotational, Femoral.
Many of the symptoms and signs of these disorders can be very similar. Different conditions can co-exist and indeed be related to each other. This makes for a sometimes confusing picture that is difficult to assess. This discussion will try to address nuances of history, physical examination and imaging as they pertain to the various disorders as well as provide a template upon which one’s own assessment can be developed. It is hoped that this will allow for a more systematic approach to this complicated and challenging subject.

References:


Current Trends in Management of Adolescent Clavicle Fractures

Michael R. Ferrick, MD
UB Orthopaedics
SUNY-Buffalo
Kaleida Health Women and Children’s Hospital

History of clavicle fracture treatment
The controversy - operative v. nonoperative treatment
The adult literature supporting operative
The adolescent literature regarding operative treatment
Conclusion / Recommendations
Legg-Calve-Perthes: MRI studies

John A. Herring, MD

This lecture summarizes a series of studies of the morphology and vascular perfusion of the femoral head in patients with early Legg-Calve-Perthes disease. MRI scans before and after intravenous contrast are compared with a subtraction technique, yielding an image which portrays the vascular perfusion of the femoral head. We have developed techniques to quantify the perfusion of the femoral head as well as the geography of that perfusion. We then have compared these measures of perfusion to the subsequent radiographic severity of the changes in the femoral head, and the early outcome measures. Our goal in these ongoing studies is to better predict the severity of the disorder and its response to treatment.
Hip Arthroscopy Update FAI and Labral Pathology

TBD
Non-Hip Causes of Groin and Lower Abdominal Pain in Athletes

Leslie J. Bisson, MD
UBMD Orthopaedics and Sports Medicine

Groin Pain: Differential Diagnosis

Groin Pain: Diagnosis
   History
   Physical Exam
   Imaging

Specific Entities:
   Osteitis Pubis
   Athletic Pubalgia
   Adductor Longus Tendinitis/Rupture
   Snapping Hip Syndrome
The Functional Path
(ADL and Sports Training Techniques)

Robert O'Malley, MEd, ATC CES
Excelsior Orthopedics

Whether conservative or surgical treatment is utilized, returning your patient to functional activities is the goal. Plinth-based (therapy table) exercises do not relate to ADL's or sports; getting your patients up and moving is the key. This presentation will explore the core (abdominals, hips, scapulae and low back) as a component of functional ADL and sport training. Simple movement-based evaluations performed in a clinical setting identify common functional compensations found in patients and athletes of all ages. A therapy and conditioning plan that includes guided functional movement will assist your patient's return to ADL's or sports.
1. Background and Basic Science
   Biomechanics of meniscus loss
   Clinical science of meniscus loss
   Vascularity of the meniscus

2. Saving the Meniscus
   Meniscus repair – open, inside-out, outside-in, all inside
   Extensions of techniques
   Results, complications
   Repair technical pearls
   Meniscus root avulsions

3. Meniscus Replacement
   Partial replacement
   Total replacement

4. Current advances and future directions
   Cellular therapy
   Biologics
1. ORIGINAL INDICATIONS:
   a. Diagnosis
   b. Loose bodies

2. EXPANDED INDICATIONS:
   a. STANDARD:
      i. OCD microfracture
      ii. Arthritis debridement
      iii. Fracture evaluation
      iv. Instability: diagnosis
      v. Capsulotomy/ release for stiff elbow
   b. ADVANCED:
      i. OCD grafting
      ii. Arthritis resurfacing
      iii. Fracture fixation
      iv. Instability repair
      v. Early excision heterotopic bone
      vi. Triceps tendon repair
      vii. Capsulectomy with ankylosis takedown +/- nerve releases & synostosis takedown

3. OCD: PATHOLOGY
   a. Bone necrosis
   b. Posterolateral synovitis
   c. Cartilage flaps
   d. Loose bodies

4. OCD: ADVANCED
   a. Resurfacing
   b. Grafts

5. ARTHROSCOPIC OATS GRAFTING

6. ARTHROSCOPIC RESURFACING

7. ARTHRITIS
   a. Synovectomy
   b. Spur excision
   c. Radial head
   d. Fossa fenestration
e. Ulnohumeral arthroplasty

8. FRACTURES
   a. Radial head
   b. Unicondylar humerus
   c. Capitellar fractures

9. CAPITELLAR FRACTURES

10. INSTABILITY
    a. Stress testing
       i. Excise secondary pathology
    b. Lateral Repairs
       i. Acute
       ii. Sub-acute
       iii. Chronic PLRI

11. EXAM FOR INSTABILITY

12. INSTABILITY REPAIRS
    a. RUHL repair
    b. RUHL reconstruction: plication + repair
    c. Posterolateral Plication

13. REPAIR OF RECURRENT INSTABILITY

14. EARLY EXCISION HETEROTOPIC OSSIFICATION

15. EXCISION H.O.
    a. Posterior
    b. Anterior

16. ARTHROSCOPIC TRICEPS REPAIR
    a. Retrograde Suture
    b. Double Row Repair

17. NIRSCHL LESION
    a. Lesion Excised

18. ANKYLOSIS TAKEDOWN

19. REMOVAL RH PROSTHESIS
    a. Debride And Lever
    b. Clean And Repair

20. POST TRAUMATIC SYNOSTOSIS TAKEDOWN

21. NERVE EXPLORATION
    a. Ulnar nerve in conjunction with arthrofibrosis
    b. Radial nerve/PIN with HO

22. MEDIAL GUTTER: ULNAR NERVE

23. ELBOW ARTHROSCOPY
    a. Valuable tool to use in the elbow
b. Neurovascular structures are close: know your 3 D anatomy!

24. WHAT CAN BE DONE
   a. Much more than we thought in the past
   b. New frontiers in resurfacing and fractures hold much promise

25. WHAT CAN'T BE DONE (YET)
   a. MCL (ulnar nerve)?
   b. Arthroplasty?

26. NEW FRONTIERS
   a. Arthroscopic Inter-positional arthroplasty
   b. LCL/MCL grafts
   c. Other???
Anterior cruciate ligament (ACL) reconstruction remains one of the most common procedures performed by orthopaedic surgeons, especially in the field of sports medicine. It has been shown that in an active population, non-operative management of ACL tears typically predispose patients to continued instability and an increased likelihood of developing meniscal tears and chondral defects; both of which leading to a higher incidence of osteoarthritis later in age. Current treatment of ACL tears, however, continue to remain a very controversial topic with regard to several factors.

Reconstruction options remain at the forefront of ACL research. Single versus double bundle reconstructions continue to be studied, and recent literature has focused on the creation of as close to an anatomic reconstruction as possible, with the increased use of anteromedial portal femoral tunnel preparation as well as flexible reaming. Proponents of this type of tunnel preparation advocate that increased control afforded by this technique allow the surgeon to more anatomically create both the femoral and tibial tunnels, since reliance on tibial tunnel placement to dictate femoral tunnel placement is obviated. However, clinical outcomes from both transtibial and anteromedial portal reconstructions continue to provide acceptable outcomes.

We will also briefly discuss concomitant surgical options in the treatment of associated pathology, as well as graft choice options. Autografts continue to be popular, acceptable choices for graft material. Allografts, when placed in the correct patient population, are also suitable choices. In addition, multiple successful fixation options exist with acceptable clinical outcomes.

Finally, recent research has focused on the possibility of biologic enhancement of ACL reconstructions, with the ideas that an enhanced biologic environment may not only increase reconstruction success but also reduce graft harvest morbidity. Although there is not an overwhelming amount of data to support biologic enhancement at this point, this will likely be an increasingly popular point of study in the coming years.
Knee Surgery: From dissections in the back yard to today’s multi-specialists

Kenneth DeHaven MD
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This presentation is a historical review of the role of human dissection in the evolution of surgery from the beginning, in the 3rd Century BC, to the present. The importance of detailed knowledge of human anatomy will be emphasized in the evolution of medical science and education in general and of surgery in particular. The evolution of Orthopaedics and Orthopaedic sub-specialization in the US will also be included.
Film Making 101: No Experience Necessary

John A. Herring, MD

This presentation reviews my experience producing two documentary films related to medicine. The first, “A Fight to the Finish: Stories of Polio” tells of the polio epidemics through the voices of patients, therapists, and researchers whose lives were influenced by the disease. The second film, “DeBakey”, was filmed with Dr. DeBakey during his last five years of life. Along the way I learned much about film making, but even more about a number of very remarkable people. Those who survived polio were motivated to prove that while this disease certainly altered their bodies, their spirits were not about to be defeated. Those who cared for polio victims describe the struggles and fortitude which faced their patients. The research which resulted in vaccines was driven as much by vigorous competition as by human motivation.

We began working with Dr. DeBakey when he was 95 years old, and last filmed him in his 99th year, still working. His accomplishments cover not only heart and vascular surgery, but also politics, public education, military medicine, and the development of the National Library of Medicine. As a fellow surgeon (orthopedic) I was able to convince Dr. DeBakey to allow us to make the film. He revealed many of his emotions and feelings about the challenges of his demanding profession. His demand for perfection became more understandable when the seriousness of his surgery was recognized. Much of what we learned from Dr. DeBakey about surgery, applies to all of us in surgical fields.
1. CURRENT RCT TREATMENT
   a. Reparability is a function of tear size, atrophy & your own skill set
   b. Too many RSP are being done for wrong indications
   c. Previous surgery is not a contraindication to repair unless RC tissue has been excised
   d. Type 2 muscle-tendon junction failures can still be repaired but success lower & these are increasing!

2. TIPS TO IMPROVE YOUR RCR
   a. Patient selection
   b. Pre-op examination
   c. Releases
   d. Anchor configuration
   e. Rehabilitation

3. PATIENT SELECTION
   a. Pain and functional impairment: What really bothers the patient?
   b. Quality of bone & soft tissues: Pre-op MRI: Evaluate atrophy of muscle & cysts in bone
   c. Comfort/Skill level with advanced techniques

4. PRE OP ASSESSMENT: PHYSICAL EXAM
   a. Assess for source of pain: not always RCT: Palpate the tear & the tendons; sometimes a shot and PT is best
   b. Passive ROM: Look especially at internal rotation in abduction (post-inf capsule)
   c. Check for impingement, biceps & a/c joint
      i. Inject if unclear

5. DIAGNOSTIC STUDIES
   a. Radiographs
      i. Check PA for superior migration, a/c djd, lateral impingement
      ii. Check outlet for acromial type, A-H distance
      iii. Check axillary for DJD, post subluxation

6. DIAGNOSTIC STUDIES
   a. MRI
      i. Atrophy in muscles?
      ii. Retraction?
      iii. Associated pathology: labrum, biceps, djd
      iv. Tendon edge & quality
      v. Adhesions on nerve?
7. SURGERY: POSITIONING
   a. Lateral or beach chair equal for RCT repair
   b. Position should allow arm rotation & inferior traction
   c. Must have access to anterior/posterior & medial shoulder for instrumentation
      i. Medial posterior portal
      ii. Nevaizer portal

8. INTRAOPERATIVE
   a. Consider posterior-inferior capsular release: it helps all cases
   b. View & shift the tendons to see what goes where
   c. Add oblique convergence stitches to decrease tension
   d. Preserve medial bursa for vascularity & add trephination holes in GT for stem cell access: think biology

9. DIAGNOSTIC ARTHROSCOPY
   a. Look at head position on glenoid
   b. Evaluate biceps
   c. Evaluate capsule
   d. Look for arthritis
   e. Re-assess tendon and bone quality

10. RELEASES INCREASE AS TEAR SIZE INCREASES
    a. Small tear = PIGHL release +/- CHL
    b. Medium = CHL + PIGHL
    c. Large = CHL + capsule under torn tendon
    d. >2 tendons with retraction = CHL, 360° capsule, SS nerve?

11. INFERIOR POSTERIOR RELEASE
12. SUPRASCAPULAR NERVE: WHEN TO RELEASE?
13. EMG/NCS proven entrapment
    a. Severe (Grades 3B to 4B) atrophy
    b. Revision RCR when tendon is retracted medial to the glenoid
    c. + relief from injection into ss notch (Warner)

14. GREATER TUBerosITY PREPARATION
    a. Debride away dead tissue
    b. Remove or impact old anchors
    c. Trough at articular edge
    d. Microfracture or trephinate to provide easy access for stem cells
    e. Preserve bone at critical anchor points

15. TREPHINATION
16. ANCHOR & SUTURE CONFIGURATION
    a. Clinically no difference in single & double row: think anatomy
    b. Tendon doesn’t heal to anchors so less may be better biologically (triple loaded anchors)
    c. Mattress configurations in the tendon are better than simple
17. “ROWS” & RELEASES INCREASE AS TEAR SIZE
   a. Small tear = single row, CHL release
   b. Medium = double row, CHL + PIGHL
   c. Large = double row, CHL + capsule
   d. >2 tendons with retraction=convergence plus single/double row:
      i. Capsule, CHL, ant interval & SS nerve
18. CONVERGE OBLIQUELY
   a. RCT separates along line of muscle action
   b. Converge in opposite direction of muscle pull
      i. Oblique convergence lines up muscle & tendon for anatomical tension free repair
19. OBLIQUE CONVERGENCE
   a. Incorrect
   b. Correct
20. OBLIQUE CONVERGENCE: POSTEROMEDIAL ANTEROLATERAL
21. MIDDLE ROW
   a. Triple loaded anchor just off articular surface & at bicipital groove
   b. Mattress sutures in IS and SS
   c. Enter at muscle tendon junction if viewing from the top.
   d. Preserve one limb of each for suture bridge
22. LATERAL ROW
   a. Anchor placed on lateral footprint, not “around the corner” & down on the shaft
   b. Boileau tension band stitch on the lateral tendon to pull it down with compression
   c. Add medial sutures to anchor to create a suture bridge to add mild compression
23. MEDIAL MATTRESS x 3 LATERAL FOOTPRINT
24. INITIAL POSTOP
   a. Abduction pillow
   b. Relaxes repair
   c. Optimal position for blood flow to critical zone
   d. Cryotherapy early & often
   e. Passive ROM for first 4 to 8 weeks
   f. Start scapular retraction early (POD 1)
25. POSTOP COURSE
   a. Keep abduction pillow at night until tendon healed to bone, usually 4 to 8 weeks
   b. Passive motion only until you palpate tendon healing without swelling
   c. Encourage scapular retraction at all times: remember supine rehab
   d. Brace/tape early & often for balance
26. ADJUNCTIVE MEASURES
   a. Neuromuscular stimulation
      i. Infraspinatus
      ii. Deltoid
   b. Aquatic therapy
c. Scapular bracing

27. RESULTS: TULANE ULTRASOUND
   a. Small (<1cm) tears: 98% healed by US, 99% satisfied
   b. Medium (1-3 cm) tears: 95% healed and satisfied
   c. Large (>3cm) tears: 90% healed, 93% satisfied
   d. Massive (>5cm with retraction and atrophy) 88% healed and satisfied
   e. Type 2 failures?????

28. CONCLUSIONS
   a. Most RCT can be repaired & should be repaired
   b. >90% patients heal and are satisfied with current techniques.
Soft Tissue Suture Options - Krackow Stitch and Cable Options

Kenneth A. Krackow, MD
Hip Fracture Coordination Models

Stephen L. Kates, MD
University of Rochester

The Geriatric Fracture Program
- What is covered

Concepts of an Organized program
Planning
Key Partners
Standardizing care
Tips for success
- Summary of Hip Fracture Care
- 330,000 fractures/yr
- Over 2.1 million bed-days
- 48,000 readmissions- 14.5%
- Mortality 21%
- Estimated 10.3 billion spent/yr*
- Frequency expected to rise
- Quality and Safety
- Should be our primary focus
- Reduce adverse events
- Readmissions
- Mortality
- Refracture
- Important focus of Health Reform
- How to Achieve this?
- System change for care of the patient is the only way to achieve this
- Geriatric Fracture Program
- Geriatric Fracture Center Principles

Total Quality Management
Protocol driven
Patient centered
Co-ownership
Early surgery
Reduced length of stay
Low cost model*
  • Rochester Model: Patient Flow
Fast Track through Emergency
Evaluation by Geriatrics
Evaluation by Orthopaedics
  “Optimized for surgery”
Co-managed post-operatively
Weight bear as tolerated
Discharge day 3 to Rehabilitation unit
  • Rochester Model Protocols
    Transfer protocols
Transfer envelope
ED orders
Admission orders
Geriatric consult
Data collection
Osteoporosis follow-up plan

Charlson score
Post op orders
Nursing care plan
Consent forms
Discharge
  • Rochester Model
Standardized geriatric medical consult
Optimize patient for surgery
Stratify risk
  • Mini-metabolic Bone workup
On admission
  • Calcium
  • Vitamin D
- TSH
- PTH
- Chem 12
- All patients receive vitamin D in hospital
- Cooperation and co-management
- Warfarin management in the GFC – last 1301 patients
  - 7.1% admitted on warfarin
  - Most common cause – a. fib (83%)
  - Mean INR on admit = 2.5
- Treatment used
  - Vitamin K- 22%
  - FFP- 9%
  - Combination 59%
- Waiting – none
- Time to surgery on warfarin vs. not  30 vs. 23 hours
- Bridged – 77%
- Bleeding complications 2.2 vs 0.8%
- Thrombotic complications – 1.1% versus 0.5%

Anesthesia Preoperative assessment
Standard consult makes finding information easy
Risk Stratified
The patient IS optimized
Rare complications in OR
Hydrated properly
Pain controlled
Beta-blocked
- In Surgery
  - Optimized
  - Not febrile
  - Skin healthy
• Post-operative care
  Weight bearing as tolerated
  Pain control
  DVT prophylaxis
  Beta blockers
• Discharge
  Most: Rehabilitation
  Some: NH placement (or return)
Osteoporosis treatment recommendations: Ca, Vitamin D, BP or referral to Metabolic Bone clinic
• Readmission
• Variable nationally
• Average 14.5%
• Most common causes: Pneumonia, Surgical, CHF, GI, Infections
• Many readmitted patients die
• Best avoided, not all avoidable
• Rochester Model Results
Length of stay ~ 4.2 days
Re-admission rate ~11.7%
  84% medical, 16% surgical
Hospital mortality rate <2.7%
Charges: 35% of US average
Costs: 20% of US average*
• Will it Work?
Yes with persistence
Attitudes take time to change
6 to 12 months may be necessary
Saves time
Shorter stay
Better bottom line for hospital
• Summary
Organized Program is better
Co-management improves quality
Shortens stay
Reduces adverse events
Lessens re-admissions
Benefits your patients!
Osteoporosis and Fragility Fractures

Stephen L. Kates, MD
University of Rochester

1. Goals for Learning
   a. Understand osteoporosis treatments
   b. Understand the importance of Vitamin D
   c. Understand issues with long term treatment
   d. Osteoporosis Treatment Principles

2. Prevention - most important
   a. Prevention of additional fractures
      i. Calcium and Vitamin D
      ii. Bisphosphonates
      iii. Selective estrogen receptor modulators
      iv. PTH

3. Osteoporosis Diagnosis
   a. Presence of a Fragility Fracture
   b. DXA Scan
   c. Vitamin D and Sun

4. Sun exposure to maintain adequate levels
   a. 20 minutes to hands and face daily
   b. SPF 8 sunscreen blocks 95% of Vit D production
   c. Above 35 N latitude (Atlanta)
   d. cannot make Vit D in skin between Nov-Feb

5. Vitamin D
   a. 25-OH Vit D levels
   b. best indicator of nutritional Vit D status

6. 25-OH Vit D converted to 1,25-OH Vit D
   a. Approx 85% of Vit D is metabolized outside of the kidney
   b. Nervous system
   c. Muscle
   d. Immune system
e. Skeletal system (osteoblasts)

7. Vitamin D

8. Levels <15ng/ml (Deficiency)
   a. Rickets/osteomalacia
   b. secondary hyperparathyroidism

9. Levels < 32ng/ml (insufficiency)
   a. Increased muscle weakness
   b. Balance difficulties
   c. Increased osteoporosis rates
   d. May have secondary hyperparathyroidism
   e. immune system response
      i. deleterious effects at levels <40ng/ml

10. Vitamin D Supplementation
    a. Several methods
    b. Vit D2 or Vit D3
    c. Goal level ≥ 32ng/ml

11. Vitamin D Supplementation
    a. Vit D3 (cholecalciferol)
    b. produced in skin
    c. Available as supplements
    d. Slower initial response (up to 4-6 months to correct)
    e. Better long term stability
    f. Vit D2 (ergocalciferol)
    g. Plant derived
    h. Excellent initial response but tails off to 20% efficiency of absorption at about 6 months

12. Vitamin D Repletion
    a. For post fracture patients
    b. Vitamin D Supplementation

13. Using Vitamin D3
    a. 2000 IU daily
    b. Continue current calcium and vitamins
    c. Treatment of 6 months to catch up
d. Better for long term maintenance

14. Common Drugs for Osteoporosis Bisphosphonates
   a. Analogs of pyrophosphate
   b. Poor absorption (<1-5% for oral dosing)
   c. Mode of action
   d. binds to hydroxyapatite crystals
   e. inhibits crystal resorption
      i. inhibit mevalonate pathway
      ii. Inhibit function of osteoclast
      iii. Osteoclast apoptosis increased

15. Oral Bisphosphonates
16. Alendronate (Fosamax)
   a. 70mg/week
17. Risedronate (Actonel)
   a. 35mg /week
   b. 75mg two consecutive days/month
   c. 150mg/month
18. Ibandronate (Boniva)
   a. 150mg/month
   b. Bisphosphonates
   c. Long half life (3-10 years)
   d. Cessation won't lead to rapid bone loss
19. Fracture rates decline 50% at spine
   a. other sites variable fracture reduction
20. Side effects
   a. esophagus irritation (10-15%)
   b. Myalgias
21. Treatment for men
22. Drug concentrates in area of highest bone turnover
23. Bisphosphonates IV
24. Zolendronate (Reclast or Zometa)
   a. No GI side effects
   b. Fracture data for zolendronate
i. decreases spinal fracture 77% at 1 year
ii. overall fractures 70% at 3 years
c. Zolendronate maintains suppression ≥12 months
d. Use
i. oral bisphosphonates not tolerated
ii. Patients at risk for poor compliance (dementia)

25. Bisphosphonates
a. “Drug holiday”
b. With long half life, patient remains therapeutic from drug already in skeleton
c. FIT extension study:
   i. Half of patients given alendronate for 10 years, other half use alendronate for 5 years, then off 5 years

1. At 10 years:
   a. Fracture rates identical between two groups
   b. Turnover markers started to go up at 9 years for second group
   c. DXA just starting to change at year 10 in second group

26. Bisphosphonates

27. Drug holiday
a. Not for high turnover state
b. Perimenopause
   i. Steroids
   ii. Hormonal therapy (Aromatase Inh, Lupron)
   iii. Chemo?
c. Follow turnover markers to determine when to return to therapy
d. Varies between drugs with their half lives

28. Bisphosphonates

29. Atypical fractures
a. Most had been on alendronate 8 years or longer
   i. Subtrochanteric Femur
   ii. Base of 4th metatarsal
   iii. Femur
   iv. Tibia
v. Humerus

30. Atypical fracture
   a. Femur
   b. Lateral cortex thickening
   c. Transverse pattern also seen with adults with osteomalacia from hypophosphatasia

31. Osteonecrosis of the Jaw
   a. Bone under the teeth exposed
   b. often painful
   c. complicated by infection
   d. Occurs mainly in patients with cancer after prolonged therapy
   e. Osteoporosis dose level risk estimated at <1 /100,000 - 250,000

32. SERMs
   a. Antiestrogens with bone augmentation effects
   b. Raloxifene (Evista)
      i. antagonist to breast but agonist to bone
      ii. reduces incidence of invasive breast cancer 50%
      iii. very effective in improving bone mass / preventing vertebral fractures
      iv. No added risk of uterine cancer
   v. Slight increased risk of DVT in first 4 months of use
   vi. Cardiac and stroke neutral

33. Denosumab (Prolia)
   a. Anti RANK-ligand
   b. Stops Bone turnover
   c. Very profound anti-resorptive
   d. SQ injection every 6 mos
   e. Atypical fractures now reported

34. Denosumab
   a. Effect lost if not continue medication at 6 month intervals
   b. Not renally cleared and renal function had not effect on drug pharmacodynamics
   c. Common adverse reactions
   d. Back pain
e. extremity pain
f. musculoskeletal pain
g. hypercholesterolemia
h. cystitis

35. PTH
   a. Anabolic agent
   b. Daily low dose injections
   c. Increase bone mass in humans
   d. Increase life span of osteoblasts by reducing their apoptosis

36. PTH
37. Teriparatide (Forteo) is first 34 amino acids of PTH
   a. Dose is 20 mcg/d for 2 years
   b. Spine BMD increases at 6-12 months
   c. Hip BMD increases delayed as much as 18-24 months

38. Follow therapy with bisphosphonates
39. Black box warning
   a. Contraindications include previous radiation therapy, active metastatic cancer to bone Paget’s disease, and patients with open growth plates

40. PTH
41. Indications
   a. Bone mass decline on bisphosphonates / estrogen / SERMs
   b. Fracture on bisphosphonates
   c. Steady state T < -3.0 SD
   d. Low turnover osteoporosis
   e. Premenopausal women
   f. Inability to tolerate other treatments
   g. Severe glucocorticoid induced osteoporosis

Summary
Fragility fracture
Think about the bone
Vitamin D is usually low
Discharge on calcium and vit D at a minimum
Diagnosis puts patient on the pathway to treatment
DXA
Address with patient and Primary MD
Future fracture reduction is possible
PLATING
“Locked” Plating
Periarticular Plates
Submuscular “Percutaneous” Techniques

UPPER - SHOULDER
- Elbow
- Wrist

LOWER – KNEE
- Distal Femur
- Proximal Tibia Ankle
- Pilon

RODDING
Proximal Femur
- Cephalomedullary
Distal Femur
- Retrograde
Tibia

“EARLY APPROPRIATE CARE”
Damage Control Orthopaedics?

