

CURRICULUM VITAE (Howard S. An, M.D.)

Office Address: Midwest Orthopaedics at Rush, Rush University Medical Center
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phone: 312-243-4244 fax: 312-942-1516 E-mail: han@rushortho.com

EDUCATION:

1979 B.A. (Chemistry), The College of Wooster, Wooster, OH
1982 M.D. University of Toledo College of Medicine (formerly, Medical College of Ohio)

POSTGRADUATE EDUCATION:

1982-1988 Internship and Orthopaedic Residency, University of Toledo Medical Center
1988-1989 Spine Fellowship at Thomas Jefferson University Hospital and Pennsylvania Hospital (Rothman Institute), Philadelphia, PA

FACULTY APPOINTMENTS:

1989-1992 Assistant Professor of Orthopaedic Surgery, Medical College of Wisconsin Milwaukee, WI
1992-1997 Associate Professor, Medical College of Wisconsin
7/1997 Professor of Orthopaedic Surgery with Tenure, Medical College of Wisconsin
9/1997 Professor of Orthopaedic Surgery with Tenure, Rush Medical College, Chicago, IL
11/1997 The Morton International Endowed Chair, Dept. of Orthopaedic Surgery, Rush Medical College

HOSPITAL AND ADMINISTRATIVE APPOINTMENTS:

2005-present Medical Director, Rush Spine and Back Center
1992-present Director of Spine Fellowship, Dept. Orthopaedics
2002-2016 Director, Division of Spine Surgery, Dept. Orthopaedics Rush University Medical Center
1997-present Active Staff, Rush University Medical Center Chicago, IL
1998-present Active Staff, Oak Park Hospital Oak Park, IL
1989-1997 Chief, Spine Service, Department of Orthopaedics, The Medical College of Wisconsin (Froedtert Memorial Lutheran Hospital and Children's Hospital of Wisconsin)
1992-1997 Active Staff, Veteran's Administration Hospital Milwaukee, WI
1991-2001 Associate Staff, Lakeland Medical Center, Elkhorn, WI
1993-1997 Courtesy Staff, West Allis Memorial Hospital, West Allis, WI
1996-1997 Interim Vice-Chairman of Orthopaedic Surgery
1995-1997 Spine consultant for Milwaukee Ballet and Milwaukee Professional Mustang Football team

CERTIFICATION:

1991 American Board of Orthopaedic Surgery, Recertification (2001, 2011)

LICENSURE:

1989-2007: Wisconsin, 1997: Illinois (active)

AWARDS AND HONORS:

1990 North American Traveling Fellowship from American Orthopaedic Association
1990, 1996 Teacher of the Year, Department of Orthopaedic Surgery, The Medical College of Wisconsin
1993, 1999 NASS Research Award
1995 SRS Traveling Fellowship
1996, 1998, 2003, 2006, 2007, 2011, 2012 Selected in Best Doctors in America
1997 The Morton International Endowed Chair for Spine Research, Rush University
1997 CSRS Research Award
1999 SRS John Moe Award for Best Basic Science Poster
2000 ISSLS Best Poster Award
2002, 2006 Golden Apple Teaching Award, Department of Orthopaedic Surgery, Rush Medical College
2002, 2003, 2004, 2006, 2007, 2012, 2015 Chicago Spine Fellows Award for Teaching Excellence
2005 Henry Farfan Award, Outstanding Contributions in Spine Basic Science Research from NASS
2006 Hibbs Award: Best Basic Science Presentation at SRS

2006 CSRS 1st Place Basic Science Research Award
 2010 AAOS Achievement Award
 2010 The Best Basic Science Paper Award ISASS
 2010 2010 Distinguished Alumnus Award, University of Toledo College of Medicine
 2010 The Second Prize Basic Science Paper, CSRS
 2011 Kappa Delta Elizabeth Winston Lanier Award, ORS and AAOS
 2012 Top Doctors 1% nationwide by Castle Connelly/US News and World Report
 2013 The Best Basic Science Paper Award ISASS
 2013 50 of the Best Spine Specialists by *Becker's Hospital Review*, Top 28 Spine Surgeons in North America by *Orthopaedics This Week*

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

1989 Jefferson Orthopaedic Society
 1990 American Medical Association (AMA)
 1991 Cervical Spine Research Society (CSRS)
 1992 American Spinal Injury Association (ASIA)
 1992 Mid-America Orthopaedic Association
 1993 American Academy of Orthopaedic Surgeons (AAOS)
 1993 North American Spine Society (NASS)
 1993 Scoliosis Research Society (SRS)
 1993 International Society for the Study of the Lumbar Spine (ISSLS)
 1995 Orthopaedic Research Society (ORS)
 1996 Societe Internationale De Chirurgie Orthopedique et De Traumatologie (SICOT)
 1997 American Orthopaedic Association (AOA)
 1998 Illinois Orthopaedic Society
 2006 Korean American Spine Society (KASS)
 2008 The International Society for the Advancement of Spine Surgery (ISASS)

COMMITTEES IN NATIONAL ORGANIZATIONS

2007-2010 Section on Spine Biologics and Research Committee: NASS
 2012-present Research Committee, CSRS
 2006-2010 Korean American Spine Society (President, 2009, Board of Directors, 2010)
 2004-2011 Program Committee (2004-2007). Vice-President (2009), President (2010) of ISSLS
 2005-2009 Endowment Committee, Research Coordination Committee, Scoliosis Research Society
 2001-2009 AAOS Research Committee: Spine Panel, AAOS
 2000-2006 Task Force for Spinal Research, AAOS
 2001-2010 Spine Program sub-committee, AAOS
 2006-2009 ORS: Chair of Spine Program Committee
 2001-2004 John J. Fahey, M.D. Memorial North American Traveling Fellowship Subcommittee, AOA
 1997-2003 Spine Committee of American Spinal Injury Association
 1999-2003 Research Committee of Scoliosis Research Society (Chairman of committee, 2001-2002)
 1995-2000 Academic Orthopedic Society Task Force on Faculty Development
 1995-2000 Outcome Analysis Committee in National Spine Network
 1999-2002 Chairman, Educational Committee, Mid-American-Orthopaedic Association
 1999-2002 Member of Resident and Fellow Education Committee, NASS
 1996-2001 Instructional Course Committee of NASS
 1997-2001 Research Grant Review Committee