CLINICAL CASE PRESENTATION
Orthopaedic Complications Of Multiple Trauma
- Infection
- Nonunion
- Amputation
- Prosthetic Advances
This presentation is based on personal reflections drawn from 40 years in the field of Orthopaedic Sports Medicine, and stresses the important elements of being relevant to our patients, to our profession, remaining relevant in the future, and the importance of not becoming irrelevant to our family and friends.
Adult Spinal Deformity

Christopher Hamill, MD
University Orthopaedics and Sports Medicine

This talk will be on how to manage the sagittal plane. This will include work up and operative options including the use of Smith Peterson Osteotomy, Pedicle Subtraction Osteotomy and Vertebral Column Resections to correct the Deformity.
Objective:
Total knee arthroplasty (TKA) is a very successful operation. Precise alignment is dependent on accurate placement of the components in all six degrees of freedom. Soft tissue balancing is also a consideration in component positioning to achieve stability and full range of motion. Computer assisted surgery (CAOS) for knee replacements has been available for more than 10 years and is a tool that can help achieve proper alignment in TKA. This study will review our 18 years of history in the development and use of CAOS for total knee replacement. We will also present data from our 10 year results of patients’ outcomes.

Methods:
We tracked our early results at 1 year of follow up of 150 navigated knee cases and compared their data to 50 non-navigated knees. The data included clinical outcomes, range of motion, average operative times and estimated blood loss. Long standing lower extremity x-rays were measured to determine mechanical alignment. In 2010 we reviewed all cases to date to determine if there were pin site problems since some articles had surfaced about fracture at the location of pin sites. In 2011 we looked at our recurvatum data. A retrospective chart review was done, after obtaining institutional approval. One thousand six hundred consecutive total knee replacements using knee navigation were reviewed. The range of motion was obtained after exposure of the knee joint but before any corrections or cuts are made to the bones. The surgeon holds the leg at the point of maximum extension and the data along with the range of motion is collected by the navigation computer.

Results:
In 1994 our lab was working on a cadaver study that examined the effects of soft tissue release using an electromagnetic system (EM). The EM system was able to track differences in varus/valgus alignment, internal/external rotation angles and tibiofemoral gaps at full extension, 45°, and 90° of flexion. Infrared technology can be used for measuring just like EM but without the problem of interference from the many objects that are in a live operating room. The thought process was this technology could be used in live surgery as a tool like mechanical instruments for precise determination of the mechanical axis. During total knee arthroplasty, structures of the knee as well as the ankle are visible and are easy to access. Proper mechanical alignment requires locating the center of the femoral head. Mechanical instruments only allow for estimation of offset with an intramedullary guide inserted in the femur. An intraoperative method to determine the center of the femoral head without the use of extra markers or imaging would be the most beneficial. Custom software was developed for an Optotrak infrared tracking system to navigate all steps in total knee arthroplasty. This included accurately determining the center of the femoral head through noninvasive means and digitizing the bony landmarks of the knee and ankle to determine the mechanical axis. Trackers were attached to the tibia, femur, and a third global reference frame was secured to the wall. The hip is moved through a gentle range of motion to collect 50 data points. The method of least squares is then used to find the best fit sphere given
the data points collected. The center estimate is then determined using an iterative Gauss Newton algorithm to solve the true non-linear system. The center point is transformed into the center femoral reference frame. Next, points are digitized from landmarks of the exposed knee joint and surface points on the ankle. These defined points provide the tibio-femoral and mechanical axes before bone cuts are made. The data from the anatomy survey then allows for instantaneously display of tibio-femoral angle, flexion-extension position, and the amount of relative internal or external rotation. The calculated centers were then compared to direct measurement made after disarticulating the hip and using the pointer to digitized the observed center of the femoral head. The dislocated hip was inspected and equator drawn free hand. A sagittal saw was used to cut the femoral head in half and the midpoint of the remaining surface was digitized in the femoral reference frame. IRB approval was obtained for the system and the first operative case was done August 1997. In 1998 we partnered with an orthopaedic company for further development of the infrared system and for global distribution. October 1, 2001 we performed the first clinical case of a navigated total knee arthroplasty in North American with an FDA approved system. The early cadaver work demonstrated average error on the order of 2-3mm for the femoral head center estimation for intra-observer variability and comparison of mean for 10 trials to the true center locations. The first total knee arthroplasty on our patient who has 13 years follow up has 2.2 degrees varus deformity with no complaints. The knee has not been revised. Our early 1 year results showed no difference in clinical outcome or range of motion compared to the non-navigated group. Operative time was 19 minutes longer for the navigated group. Estimated blood loss and range of motion were no different for the 2 groups. The navigated knee group had better alignment; 52% were in neutral alignment, vs. 23% in the non-navigated group. Overall the navigated group had 80% of all alignment and was within 1.5 degrees of neutral while the non-navigated group 80% of cases were between 5 degrees valgus and 4 degrees varus. Results from our 2011 study showed that out of 1617 navigated knee cases 221, 13.7% had some genu recurvatum. The range was 0.5° to 30°, 91 patients, 5.6% had more than 5° recurvatum.

Conclusions:
To date we have done 1853 navigated knee cases with 7 orthopaedic surgeons. We have data on 30 knee arthroplasties that have a minimum of 9.5 years follow up. The pre-operative alignment, on LSLE, ranged 16° valgus to 20° varus. In this group 2 knees have been revised, 1 for infection that received an irrigation and debridement with just a poly exchange and 1 for tibial osteolysis on the medial side. All components were revised. The patient was 10.25 years post-op from the index procedure.
Objective:
1.) to determine the prevalence of MRSA colonization in orthopaedic trauma patients; 2.) to identify risk factors for MRSA colonization; 3.) to implement the use of rapid PCR amplification testing to determine MRSA colonization prevalence and guide perioperative antibiotic prophylaxis. We hypothesized that the prevalence of MRSA colonization is greater than that reported in the literature and that certain risk factors in the patients’ history will predispose the patients to MRSA colonization. Furthermore, it was hypothesized that rapid PCR amplification has utility in orthopaedic trauma patients as it will help to quickly determine MRSA carriage status in order to tailor perioperative antibiotic prophylaxis appropriately.

Methods:
The study population was all adult trauma patients who presented to a Level I Trauma Center with an orthopaedic injury that required surgical treatment. Upon admission, MRSA PCR amplification was performed using a nasal swab obtained in the Emergency Department. The main advantage of using rapid PCR over bacterial culture is that results are available much faster than with PCR-based tests: providers can know a patient’s MRSA carriage status within 4 hours with PCR compared to 2 days with bacterial culture. Patients who were MRSA carriers had their perioperative antibiotics changed to vancomycin to decrease the risk of infection with MRSA. Finally, charts were reviewed for basic demographic data, presence of chronic illness previously associated with MRSA colonization, recent hospitalizations and past surgical history. Charts were also reviewed for social history also associated with MRSA, including obesity, drug use, nursing facility residence. Univariate and multivariate analyses were then performed to identify the risk factors most associated with MRSA colonization.

Results:
During the first thirteen months of this ongoing study, 836 consecutive patients were admitted to the Level I Trauma Center with orthopaedic injuries which required surgical treatment. Of these, PCR identified 59 (7.1%) as being MRSA carriers. Due to positive MRSA test results, 43 patients (73%) had their perioperative antibiotics adjusted to vancomycin. Independent risk factors most strongly associated with MRSA colonization include previous MRSA infection (odds ratio [OR] 15.3, 95% confidence interval [CI] 6.2-37.7), chronic antibiotic use (OR 12.0, CI 5.1-28.3), obesity (OR 6.9, CI 3.1-15.2), chronic illness (OR 6.4, CI 3.6-11.1), recent hospital admissions (OR 5.5, CI 3.2-9.6), and gastrointestinal disease (OR 5.0, CI 2.8-8.5). On multivariate analysis, the most significant factors for MRSA colonization are: current infection (p < 0.0001), gastrointestinal disease (p = 0.0001), and heart disease (p = 0.001).
Conclusions:
We found the prevalence of MRSA carriage to be 7.1%, which is higher than previous figures in the orthopaedic literature and in our pilot data. Additionally, we have demonstrated that rapid PCR amplification for MRSA carriage has utility and can be instituted in order to tailor perioperative antibiotic prophylaxis. Even after doing this for one year, there were still some instances of MRSA carriers not receiving vancomycin for perioperative prophylaxis. Adding MRSA status to the preoperative pause may be useful to assure proper administration of vancomycin.
TITLE: Comparison of outcomes and costs of tension band versus plate osteosynthesis in transverse olecranon fractures: A matched cohort study

AUTHOR(S): Michael H Amini, MD, Frederick M Azar, MD, Benjamin Wilson, MS, Richard A Smith, PhD, Thomas W Throckmorton, MD

AFFILATION: University of Tennessee – Campbell Clinic Department of Orthopaedic Surgery, Memphis, TN

Objective:
Fractures of the olecranon process are a common injury, and fixation of displaced fractures is usually indicated to restore function. Isolated, displaced, transverse fractures with no comminution are amenable to fixation with either a tension band (TB) construct or a plate. But there have been no studies published to compare the outcomes or cost-effectiveness of these two techniques. We hypothesized that there would be no significant differences in outcomes between TB and plate fixation but that plate fixation would be more expensive.

Methods:
We retrospectively reviewed our experience using TB and plate fixation in isolated, displaced, transverse olecranon fractures from 2004-2011. Ten patients from each cohort, matched according to age and length of follow up, were assessed through review of medical records, physical examination, AP and lateral radiographs of the elbow, and functional scoring using the Mayo Elbow Performance Score (MEPS) and the Quick Disability of the Arm, Shoulder, and Hand (QuickDASH/QDASH). Differences in range of motion (ROM), arthrosis, complications, functional scores, and costs were compared using independent t-tests. Differences with p<0.05 were considered significant.

Results:
At an average follow up of 4.3 years (range 2.1-8.7 years), there were no significant differences in length of follow-up, flexion, extension, arthrosis, MEPS and QDASH scores between groups (all p>0.05). There were no infections or non-unions in either group. One of 10 patients in the plate cohort had undergone removal of hardware compared to 4 of 10 in the TB cohort, and this difference trended toward significance (10% vs 40%, p=0.12). Three of 10 patients in the plate cohort reported symptomatic hardware compared to 7 of 10 in the TB cohort, and this difference also trended toward significance (30% vs 70%, p=0.07). Operative time was significantly less in the TB cohort compared to the plate cohort (55 vs 86 minutes, p=0.02). Charges were significantly less in the TB group for implants ($207.97 vs $6,994.81, p<0.0001), operative costs ($5,171.06 vs $15,492.30, p<0.0001), and for total cost of care, including hardware removal ($6,120.51 vs $14,920.37, p=0.0002). If all patients in the TB cohort and no patients in the plate cohort underwent hardware removal, TB fixation would still cost significantly less ($7,226.46 vs $15,492.42, p=0.0001).

Conclusions:
Both TB and plate fixation are viable options for treatment of displaced transverse olecranon fractures. While there were no significant differences in clinical outcomes, our study
suggests that plate fixation may be associated with less symptomatic hardware and fewer repeat operations for removal of hardware; differences that trended towards significance. Operative time and patient charges were both significantly less in the TB cohort, with implant expenses being the primary driver of the cost differential. Further, even if all patients in the TB cohort and no patients in the plate cohort underwent hardware removal, plating would still cost twice as much. Larger, randomized studies are needed to further investigate the differences between these two techniques.
Objective: Early orthopaedic surgery in the multiple injured patient has been reported to have a safe upper limit of 2 hours (1). A review of the literature reveals evidence of a six hour limit (2) however, no evidence was found for the 2 hour time constraint. We hypothesized that length of early surgery time would not be associated with patient outcome. Standard of care at our institution requires ongoing resuscitation and careful monitoring of patient status for surgery to continue as long as the patient is stable.

Methods: University IRB approval was obtained and a report was requested from the institutional trauma database of all multi-trauma patients presenting with an Injury Severity Score (ISS) of ≥18 from January 2007 – May 2011. This report contained 1,690 patients with 232 orthopaedic injuries, of these 187 had long bone injuries and were included in the analyses. Data were analyzed with independent t-tests for continuous variables and Chi-square or Fisher’s exact test for categorical. Logistic regression analysis was used to determine predictors of mortality and ARDS. A power analysis revealed that with alpha at 0.05 and 153 cases, we could determine a difference in Odds of 1.5 with 80% power.

Results: There were no significant associations found with total minutes of surgery and pulmonary complications nor were there any significant associations found with surgery as a categorical value (<2, ≥2 hours; 1 <3,3-6, >6). Length of surgery was not a significant predictor or mortality (p=0.45) or ARDS (p= 0.75).

Conclusions: Conclusion: This series of patients suggests duration of surgery alone need not limit early orthopaedic trauma procedures in the multiply injured patient.

<table>
<thead>
<tr>
<th>Surgery Time</th>
<th>Mortality</th>
<th>ARDS</th>
<th>Pneumo-thorax</th>
<th>Pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>L</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>&lt; 2 HOURS</td>
<td>5</td>
<td>85</td>
<td>9</td>
<td>81</td>
</tr>
<tr>
<td>≥ 2 HOURS</td>
<td>3</td>
<td>94</td>
<td>11</td>
<td>86</td>
</tr>
<tr>
<td>p</td>
<td>0.41</td>
<td>0.77</td>
<td>0.15</td>
<td>0.48</td>
</tr>
<tr>
<td>1 &lt; 3 HOURS</td>
<td>7</td>
<td>119</td>
<td>13</td>
<td>113</td>
</tr>
<tr>
<td>3 – 6 HOURS</td>
<td>1</td>
<td>52</td>
<td>7</td>
<td>46</td>
</tr>
<tr>
<td>&gt;6 HOURS</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>p</td>
<td>0.61</td>
<td>0.68</td>
<td>0.54</td>
<td>0.77</td>
</tr>
</tbody>
</table>
Objective:
Ambulatory surgery centers (ASC) are widely accepted as the preferred setting for a growing number of orthopaedic procedures formerly performed in an inpatient hospital setting. The purpose of this study is to determine whether outpatient total elbow arthroplasty (TEA) is at least as safe as inpatient TEA.

Methods:
We performed a retrospective complication rate analysis of inpatient (IP group) versus outpatient (OP group) TEA by a single surgeon over the last decade. Inpatients were defined by in-hospital operation and admission for at least 24 hours post-operatively, while outpatients are defined as hospital outpatient department procedures with less than 23 hours observation or those performed in an ASC. Complications were defined as aseptic loosening, infection, cubital tunnel syndrome or triceps insufficiency. Demographic, social, and comorbidity measures were compared between the two groups. Chi-square analysis and independent samples t-tests were performed to determine the association between age, gender, body mass index (BMI), comorbidities (coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), diabetes, tobacco use) and complication rate, stratified by inpatient or outpatient status.

Results:
Bivariate comparison showed increased prevalence of CAD in the OP group (33% vs. 7%), and increased age in the IP group (69 years vs. 58 years). All other demographic, social, and comorbidity factors were comparable between the IP and OP groups (Table 1). Most importantly, no difference in complication rate was observed between the IP and OP groups.

Conclusions:
There is no statistical significant difference in complication rates for total elbow arthroplasty performed in an outpatient versus inpatient setting. Thus, this study supports the effectiveness of outpatient facilities for TEA. Although we did not examine comparative cost between inpatient and outpatient treatment in this study, this would be a promising future direction.
# Table 1. Comparative descriptive statistics of study population

<table>
<thead>
<tr>
<th></th>
<th>Inpatient (n=27)</th>
<th>Outpatient (n=24)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean (SD)</strong></td>
<td><strong>Mean (SD)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>69 years (9.76)</td>
<td>58 years (16.3)</td>
<td>0.009*</td>
</tr>
<tr>
<td>BMI</td>
<td>27.8 (7.5)</td>
<td>30.0 (7.4)</td>
<td>0.300</td>
</tr>
<tr>
<td>Length of follow-up</td>
<td>1037 days (836.5)</td>
<td>1203 days (855.9)</td>
<td>0.492</td>
</tr>
<tr>
<td><strong>Count (%)</strong></td>
<td><strong>Count (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4 (15)</td>
<td>5 (21)</td>
<td>0.718</td>
</tr>
<tr>
<td>Female</td>
<td>23 (85)</td>
<td>19 (79)</td>
<td></td>
</tr>
<tr>
<td>Co-morbidities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAD</td>
<td>2 (7)</td>
<td>8 (33)</td>
<td>0.033*</td>
</tr>
<tr>
<td>COPD</td>
<td>4 (15)</td>
<td>1 (4)</td>
<td>0.354</td>
</tr>
<tr>
<td>Diabetes</td>
<td>22 (82)</td>
<td>16 (67)</td>
<td>0.336</td>
</tr>
<tr>
<td>Tobacco Use</td>
<td>21 (78)</td>
<td>23 (96)</td>
<td>0.103</td>
</tr>
<tr>
<td>Complication</td>
<td>10 (37)</td>
<td>6 (25)</td>
<td>0.384</td>
</tr>
</tbody>
</table>

* Significant at P-value < 0.05
Objective:
Early metal backed patellae designs were fraught with early failures and poor outcomes. Technologic advances and design changes have focused on improving the outcomes and survivorship of earlier designs. A metal backed patella with a porous hydroxyapatite surface has been available in the United States since 2007, but very little clinical data exists evaluating the durability of this implant. We evaluated the survivorship and radiographic stability of a cohort of patients with a hydroxyapatite coated metal backed patella, and compared those results to a cohort with a traditional cemented polyethylene patella.

Methods:
We retrospectively evaluated a cohort of 75 patients who received a three-pegged patella with a metal hydroxyapatite coating (HAP), and a similar cohort of 50 patients who received a three pegged cemented all polyethylene patella (CP) between June 2007 and March 2011. Medical records were reviewed for demographics, diagnosis, range of motion, and alignment. Lateral and merchant radiographs were evaluated by two orthopedic surgeons at final follow up for radiolucent lines or areas of cystic changes in seven separate zones as previously described by the Knee Society for a two-pegged component, which was modified for a three-pegged component used in this study. Survivorship at final follow up was determined using revision for any reason as the endpoint. Radiolucent lines were defined as an area with no trabecular bone contacting the implant. Student's t-tests were used to evaluate continuous variables.

Results:
The overall survivorship of the HAP and CP groups was 100% at an average follow up of 38 months (range 24-74 months) in the HAP group, and 43 months (range 24-69 months) in the CP group. The HAP group was significantly younger than the CP group (54±6 vs. 65±9 respectively, p<.0001). Mean body mass index (BMI) was not statistically different between the groups. Pre and postoperative mechanical alignment was similar between groups. Average preoperative flexion and extension were similar between groups, but the HAP group had significantly greater postoperative flexion at final follow up as compared to the CP group (120±8 vs 115±7 respectively, p=.004). Radiolucent lines were not observed in either cohort, but 40/75 (53%) patients in the HAP group had 1-2 mm areas of decreased trabecular bone density around one or more of the pegs, which was not observed in the CP group (figure 1). No implants were radiographically or clinically loose at final follow up.

Conclusions:
This is one of the first studies to evaluate the survivorship of this metal backed patellar implant. We observed 100% survivorship of both HAP and CP implants at short term follow up. We did note areas of decreased bone density around some of the hydroxyapatite pegs, which likely represented stress shielding due to biologic fixation at the base of the component. Longer follow up is needed to determine the durability of this implant, and the significance of stress shielding around the HAP pegs.
TITLE: Negative pressure improves tissue adhesion to porous titanium implant material

AUTHOR: Stephen K. Bubb, MD

AFFILATION: University of Kansas Medical Center, Orthopedic Research Center

Objective:
To test the hypothesis that negative pressure increases the speed and extent of soft tissue adhesion to porous titanium implant material.

Negative pressure wound therapy is in common use. It has been frequently observed that polyurethane sponges must be changed every 3 to 5 days in order to prevent unwanted tissue growing into the sponge. Porous titanium resembles the sponge, but is intended to be incorporated in tissue. Negative pressure may improve tissue adherence and ingrowth in porous Titanium implant material.

Rapid incorporation of orthopedic implants may have the advantage of preventing bacterial biofilm formation. The combination of therapies may be applicable to implants intended for use in open, contaminated, or infected wounds.

Methods:
Six female Spanish/Boer Cross goats ages 4-6 had porous Titanium blocks implanted bilaterally at the greater trochanter of the femur. Figure 1 shows the implant design. Negative pressure therapy was applied through an open wound on one side. On the other side the wound was closed by sutures. Figure 2 shows the negative pressure apparatus in place.

Specimens were harvested at six to twelve day intervals.

Gross observations for of tissue adhesion, hematoma, fibrinoid film formation, hematoma formation, fluid filled bursa formation, and fixation to bone, were made at necropsy.

Results: Fig. 3 and Fig 4 show the most pronounced findings. Fig. 5 outlines the qualitative results obtained from the gross observations of the specimens at the time of necropsy.
<table>
<thead>
<tr>
<th>Animal</th>
<th>Specimen</th>
<th>Tissue Adhesion</th>
<th>Film Formation</th>
<th>Hematoma</th>
<th>Infection</th>
<th>Fluid Filled Bursa</th>
<th>Maintained Fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1, 6 days at 125 mmHg</td>
<td>No Therapy</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>#2, 6 days at 200 mmHg</td>
<td>No Therapy</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>#3, 9 days at 125 mmHg</td>
<td>No Therapy</td>
<td>-</td>
<td>Yes</td>
<td>Yes (2 cm)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>#4, 9 days at 200 mmHg</td>
<td>No Therapy</td>
<td>-</td>
<td>Yes (small)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>#5, 12 days at 125 mmHg</td>
<td>No Therapy</td>
<td>±</td>
<td>Yes</td>
<td>Yes (2 cm)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>#6, 12 days at 200 mmHg</td>
<td>No Therapy</td>
<td>-</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>#1, 6 days at 125 mmHg</td>
<td>Therapy</td>
<td>++</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>#2, 6 days at 200 mmHg</td>
<td>Therapy</td>
<td>++</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>#3, 9 days at 125 mmHg</td>
<td>Therapy</td>
<td>++</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>#4, 9 days at 200 mmHg</td>
<td>Therapy</td>
<td>++</td>
<td>No</td>
<td>Yes (large)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>#5, 12 days at 125 mmHg</td>
<td>Therapy</td>
<td>+</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>#6, 12 days at 200 mmHg</td>
<td>Therapy</td>
<td>±</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Fig. 3 and Fig 4 show the most pronounced findings. Fig. 5 outlines the qualitative results obtained from the gross observations of the specimens at the time of necropsy. Complications are listed.

Conclusions:
Gross examination of necropsy specimens showed consistently better quantity and quality of tissue adhesion to porous Titanium implant material with negative pressure compared to contralateral controls in goats. Further studies are justified.
Objective:
Heterotopic ossification (HO) is the ectopic formation of mature lamellar bone in nonosseous tissue, such as muscle. The prevalence of HO following combat injuries, including traumatic amputations, is much higher than civilian data would suggest. In select cases, the aberrant bone formation can envelop major neurovascular structures such as the sciatic or tibial nerves as well as the femoral or posterior tibial arteries, leading to symptomatic neurovascular entrapment. The goal of this study is to illustrate a successful method for surgical excision of heterotopic ossification leading to symptomatic neurovascular entrapment.

Methods:
We describe five consecutive cases of heterotopic ossification leading to symptomatic neurovascular entrapment in the lower extremity as a result of blast trauma and present our method of patient assessment, pre-operative planning, and surgical excision.

Results:
Heterotopic ossification was successfully excised without neurovascular injury in all patients. At a mean postoperative follow-up of 20 months (range, 8-45 months), all patients demonstrated sustained improvement of their pre-surgical function. All patients who had complaints of neuropathic pain had improvement in their pain after the initial postoperative phase. Those with decreased range of motion regained their motion with physical therapy once their wounds were stable. We found that sensory deficits resolved prior to motor deficits. Clinically significant HO recurrence has not been a frequent complication in combat casualties and did not occur in this series. In the present series, one patient developed wound-healing complications leading to infection and operative intervention.

Conclusions:
Excision of heterotopic ossification, particularly with concurrent neurovascular entrapment, can be a morbid procedure associated with significant short- and long- term complications. We found that using our treatment algorithm, with careful preoperative planning and meticulous operative excision, HO entrapping major neurovascular structures following severe extremity trauma can be safely excised. Heterotopic ossification excision in this setting is associated with a relatively low rate of recurrence and appears to reliably resolve the symptoms associated with neurovascular compression.
Objective:
With increasing reports of acute knee dislocations in the morbidly obese through seemingly benign mechanisms, further investigation is required to understand the most appropriate initial evaluation of neurovascular injury in these patients. While some authors advocate for routine arteriography for all patients with knee dislocation, others have reported success with selective arteriography. We proposed to review our experience with a selective arteriography algorithm to determine its utility with specific emphasis on the morbidly obese population.

Methods:
All patients presenting to our institution with an acute knee dislocation over a five year period (2007-2012) were included. Patients with a normal neurovascular exam and/or ankle-brachial indices greater than 0.9 were clinically observed. Those with abnormal ABI (< 0.9) but palpable pulses underwent arteriogram at the discretion of the attending physician, while patients with pulse discrepancy compared to the contralateral side received arteriography. Missed injuries were defined as worsened clinical exam resulting in further radiographic or invasive evidence of vascular injury prior to discharge. Clinical data, including the presence of vascular and neurological injuries, was collected. Patient demographic data was also compiled and analyzed referable to the presence of neurovascular injuries. Statistical analysis was performed using Pearson’s Chi-Square, ANOVA, and students paired t-test where appropriate. Differences with p < 0.05 were considered significant.

Results:
Fifty-three patients were included in the study. The rate of popliteal artery injury was 17% (9/53) and peroneal nerve injury 38% (20/53). There were no missed vascular injuries using the selective arteriography algorithm as defined by no patients with evidence of worsening exam and/or radiographic evidence of injury prior to discharge. Extreme obesity (BMI > 40) was significantly associated with popliteal artery injury (p = 0.01) and the mean BMI was increased (40 vs. 33) in patients with popliteal artery injury (p = 0.04) Trends toward statistical significance for popliteal artery injury were time to reduction greater than six hours (p = 0.07) and transfer from another facility (p = 0.17). A trend was also noted toward popliteal artery injury in falls from a standing height (p = 0.22) while peroneal nerve injury was significantly higher with this ultra-low-velocity mechanism (p = 0.02).

Conclusions:
The rates of neurovascular injury after acute knee dislocation in this study are significant and consistent with previous literature. We found no missed vascular injuries utilizing a selective arteriography algorithm. Extreme obesity and an ultra-low-velocity mechanism are associated with an increased risk of neurovascular injury in acute knee dislocation with no evidence to suggest arteriography is obligatory in this population.
Objective:
Management of large acetabular defects during revision hip arthroplasty still remains a challenge. Previous animal laboratory studies have supported the use of recombinant human bone morphogenic proteins (rhBMP) as an adjunct to allograft bone grafting around the hip, but very little clinical research exists to support its use in humans. We retrospectively evaluated the radiographic incorporation of allograft bone chips when they were combined with rhBMP-2 as an off label use for bone grafting large acetabular defects in order to evaluate the efficacy and safety of this treatment option.

Methods:
We retrospectively reviewed the records of 16 consecutive patients who received a mixture of allograft cancellous bone chips and rhBMP-2 for their acetabular bone defect. Patient charts were reviewed for demographics, number of previous revision hip procedures, complications, and amount of cancellous bone chips utilized. Acetabular defects were graded according to the Paprosky classification system by the senior operating surgeon. Hip and pelvis radiographs were reviewed by two fellowship trained adult lower extremity reconstructive surgeons in sequential order to evaluate the incorporation of the bone graft into the host bone. Patients with greater than one year follow up were evaluated with the modified Harris Hip Score (HHS). A non-parametric Mann Whitney test was used to evaluate patient outcomes.

Results:
The average age was 62 (range 45-84) years old (12 females and 4 males) with an average BMI of 30.8. Mean radiographic follow up was 12 months (range 3-43 months). Average amount of rhBMP-2 used was 6.9 mg (range 4.2-12mg). Patients, on average, had 1 previous hip revision surgery (range 0-4). All patients had acetabular defects ranging from IIB-IIIB according to the Paprosky classification system. The average amount of cancellous bone chips used was 70 cc (range 30-150cc). Highly porous revision acetabular shells were used in all cases, and highly porous augments were used in five cases. All patients showed bone graft consolidation at the 6 week follow up, and full incorporation with fusion of the graft to host bone at 12 weeks (figures 1 and 2). Preoperative HHS (n=9) significantly improved postoperatively (40.1±24.2 vs. 71.8±14.7 respectively, p=0.01). One patient suffered a traumatic fall shortly after their hip revision, which required a subsequent revision procedure, and one patient developed a deep infection requiring implant removal and antibiotic spacer placement. Despite these complications, both patients had full radiographic incorporation of their bone graft into host bone at the time of their revision procedures.

Conclusion:
This is one of the first case series to evaluate the clinical use of rhBMP-2 in revision hip surgery. At 6 weeks we noted excellent graft consolidation with full incorporation into the host bone at 12 weeks in all cases. The off label use of rhBMP-2 combined with allograft bone chips during revision hip arthroplasty is a safe and effective treatment option for bone grafting large acetabular defects.
Objective:
With the large number of traumatic and combat-related amputations sustained by service members during the last decade, we have struggled to determine at what cost residual limb length should be preserved. Due to concerns regarding durability and complication rates, split thickness skin grafts (STSG) have historically been utilized sparingly for amputation coverage when primary closure is not feasible without substantial loss of length. We hypothesized that amputations with STSG would be associated with an increased rate of wound complications, and increased rate of heterotopic ossification (HO) requiring excision versus residual limbs that were closed primarily with either conventional or atypical fasciocutaneous flaps; however, STSG would ultimately facilitate length and level preservation as anticipated.

Methods:
We performed a retrospective review of 300 consecutive lower extremity and 100 consecutive upper extremity amputations treated at our facility from 2005- and 2003 – 2009 respectively comparing patients treated with STSG (study cohort) to those treated with delayed primary closure (DPC, controls). Principle outcomes measured included early (wound failure) and late (HO requiring excision and soft tissue revisions) complications requiring operative treatment.

Results:
Statically significant differences were seen with the STSG group having an increased incidence of wound failure (p<0.022), HO requiring excision (p<0.001), and soft tissue revisions (p<0.001) as compared to controls. The risks of revision were higher for lower than upper extremity amputations undergoing STSG. However, amputation level salvage was successful for all residual limbs with STSG.

Conclusions:
STSG for closure of amputations results in significantly increased reoperation rates, but is ultimately successful in salvaging residual limb length and amputation levels. STSG in the carefully selected patients may be successful means of achieving definitive coverage when performed over robust, healthy muscle. In many patients, however, STSG should be viewed as a staging procedure in order to maintain length and amputation level until swelling decreases and revision surgery for STSG excision with or without concurrent procedures can be performed without the need to substantially shorten the residual limb.
Objective:
The author wishes to update the Clinical Orthopaedic Society on recent developments in the use of subatmospheric pressure in closed wound management. The technique was presented at the 2003 COS meeting. After vigorous discussion, a follow-up report was requested.

Since then, one version of the technique has received FDA approval and has been commercially available for three years. Early literature supports the use of that simple design for prevention of wound complications in high risk operations.

The operations studied so far include high risk lower limb fractures, foot and ankle trauma, and total hip arthroplasty. In non-orthopedic specialties, sternotomy in obese cardiac patients, caesarian section in obese patients, excision of extensive scars, groin wounds for vascular surgery, groin wounds for lymphadenectomy, and laparotomy with high risk of wound complications.

Methods:
A PubMed search with the key words: Subatmospheric pressure; negative pressure; incisional; and brand specific key words yielded 12 results in peer reviewed publications. As detailed above, they involved a variety of dissimilar operations and specialties. The evidence ranged from level 4 to level 2.

Results:
The various studies all reported significant reduction in rates of infection, drainage, hematoma, and seroma in sutured wounds at special risk. Shorter hospital stays and other non-wound benefits were also reported.

Conclusions:
The simplified commercial device shows benefit in preventing infections and other wound complications. The available literature is appropriately focused on operations with fairly consistent risks. The results are compelling.

The author previously presented to the COS a level 4 selection of cases demonstrating advanced, off-label techniques for unusual orthopedic applications. Among these were total hip revisions for sepsis where debridement and re-configured implants leave irregular deep dead spaces. A few of these clinical cases will be briefly reviewed. Possible further device development will be mentioned.
Objective:
The etiology of adult respiratory distress syndrome (ARDS) is multifactorial and has been difficult to assess as several publications report. In regards to early fracture fixation, the orthopaedic trauma literature suggests an incidence > 80% of ARDS in pulmonary contusion (PC) volumes ≥ 20% of the total lung volume. We analyzed data on 586 consecutive multiple trauma patients with pulmonary contusions to determine any correlation with the development of ARDS. Based on the limited evidence and our clinical experience, our hypothesis was that volume of lung contusion alone is not a predictor for the development of ARDS in the multiple trauma patient.

Methods:
A report of the New York State Trauma Registry on all multiple trauma patients with an ISS ≥18 (Injury Severity Score) with lung contusions presenting to our Level 1 Trauma center from 1/2007 – 5/2011 was requested after receiving University IRB approval. This report contained 586 patients. All patients were reviewed for the development of ARDS following the guidelines of the American European Consensus Conference on ARDS Definition. 56 patients met the criteria for ARDS and a subsequent lung and contusion volume was calculated after developing a modified method of Breiman et al to address the problems of border definition and polygon cross sectional areas on axial computed tomography.

Results:
In the analysis of all 586 patients there was a significant difference between those who developed ARDS and those who did not in: Glasgow Coma Scale (GCS, p<0.001), Base Excess (BE, p<0.001), days on ventilator (p<0.001), ISS (p<0.001), AIS (lung, Abbreviated Injury Scale, p<0.01) and total hospital days (p<0.001). Mortality was significantly increased in those patients that developed ARDS (p=0.025). Matched analysis consisted of 90 patients. Significant predictors for developing ARDS were GCS (OR = 0.91 (95% CI=0.84, 0.99)) and BE (OR = 0.55 (95% CI=0.35, 0.87)). Volume of lung contusion was not a significant predictor of ARDS (p=0.36). Volume of lung contusion as a categorical value of <20% and ≥20% was not a significant predictor of ARDS (p=0.14).

Conclusions:
These data support the hypothesis that volume of lung contusion is not a predictor for the development of ARDS.
Arthroplasty Innovations

Kenneth A. Krackow, MD
Unicompartmental Knee Replacement: Past, present and future

John A. Repicci, DDS, MD
Joint Reconstruction Orthopedic Center

A review of Unicompartmental Knee Replacement addressing the following issues:

- History of Unis
- Literature review
- What percent of knee arthritis is tricompartmental?
- What happens without surgical treatment of knee arthritis?
- Uni disease, is the other compartment normal?
- Dosage of insertion matter?
- Untreated, what are the risks of progression of unicompartmental knee osteoarthritis?
- Unicompartmental prosthetic treatment options
- The age of robots and uni-technology
Reverse Shoulder Arthroplasty
Instrument of the Devil?

Paul D. Paterson
Excelsior Orthopaedics

Before the introduction of the reverse total shoulder (RTSA) to the US in 2004, massive rotator cuff tears and cuff tear arthropathy were often treated with benign neglect. The RTSA was received with significant skepticism by many prominent US shoulder surgeons. It was referred to by some as the instrument of the devil. This reluctance to accept the RTSA was due to the spectacular failures reported by other surgeons, including Dr. Neer.

Today there appears to be a rapid growth of this procedure. What has led to the increased utilization of RTSA? What are the indications? What are patient outcomes? Is it reliable and durable? What happens when it fails? Are the concerns voiced 10 years ago the reality of the US experience? These are the primary questions addressed in this talk.

References
Outpatient Hip and Knee Replacements

John A. Repicci, MD, DDS
Joint Reconstruction Orthopedic Center

Joint replacement technology has been available for over 40 years. Dramatic improvements in anesthesia and surgical techniques have reduced morbidity to the point where in some circumstances hospitalization may not be required for surgery. Total knee and hip replacements are generally performed on senior citizens who present with significant issues of independent status are also factors limiting outpatient surgery for total joint replacement. Partial knee replacement was in the past performed utilizing the same techniques as total knee replacement. In the early 1990s the Unicompartmental Mini-Invasive Surgical technique was introduced. Modifications in patient preparation, surgical incision, preservation of the supra-patellar pouch, anesthetic control and postoperative management has reduced morbidity to the point where hospitalization is no longer necessary for unicompartmental replacement. Out-patient unicompartmental knee Arthroplasty can be performed utilizing the steps presented in this presentation.

Between 2007 and 2011, 2,237 unicompartmental knee replacements were inserted in the outpatient setting with 92.1 percent returning home on the day of surgery, the remaining on the following morning.
Modular Femoral Components in Primary and Revision Hip Replacement

Sridhar Rachala, MD

This presentation will look into the evolution of modularity in the femoral reconstruction of the hip. Modularity helps surgeons a great deal in optimizing the biomechanics of the hip, however it comes at a cost. The issues that would be specifically be looked into in this presentation are the:

1. Location and types of modularity- Head/neck, neck/body (dual modular stems), Body/Body, sleeve type modular systems
2. Clinical scenarios (primary and revisions) when having a modular system is a huge advantage
3. Potential risks of having modularity

The final aspect that this presentation will deal with is to make recommendation regarding when a surgeon should strongly consider a modular stem and the types of modularity that he/she may choose in those situations.
What Does That Bone Do Anyway? The Role of the Scapula in Shoulder Function and Shoulder Injury

W. Benjamin Kibler, MD
Shoulder Center of Kentucky, Lexington, KY

The scapula plays key roles in shoulder function. Anatomically, it is the “A” of the AC, the “G” of GH, and the “S” of SHR. Mechanically, it elevates to allow humeral head motion in arm abduction, retracts/protracts with the moving arm to provide a congruent socket for the humeral ball, stabilizes to allow maximal muscle activation, acts as part of a lever system to produce work, and acts as an efficient funnel for forces developed in the core to be passed to the arm and hand. Scapular mechanics are a combination of 3 rotations (upward/downward rotation, anterior/posterior tilt, internal/external rotation) and 2 translations (elevation/depression, medial/lateral translation) which can be identified by clinical observation.

Alterations in scapular roles and mechanics are seen frequently in association with almost all types of shoulder pathology. Alterations in static scapular position or in dynamic scapular motion are termed scapular dyskinesis. Dyskinesis can be reliably identified on clinical exam by a specific protocol of observational tests, and when dyskinesis is found in patients with symptoms it should be treated as part of the comprehensive treatment of the shoulder problem. Dyskinesis is most commonly an impairment of optimal shoulder function.

Scapular impairment in impingement is lack of acromial elevation and posterior tilt, creating mechanical compression in the subacromial space. Impairment in rotator cuff disease includes impingement and lack of retraction to allow maximal muscle activation. Impairment in labral injury includes lack of posterior tilt and external rotation, contributing to internal impingement and labral shear. Impairment in GH instability, especially MDI, includes anterior and inferior tilt, decreasing concavity-compression, and creating a functional instability.
Classical Ballet as we know it today had its origin in Renaissance Italy and was taken to France by Catherine Di Medici when she married Henry II. It flourished in the courts of the French Kings. The first toe shoe was worn by Marie Taglioni in 1835.

Professional Ballet dancers are an elite group—the product of a Darwinesque selection process that begins at age 8 and selects those with the right body and rejects those with the wrong one. I often compare them to thoroughbred racehorses. They love what they do and are very dedicated to it. It is better to think of them as athletic artists rather than artistic athletes.

They have two types of injuries; acute versus chronic-overuse. The chronic overuse being more common than the acute. They have a great tolerance for low level pain and discomfort and often perform with injuries that need rest.

The most common acute injury is the lateral ankle sprain (as it is in sports in general). We classify them as mild, moderate and severe or Grade I, Grade 2 and Grade III. Other acute injuries, include muscle strains and contusions. Fortunately, severe career ending injuries such as a torn ACL or a ruptured Achilles tendon are rare.

Chronic injuries are very common in dancers, usually due to overuse they include stress fractures chronic strains and tendonitis, especially “Dancer's Tendonitis” of the FHL tendon.

Aspects of these injuries will be discussed in more detail in the presentation.
Primary function of the clavicle is to act as a strut to stabilize the scapula and arm for shoulder/arm function. The AC joint functions as a pivot joint to link the clavicular and scapular motions. The clavicle, AC joint, and scapula function in 3-D space, and understanding, evaluating, and treating injuries with this concept in mind creates optimal treatments and results.

Clavicle fractures should be treated to restore the 3-D function. Not only shortening, but mal-angulation and mal-rotation need to be considered. A useful clinical clue is the presence or absence of scapular dyskinesis, which can occur if the clavicle is shortened, angulated, or mal-rotated. This can be easily seen on clinical exam early in the injury. Surgical treatment is usually considered easier when done in the acute setting, and has been shown to obtain better results.

The current classification system for AC separations is poorly related to treatment content and timing, and has no relation to outcomes. AC separations can be best understood in the context of the biomechanical effect of the injury on the strut/pivot function. Type I injuries, most type II injuries, and about 1/3 of the type III injuries have enough AC and CC ligament integrity so the strut/pivot function is not impaired, the scapula is stabilized, and shoulder function can usually be restored by therapy. Some type II injuries, 2/3 of type III injuries, and type V injuries do not have ligament integrity, the strut/pivot function is lost, the scapula is not stabilized, and shoulder function is frequently compromised. The clinical exam for presence/absence of scapular dyskinesis is helpful in determining the “yes” (strut/pivot intact)/”no” (strut/pivot not intact) condition, and providing a rationale for treatment options.
AAOS, PAC, and Advocacy Update

Peter J. Mandell, MD
Assistant Clinical Professor
Department of Orthopaedic Surgery
University of California San Francisco

- AAOS update – New Building, Revenues, Expenses, Major Activities
- Council on Advocacy – 501(c) (6) vs 501 (c) (3), Medicare reimbursements, Affordable Care Act, Orthopaedic value as the basis for advocacy, PAC
- Council on Research and Quality – Clinical practice guidelines, Appropriate use criteria, Patient safety, American Joint Replacement Registry
- Council on Education – Orthoportal, Electronic media programs, Self-assessment exams, CME courses, Practice management, Online publications, Print publications
- Communications – Public relations, Public service announcements, A Nation in Motion
- Professional Compliance Program update
- Maintenance of Certification
New York State Workers’ Compensation Medical Treatment Guidelines: Variance Tracking and Guidelines Amendment Program

John M. Olsewski, MD, FACS

Introduction: In December of 2010 the New York State Insurance Department drafted Workers’ Compensation Guidelines utilizing input from specialists in fields other than orthopaedic surgery who were representatives of labor unions or medical directors for workers’ compensation insurance carriers. The initial rollout was for four body regions: shoulder, knee, low back and neck. When the New York State Society of Orthopaedic Surgeons (NYSSOS) reviewed these Guidelines, concerns were raised that the treatment protocols would disrupt many orthopaedic surgeons’ practices and would lead to a two-tier system of medical care in the State: one system of medical treatment for injured workers and different protocols for everyone else. These Guidelines were subsequently reviewed by the Research and Scientific Affairs Department of the AAOS, and found to be not evidence based, yet New York State instituted them.

Methods: In an effort to determine whether the Guidelines were disruptive to the provision of high quality orthopaedic care, NYSSOS developed a process whereby patients could be treated outside these Guidelines, requiring a variance request by the treating physician. These variance requests were tracked for a six month consecutive time frame by treating physician, body part treated, insurance carrier involved, type of variance request, and results of the variance request, to develop background material necessary to seek permanent amendment to the Guidelines.

Results: of the total of 1780 variance requests, 1281 (67%) were made for only one type of treatment regimen, the majority being physical therapy, followed by diagnostic imaging, and surgery only constituting 10% of all variance requests. By body part for treatment, variances were 36% shoulder, 35% knee, 19% low back, and 10% neck. Of all surgical variance requests, 86% were for surgeries that should have been automatically authorized under the directives of the Guidelines. Of concern also was that one Insurance Carrier, with a dominant market share, constituted 25% of all variance requests and 23% of all variance denials.

Discussion and Conclusion: 80 to 90% of all denials for variance requests were eventually reversed in favor of the provider by either the Board or a Law Judge. However, the delay in institution of treatment regimens as a result of the need for this additional process step will assuredly affect treatment outcomes. This data is now being returned to the Workers’ Compensation Board to show where the Guidelines do not work and to utilize this information to identify areas where the greatest number of variance requests were issued, and thereby amend the Guidelines. The data will be shared with all other State Orthopaedic Societies in an attempt to prevent the recurrence of such an event.
Increasingly, the use of metrics will become more important in the field of medicine and musculoskeletal care as payers and providers of healthcare alike seek to measure and improve the quality of care they provide to patients. The Institute of Medicine (IOM) has hypothesized that medical errors cost as much as 29 billion dollars per year, with the majority of this money being borne by Medicare. In addition, the Congressional Budget Office believes that the annual percentage of the GDP spent on medicine will rise significantly by the year 2048. Paramount to quality care is the aspect of patient safety, reducing medical errors and complications, and thus limiting healthcare spending. As patient safety concerns are become more and more open to the public eye (internet, social media, public polls), they are apt to become more highly scrutinized. Hospital systems and providers are thus placing a higher emphasis on quality and safety analysis.

In this talk, we will discuss several key aspects of safety especially as they pertain to orthopaedic surgeons. Firstly, we will discuss “never events” as they pertain to orthopaedic surgery, and discuss methods to reduce the chances of this problem, including “Near-Miss analysis”. In addition, we will discuss initiatives we have undertaken at our institution to minimize the incidence of surgical site infection, reduce length of stay and increase the prevention of post-operative venous thromboembolism.
Cervical Spine Injuries

Joseph Kowalski, MD
Ischiofemoral Impingement Overview

Ronald E. Femia, MD
Academic Practice to Private Practice to Academic
Practice to Private Practice to Hospital Based Practice

John Olsewski, MD, FACS
SATURDAY
September 21, 2013
Title: 2 year Clinical and Radiologic Outcome after Pedicle Subtraction Osteotomy

Author: David Feiner, MD

Affiliation: Department of Orthopaedic Surgery, University at Buffalo, The State University of New York

Objective:
To assess mid-term radiographic and clinical outcomes of pedicle subtraction osteotomies for patients with a fixed sagittal imbalance.

Methods:
Retrospective radiographic analysis, outcomes analysis (Oswestry), and accumulation of complications. Forty-eight patients with sagittal imbalance, treated with pedicle subtraction osteotomy at one institution with a minimum of 2 year follow up, were analyzed. Charts and outcome measurements (Oswestry) were reviewed. Complications were accumulated.

Results:
For the 48 patients there was significant improvement in sagittal correction from pre op average +12.6cm to, post op +4.6cm (p=<.0001), and at two year +7.1cm (p=<.0001). There was significant improvement in lumbar lordosis from 18.10°, to 45.17°(p=<.0001) post op, and at two years to 45.94°(p=<.0001). There was significant change in the pedicle subtraction angle (PSA) from 7.94° to post op 30.54° (p=<.0001), and at two years 30.13° (p=<.0001). There was a significant increase in thoracic kyphosis post op and at two years post op. There was no difference in pelvic incidence, sacral slope, or global coronal alignment. There was a significant reduction in Oswestry disability index from 66.8 to 43.6 (p=<.0001)

Conclusions:
There was radiographic correction of sagittal balance with significant increase in lumbar lordosis, and decrease in sagittal balance. The Oswestry scores also show significant improvement in impairment. These results were not however without significant complications.
Objective: To report the surgical technique and outcomes of an arthroscopic assisted ACL reconstruction technique using quadruple looped hamstring graft with synthetic graft extender and a distal femoral physeal sparing technique.

Methods: Retrospective chart review and follow-up exam on all patients who underwent the novel surgical procedure. Information gathered from the chart review included injury mechanism, associated injuries, time to surgery, rehabilitation protocol, length of follow up, incidence of growth disturbance/deformity, and ability to return to pre-injury activity level. Patients were invited to return for repeat physical examination, KT-1000 measurement, scanogram, and to complete a Lysholm knee scale and/or International Knee Documentation Committee (IKDC) score.

Results: The first procedure was performed in 2007 and 17 patients underwent the operation through 2012. Nine of the 17 patients had completed follow-up exams by the time of submission, follow-up exams are still ongoing. The average age of the 17 subjects was 12.4 years old with an average time to surgery of 78 days. For the nine patients who completed follow-up exams, the average length of follow-up was 2.7 years. On physical exam of the involved extremity compared to the contralateral limb, the average difference in knee flexion was 1.4 degrees and in thigh circumference was 0.5cm. The difference in KT-1000 measurements at 20lb and 30lb were 0.8 and 0.9 respectively. No significant differences in limb length or angulation were detected on scanogram or AP lower extremity radiographs. The average Lysholm knee and IKDC scores were 92.4 and 93.1, respectively.

Conclusions: Arthroscopic assisted ACL reconstruction using quadruple looped hamstring graft with a synthetic graft extender and a distal femoral physeal sparing technique restored knee stability in all cases with no incidence of growth disturbance at an average of 2.7 years follow-up. This technique is an option for the skeletally immature population at risk for growth disturbance during ACL reconstruction.
Objective:
Anterior shoulder instability associated with significant (>20%) glenoid bone loss can be disabling even for activities of daily living. Numerous surgical techniques and modifications such as the Latarjet, Latarjet-Patte, Arthroscopic Latarjet and Congruent Arc have been developed to address this bone loss/defect. The purpose of this study is to describe a combination of open and arthroscopic techniques for treating anterior shoulder instability. This technique can be done solely in the lateral decubitus position, which offers better access to the inferior capsule and saves the surgeon time otherwise spent converting position after diagnostic arthroscopy. Another advantage of this technique is the sparing of the capsulolabral structure and dilation of the subscapularis rather than a traumatic split. Current all arthroscopic techniques involve significant trauma to both the anterior capsule and subscapularis that we avoid in this technique. We believe that this technique provides improved stability and is an excellent option for patients who have failed prior stabilization procedures. As a result, patients will have restored shoulder stability, good functional outcome and high satisfaction scores.

Methods:
From 2011-2013 we performed 16 of these procedures at our institution. A retrospective review of these patients was performed and revealed fourteen patients that met our inclusion criteria. All patients underwent clinical and radiographic assessment at both preoperative and final postoperative visits. Operative reports, outpatient records and follow up radiographs were used to determine the demographic information, associated surgical procedures, and any complications. Functional evaluation and patient satisfaction scores were measured by a questionnaire. The questionnaire consists of standardized questions including visual analog pain rating, activities of daily living pertinent to the American Shoulder and Elbow Surgeons score calculation, as well as a series of patient centered outcome questions. Patients were contacted by telephone and interviewed with regard to pain, stability, return to work, return to daily activity, return to sport and overall satisfaction.

Results:
Fourteen patients with a mean age of 30.2 years (range, 21-41 years) that met our inclusion criteria were available for review. Thirteen of these fourteen patients had at least 1(n=8), 2(n=3), or at least 3(n=2) previous stabilization procedures other than our technique and recurrent anterior shoulder instability. One patient had no prior surgery. The mean follow-up was 23 months (range, 1-35). There was one worker's compensation case.

Thirteen patients (93%) had returned to normal activity and 12 (86%) had returned to sport activity at latest follow-up. The average Visual Analog Pain rating and ASES score was 1.7 (range, 0-10) and 88.8 (range, 16.6-100) respectively. Thirteen of the patients (93%) reported being satisfied with the procedure and that their injury improved. There were no re-dislocations of subluxations reported by the patients. All patients had a negative
apprehension test at most recent follow-up. The average external rotation, forward flexion and abduction values were 76.5° (range 40° - 95°), 168° (range, 140° - 180°), and 162° (range, 120°- 180°) respectively. One of the patients required revision surgery. There were no other complications recorded in the medical records or noted by the patients. Radiographic healing of the bone block was observed in all patients.

Conclusion:
This technique seems to be a reliable one that allows the advantages of both open and arthroscopic techniques without damaging the anterior capsule and subscapularis. It has shown excellent short-term follow-up results with minimal complications and high patient satisfaction scores. We recommend this technique to those Orthopaedic surgeons with excellent arthroscopic skills, knowledge of anatomy and experience in treating patients with prior failed stabilization procedures.
Objective:
The number of arthroscopic procedures in the hip performed in the last five years has more than doubled due to growing interest among orthopedic surgeons in helping preserve hip health and function within an increasingly aware and active patient population. Advances in both surgical technique and instrumentation have evolved hip surgery from an open procedure to an arthroscopic procedure, and have increased the complexity of conditions that can be treated in the central and peripheral compartments as well as the peritrochanteric space. A common approach to these procedures has been to perform capsulotomies that allow better access to the pathology. The development of high performance surgical blades, which optimize sharpness, strength, and maneuverability, has enabled this procedural evolution, though reports of blade breakages cause some concern about their use. A comparative evaluation of the biomechanical properties (i.e., sharpness and strength) of these blades has not yet been undertaken. The biomechanical properties of surgical instruments must be evaluated in a medium that accurately approximates tissue. The thickness and durometer of the polyurethane rubber used to simulate hip capsule was selected through surveys with clinical experts and validated by confirming the results of two blades at the extremes of the sharpness results (showing that the lowest peak force was 60% of the highest force in both 5mm thick 24A durometer rubber and in bovine tissue). Therefore, the objective of this study is to evaluate the sharpness and strength of several high performance hip capsulotomy blades using a polyurethane model.

Methods:
The following five high performance hip blades were selected for inclusion in the study: DePuy Synthes Mitek Sports Medicine Hip Straight Blade, Smith & Nephew reusable Banana Blade Knife, Smith & Nephew Beaver® 4.0mm Banana Blade, Arthrex Banana Knife, and BD Beaver® Arthro-lok™ Banana Blade. Blade sharpness and blade strength were evaluated by testing six samples for each test in a polyurethane model simulating an average hip capsule. Blade sharpness was evaluated by determining the peak force required to penetrate the representative capsule for each blade. Lower force is therefore indicative of a sharper blade. Blade strength was evaluated by determining the force required to yield each blade in bending. Additionally, blade strength was evaluated against a clinical load threshold (13.5N), determined through measuring actual loads applied to capsulotomy blades during representative hip arthroscopy procedures in cadaveric specimens.

Results:
The mean sharpness or peak force (SD) required to penetrate the representative capsule for each blade was as follows: BD Beaver® Arthro-lok™ Banana Blade, 15.0 (1.03); Mitek Sports Medicine Hip Straight Blade, 15.7N (3.97); Smith & Nephew Beaver® 4.0mm Banana Blade, 15.8N (0.90); Arthrex Banana Knife, 28.1N (1.17); and Smith & Nephew reusable blade, 20.4N (2.32).
Banana Blade Knife, 37.7N (3.87). The Mitek Sports Medicine Hip Straight Blade, the BD Beaver® Arthro-lok™ Banana Blade, and the Smith & Nephew Beaver® 4.0mm Banana Blade were found to have similar results (p=0.85) and represent the sharpest samples since these blades required the least amount of force to penetrate the capsule. The mean strength or peak force (SD) required to flex the blade to failure was as follows: BD Beaver® Arthro-lok™ Banana Blade, 10.7N (0.80); Mitek Sports Medicine Hip Straight Blade, 26.5N (0.78); Smith & Nephew Beaver® 4.0 Banana Blade, 10.8N (0.76); Arthrex Banana Knife, 17.2N (1.26); and Smith & Nephew reusable Banana Blade Knife, 77.7N (5.47). When only mean load is considered, all of the blades with the exception of the BD Beaver® Arthro-lok™ Banana Blade and the Smith & Nephew Beaver® 4.0mm Banana Blade exceeded the clinical load threshold. However, when the 95/90 (confidence/reliability) Lower Statistical Tolerance Limit (LSTL) is considered, three of the five blades did not meet the target clinical loads measured: Arthrex Banana Knife, BD Beaver® Arthro-lok™ Banana Blade, and the Smith & Nephew Beaver® 4.0mm Banana Blade. The Mitek Sports Medicine Hip Straight Blade and the Smith & Nephew reusable Banana Blade Knife exceeded the clinical load by 77% and 350%, respectively.

Conclusion:
As the number of hip arthroscopy procedures performed each year continues to grow, the choice of surgical instrumentation of these procedures becomes increasingly important. Blade sharpness and blade strength are two important attributes in evaluating the choice of surgical blades used in hip arthroscopy. The results indicate that sharpness is generally achievable for hip capsulotomy blades, though strength may not meet clinical requirements for these products. The Mitek Sports Medicine Hip Straight Blade achieved both high relative sharpness while satisfying the strength requirements for the procedure. These results will need to be confirmed in future clinical studies.

Endnotes:
Objective: The successful use of some biocomposite materials in interference screws and suture anchors has been well described in the clinical literature [Barber Arthroscopy 2011; Van Klunen AJSM 2012], but to the best of our knowledge, the in vivo biomechanical properties have not been described. We sought to understand how well the biomechanical properties of one specific biocomposite material are maintained over the course of the healing period.

Methods: Following approval of the protocol by the Institutional Animal Care and Use Committee (IACUC), a total of 12 sheep were enrolled in this study. Both humeri of each sheep were inserted with a biocomposite anchor following the manufacturer's Instructions for Use. Two experienced orthopedic surgeons (AM and JS) performed all device insertions. Anchors were inserted into the humeral tuberosity and the high strength suture coiled and placed intramuscularly rather than being used to perform a repair. Sterile techniques were used for all anchor insertions on sheep in the six week (n=4), 12 week (n=4), and alternate groups (n=2). For the two sheep that were going to be sacrificed immediately (zero time point), both humeri received anchors. For the ten sheep that were not going to be sacrificed immediately, the left humerus received an anchor immediately but the right humerus received an anchor after sacrifice and just prior to biomechanical testing. The two alternates were sacrificed at 12 weeks because they were not needed to substitute for a sheep at another time point (i.e. no sheep dropped out of the study). Following sacrifice, humeral disarticulation was performed with significant effort made to preserve the integrity of the suture, despite it being embedded in fibrous tissue. Tensile loading to failure along the long axis of the anchor was performed after both sutures had been tied together to form a loop around a 25.4 mm diameter mandrel. The anchors were pulled to failure at 24.5 mm/min. Maximum load, stiffness, and load to 3 mm displacement were calculated and statistically compared across the three time points. A level of significance of 95% was set a priori.

Results: The average maximum load, stiffness, and load to 3 mm of displacement (Figure 1) held roughly constant over the 12 week time period studied (differences were not statistically significant). The average maximum load was 184 N ± 22 N at time zero, 237 N ± 53 N at 6 weeks, and 168 N ± 19 N at 12 weeks and therefore remained 8-10 times above the clinically relevant loads expected of these anchors following labral repair [Oliashirazi AJSM 1999; Tashjian, Arthroscopy, 2007]. The mode of failure was 50% anchor pull out and 50% anchor bridge break for time zero, but then shifted to 100% bridge break for the six and 12 week time points.
Conclusions: At least in this in vivo ovine model, the biocomposite anchors supported many times the clinically relevant loads even out to 12 weeks post-operatively. The ovine humerus model has been shown to produce maximum pull-out loads for suture anchors almost identical to “healthy” human humeri (i.e. from cadavers with high bone mineral densities) [Pietschmann JOB 2010]. Interestingly, there seemed to be a trend toward the average maximum load increasing between the time zero and six week data. Similarly, the average load to 3 mm displacement showed a trend toward increasing over time, with the highest value at 12 weeks (58 N ± 20 N). Stiffness followed this same pattern, but with more moderate gains at 12 weeks. Clinically, this potential for increased repair strength over the healing period could support the use of more aggressive rehabilitation protocols.

Figure 1: Average load to 3 mm displacement over all three time points
Objective:
This study was designed to assess the value of initial serologic and arthrocentesis results of patients diagnosed with acute septic arthritis of a native joint. We analyzed this information for two different groups of patients: 1) patients needing a single surgical debridement and, 2) those needing multiple surgical debridements. Our hypothesis is that the initial laboratory and arthrocentesis data would not be predictive of the total number of debridements needed for surgical treatment of acute septic arthritis of a native joint.

Methods:
We retrospectively reviewed all charts of patients that underwent surgical treatment at our institution for septic arthritis during the years of 2006-2011. All initial serologic laboratory data including white blood cell count (WBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), as well as arthrocentesis results including cell count with differential, crystal analysis, gram stain, anaerobic and aerobic culture results were captured and entered into our database. The total number of surgeries per infected joint was recorded. Surgical treatment consisted of either arthroscopic or open irrigation and debridement of the infected joint or joints determined by the attending surgeon. All patients were started on broad spectrum antibiotics immediately after deep cultures were obtained intra-operatively from the initial surgery. Final antibiotic selection and duration of treatment was chosen by Infectious Disease specialists at our institution and based on final culture results and antibiotic sensitivities were obtained. The decision for repeat surgical debridement was based on daily physical exam and clinical picture assessed by the attending.

Results:
In all, 132 patients with a total of 135 affected joints underwent surgical debridement for acute septic arthritis. 52 patients with 53 affected joints underwent at least two surgical debridements (range two to four). Initial open surgical debridement was performed in 57 (70%) of single surgery patients (S) v. 39 (74%) of multiple surgery patients (M) (ns). The knee was the most affected joint (n=95) followed by shoulder (n=14), ankle (n=8), elbow (n=8), hip (n=7), and wrist (n=3). The initial lab data was significant for: WBC (S) 11.3 v (M) 14.3 thou/μL (p<0.001), Cell count (S) 52,250 v. (M) 68,595 (p=0.04) and CRP (S) 162 v. (M) 199 mg/L (p=0.04). ESR (S) 73.9 v. (M) 78.5 mm/hr or the presence or absence of crystals weas not significant. S. aureus (SA) was the most common bacterial isolate identified (45%, n=61/135) of which 61% (n=37/61) were identified as MRSA. The presence of SA was significantly higher for patients undergoing multiple surgeries (34/53) than those needing only a single surgery (27/82), (p<0.001). Similarly, MRSA was also identified significantly more in patients needing multiple surgeries, (S)17% v. (M)43% (p=0.001).
Conclusions:
Our results show that an elevated initial lab results of WBC >14 thou/μL, CRP >200mg/mL or cell count >70,000 were all risk factors associated with more than one surgery for treatment of acute septic arthritis in a native joint. The presence of SA or MRSA as the bacterial isolate was also identified as a risk factor. Further studies may help elucidate additional risk factors and predictors of patients who will need multiple surgeries to treat their acute septic arthritis.
Objective:
Dupuytren's contracture is a slowly progressive hand deformity that causes significant loss of function in patients. Historically, the treatment for this common connective tissue disease has been conservative vs surgical management. Collagenase clostridium histolyticum injections provide a viable alternative treatment method. The purpose of this study is to further demonstrate the usefulness of collagenase clostridium histolyticum injection as an alternative to surgical intervention.

Methods:
A retrospective review was conducted on collagenase injections performed by the same surgeon from March 2010 through January 2013. All patients had a palpable cord and received an injection of clostridium collagenase followed by manipulation of the affected digit at an average of four days post injection. Pre and post injection range of motion measurements were recorded of metatarsophalangeal (MCP) and proximal interphalangeal (PIP) joints.

Results:
A total of 97 injections were performed on 70 patients. Arc of motion of all joints improved by an average of 41 degrees at the MCP joint and 18 degrees at the PIP joint. The amount of contracture improved by 37 degrees at the MCP joint and 14 degrees at the PIP joint. Complications included bruising (67%), skin tears (30%), and pain (11%).

Conclusions:
Clostridial collagenase injections continue to be a safe alternative to surgical intervention that can be performed in the office and provide immediate use of the affected hand.
Objective:
We will discuss the different late complications of calcaneus fractures, most importantly, subtalar joint arthritis. We will discuss the evaluation and treatment of these fractures.

Methods:
We will report on the posterior approach to subtalar joint fusion with its novel suggestion of performing the procedure with or without complete removal of the previous internal fixation.

Results:
Our series had nine patients with 10 procedures, one bilateral. The average age was 52 years. The time to boney union was 35-102 days with an average of 58.5 days. Eight patients were very satisfied and two were moderately satisfied. Heel height improved 7.1 mm. Follow up was 6-43 months, averaging 19.

Conclusions:
Calcaneus fractures are serious, disabling injuries with subtalar post traumatic arthritis commonly occurring with or without initial surgery resulting in loss of calcaneal height. Subtalar arthrodesis can be performed by a lateral or posterior approach. Using the posterior approach reduces the possibility of wound complications especially in those patients with a prior lateral approach for the initial surgery.
TITLE: Outcomes of Non-Operative versus Operative Treatment of Displaced Pediatric Clavicle Fractures

AUTHOR: Lindsey Hagstrom, MD

AFFILIATION: Department of Orthopaedic Surgery, University at Buffalo, The State University of New York

Objective:
To examine the short and long-term outcomes of pediatric patients with displaced clavicle fractures with respect to radiographic healing, full active range of motion and return to activity.

Methods:
A retrospective review of pediatric patients who sustained clavicle fractures between January 2001 and October 2011 was performed. Three hundred thirty-nine non-operative patients and 50 operative patient's charts were reviewed. Inclusion criteria was any fracture that demonstrated greater than or equal to one centimeter of shortening and greater than or equal to one hundred percent displacement on presenting radiographs. Excluded were those patients whose radiographs were not available for review, patients who were lost to follow-up and patients less than five years old. Mean follow-up was 54 months (range 14-115 months) in the non-operative group and 41 months in the operative group (range 15-102 months).

Results:
Thirty-two patients were included in the non-operative group and 46 patients in the operative group. Mean time to return to activity (weeks) was 12.24 in non-operative group and 12.70 in operative group (p =0.67), Mean time to achieve full active range of motion (weeks) was 7.85 in the non-operative group and 8.74 in the operative group (p= 0.24) and mean time to achieve radiographic evidence of healing (weeks) was 12.02 in the non-operative group and 11.90 in the operative group (p =0.90). DASH scores were an average of 1.17 in the operative group (range 0-8.3) and 0.04 in the non-operative group (range 0-0.08), which demonstrated no significant difference between the two groups.

Conclusions:
There was no significant difference in any of our outcome measures: return to activity, full active range of motion and evidence of radiographic healing when comparing the operatively treated and non-operatively treated displaced clavicle fractures. Thus, we would propose that unless the patient's injury is an absolute indication for surgery, conservative management provides equivalent immediate clinical results and long-term clinical results.
TITLE: Precision and Accuracy of Identifying Anatomic Surface Landmarks Amongst 30 Expert Hip Arthroscopists

AUTHOR: Jeffrey M. DeLong, B.S.

AFFILATION: Medical University of South Carolina

Objective:
Anatomic surface landmarks around the hip and lower abdomen are frequently referenced for placement of arthroscopic portals and office based injections. It is currently unknown to what degree surgeons are capable of reproducibly identifying these landmarks. This study evaluates the ability of 30 independent expert hip arthroscopists to identify common surface landmarks used in the hip specialty practice by comparing examiner applied landmark tags with ultrasound verified anatomic tags. Five surface landmarks on a test patient were identified: anterior superior iliac spine, anterior inferior iliac spine, psoas tendon at the joint, superficial inguinal ring, tip of greater trochanter.

Methods:
The subject was independently examined by each surgeon in the supine position and colored tags were applied corresponding to the anatomic surface landmark. Overhead and lateral digital photographs were taken to document the position. An expert ultrasonographer also completed an examination with a specialized musculoskeletal ultrasound and placed tags. All surgeons were compared with the ultrasound standard for accuracy and the precision of the group was also determined.

Results:
Average distances from the examiner marks to ultrasonographer marks were: 31mm medial-distal for ASIS; 26mm medial-distal for AIIS; 35mm medial-distal for psoas tendon; 19mm lateral-distal for superficial inguinal ring; 24mm anterior-proximal for tip of greater trochanter. Statistical analysis demonstrated examiners were greater than 10mm from the ultrasound markers. Examiner distribution showed most precision for the ASIS with variance over 18mm x 36mm area and the least precision for the superficial inguinal ring (51mm x 74mm area). Scattergram plots of deviation patterns showed common directional miscues amongst examiners.

Conclusions:
The wide variance between ultrasound guided landmarks and examiner landmarks suggest a role for ultrasound in improving accuracy of identification. Experienced examiners demonstrate variable precision in identification of commonly referenced anatomic landmarks and this should be considered when describing arthroscopic techniques and portals.
Objective:
Total ankle arthroplasty (TAA) has become an increasingly effective treatment option for tibiotalar arthritis. Multiple different cementless mobile and fixed bearing implant designs have been evaluated over the past two decades with varying success rates. We evaluated an implant that has been used clinically in Europe since 1997, but has only been FDA approved in the United States since 2006. The vast majority of clinical data for this implant has been from a European population, which may not accurately reflect American outcomes. This study evaluates the short to midterm clinical and radiographic outcomes of a cementless fixed bearing total ankle prosthesis.

Methods:
We retrospectively reviewed the radiographs and patient records of 74 consecutive patients with 75 TAA implants from January 2007 to April 2011. Patient records were reviewed for demographics, postoperative complications, revision procedures, range of motion (ROM), and return to the operating room (OR) for any reason. Radiographs were reviewed by two authors for areas of radiolucency and cystic changes around the talar and tibial implants, as well as, for implant migration using standardized tibial, talar, talocalcaneal, and tibial slope angular measurements as previously described in the literature. Component migration was defined as a change in 5 degrees from immediate postoperative radiographs compared to final follow up radiographs, and a radiolucent line was considered significant if it was greater than 2 mm. A cystic area was defined as a zone of lucency greater than 5 mm. The validated Foot and Ankle Outcome Score (FAOS), Short Form-12 (SF-12), and Visual Analog Scale (VAS) for patient satisfaction with a score of one indicating complete dissatisfaction and a score of 10 indicating complete satisfaction were used as subjective patient outcome measures. One Kaplan Meier (K-M) curve was created for implant survivorship with revision of components as an endpoint, and one for return to the OR for any reason. Student's t-tests were used to analyze patient outcome measures.

Results:
The average age was 60.6 years (range 41-82) with 41 females and 33 males. The average clinical follow up was 43 months (range 24-73 months) with an implant survivorship of 98%. Thirteen patients returned to the OR for any reason (one related to the implant) resulting in a 68% survivorship. There was one deep infection requiring irrigation and debridement, and no ankles were converted to an arthrodesis. Average dorsiflexion and plantarflexion improved from 4.3±3.3 to 8.7±5.6 degrees (p=0.0008), and 24±11 to 29±7 degrees (p=0.04) respectively. Fifty patients had completed postoperative subjective outcome scores. Patients showed significant improvements in all subscales of the FAOS (p<0.0001). The physical component of the SF-12 significantly improved from 30±8 to 41±13 (p<.0001), but this was not observed with the mental component (52±1 vs. 53±1, p=.55). The mean VAS for patient satisfaction was 9 (range 2-10). Two patients had component migration (one tibial
and one talar component) neither of which required a revision procedure. Six ankles had a total of 9 radiolucent lines in different regions with a radiographically stable implant, and no patients had cystic changes.

Conclusion: This is one of the first series of clinical outcome data for this prosthesis outside of Europe. We observed significant improvements in subjective outcome measures and ROM with a 98% component survivorship at short to midterm follow up. Longer follow up will be necessary to determine the durability of this implant.
Objective:
To determine which suture repair technique better restores glenoid labrum height: horizontal versus simple sutures.

Methods:
16 cadaveric glenoids, 8 per repair technique, were utilized to measure native labral height at the 3:00-6:00 timepoints on the half-hour time increments. A Bankart lesion was then created from 3:00-6:30. Height measurements at each timepoint were again taken after creation of the Bankart lesion. Repair with a 3mm knotted suture anchor was then performed at the 3:30, 4:30 and 5:30 timepoints with either a simple or horizontal suture technique and post-repair heights were measured across all timepoints.

Results:
A significant decrease in height was seen at the 3:30, 4:30 and 5:30 timepoints in the simple repair group when compared with the native height. A 1.4 mm (p=0.044), 2.1 mm (p=0.030) and 1.1 (p=0.034) decrease in height were found at the 3:30, 4:30 and 5:30 timepoints. No significant decrease in height was found at these respective timepoints in the horizontal repair group.

Conclusions:
In vitro horizontal mattress suture technique betters restores labral height and anatomy when compared with a simple suture technique in the repair of acute Bankart lesions.
Objective: To determine the complication rate in forefoot surgery as associated with cigarette smoking.

Methods: Retrospective study. Medical records were reviewed for all patients whom underwent forefoot surgical procedures at the Campbell Clinic between years 2008-2010. Patients were classified into three groups. Group I patients had no history of tobacco use. Group II patients had reported tobacco use in the past but stopped prior to date of surgery. Group III patients continued to use tobacco in the perioperative period. Outcome measures included total complications, nonunion, infection, delayed wound healing, delayed union, and persistent pain.

Results: 633 patients underwent forefoot procedures in years 2008-2010. Tobacco use could be determined from medical records in 602 patients (95%). Group I contained 457 patients, Group II had 79 patients, and Group III had 66 patients. The percent of patients with diabetes, rheumatoid arthritis, peripheral vascular disease, and steroid use were similar amongst all groups. The number of patients with a complication occurring in each group were: Group I – 39 (8.5%), Group II – 13 (16.5%), and Group III – 24 (36.4%). There is a statistically significant (p<0.0001) increase in complication rate associated with cigarette smoking. The rate of nonunion, infection, delayed wound healing, delayed union, and persistent pain each showed statistically significant variation amongst each group with the highest incidence for each in those patients who continued to use tobacco in the perioperative period.

Conclusions: This is the first study to examine complication rate associated with cigarette smoking in forefoot surgery. Tobacco use significantly increases the rate of complications in those patients undergoing forefoot procedures with 36.4% of current tobacco users suffering a complication. Surgeons should educate patients who smoke cigarettes on the increased incidence of complications prior to forefoot surgery and support those patients through smoking cessation.
Objective:
Controversy remains as to the role of the long and short head of the biceps in the throwing motion. The LHB has been described as a humeral head depressor as well as a compressor and an anterior stabilizer of the glenohumeral joint as well as a posterior stabilizer. In addition, it has been described as a constraint to external rotation and as a stress-shield to the inferior glenohumeral ligament in the abduction external rotation position. The short head of the biceps (SHB) has not been studied as in-depth as the LHB. The objective of this study was to examine the roles of each individual head of the biceps and its effects in glenohumeral kinematics and contact characteristics in the throwing shoulder.

Methods:
Eight cadaveric shoulders were dissected leaving only the tendonous insertions of the rotator cuff, deltoid, pectoralis major, latissimus dorsi and coracoacromial ligament. Two muscle loading conditions were used for late-cocking and deceleration based on EMG of throwing athletes. The LHB and SHB were loaded with 10, 20, and 40N each. For the late-cocking position, the shoulders were placed in 90° degrees of abduction in the coronal plane and 90° and maximum external rotation. For deceleration, the shoulders were placed in the scapular plane and neutral rotation and maximum internal rotation. Range of motion and the humeral head apex (HHA) position were measured using a goniometer and a 3-D digitizing system. A Tekscan pressure sensor was used to measure glenohumeral contact.

Results:
In the late-cocking condition, loading of the LHB decreased maximal external rotation and moved the humeral head apex (HHA) anteriorly. With the deceleration condition, loading the LHB resulted in a significant decrease in maximal internal rotation, and the HHA moved posteriorly, inferiorly and medially. Contact data showed no difference in contact characteristics with LHB loading in either position. In the late-cocking condition, loading the SHB significantly moved the HHA superiorly and there was a trend towards moving the HHA posteriorly. There was a significant decrease in maximum external rotation and increase in peak pressure with the SHB loaded. In the deceleration condition, loading the SHB tended to move the HHA posterior, inferior and medial; however, none of these values reached significance. Loading the SHB also decreased maximum internal rotation and increased both contact pressure and peak pressure.

Conclusions:
This study shows that loading the LHB and SHB has significant effects on glenohumeral kinematics and contact characteristics in the throwing shoulder. According to this study, unloading the LHB moves the humerus posteriorly during late-cocking, which may lead to higher rates of internal impingement and articularraysed partial thickness rotator cuff tears. This could have negative consequences in throwing athletes who undergo biceps tenodesis for superior labral injuries. While it did not reach significance, the SHB tended to act as a...
restraint to anterior translation of the humerus in both the late-cocking and deceleration positions. Our results showed that increased load on the SHB increased glenohumeral contact pressures which appears to give the glenohumeral joint more stability.
Total Ankle Arthroplasty

Steven Weinfeld, MD
Chief; Foot and Ankle Service
Associate Professor of Orthopaedic Surgery
Mount Sinai Medical Center, NY

Osteoarthritis
- Can be post traumatic
- Degenerative
- May affect any joint in the foot and ankle
- Limits range of motion
- Swelling and pain

Inflammatory Arthritis
- Rheumatoid
- Systemic Lupus Erythematosis
- Psoriatic
- Gout
- Others

Ankle Arthritis
- Most often post traumatic
- Swelling and pain with up and down motion of ankle, crepitance
- Pain with push off and up and down stairs
- May see swelling (effusion) of ankle
- May also have deformity

Treatment of Ankle Arthritis
- NSAIDS, Bracing, Shoewear modifications
- Corticosteroid injection
- Ankle joint debridement
- Distraction
- Arthrodesis
arthroplasty

Results of Ankle Arthrodesis
- Many reports of successful results - good pain relief
- Pseudoarthrosis rates up to 50%
- difficult to obtain ideal position
  - especially with bone loss
- 16% decreased gait velocity - Waters 1988
- tibial stress fractures following ankle arthrodesis
- development of arthritis of adjacent joints - 50%

Ankle Arthrodesis
- 75% loss of sagittal motion
- 70% loss of inversion/eversion
  - Mann and Rongstad  Foot Ankle 1998
- Buck and Morrey JBJS 1987
  - 19 patients with ankle arthrodesis
  - Only 1 reported no pain
  - All patients had difficulty on uneven terrain

Ankle Fusion-Function
- 30 patients over age 70
- Solid union 27 of 30 ankles (90%)
- 11 with progression of subtalar arthritis
AOFAS score 73.0 postop (Average function)

2 patients required subsequent subtalar fusion
- Strasser et al, Foot Ankle Int Sept 2012

Total Ankle – History

- uniformly poor long term results
- Newton 1982 - results of total ankle in RA so poor that procedure is contraindicated
- Bolton-Maggs 1985 - arthrodesis treatment of choice for arthritis of ankle regardless of underlying condition
- Kitaoka et al 1996 - reviewed 160 ankle replacements with 36% failure rate requiring removal of implant - Mayo Clinic

First Ankle Replacement – 1970

- inverted hip prosthesis
- failed miserably
- newer designs show improved results due to better understanding of ankle mechanics and modes of failure

Total Ankle Replacement – Indications

- older patient with multiple joint problems
- normal alignment and ligamentous stability of ankle and foot
- no history of septic arthritis
- patient with reasonable expectations!!!

Contraindications to Ankle Replacement

- prior sepsis
- osteonecrosis or profound osteoporosis
- young, very active patient
- severe deformity of ankle or foot

Implant Design

- constrained prosthesis
  – ICLH, Thompson-Parkridge-Richards, Mayo
- nonconstrained designs
- Richard Smith prosthesis, New Jersey Ankle
  - semiconstrained
- Agility ankle
- STAR ankle
- Salto (Tornier)
- InBone
- Mobility

**Modes of Failure of Ankle Arthroplasty**
- loosening 22-75%
  - greater in constrained designs
  - cemented prosthesis
- wound complications with subsequent infection
  - amputation rate not insignificant
- ankylosis following arthroplasty
- difficult salvage including arthrodessis

**STAR Ankle- Scandinavia**
- widely used in Europe
- 3 component design
- sliding polyethylene meniscus
- 70% survivorship at 10 year follow up
  - Kofoed JBJS 1998

**Functional Evaluation of STAR Ankle**
- 9 patients had ankle function evaluated following arthroplasty
- External ankle dorsiflexion, inversion, and eversion moments all improved compared to pre-op
  - Still decreased compared to controls
  - Mann et al Foot Ankle June 2004

**STAR Ankle Replacement**
- 49 replacements in 47 patients
• Mean f/u 28 months
• 4 failures due to loosening
  – Schutte and Louwerens Foot Ankle Int 2008

STAR Ankle vs. Arthrodesis
• Better function and equivalent pain relief with STAR ankle
• Min 24 month follow up
• Higher complication rate with STAR
• Saltzman et al: Foot Ankle Int 2009

Agility Ankle
• semiconstrained design
  – requires distal tib/fib fusion
• recent review of 100 arthroplasties JBJS 1998- Pyevich et al
  – 26 with RA
  – 2-12 year follow up- 93% patient satisfaction
  – 83% reported no pain or mild pain
  – 5 revisions, 21% radiographic loosening

Surgical Technique - Agility Ankle
• anterior approach to ankle
• application of external fixator for distraction
• resection of distal tibia and talus
• trial implantation
• implantation of components
• distal tibia/fibula fusion

Complications with Agility Ankle
• radiographic loosening
• delayed or nonunion of syndesmosis- 30%
• wound complications
• migration of tibial component
• 132 ankles in 126 patients with avg. 9 year follow up – 1 surgeon (F. Alvine)
90% reported satisfaction
14 ankles revised or fused (11%)
8% syndesmosis nonunion
<25% progressive hindfoot arthritis as compared to >50% with ankle fusion
Saltzman et al JBJS June 2004

Mobility Ankle
- Mobile bearing polyethylene
- Wood et al – 100 Mobility Ankles
  - 43 month follow up
  - 5% revision rate
  - 4 yr survival – 93.6%
  - Wood et al: JBJS Br 2010

Total Ankle Arthroplasty vs. Ankle Arthrodesis
- Meta analysis of 10 studies of total ankle with 852 patients and 39 studies of ankle arthrodesis with 1262 patients
- AOFAS scores 78.2 for total ankle and 75.6 for ankle arthrodesis with similar revision rates
- Intermediate outcome similar between the two groups

Arthrodesis vs. Arthroplasty
- 18 patients – 9 fusion, 9 replacements
- Pain reduction and gait improved both groups
- Better motion with arthroplasty with more natural gain
- Similar complication rate
- Sangeorzan et al Foot Ankle Int 2012

Total Ankle – Review of Literature
- 13 studies of at least 20 patients
- 1105 total ankle arthroplasties
  - 234 Agility, 344 STAR, 153 Buechel Pappas
  - 152 Hintegra, 98 Salto, 70 TNK, 54 Mobility
• 10% failure rate at 5 years
  – Gougoulias et al: CORR 2010

Function After Ankle Arthroplasty
• 51 patients with fixed bearing TAR
• Examined at 1 and 2 years post op
• Gait analysis and ROM evaluated
• Improved pain and gait
• No change in ROM
• Nunley et al Foot Ankle Int 2012

Complications and Failure After Total Ankle Arthroplasty
• 306 Agility Ankles
• Mean F/U 33 months
• 85 patients (28%) underwent 127 reoperations (168 procedures)
• Debridement of heterotopic bone, alignment correction, component replacement
• 8 Below knee amputations
• 5 year survival rate 80%
• Hansen S JBJS 2004

Salvage of Failed Ankle Replacement
• Arthrodesis
  – Requires large bone graft to fill void
  – Try to restore length
• Revision
  – Often requires custom implant
  – Bone graft to syndesmosis for nonunion (Agility)
• Amputation
• Walling AK et al, Foot Ankle Clin Dec 2012

Fresh Allograft Ankle Replacement
• 88 bipolar allograft ankle replacements
Mean age 44 yrs – avg 5.3 year follow up
25 failures(29%) requiring reoperation
76% survivorship at 5 yrs
44% at 10 years
Brage M et al, JBJS March 2013

Conclusion
- total ankle replacement an option for the treatment of ankle arthritis
- careful patient selection and education
- new generation of prostheses may offer greater longevity
- complications common- Saltzman et al Foot Ankle June 2003
- Ankle fusion can provide pain relief and good function

Bibliography


Difficult Pilon Fractures

Christopher Ritter, MD
This talk will review some of the more common foot pathologies encountered by the orthopaedic surgeon. Specifically, it will focus on hallux rigidus, lesser toe pathology and midfoot arthritis. The etiology, presentation, evaluation and management will be discussed.

I will review the common clinical presentations of these conditions and review the assessment and work-up. There will be a review of conservative treatment and an emphasis will be on the surgical management of these conditions. In addition to discussing the more “traditional” solutions to these problems, there will be a review of some recent trends in surgical management of these pathologies. Included in this will be a review of the outcomes of treatment.
Posterior Tibial Tendon Problems

Adolph Samuel Flemister, Jr., MD
University of Rochester School of Medicine and Dentistry

Posterior Tibial Tendon Dysfunction (PTTD) is a common tendinopathy that often leads to Acquired Adult Flatfoot Deformity (AAFD). A stage II or flexible deformity occurs most commonly in middle age women and may result in chronic pain and deformity. Multiple surgical procedures have been described to correct this deformity. These include calcaneal osteotomies, hindfoot fusions, midfoot fusions and medial sided soft tissue procedures (FDL transfers). However, these have associated complications and usually a prolonged recovery period. Nonoperative treatment for this condition consists of the use of orthotic devices and exercise programs designed to improve patients’ pain and function. While nonoperative management is attractive in that it potentially avoids the complications and recovery associated with operative intervention, the benefit of this type of treatment has not been well studied.


Distal Radius Fractures

Dale W. Wheeler, MD
Excelsior Orthopaedic
Amherst, NY

Distal radial fractures are extremely common in the Medicare population. The trend in care for distal radius fractures has shifted from closed fracture management to operative care and recently to open reduction internal fixation with volar fixed angle plating. This has been in part precipitated from studies suggesting improved outcomes with more anatomic alignment of the articular surface as seen in young adults and the advent of the fixed angle locking plate. There is little data to support this in the elderly population although this trend to operative care exists in this population as well. Age and bone mineral density appear to be additional predictors of fracture instability. Closed fracture management yields less satisfactory radiographic parameters but frequently similar functional results. Increased numbers of complications appear with external fixation but more significant ones requiring surgery are seen with fixed angle plating. Osteoporosis and increased comorbidities each appear linked to worsened DASH scores. There appears to be a lack of correlation between radiographic and functional outcomes in patients over 65. Reasonable results are seen with fixed angle plating but with higher complications. Attention to the patient specific factors in selecting the treatment option is critical in this patient group.

Selected References:


FitzPatrick SK et al. The Effect of Osteoporosis on Outcome of Operatively Treated Distal Radius Fractures J Hand Surg 2012;37A:2027-2034
Wrist Instability: Scapholunate Tears and Reconstruction

Timothy V. McGrath, MD
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Assistant Professor of Orthopedic Surgery
SUNY at Buffalo

• Review of Wrist Biomechanics and Ligamentous Anatomy
• History and evolution of surgical treatment
• Review of literature and current treatment options
• Presenting new technique for anatomic reconstruction of SL ligament
First CMC Arthritis

Owen J. Moy, MD
Soft Tissue Coverage of the Hand and Wrist

Warren C. Hammert, MD
University of Rochester Medical Center

Soft tissue injuries to the hand and wrist are common and although many can be managed with simple debridement and wound closure, some are more complicated, involving tissue loss or damage to underlying structures and may require special attention.

This presentation will cover management of wounds that cannot be treated with simple closure, describing the use of grafts, skin substitutes and flaps. Reconstruction will be discussed as it applies to scar contracture release and well as closure of wounds following surgery requiring tissue removal.

Although these are common conditions, there is little evidence to guide the physician in treatment choices and thus, he/she is left to make decisions based on experience. Basic principles will be emphasized to help guide the decision process.

References:


Wrist Arthroscopy

Timothy V. McGrath, MD
Excelsior Orthopedics, Amherst, NY
Assistant Professor of Orthopedic Surgery
SUNY at Buffalo

• Review of arthroscopic anatomy and operating room setup
• Indications for wrist arthroscopy
• Arthroscopic classification of degree of wrist instability
• Treatment options for arthroscopic management of TFCC and intercarpal ligament instability
• Arthroscopic wafer vs ulnar shortening osteotomy
• Pearls and case presentations
POSTERS
1. A Biomechanical Analysis of Anchor Suture Fixation of a Bony Bankart Lesion  
   – Evgeny Dyskin, MD, PhD
2. A Prospective Study of the Association between Bone Contusion and Intra-articular  
   Injuries Associated with Acute Anterior Cruciate Ligament (ACL) Tear  
   – Lindsey Hagstrom, MD
3. Effects of Bipolar Sealer System on Blood Loss and Operating Room Time in Posterior  
   Lumbar Fusions – David Feiner, MD
4. Failures in High-Energy Intertrochanteric (IT) Femur Fractures – Michael H. Amini, MD
5. Fluid Collections in Amputations: Prevalence and clinical implications  
   – Elizabeth M. Polfer, MD
7. Outcome Comparison Between Endoscopic Trigger Finger Release and Open Release  
   – Scott F.M. Duncan, MD
8. Patient-Specific Implants and Instruments Improved Outcomes of Total Knee  
   Replacement – B. Sonny Bal, MD, MBA, JD
10. Prevention and Treatment of Wound Complications with Tissue Expanders in Patients  
    with Early Onset Scoliosis Treated with Vertical Expandable Prosthetic Titanium Rib  
    (VEPTR) – Jeffrey R. Sawyer, MD
11. Reliability Testing of Two Classification Systems for Elbow Osteoarthritis and Post-  
    Traumatic Arthritis – Michael H. Amini, MD
12. The Effect of Timing on Orthopaedic Residency Application – Michael H. Amini, MD
13. Variability of Cobb Angle and Spinal Height Measurements in Non-Ambulatory  
    Myelodysplastic Children – Jeffrey R. Sawyer, MD
TITLE: A biomechanical analysis of anchor suture fixation of a bony Bankart lesion.

AUTHOR: Evgeny Dyskin, MD, PhD

AFFILIATION: Department of Orthopaedics, University at Buffalo, Buffalo, NY

Objective:
To determine how closely repair of a bony Bankart lesion with suture anchors recreates kinematics and anatomy of an intact shoulder.

Methods:
In this biomechanical, laboratory, cadaveric study 10 frozen, unmatched, deidentified, adult cadaveric shoulders (one specimen was excluded from the analysis) were dissected down to capsule and mounted on an MTS testing frame in a position of 45° of abduction and 30° of external rotation of the humerus relative to the glenoid. A compressive force of 50 N was applied. By combination of the MTS machine and an OptiTrack motion capture system, lateral humeral displacement and a peak translational force needed to displace a humeral head anteriorly and posteriorly to a distance of 10 mm at 2 mm/sec were recorded. A longitudinal osteotomy of the anterior glenoid with a width of 19% of glenoid length was performed to simulate an osseous Bankart lesion. Testing was performed with (1) glenoid intact, (2) a simulated bony Bankart lesion and (3) the Bankart lesion repaired with three suture anchors where the sutures of the middle anchor were tied around the osseous fragment and sutures of two other anchors were passed through the labrum and tied.

Results:
Force and lateral humeral displacement decreased after the osteotomy of the anterior glenoid and they were restored after fixation with three suture anchors. The mean peak translational force after creation of an osseous defect (12.9 ± 5.9 N) was significantly smaller compared to both the baseline (23.6 ± 7.8 N) and the shoulder with a repaired lesion (18.9 ± 4.5 N). The force in the intact shoulder and the force after repair were not significantly different from each other. The depth of the intact glenoid (1.4 ± 0.4 mm) significantly decreased after the osteotomy (0.07 ± 0.6 mm). Glenoid depth after the repair (0.9 ± 0.9 mm) was not significantly different from the intact shoulder.

Conclusions:
Osteotomy of the anterior rim of the glenoid destabilizes the shoulder; therefore, it can be used to simulate a bony Bankart lesion.

Repair of a bony Bankart lesion with suture anchors in experimental settings restores a translational force and glenoid anatomy of a native shoulder.

**PEAK TRANSLATIONAL FORCE**

<table>
<thead>
<tr>
<th></th>
<th>Intact</th>
<th>Osteotomy</th>
<th>Repair</th>
<th>Intact vs. Osteotomy</th>
<th>Intact vs. Repair</th>
<th>Osteotomy vs. Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Translational Force (N)</td>
<td>23.6 ± 7.8</td>
<td>12.9 ± 5.9</td>
<td>18.9 ± 4.5</td>
<td>P-value: 0.004</td>
<td>0.071</td>
<td>0.001</td>
</tr>
</tbody>
</table>
### ANTERIOR GLENOID DEPTH

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Intact</th>
<th>Osteotomy</th>
<th>Repair</th>
<th>Intact vs. Osteotomy</th>
<th>Intact vs. Repair</th>
<th>Osteotomy vs. Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior glenoid depth (mm)</td>
<td>1.4 ± 0.4</td>
<td>0.07 ± 0.6</td>
<td>0.9 ± 0.9</td>
<td>P-value</td>
<td>0.001</td>
<td>0.026</td>
</tr>
</tbody>
</table>
Objective:
To examine the prevalence and predictors of bone bruising in patients undergoing ACL reconstruction.

Methods:
ACL-injured patients who had an MRI within 6 weeks and arthroscopy within 3 months of injury were included in this prospective study (N=171). Percentage of bone bruising of the LFC, medial femoral condyle (MFC), LTP, and MTP was estimated from preoperative MRIs. Multiple logistic regression was used to calculate adjusted odds ratios (OR) and 95% confidence intervals (CI) for predictors (demographic factors and intra-articular injuries) of the presence and severity (none/minimal, mild, moderate, and severe) of bone bruising.

Results:
LFC bruising was predicted by age (18-28 years: OR, 0.27; CI, 0.09, 0.82; ≥29 years: OR, 0.18; CI, 0.05, 0.61) and lateral meniscus tears (OR, 2.57; CI, 1.04, 6.32). LTP bruising was also predicted by lateral meniscus tears (OR, 3.13; CI, 1.06, 9.23). There were no statistically significant predictors of MFC and MTP bruising. Males had greater odds of mild (OR, 6.16; CI, 1.44, 26.43), moderate (OR, 8.98; CI, 1.96, 41.19), and severe (OR, 15.66; CI, 3.19, 76.92) LFC bruising. Age (18-28 years: OR, 0.15; CI, 0.03, 0.66; ≥29 years: OR, 0.10; CI, 0.02, 0.68) and contact injury (OR, 0.17; CI, 0.04, 0.78) were predictors of moderate LFC bruising. Males had lower odds of mild LTP bruising (OR, 0.19; CI, 0.05, 0.83). Medial meniscus tears were associated with greater odds of moderate (OR, 8.14; CI, 1.93, 34.27) and severe (OR, 15.30; CI, 2.34, 100.10) LTP bruising. Contact injuries were also associated with greater odds of severe LTP bruising (OR, 5.01; CI, 1.21, 20.67).

Conclusions:
Bone bruising is more common and severe in young males, and on the lateral side is associated with lateral meniscal tears. Medial meniscal tears are associated with increased severity of LTP bruising.
TITLE: Effects of Bipolar Sealer System on Blood Loss and Operating Room Time in Posterior Lumbar Fusions

AUTHOR: David E. Feiner, M.D.

AFFILIATION: Department of Orthopaedic Surgery, University at Buffalo, The State University of New York

Objective:
The Aquamantys System is a bipolar sealer that uses a radiofrequency generator and saline to deliver transcollation technology to provide intra-operative hemostasis and reduce blood loss. The objective of the current study was to determine if the use of the Aquamantys System decreases intra-operative blood loss, transfusion rates, and operative time in posterior lumbar fusions.

Methods:
All patients presenting to a single surgeon from 2010-2012 for posterior spinal fusion were retrospectively reviewed. This period included twelve months before the routine use of the Aquamantys System and twelve months following the introduction of the bipolar sealer. The following data was obtained: levels fused, iliac crest bone grafting, operative time, estimated blood loss, Cell Saver return, Hemovac output, units of packed red blood cells transfused, pre-operative hemoglobin, post-operative hemoglobin, body mass index, medical comorbidities, complications, and reoperations. Continuous data was analyzed with descriptive statistics and independent student's t-test, while chi-square test or Fisher's exact test was used for categorical data. 135 patients were identified meeting the inclusion criteria, 65 in the Aquamantys group and 70 patients without Aquamantys.

Results:
The two groups were similar in age, sex, BMI, and levels fused. Significantly more patients in the group without Aquamantys underwent iliac crest bone grafting than those in the Aquamantys group (67% versus 48%, P=0.03). The mean operative time in the Aquamantys group was 155.5 minutes and 165.2 minutes without Aquamantys (P=0.03). Pre-operative hemoglobin was 14.1gm/dL without Aquamantys and 14.0gm/dL with Aquamantys (P=0.75). Post-operative day one hemoglobin was 11.0gm/dL without Aquamantys versus 11.5gm/dL with Aquamantys (P=0.04). While post-operative day two hemoglobin was 9.7gm/dL without Aquamantys and 10.3gm/dL with Aquamantys (P=0.009). No statistical difference was found with transfusion rate, estimated blood loss, Cell Saver return and Hemovac output between the two groups.

Conclusions:
The routine use of Aquamantys bipolar sealer in posterior lumbar fusions significantly decreases operative time by 10 minutes and results in significantly higher post-operative hemoglobin values.
Objective:
Much literature has been published in recent years regarding the optimal implant choice for IT fractures. With the exception of reverse obliquity fractures (AO/OTA A3), both a screw and side plate (SSP) and a cephalomedullary nail (CMN) are efficacious. However little has been published in younger patients with high-energy mechanisms of injury (MOI). No study to date has examined the efficacy of a SSP vs a CMN in this patient group.

Methods:
We retrospectively reviewed all IT fractures at a single urban Level 1 Trauma Center between January 2008 and February 2013. We excluded patients age 65 or older, fractures from a simple fall, pathologic fractures, patients without follow up to union or at least three months, reverse obliquity fractures, and fractures treated with a proximal femoral locking plate. Patients were grouped according to implant, either SSP or CMN. We compared differences in demographic data, fracture characteristics, measures of surgical quality, and complications. Data were compared using Independent T-tests and Pearson Chi Squared tests. P values <0.05 were considered significant.

Results:
We identified 19 patients in the SSP group and 18 fractures in 17 patients in the CMN group who met inclusion criteria. There were no differences in age, sex, follow up, smoking status, body-mass index, MOI, or post-op weight-bearing (all p values >0.05). Most fractures exhibited simple fracture patterns and were classified as AO/OTA A1 (SSP 89.5% vs CMN 72.2%, p=0.18), however, they exhibited significant displacement in the sagittal plane (mean 53% displacement). Regarding surgical parameters, there was no difference in TAD (SSP 21.3 mm vs CMN 21.7, p=0.79), the percentage of lag screws placed at 25 mm or less from the apex (SSP 78.9% vs CMN 77.8%, p=0.62), reduction quality (SSP 68.4% good vs CMN 61.1%, p=0.13), or position of the lag screw (SSP 50.0% center-center vs CMN 47.4%, p=0.92). There were no differences in blood loss (SSP 400 vs CMN 285, p=0.48) or surgical time (SSP 158 minutes vs CMN 144, p=0.26). In the CMN group, 14 of 18 (77.8%) required an open reduction. In the SSP group, 3 patients exhibited medialization >3mm, while none did in the CMN group.

No infections were identified, one intraoperative lateral wall fracture occurred in each group, and one patient in the SSP group went on to a delayed union at 4 months but was lost to further follow up. In the SSP group, 3 patients (15.8%) developed varus collapse, two of which underwent revision surgery, and the remaining patient elected to not undergo revision. No fractures in the CMN group developed varus collapse. All 3 failures had a TAD of 25 mm or less (mean 20.3); two had good reductions, and one acceptable; and two had lag screws in the center-center quadrant, and one in the center-posterior quadrant.
Conclusions:
Even with similar success of SSPs and CMNs in geriatric IT fractures, this group of younger patients with higher-energy injuries appears to have more unstable fractures despite relatively simple fracture patterns. In this subgroup of IT fractures, SSPs failed more often than CMNs, and failures occurred even in those with good reductions and TADs. Further prospective studies are required to examine these findings.
Objective:
In the acute post-operative period, fluid collections are common in lower extremity amputations. Existing literature provides minimal guidance with regard to whether these fluid collections lead to adverse clinical outcomes. The purpose of this study was to determine the prevalence of post-operative fluid collections in post-traumatic amputations and their implications on the presence or absence of infection. We hypothesized that fluid collections are common in the acute post-operative period, decrease and generally resolve over time, and lack clinical relevance in the absence of clinical indicators of extremity infection.

Methods:
A retrospective review of 300 consecutive lower extremity amputations was performed looking for amputations which underwent advanced imaging after definitive closure. The study cohort was comprised of those patients with a fluid collection on advanced imaging. The clinical course was reviewed with the principle outcome being if the patient returned to the operating room for irrigation and debridement.

Results:
Fluid collections are common (55%) in the acute post-operative period and reliable decrease or resolve with time (11%). There was no statistically significant association between the presence of a fluid collection and infection. However, there was a statistically significant association between clinical concern at the extremity and return to the operating room (p<0.0001).

Conclusions:
Fluid collections are common after closure of an amputation and most decrease in size or resolve with time. An incidental finding of a fluid collection on CT post-operatively does not indicate the presence of infection. Conversely, the presence of extremity erythema and wound drainage are highly predictive of an infection and return to the operating room.
Objective:
The purpose of the study was to evaluate and compare variations in maximum load to failure and 3 mm displacement (clinical failure) of arthroscopic suture knots tied by 73 independent expert orthopaedic arthroscopists.

Methods:
Each surgeon tied 5 of the same type of their preferred arthroscopic knot and half-hitch locking mechanism. Each knot was mechanically tested for maximum load to failure and clinical failure.

Results:
For the 365 knots tested, the average ultimate load was 231N (range, 29 - 360N) with a standard deviation of 104N (range, 6 - 133NN). The average clinical failure load was 139N (range, 16 - 328N) with a standard deviation of 62N (range, 6 - 87N). The average knot stack height among the 365 knots was 5.61 mm (range, 2.89 - 10.32 mm) with a standard deviation of 1.03 mm.

Subgroup analysis was conducted based on surgeons’ years in practice. The ultimate and clinical failure load for surgeons with less than 10 years of practice (n = 39) were 248 ± 93N and 142 ± 56N respectively. The ultimate and clinical failure load for surgeons with greater than 10 years of practice (n = 34) were 211 ± 111N and 136 ± 69N, respectively. Significant differences existed in ultimate load (p = 0.001); however, there were no differences in clinical failure load (p = 0.329).

Subgroup analysis based on number of arthroscopic shoulder cases performed annually was also performed. The ultimate and clinical failure load for surgeons whom performed greater than 200 cases annually (n = 30) were 226 ± 101N and 136 ± 64N respectively. The ultimate and clinical failure load for surgeons whom performed less than 200 cases annually (n = 43) were 239 ± 103N and 141 ± 61N respectively. There was no significant difference for either ultimate load or clinical failure load between the two groups (p = 0.292 and 0.479, respectively).

Conclusions:
Considerable variations in knot strength exists between arthroscopic knots of the same type tied by the same surgeon. This variation has the potential to affect the integrity of arthroscopic repairs. Independent objective testing of the ability to tie secure knots as part of a surgeons training may be necessary.
Objective:
Endoscopic techniques for carpal tunnel and cubital tunnel syndrome have been adopted in many countries. We sought to find out whether patients undergoing endoscopic trigger finger releases had better (lower) QuickDash scores than their open release counterparts.

Methods:
Over a 12 month period we recruited 14 patients into the open technique cohort and 13 patients into the endoscopic cohort. All patients were followed for a minimum 3 month period. The QuickDash was given at the 2 week, 6 week, and 12 week follow-up appointments.

Results:
The endoscopic group on average had better scores at the 2nd and 6th week visits. However, by the 12th week visit the difference was negligible. Interestingly the greatest difference was at the 6 week visit. The average range of motion was not different between the two groups at any follow-up time. There were no complications in either group and in all cases the triggering symptoms were cured.

Conclusions:
In our small series the endoscopic trigger finger release group had better (lower) QuickDash scores early on, but the difference in outcome was negligible at 3 months.
Objective:
Patient-specific cutting guides (PSCG) built from imaging of the extremity can improve the accuracy of bone cuts during total knee replacement (TKR). Some reports have suggested that PSCG offer only marginal improvement in the accuracy of alignment and component positioning in TKA. We compared outcomes between TKRs done with PSCG versus standard, intramedullary-based instrumentation.

Methods:
Blood loss, duration of surgery, alignment of the mechanical axis of the leg, and implant position on standing, long-leg, and standard lateral digital radiographs were compared between a CT-guided, custom-built TKA implant (n=50; ConforMIS iTotal, Boston, MA) implanted with PSCG, versus an off-shelf posterior stabilized TKA implanted with standard instrumentation. The fraction of outliers (>3 degrees) was calculated for the two groups.

Results:
The mean mechanical axis of iTotal was 181 degrees with a fraction of outliers of 0.2, versus 178 degrees for NKII with fraction of outliers of 0.7. For frontal plane positioning of femoral components, fraction of outliers for iTotal was 0.04, versus 0.6 for NKII. For tibial components, corresponding values were 0.1 and 0.6, respectively. Sagittal plane outliers were 0.2 and 0.9, respectively, for femoral components; and 0.2 and 0.6 for tibial components. Surgery duration was 5 minutes less and blood loss was 100 mL less for iTotal than for intramedullary-aligned NKII.

Conclusions:
Patient specific instrumentation and custom-built implants showed a trend toward improved accuracy of alignment, reduction in blood loss and operating time, when compared to standard, off-the-shelf TKA implants with intramedullary alignment, with fewer radiographic outliers. Larger, randomized trials are necessary to evaluate this technology further, but the initial outcomes appear favorable, with no cost disadvantage to the custom-built implant.
Summary:
The PAW platelet-rich plasma classification system offers a simple, effective method for accurately documenting PRP cellular components and activation methods used allowing investigators to replicate published data or perform meta-analyses.

Abstract:
Despite the promising effects of PRP therapy, most studies conducted have lacked accurate measurements and documentation of the PRP components and delivery methods used. This lack of standardization and consistency is prevalent throughout the literature and has frustrated attempts to compare results between articles. In order to determine the efficacy of PRP from system to system and patient to patient, the PRP components and the means by which they are delivered to the target tissue site should be identified and documented. Without these fundamental prerequisites, the evolution of PRP as a safe and effective treatment for orthopedic disorders may not progress efficiently.

Protocols for PRP preparation vary widely between authors and are often not well documented in the literature, making results difficult to compare or replicate. A classification system is needed in order to more accurately compare protocols and results and effectively group studies together for metanalysis. While some classification systems have been proposed, no single system takes into account the multitude of variables that determine the efficacy of PRP.

The PAW classification system offers a simple, effective method for quickly documenting the cellular components and activation method utilized. The P.A.W. classification system is based on three components: 1. The absolute number of (P)latelets. 2. The manner in which platelet (A)activation occurs. 3. The presence or absence of (W)hite cells. Utilizing a classification system will speed the process of identifying the optimal PRP preparation for each indication, and allow other investigators to replicate published data or perform metanalyses.
Objective:  
To describe the use of tissue expanders as an option for the prevention and treatment of wound breakdown associated with the use of the Vertical Expandable Prosthetic Titanium Rib (VEPTR).

Early onset scoliosis (EOS) remains a challenging condition to treat due to a variety of factors including the young age and frequent co morbidities of the patients as well as that often times, these curves are rapidly progressive. The VEPTR has been used in the treatment of EOS, which allows for curve control and allowing the thoracic and lung growth. The use of VEPTR as well as other growth sparing devices is the need for repetitive lengthening procedures, usually at 6-month intervals, which are associated with high complication rates, especially wound breakdown and infection. The use of tissue expanders is well established and described, but to date has not been described for use in EOS patients treated with VEPTR.

Methods: 
An IRB-approved retrospective review of a VEPTR patient database identified 2 patients who had been treated with tissue expanders for exposed and/or prominent VEPTR devices. Their medical records and radiographs were reviewed and reported.

Results: 
The 2 patient shad a mean age of 8.5 years and mean follow up of 17 months. The first patient, a 11 year old girl with congenital scoliosis and fused ribs who underwent treatment with tissue expanders for a postoperative wound dehiscence resulting in exposed hardware. She is now 1 year following successful implantation and removal and has undergone 2 subsequent VEPTR lengthening without wound compromise. The second patient is a 6 year-old boy with Jeune Syndrome who underwent prophylactic tissue expander placement prior to multiple rib osteotomies to prevent wound breakdown. The expanders were removed at the time of rib osteotomies and VEPTR expansion and he healed uneventfully with no skin or wound complications. He has also undergone a subsequent lengthening without complications as well.

Conclusion: 
The use of tissue expanders is a novel technique in the prevention and/or treatment of wound complications in patients with EOS and VEPTR. The use of tissue expanders in this patient population is an alternative to traditional procedures such as free flap reconstruction. Further study is underway regarding the use of tissue expanders in patients undergoing treatment of EOS with VEPTR.
Objective:
Multiple classification systems have been proposed to radiographically stage patients with elbow arthritis. To our knowledge, no study has compared the reliability of the different systems. We proposed to compare the Broberg and Morrey classification of elbow arthritis to the system advanced by Hastings and Rettig based on radiocapitellar subluxation. We hypothesized that there would be no significant differences in inter-observer or intra-observer reliability between systems for either primary elbow osteoarthritis (OA) or post-traumatic arthritis (PTA).

Methods:
The radiographs of 45 patients who were diagnosed at our institution with either primary osteoarthritis (26 elbows) or post-traumatic arthritis (19 elbows) were evaluated. The highest quality anteroposterior and lateral radiographs were selected, de-identified and distributed to 6 evaluators (2 orthopaedic residents, 1 sports medicine fellow, and 3 attending physicians with fellowship training in upper extremity surgery). Each evaluator graded all 45 radiographs according to the Broberg and Morrey (BM) and the Hastings and Rettig (HR) classifications on 2 occasions, at least 2 weeks apart. Patients with an absent radial head were not included in the analysis of the HR classification. Intra- and inter-observer reliability were calculated using Spearman's correlation coefficients with 95% confidence intervals (CI). Coefficients greater than 0.8 were considered to have near-perfect agreement while coefficients from 0.6-0.8 demonstrated good agreement.

Results:
In patients with primary OA, inter-observer reliability was 0.66 (CI 0.63-0.69) for BM and 0.64 (CI 0.58-0.69) for HR. Mean intra-observer reliability was better for BM (0.77 (CI 0.73-0.82)) than HR (0.63 (CI 0.57-0.70). This difference in mean intra-observer reliability was statistically significant (p=0.006). In patients with PTA, inter-observer reliability was 0.65 (CI 0.62-0.69) for BM and 0.66 (CI 0.60-0.72) for HR. Mean intra-observer reliability was 0.74 (CI 0.67-0.82) for BM and 0.68 (CI 0.58-0.78) for HR. There were no significant differences in inter-observer or intra-observer reliability between attending physicians and trainees for either classification system (all p>0.10).

Conclusions:
The BM and HR classifications both show good inter-observer and intra-observer reliability for both primary elbow osteoarthritis and post-traumatic arthritis. While intra-observer reliability for the BM classification was better than the HR system for primary osteoarthritis, both scores fell within the range of good agreement. Training level differences did not result in substantial variances in reliability for either system.
Objective:
With only 75% of all applicants successfully matching in 2013, Orthopaedic Surgery remains one of the most competitive fields in medicine. Students are often encouraged to apply as early as possible to avoid being denied an interview because a program has already filled its interview slots. Though previous work has suggested that earlier applicants are more likely to be offered interviews, the same study noted the earlier applicants were academically more successful. We hypothesized that, among academically similar applicants, timing does not affect success in obtaining interviews and matching.

Methods:
We distributed an electronic survey through Survey Monkey to all Post Graduate Year-1 (PGY-1) and incoming PGY-1 categorical orthopaedic residents in the 163 ACGME approved orthopaedic residencies. Responders reported USMLE Step 1 scores (three digit score) and class rank (expressed as a percentile), the percentage of interviews offered, and the placement on their Rank Order List (ROL) (expressed as 1st choice, 2nd-3rd choice, 4th-5th choice, and >5th choice). Applicants were compared based on the date he or she applied using two different cutoff dates: first, defining Early as September 1st-15th and Late as after September 15th; and second, defining Early as September 1st-30th and Late as after September 30th. We used independent t-tests to compare Step 1 scores, class rank, and the percentage of interviews offered, and Chi-squared tests to analyze placement on the ROL. Differences with p<0.05 were considered significant.

Results:
One hundred ninety three responses were submitted from a potential of 1,375, a response rate of 14%.

Using the Sept 15th cutoff, 136 applied early, and 57 applied late. There were no statistically significant differences in Step 1 scores (Early-240.7 vs Late-240.4, p=0.87) or class rank (Early-77th percentile vs Late-80th, p=0.47). There were similarly no differences in the percentage of interviews offered (Early-23.7% vs Late-25.4%, p=0.13) or in the placement on the ROL (Early- 49% 1st choice, 23% 2nd-3rd, 18% 4th-5th, 11% >5th; Late- 51% 1st, 25% 2nd-3rd, 15% 4th-5th, 7% >5th, p=0.80).

Using the Sept 30th cutoff, 175 applied early, and 18 applied late. There were no statistically significant differences in Step 1 scores (Early-240.7 vs Late 239.3, p=0.67) but a trend toward better class rank (Early-77th percentile vs Late-86th, p=0.054) in the Late group. There was similarly a trend favoring late application regarding the percentage of interviews offered (Early-28.3% vs Late-38.0%, p=0.055). Further, the Late applicants were more likely to match their 1st choice (Early- 46% 1st, 25% 2nd-3rd, 19% 4th-5th, 10% >5th; Late- 78% 1st, 11% 2nd-3rd, 0% 4th-5th, 11% >5th, p=0.045).
Conclusions:
In academically similar populations, there is no clear advantage or disadvantage to early application and no definite penalty for later application. For the latest applications turned in after Sept 30th, there seemed to be a slight advantage, but this may be a result of slightly better academic performance, suggested by the trend towards higher class rank. Nevertheless, the majority of applications are completed prior to September 15. Further prospective studies are needed, with inclusion of students who did not match, to further analyze these trends.
Objective:
Measurements of Cobb angles and spinal column height in children with Myelodysplasia may vary greatly depending on the radiographic technique utilized. The aim of our study is to evaluate the variability of Cobb angle and spinal height measurement in non-ambulatory myelodysplastic children.

Methods:
Retrospective review was conducted of 41 children with myelodysplasia comparing plain spine radiographs (unsupported sitting, supine traction, sitting push up) and supine 3D CT scans of the entire spine and pelvis. All images were measured independently by two pediatric orthopaedic surgeons and a radiologist. Cobb angles of thoracic as well as lumbar curves were compared between sitting and supine radiographs. The spinal column height for each radiographic position was compared with a direct calculation of spinal height acquired from CT scans. Thoracic height was measured from T1 and T12 and lumbar height from the most caudal border of T12 to S1. Statistical analysis was complete using the paired t-test.

Results:
41 patients (18 boys, 21 girls) average age: 14.2 years. Thoracic cob angles measurements demonstrated a statistical significant different between sitting (40") and supine traction (31") radiographs (p<0.001); however, there wasn’t a different between sitting push up (33") and supine traction (31") radiographs [Cobb angle <90'; p=0.079]. Lumbar Cobb angle measurements also demonstrated a statistical significant difference between sitting (55") and traction (46") radiographs (p<0.001). A statistically significant different in total spine heights between sitting/supine radiographs and CT measurements were not found. However, the lumbar heights showed a statistically significant different between sitting radiographs (93.3 mm) and CT (103.0 mm) (p=0.027).

Conclusion:
Cobb angle measurements vary between sitting and supine radiographs up to a total of 18" for both curves; however, traction and push up radiographs are similar when thoracic cob angle is less than 90". Supine traction radiographs are helpful to measure total as well as thoracic/lumbar spine column heights.
Welcome New Members

Mark J. Anders, MD ............................................... Buffalo, NY
Lisa A. Daye, MD .................................................... Amherst, NY
Boon Leng Kevin Lee, MD ........................................... Singapore
Jeffrey Lozman, MD ................................................ Delmar, NY
Edward T. Marcoski, MD ........................................... Hinsdale, IL
Steven Mardjetko, MD .............................................. Lake Forest, IL
NECROLOGY LIST

A
Abbott, LeRoy C.
Acker, Robert B.
Agins, Howard J.
Ainsworth, William H.
Aitken, George T.
Albrecht, Franklin H.
Allard, L. W.
Aldredge, Rufus H.
Allen, H. R.
Allison, Nathaniel
Alsfielder, S. Russell
Altenberg, Alfons R.
Amspacher, James C.
Anderson, Harry O.
Anderson, Lewis D.
Andre, Harvey M.
Ashby, J. Jefferson
Atmore, William G.

Blackwell, Donald S.
Blake, Thomas H.
Blanchard, Wallace
Bland, William Griffin
Blodgett, William E.
Blodgett, William H.
Bloss, Bryant A.
Blount, Walter P.
Blunk, Conrad F.
Bohne, William R.
Bombach, Jaren D.
Bost, J. R.
Bowman, Harold S.
Boyd, Harold B.
Boyd, John F.
Brady, Thomas
Brainard, Clifford W.
Brand, Paul Wilson
Breck, Louis W.
Breuer, Bruce J.
Brindley, Hanes
Brown, Frederic W.
Brown, Joseph E.
Brown, Marion G.
Brown, Robert R.
Brumbaugh, Herbert L.
Bryan, Richard S.
Bungardt, Alfred H.
Burney, Dwight W., Jr.
Burns, Robert E.
Bywaters, Theodore W.

B
Bacon, J. H.
Badgley, Carl E.
Bailey, G. L.
Bailey Robert W.
Baird, William A.
Banks, Sam
Banks, Tyre E., Jr.
Bannerman, Moss M.
Barber, C. Glenn
Barker, William E.
Barnett, Harry E.
Barnhart, Joseph M.
Bartels, Wilbur W.
Barton, Francis W.
Batman, Gordon W.
Battalora, George C.
Bauman, George L.
Beatty, B. W.
Beer, John J.
Bell, James P.
Bence, A. E.
Bender, Jr., Theodore J.
Bendixen, Peter A.
Berkheiser, E. J.
Bershon, Albert L.
Betzner, Clarence W.
Bickel, William H.
Billington, R. Wallace
Bishop, Jr., W. A.

C
Calandruccio, Rocco A.
Caldwell, Gene D.
Caldwell, Guy A.
Callander, C. N.
Cain, Thomas
Cameron, David M.
Campbell, Willis C.
Canales, Gregoria M.
Carlander, Lester W., Jr.
Carlson, Milton R.
Carothers, Robert
Carpenter, Jr., George K.
Carr, Bradley W.
Carr, Lewis R.
Carrell, Brandon
Carrell, William Beall
Carruthers, F. Walter

Carter, Ralph M.
Caspers, Carl G.
Cassidy, Robert H.
Chandler, Fremont A.
Chatterton, Carl C.
Chollet, Burt G.
Clark, Robert R.
Clark William A.
Claussen, Bruce F.
Clayburgh, Bennie J.
Clayton, Charles F.
Clayton, Mack L.
Cofield, Robert B.
Cole, Bart
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  Kuo, Alfred
Santa Rosa
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COLORADO

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CONNECTICUT

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NEVADA
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Las Vegas
Mackay, Donald R.

NEW MEXICO
Albuquerque
Turner, Robert
Santa Fe
Shapiro, Jules S.

NEW YORK
Amherst
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Delmar
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Lowville
Campbell, Dwight
New York
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Slough, James

NORTH CAROLINA
Asheville
Mangone, Peter
Chapel Hill
Hurwitz, Shepard
Durham
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Greenville
Reeg, Scot E.
Kinston
Kasselt, Max
Raleigh
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Wilmington
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Winston Salem
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OHIO
Akron
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Beachwood
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Leb, Robert
Nahigian, Stanley
Bexley
Torch, Martin
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Longert, Alan L.
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Sheboygan
  Gore, Donald

VERMONT

Morrisville
  Trevino, Saul

VIRGIN ISLANDS

St Thomas
  Bubb, Stephen

WYOMING

Cheyenne
  Kline, Jr., Duane
  Torkelson, Richard E.
BYLAWS
OF THE CLINICAL ORTHOPAEDIC SOCIETY, INC.

ARTICLE 1
General
Section 1. Name. The name of the corporation is Clinical Orthopaedic Society, Inc. (the "Society").

Section 2. Address and Agent. The address of the Society's initial registered office and the name of the registered agent at such address shall be that address and name reflected in the Articles of Incorporation of the Society (the "Articles").

Section 3. Fiscal Year. The fiscal year of the Society shall begin on the first day of January and end on the last day of December.

Section 4. Purpose. The purpose of the Society is the advancement of clinical orthopaedics through teaching and education of the members and other orthopaedists.

ARTICLE II
Members
Section 1. General. Membership in the Society shall be governed by the provisions of the Articles and these Bylaws. The members shall be one (1) or more members of the orthopaedic community who support the Society's exempt purposes and who meet the criteria established from time to time by the Board of Directors. Such members shall be admitted only in accordance with the procedures set forth in these Bylaws.

Section 2. Classification of Members. The members of the Society shall consist of the following cases:

(a) Regular Members. Regular Members shall be orthopaedic surgeons, residing in the United States or Canada, who have become diplomats of the American Board of Orthopaedic Surgery, the American Osteopathic Board of Orthopaedic Surgery or the Royal College of Physicians and Surgeons of Canada, or have made outstanding contributions to orthopaedic surgery. Regular Members shall pay dues, may vote and may hold office.

(b) Emeritus Members. Upon retirement from active practice or upon reaching seventy (70) years of age, a dues paying member in good standing for a minimum of seven (7) years, may become an Emeritus Member by requesting a change in membership status by sending a letter to the Secretary-Treasurer. Emeritus Members retain the privilege of attending the annual meetings, and have the privilege of the floor, but may not vote or hold office and are not required to pay dues.
International Members. International Members are outstanding orthopaedists who are not residents of the United States or Canada. International members pay dues, and may attend meetings, but may not vote or hold office.

Honorary Members. Outstanding orthopaedists who are not members of the Society but have contributed significantly to the field of orthopaedics may be admitted as Honorary Members. Honorary Members do not pay dues. They may attend the annual meeting but may not vote or hold office.

Candidate Members. Candidate members shall be duly elected orthopaedic surgeons residing in the United States or Canada who have graduated from orthopaedic residency programs accredited by the Liaison Committee on Medical Education (LCME), the Committee on Accreditation of Canadian Medical Schools (CACMS) or the American Osteopathic Association (AOA) Bureau of Professional Education and have not yet achieved board certification as required in Section 2(A). Upon such certification Candidate members shall be advanced to regular membership. Candidate Membership is limited to three years after completion of residency or fellowship. If board certification is not achieved in that period, the candidate’s membership will be terminated. Candidate Members are not required to pay dues, but may be committee members, vote on committees to which they are appointed and have the privilege of the floor.

Section 3. Membership: Qualifications and Privileges
Membership in the Society shall be available to those orthopaedic surgeons who have qualified for such membership as set forth in these Bylaws. The categories of membership shall be as follows: Regular, Emeritus, International, Honorary, and Candidate.

Section 4. Application
Any individual applying for membership in the Society shall submit information as required by the Society’s Board of Directors which has final approval authority. Any controversy concerning membership categories or criteria will be resolved by the Board of Directors, which has final authority in this regard.

Section 5. Termination of Membership. Membership in the Society may be terminated for cause by the Board of Directors. For purposes of this Section 5, “for cause” means a violation of these Bylaws or any rule of practice of the Society, or loss of full legal right to practice medicine. In the event a member is terminated, the member shall be notified of the termination by registered mail, return receipt requested. At the time of the notification, the member shall be offered a hearing at which time he or she shall have the right to appear before the Board of Directors to present reasons why he or she should be reinstated as a member. Such hearing must be requested by the terminated member within thirty (30) days of the notification of termination. After the hearing, the Board of Directors shall determine whether the member shall be reinstated. The action of the Board of Directors shall be final.

Section 6. Re-Application. Any former member of the Society may apply for reinstatement through the regular procedure at any time, unless the member was terminated for cause. In
that case, the former member may not reapply until a period of three (3) years from the date of termination has elapsed.

Section 7. Place of Meetings. Every meeting of the members shall be held at such a place that the Board of Directors selects from time to time.

Section 8. Annual and Special Meetings. Each annual meeting of the members shall be held on a date set by the Board of Directors, but not less frequently than once per year. Except as otherwise provided by law, special meetings of the members may be called only by the Board of Directors. There shall be at least one business session of the membership at each annual or special meeting, at which the President shall preside. The latest edition of Robert's Rules of Order will serve as a guide at the business meetings of the Society. At any special meeting of the Society, only those matters that are within the purposes described in the meeting notice may be voted on by the members.

Section 9. Notice of Meetings. The Society shall give notice of meetings of members to each of the members setting forth the place, date, and time of each annual, regular, and special meeting of the members at least one (1) month before the meeting date. Notice of any annual or regular meeting shall include a description of any matter or matters to be considered at the meeting that must be approved by the members, and notice of any special meeting shall include a description of the purpose for which the meeting is called.

Section 11. Waiver of Notice. Notice may be waived in writing, signed by the member entitled to notice, and filed with the minutes or the corporate records. Attendance at or participation in any meeting (a) waives objection to lack of notice or defective notice unless the member at the beginning of the meeting objects to holding the meeting or transacting business at the meeting and (b) waives objection to consideration of a particular matter at the meeting that is not within the purposes described in the meeting notice, unless the member objects to considering the matter when the matter is presented.

Section 12. Representation by Proxy. Voting by proxy shall be permitted only at special meetings of the Society and only if the member or the member’s attorney-in-fact appoints such proxy in a signed, written or electronic form delivered to the Society. The appointment of a proxy shall not be valid after eleven (11) months from the appointment date unless a longer time is expressly provided therein. An appointment of a proxy is revocable by the member.

Section 13. Quorum for Meetings. At all meetings of the members, a quorum shall consist of ten percent (10%) of the Regular Members. After a vote is taken for any purpose at a meeting, a quorum is considered present for the remainder of the meeting and for any adjournment of that meeting. Any meeting of the member, including an annual or special meeting or any adjournment thereof, may be adjourned to a later date if less than a quorum is present.

Section 14. Vote of Members. Each Regular Member of the Society shall be entitled to one (1) vote on each matter to come before the members. Except as otherwise required by law, the Articles or these Bylaws, each question shall be determined by majority vote of the
Regular Members entitled to vote, represented in person or by proxy, at a meeting at which a quorum exists. Cumulative voting is not permitted.

Section 15. Action by Written or Electronic Consent. Any action required or permitted to be taken at any meeting of the members may be taken without a meeting if the action is approved by members holding at least eighty percent (80%) of the votes entitled to be cast on the action. The action must be evidenced by at least one (1) consent describing the action taken that is:

(a) signed by the members representing at least eighty percent (80%) of the votes entitled to be cast on the action; and
(b) included in the minutes or filed with the Society's records reflecting the action taken.

Requests for consents must be delivered to all members.

Section 16. Action by Written or Electronic Ballot. Any action that may be taken at an annual, regular, or special meeting of the members may be taken without a meeting if the Society delivers a ballot or notice of ballot or any approved method to every member entitled to vote on the action. A ballot must set forth each proposed action and provide an opportunity to vote for or against each proposed action. Approval of such ballot is valid only when the number of votes cast by ballot equals or exceeds the quorum required to be present at a meeting authorizing the action and the number of approvals equals or exceeds the number of votes that would be required to approve the matter at a meeting at which the total number of votes cast was the same as the number of votes cast by ballot. A solicitation for votes by such ballot must (a) indicate the number of responses needed to meet the quorum requirements, (b) state the percentage of approvals necessary to approve each matter other than the election of directors, and (c) specify the time by which a ballot must be received by the Society to be counted. Such a ballot may not be revoked.

Section 17. Means of Communication. The Society and the Board of Directors may (a) permit a member to participate in an annual, a regular, or a special meeting by, or (b) conduct an annual, a regular, or a special meeting through the use of any means of communication by which all members participating may simultaneously hear each other during the meeting. A member participating in a meeting by such means shall be considered present in person at the meeting.

ARTICLE III
Board of Directors

Section 1. Number, Election, and Term. The affairs of the Society shall be managed, controlled, and conducted by, and under the supervision of, the Board of Directors, subject to the provisions of the Articles and these Bylaws. The Board of Directors shall consist the President, First President Elect, Second President Elect, Secretary-Treasurer, Librarian-Historian, Immediate Past President and a member under the age of 40 at the time of his/her election, these members shall also comprise the Executive Committee of the Board, and other members consisting of the two (2) Past Presidents serving prior to the Immediate Past President and three (3) Members-at-Large, elected by the members entitled to vote. All
members of the Board of Directors shall be members in good standing. In the event any of the above-designated individuals is not a member in good standing or is unable to serve as a Director, the number of Directors shall be reduced accordingly, provided that the number of Directors shall be no less than three (3). In such event, the Board shall immediately fill any vacancy required to maintain at least three (3) directors. The three (3) Members-at-Large and the Member under the age of 40 shall be Regular or Candidate Members in good standing who shall serve three (3) year staggered terms. The Executive Committee shall exercise the authority of the Board of Directors in the interim between board meetings.

Section 2. Quorum and Voting. A majority of directors in office immediately before a meeting begins shall constitute a quorum for the transaction of any business properly to come before the Board of Directors. Unless otherwise provided in the Articles or these Bylaws, the act of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board of Directors.

Section 3. Meetings. The Board of Directors may hold regular meetings, as fixed by these Bylaws or by resolution of the Board of Directors, for the purpose of transacting such business as properly may come before the Society's Board of Directors and may hold special meetings for any lawful purpose which need not be specified in the notice of the meeting. The latest edition of Robert's Rules of Order will serve as a guide at all business meetings of the Board of Directors.

Section 4. Notice of Meetings. A notice stating the date, time and place of any meeting of the Board of Directors or a committee thereof shall be mailed or electronically transmitted to each member of the Board of Directors or such committee, as applicable, at least one (1) month before the date of the meeting.

Section 5. Waiver of Notice. Notice may be waived in writing, signed by the director entitled to notice, and filed with the minutes or the corporate records. Attendance at or participation in any meeting (a) waives objection to lack of notice or defective notice unless the director at the beginning of the meeting objects to holding the meeting or transacting business at the meeting and (b) waives objection to consideration of a particular matter at the meeting that is not within the purposes described in the meeting notice, unless the director objects to considering the matter when the matter is presented.

Section 6. Means of Communication. The Board of Directors, or a committee thereof, may (a) permit a director or a committee to participate in an annual, a regular, or a special meeting by, or (b) conduct an annual, a regular, or a special meeting through the use of any means of communication by which all directors or committee members participating may simultaneously communicate with each other during the meeting. A director or committee member participating in a meeting by such means shall be considered present in person at the meeting.

Section 7. Action by Written Consent. Any action required or permitted to be taken at any meeting of the Board of Directors, or any committee thereof, may be taken without a meeting if a written consent describing such action is signed by each director or committee member and such written consent is included in the minutes or filed with the corporate records.
reflecting the action taken. Action taken by written consent shall be effective when the last director or committee member signs the consent, unless the consent specifies a prior or subsequent effective date. A consent signed as described in this Section 7 shall have the effect of a meeting vote and may be described as such in any document.

Section 8. Additional Duties. In addition to the duties imposed on the Board of Directors by these Bylaws, the Board of Directors shall provide such arrangements as are appropriate for meetings of the members, appointing committees for such purposes as necessary.

Section 9. Compensation. Directors, as such, shall not receive any stated compensation for their services as directors, but the Board of Directors may, by resolution, authorize reimbursement for reasonable expenses incurred in the performance of their duties. The Board of Directors will from time to time review the reimbursement policy.

ARTICLE IV
Officers

Section 1. In General. The officers of the Society shall be a President, a First President Elect, a second President Elect, a Secretary-Treasurer and a Librarian-Historian, each of which shall be elected by the members in accordance with Article VI. An officer may simultaneously hold more than one (1) office. Each officer that is elected by the Board of Directors at a regular or special meeting shall serve for one (1) year, or such other period as is prescribed by the directors at the time of such election, and until the officer’s successor is elected and qualified. Any officer elected by the Board of Directors may be removed by the Board of Directors and any officer elected by the members may be removed by the members, each with or without cause. Any vacancy occurring in any office shall be filled by the Board of Directors, and the person elected to fill such vacancy shall serve until the expiration of the term vacated.

Section 2. President. The President shall be the chief executive officer and Chairman of the Board of Directors. He or she shall preside at all general meetings of the Society and of the Board of Directors. He or she may sign, with the Secretary or any other proper officer or agent of the Society authorized by the Board, any deeds, mortgages, bonds, contracts or other instruments which the Board has authorized to be executed, except in case where the signing and execution thereof shall be expressly delegated to the Board of Directors by these Bylaws or by law to some other officer or agent of the Society. He or she shall appoint the members of any regular or special committee or task force not otherwise provided for in the Bylaws with the approval of the Board of Directors. The President shall be a non-voting ex-officio member of all committees except the Membership, Resolutions, Bylaws and Nominating Committees. He or she may fill any vacancies which may occur in any committee or task force of the Society, during the period between annual meetings, subject to the approval of the Board of Directors at its next meeting, unless otherwise specified in these Bylaws. He or she is authorized to act in the event of any contingency or emergency not covered by the Bylaws. He or she shall, in general, perform all duties incident to the office of the President and such other duties as the Board may prescribe.

Section 3. First President Elect. In the absence of the President, the First President Elect will perform the duties of the President. The First President Elect will succeed to the office of President at the conclusion of the annual meeting, or if the President dies or is unable or
refuses to act. If the First President Elect succeeds to the office of President for any reason other than natural succession by expiration of the current President's term of office, the First President Elect shall serve for the remaining unfulfilled term of the replaced President and further serve the one (1) year term of office that he or she normally would have served. The First President Elect shall perform such other duties as the President or Board of Directors may assign. The First President Elect shall serve as Chairman of the Membership Committee.

Section 4. Second President Elect. The Second President Elect will succeed to the office of First President Elect at the end of the annual meeting or at any time the First President Elect is unable or refuses to act, or at any time the First President Elect assumes the duties of the President. The Second President Elect shall perform such duties as the President or Board of Directors may assign.

Section 5. Secretary-Treasurer. The Secretary-Treasurer shall be the custodian of all papers, books, and records of the Society. The Secretary-Treasurer shall send notice of, keep a register or all members present at, and prepare the minutes or all meetings of the members and of the Board of Directors. The Secretary-Treasurer shall authenticate records of the Society as necessary. The Secretary-Treasurer shall prepare and maintain correct and complete records of account showing accurately the financial condition of the Society and shall furnish, whenever requested by the Board of Directors or the President, a statement of the financial condition of the Society. All notes, securities, and other assets coming into the possession of the Society shall be received, accounted for, and placed in safekeeping as the Secretary-Treasurer may from time to time prescribe. The Secretary-Treasurer shall notify new members of their election, collect the dues, have charge of all funds of the Society and perform such other duties that may be reasonably expected of the Secretary-Treasurer or as are prescribed by the President or the Board of Directors. The Secretary-Treasurer shall chair the Finance Committee. If the President, First President Elect and Second President Elect all die or are unable to refuse to act, the Secretary-Treasurer shall assume the duties of the President. The Secretary-Treasurer shall be elected annually, shall not serve longer than five (5) consecutive years.

Section 6. Library-Historian. The Librarian-Historian will be elected annually, not to serve for longer than five (5) consecutive years, and shall keep a record of on-going activity and history of the Society, and present a necrology report at the annual meeting. The Librarian-Historian shall serve as Chairman of the Bylaws Committee.

ARTICLE V
Committees

Section 1. Executive Committee. Those officers of the Society specified in Section 1 of Article III shall constitute the Executive Committee of the Board of Directors. The Executive Committee shall meet regularly and as necessary. The President shall convene the Executive Committee. The Executive Committee shall be authorized to act on behalf of the Board of Directors with respect to the membership approval process. The actions of the Executive Committee are subject to ratification by the full Board of Directors.
Section 2. Nominating Committee. The Nominating Committee shall consist of five (5) members. The Second Past-President shall serve as chair. The other four (4) members of the Nominating Committee shall be elected at the annual meeting, and all members shall serve for one (1) year. They shall nominate at the next annual meeting a Second President-Elect, Secretary-Treasurer, Librarian-Historian, Members-at-Large of the Board of Directors, members of the Membership Committee.

Section 3. Finance Committee. The Finance Committee shall consist of the Secretary-Treasurer as Chair, the President, the Immediate Past President and an at-large delegate, appointed by the President every other year, who will serve a two (2) year term. The Finance Committee shall recommend investment policies for the Society and shall, subject to the direction and control of the Board of Directors, manage, supervise and control the financial affairs and policies of the Society.

Section 4. Publication Committee. The Publication Committee shall consist of three (3) members who will serve three (3) year staggered terms. The President will appoint a new member each year. The senior member of the Publication Committee shall be the Chairman in his or her final year. The Publication Committee has the responsibility of preparing and submitting the abstracts of the annual meeting for publication in Orthopaedic Transactions. The outgoing Program Chairman and the editor of The Journal shall serve as ex-officio members of the Committee, without vote.

Section 5. Continuing Medical Education Committee. The Continuing Medical Education Committee will consist of five (5) members: the Immediate Past President, the First President Elect, the immediate Past General Chairman of the annual meeting and the General Chairmen of next two (2) following meetings. The President shall appoint the new General Chairman each year.

Section 6. Membership Committee. The Membership Committee shall consist of six (6) members. Two (2) of such members shall consist of the First President Elect and the Second President Elect. The other four (4) of such members shall be elected two (2) each year for a two (2) year staggered term. The membership committee shall be responsible for initial approval of new members pursuant to Article II of these Bylaws. The First President Elect shall serve as Chairman.

Section 7. Elmer Nix Ethics Award Committee. The Elmer Nix Ethics Award Committee shall consist of three (3) members selected by the nominating committee to serve a one-year term. The committee will meet via conference call or at the annual meeting to select a recipient who represents the concept of ethical behavior in the profession of Orthopaedic Surgery. Members of the COS may be solicited for candidate names. The candidate should be an Orthopaedic Surgeon. The committee will forward their selection to the Executive Committee for approval and Dr. Elmer Nix for review. The Chairman of the Committee will notify selected candidate after the above approval. The Recipient will be expected to attend the annual meeting and receive an appropriate plaque and honorarium of $500.

Section 8. Bylaws Committee. The Bylaws Committee shall be chaired by the Librarian-Historian and shall consist of two (2) other members appointed by the President who shall serve
staggered two (2) year terms.

Section 9. Ad Hoc Committees. The President, with consent from the Board of Directors, may appoint ad hoc committees to function for up to three (3) years. If an ad hoc committee is still functioning after three (3) years of continuous service, the Board of Directors may, with ratification of the membership, convert the ad hoc committee to a standing committee. The size and membership of the committee will be determined by the Board of Directors, and the President shall make appointments to the committee in a manner similar to other standing committees.

Section 10. Resident Paper Award Committee. The Resident Paper Award Committee shall consist of four (4) members appointed by the President to serve staggered four (4) year terms. Up to two (2) awards may be given each year.

Section 11. Traveling Fellowship Committee. The traveling fellowship committee shall consist of three (3) members. Each member is selected by the president to serve a term of three (3) years. The terms will be staggered at one (1) year intervals. The function of the committee shall be to select an orthopaedic surgeon to receive the award. The term of the fellowship is one year. The committee shall establish guidelines for the award and outline the responsibilities of the awardees.

Section 12. Reports. All standing committees are required to submit a written report at the annual meeting.

Section 13. Committee Removal and Vacancies. A committee member appointed by the President may be removed by the President, a committee member appointed by the Board of Directors may be removed by the Board of Directors, and a committee member elected by the members may be removed by the members, each with or without cause. Vacancies shall be filled as specified in Article IV, Section 2.

Section 14. Committee Action. Each committee and member thereof shall be subject to the requirements of Sections 2 through 9 of Article III in the same manner as the Board of Directors and each member thereof.

ARTICLE VI

Elections

At the business meeting at each annual meeting the Nominating Committee will suggest a slate of names for consideration. Nominations for all positions will be accepted from the floor. The elected positions include the Second President-Elect, Secretary-Treasurer, Librarian-Historian, two (2) members of the Membership Committee, one (1) Member-at-Large to the Board of Directors, two (2) members of the Planning and Development Committee and four (4) members of the Nominating Committee. A majority vote of the membership present and voting will be required to elect a candidate. If no majority is achieved for a particular office, the candidate receiving the least number of votes is dropped and the vote retaken. The procedure is repeated until one candidate wins a majority.
ARTICLE VII
Dues
The initial and annual dues for each category of membership of the Society, the time for paying such dues, and other fees and assessments, shall be determined from time to time by the Board of Directors. Annual dues are not refundable.

ARTICLE VIII
Resignation & Delinquency
Section 1. Resignation. Any member may resign at will by presenting his or her resignation in writing to the Secretary, who shall report such resignation at the next meeting.

Section 2. Nonpayment of Dues. Dues paying members shall be removed at the discretion of the Board of Directors for non-payment of dues, fees or assessments, after thirty (30) days from the date of notice sent to the last known address of the member. Dues, fees and assessments are delinquent if not paid by May 1 providing three dues notices have been sent by regular mail. The former member may reapply for membership under that procedure specified in Article II, Section 6 once all past dues have been paid.

ARTICLE IX
Guests
Guests shall be limited to members of the medical profession whom the Meeting Committee may wish to invite and to distinguished guests of the President.

ARTICLE X
Amendments to the Bylaws
These Bylaws may be altered, amended or repealed, and new and other Bylaws may be made and adopted at any regular or special meeting of the membership, provided the proposed changes have been circulated to the membership at least one (1) month before the meeting at which they are to be changed.

ARTICLE XI
Books and Records
The Society shall keep correct and complete books and records of account and shall also keep minutes of the proceedings of its members, Board of Directors, and committees having any of the authority of the Board of Directors, and shall keep at the registered or principle office a record giving the names and addresses of the members entitled to vote. All books and records of the Society may be inspected by any member, or his or her agent or attorney, for any proper purpose at any reasonable time.

ARTICLE XII
Contracts Checks, Deposits and Funds, Bonding
Section 1. Contracts. The Board of Directors may authorize any officer, officers, agent or agents of the Society, in addition to the officers so authorized by these Bylaws, to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Society and such authority may be general or confined to specific instances. Unless so authorized by the Board of Directors, no officer, agent or employee shall have any power to bind the Society or to render it liable for any purpose or amount.
Section 2. Depositories. All funds of the Society not otherwise employed shall be deposited from time to time to the credit of the Society in such banks, trust companies or other depository as the Board of Directors may designate. Such designation may be general or confined to specific instances.

Section 3. Checks, Drafts, Notes, Etc. All checks, drafts of other orders for the payment of money and all notes or other evidences of indebtedness issued in the name of the Society shall be signed by such officer or officers, or agents, of the Society and in such manner as shall from time to time be determined by resolution of the Board of Directors. The designation of such person or persons may be general or confined to specific instances.

Section 4. Bonding. The Board of Directors shall provide for the bonding of such officers and employees of the Society as it may from time to time determine.

Section 5. Delivery of Notice. Any notices required to be delivered pursuant to these Bylaws shall be deemed to be delivered when transferred or presented in person or deposited in the U.S. mail addressed to the person at his, her or its address as it appears on the records of the Society, with sufficient first-class postage prepaid thereon.

Section 6. Investments. Unless otherwise specified by the terms of a particular gift, bequest, devise, grant or other instrument, the funds of the Society may be invested, from time to time, in such manner as the Board of Directors may deem advantageous without regard to restrictions applicable to directors of trust funds.

Section 7. Loans. Unless authorized by the Board of Directors, no loan shall be made by or contracted for on behalf of the Society and no evidence of indebtedness shall be issued in its name. Such authorization may be general or confined to specific instances.

Section 8. Gifts. The Board of Directors may accept on behalf of the Society any gift, bequest, devise, or other contribution for the purposes of the Society on such terms and conditions, as the Board of Directors shall determine.

ARTICLE XIII
Indemnification

Section 1. Indemnification by the Society. To the extent not inconsistent with applicable law, every person (and the heirs and personal representatives of such person) who is or was a director, officer, member, employee, or agent of the Society shall be indemnified by the Society against all liability and reasonable expense that may be incurred by her or him in connection with or resulting from any claim, action, suit or proceeding (a) if such person is wholly successful with respect thereto or, (b) if not wholly successful, then if such person is determined as provided in Section 3 of this Article XIII to have acted in good faith, in what he or she reasonably believed to be the best interests of the Society (or, in any case not involving the persons official capacity with the Society, in what he or she reasonably believed to be not opposed to the best interest of the Society) and, in addition, with respect to any criminal action or proceeding, is determined to have had reasonable cause to believe that her or his conduct was lawful (or no reasonable cause to believe that the conduct was unlawful). The termination of any claim, action, suit, or proceeding, civil or criminal, by judgment, order,
settlement (whether with or without court approval), or conviction or upon a plea of guilty or of nolo contendere or its equivalent, shall not create a presumption that a person did not meet the standards of conduct set forth in this Article XIII.

Section 2. Definitions.

(a) As used in this Article XIII, the term “claim, action, suit, or proceeding” shall include any threatened, pending, or completed claim, action, suit, or proceeding and all appeals thereof (whether brought by or in the right of the Society, any other corporation, or otherwise), whether civil, criminal, administrative, or investigative, or a thread thereof and whether formal or informal, in which a person (or her or his heirs or personal representatives) may become involved, as a party or otherwise:

(i) By reason of her or his being or having been a director, officer, member, employee, or agent of the Society or of any corporation where he or she served as such at the request of the Society, or

(ii) By reason of her or his acting or having acted in any capacity in a corporation, partnership, joint venture, association, trust, or other organization or entity where he or she served as such at the request of the Society, or

(iii) By reason of any action taken or not taken by her or him in any such capacity, whether or not he or she continues in such capacity at the time such liability or expense shall have been incurred.

(b) As used in this Article XIII, the terms “liability” and “expense” shall include, but shall not be limited to, counsel fees and disbursements and amounts of judgments, fines, or penalties against, and amounts paid in settlement by or on behalf of, a person.

(c) As used in this Article XIII, the term “wholly successful” shall mean (i) termination of any action, suit, or proceeding against the person in question without any finding of liability or guilt against he or him, (ii) approval by a court, with knowledge of the indemnity herein provided, or a settlement of any action, suit, or proceeding, or (iii) the expiration of a reasonable period of time after the making of any claim or threat of any action, suit, or proceeding without the institution of the same, without any payment or promise made to induce a settlement.

Section 3. Entitlement to Indemnification. Every person claiming indemnification hereunder (other than one who has been wholly successful with respect to any claim, action, suit, or proceeding) shall be entitled to indemnification (a) if special independent legal counsel, which may be regular counsel of the Society or other disinterested person or persons, in either case selected by the Board of Directors, whether or not a disinterested quorum exists (such counsel or person or persons being hereinafter called the “referee”), shall deliver to the Society a written finding that such person has met the standards of conduct set forth in the preceding Section 1 of this Article XIII and (b) if the Board of Directors, acting upon such written finding, so determines. The person claiming indemnification shall, if requested, appear before the referee and answer questions, which the referee deems relevant and shall be given ample opportunity to present to the referee evidence upon which he or she relies.
for indemnification. The Society shall, at the request of the referee, make available facts, opinions, or other evidence in any way relevant to the referee's findings that are within the possession or control of the Society.

Section 4. Relationship to Other Rights. The right of indemnification provided in this Article XIII shall be in addition to any rights to which any person may otherwise be entitled.

Section 5. Extent of Indemnification. Irrespective of the provisions of this Article XIII, the Board of Directors may, at any time and from time to time, approve indemnification of the Society's directors, officers, members, employees, agents, or other persons to the fullest extent permitted by applicable law, or, if not permitted, then to any extent not prohibited by such law, whether on account of past or future transactions.

Section 6. Advancement of Expenses. Expenses incurred with respect to any claim, action, suit, or proceeding may be advanced by the Society (by action of the Board of Directors, whether or not a disinterested quorum exists) prior to the final disposition thereof upon receipt of an undertaking by or on behalf of the recipient to repay such amount unless he or she is entitled to indemnification.

Section 7. Purchase of Insurance. The Board of Directors is authorized and empowered to purchase insurance covering the Society's liabilities and obligations under this Article XIII and insurance protecting the Society's directors, officers, members, employees, agents, or other persons.

ARTICLE XIV
Dissolution

In the event of dissolution or final liquidation of the Society, all of its assets remaining after payment of its obligations have been made and provided for shall be distributed to and among such corporations, foundations, or other organizations operated exclusively for scientific and educational purposes consistent with those of the Society. This distribution shall be designated by the Board of Directors.

Revised March 2007
Angiotech

Arthrex

Auxilium Pharmaceuticals

BREG
Breg provides premium, high-value sports medicine products and services that advance orthopedic patient care. From pioneering cold therapy and innovative bracing, to caring customer service and award-winning orthopedic practice solutions, Breg delivers a 360° customer experience unmatched in the industry. Founded in 1989, Breg is based in Carlsbad, CA. Visit www.breg.com.

Cadence Pharmaceuticals, Inc.
Cadence Pharmaceuticals is a biopharmaceutical company focused on in-licensing, developing and commercializing proprietary product candidates principally for use in the hospital setting. The company is currently marketing OFIRMEV® (intravenous acetaminophen) for the treatment of acute pain and fever.

ConforMIS, Inc.
ConforMIS develops and commercializes medical devices for the treatment of osteoarthritis and joint damage. The company’s patented ‘image-to-implant’ technology enables the creation of patient-specific implants and instruments that are precisely sized and shaped to match the 3D topography of a patient’s anatomy.

DePuy Synthes

DJO Surgical

DT Preferred Group, LLC
Ortho-Preferred is a nationwide healthcare malpractice insurance program exclusively for orthopaedic surgeons. Developed by DT Preferred Group, LLC, a RPG, and Medical Protective, the Ortho-Preferred program combines healthcare liability insurance coverage with additional benefits like, CE opportunities, risk management and association membership.

East Coast Orthotic & Prosthetic Corp
Established in 1997, East Coast Orthotic & Prosthetic Corporation has become a leader in custom orthotic and prosthetic devices. As the largest privately owned orthotic and prosthetic company in New York State, we are pleased to serve our patients throughout the NYC metropolitan area and Western New York.
Hapad, Inc
Manufacturer of 100% natural wool felt foot products and Comf-Orthotic Insoles to treat common, painful foot complaints.

New York State Athletic Trainers’ Association
The mission of the New York State Athletic Trainers’ Association shall be to advance, encourage and improve the profession of athletic training and enhancing the quality of health care for the physically active in New York State.

Orthofix, Inc.

Pfizer

Planmed, Inc.
Planmed
100 North Gary Avenue, Suite A
Roselle, IL 60172
Phone: 630-894-2200
www.planmed.com
Contact: chris.oldham@planmedusa.com

Planmed, a trusted leader in imaging solutions, designs, manufactures and markets equipment for healthcare professionals to over 100 countries worldwide. The Planmed Verity Cone Beam CT scanner for extremities delivers detailed diagnostics with ortho-3D imaging. The motorized gantry with adjustable height and tilt allows the patient to be imaged at a lower x-ray dose and in a more relaxed manner than conventional CT. Planmed systems are well known for imaging performance, user-friendliness and excellent ergonomics.

PolyGel

SANOFI Biosurgery

Smith & Nephew
Smith & Nephew is a global medical technology business dedicated to helping improve people's lives. With leadership positions in Orthopaedic Reconstruction, Advanced Wound Management, Sports Medicine and Trauma, Smith & Nephew has almost 10,500 employees and a presence in more than 90 countries. Annual sales in 2012 were more than $4.1 billion. Visit our website www.smith-nephew.com.

SRSsoft
SRS understands physician productivity and is the recognized leader in EHR and healthcare IT solutions chosen by orthopaedists for increased efficiency, revenue, and patient satisfaction. Contact: info@srssoft.com, 800.288.8369, www.srssoft.com.
UBMD Orthopedics and Sports Medicine

UBMD Orthopaedics & Sports Medicine is a leading team of surgeons, sports medicine specialists, physical therapists and athletic trainers. They serve as team doctors for the Buffalo Bills, Buffalo Sabres, Buffalo Bandits, University at Buffalo, ECC, NCCC and several other collegiate and high school programs. UBOSMs certified and fellowship-trained physicians offer complete care for all orthopaedic and musculoskeletal conditions, for patients of all ages - including pediatrics. UBOSM’s patient offices are located in Amherst, Buffalo, Niagara Falls, Orchard Park and West Seneca.
Hip Arthroscopy: Update on FAI and Labral Tears

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Northtowns Orthopedics
Medical Director, Pediatric and Adolescent Sports Medicine
Women and Children’s Hospital of Buffalo

Introduction:
- Hip pain and pathologic conditions are more frequently recognized in the non arthritic patients
- Many of the painful condition are acquired or congenital
- Hip arthroscopy is becoming the gold standard for treatment of many intra and extra compartmental pathologies of the hip
- Limitations to hip arthroscopy have to be understood and combination of open and arthroscopic procedures should be utilized when indicated

Hip Arthroscopy:
- Technique
- Set up and portals
- Supine or lateral
- Fluoroscopy
- Portals
- Capsulotomy
- Arthroscopic Anatomy
- Central and Peripheral compartments
- Labral Management
- Débridement versus Repair
- Osteoplasty
- Acetabulum
- Femur
- Articular cartilage management
- Coxa Sultans Interna/ Externa
- Capsular closure

Indications and Limitations of Hip Arthroscopy:

Hip Arthroscopy in Children and Adolescents:
- 54 hip arthroscopies
- Age mean 15 (5.9-18.9)
- Indications: Labral tears, Perthes, DDH, PAO, JRA, SED, AVN, SCFE, Osteochondral fracture
- Results-HHS 53.1-> 82.9, 83% patient improved

FAI:
- 65 hip arthroscopies
- Age 11-16 years
- 2-5 year follow up
- Results-MHHS mean pre op- 57 mean at FU -91

- 27 hip arthroscopies
- Age <19
- FU 1 year
- HHS average improvement 21 points, HOS average improve 16 points

Dysplasia:
- Arthroscopic management of labral tears intra-articular hip pathology showed favorable results when combined with definitive treatment for dysplasia with the PAO
- Early studies suggest staged procedures allowing the labrum to be repaired prior to undergoing a reconstructive procedure yield good results
- Arthroscopic debridement has also shown to be beneficial in improving mechanical symptoms in patients with DDH who previously underwent a reconstructive procedure and in patients who have failed a closed reduction under the age of 2.

Perthes disease:
- In early disease onset hip arthroscopy has been utilized for staging, classifying avascular necrosis, arthroscopic core decompression with drilling
- After the disease has matured, arthroscopy has been utilized to treat residual disorders including synovitis, labral tears, cartilage injuries, loose bodies, and perform femoral neck decompression

SCFE:
- Early evidence suggests that mild slips can lead to early arthritis and mechanical damage consistent with FAI
- Only 2 studies have been performed with arthroscopic assistance during the time of in situ pinning. Both cases involved the femoral resection to the physis.
Complications:
- 218 hip arthroscopies in 175 patients
- 18 years and younger
- Indications: Labral tear, loose body, FAI, SCFE, Perthes
- Results: 1.8% complication rate (transient pudendal neuropraxia, instrument breakage, suture abcess) or with the patient and her patient is his family. There is a problem right now is the OR is still using distal doing all his is a no cases of proximal femoral physeal separation, growth disturbance or osteonecrosis

Adult Hip Arthroscopy

FAI

Literature review
- 2834 articles, clinical outcomes, more then two year follow up
- 83.7 % excellent/good outcome
- Identification of good –excellent surgical candidates
  o Young, under 30 years
  o Symptomatic
  o Activity related pain, groin
  o Worse with internal rotation and flexion
  o Positive impingement test
  o Defined impingement deformity on imaging
- Etiology of failures
  o Preoperative radiographic OA (less then 2 mm joint space)
  o Severe preoperative pain
  o Surgeons performing a smaller number of cases with inadequate deformity correction

Arthroscopic management of FAI in athletes
- 200 patients with 19 month follow up
- Average age 28 (11-60)
- Median Pre op HHS -72 Post op HHS -96
- 95% professional athlete and 85% collegiate athlete returned to sports

FAI with Grade 4 Chondromalacia
- 200 patients
- Average age 33
- 16 month follow up
- 94% with grade 4 chondral injury
- Results:
  - 83% overall improvement
  - HHS 65->85
  - 0.5 % conversion to THA

Labral tears
- Debridement
  - Systematic literature review 1980-2005
  - Inclusion: Two year follow up, patient with symptomatic labral tear that failed conservative management. No dysplasia, arthritis, workers compensation
  - 3.5 year follow up- 67% patient satisfaction
  - 50% resolution of mechanical symptoms
  - good results with HHS
- Repair
  - Cohort study
  - Group one- (44) Debridement, Group two -(50) Repair
  - Average age 32 years, 3.5 year follow up
  - Outcome measurements VAS, HHS, SF-12
  - Results
    - Debridement- 68%
    - Repair- 92%

References:

6. Philippon MJ, Ejnisman L, Ellis HB, Briggs KK. Outcomes 2 to 5 years following hip arthroscopy for femoroacetabular impingement in the patient aged 11 to 16 years. Arthroscopy. 2012 Sep;28(9):1255-61


See you next year!

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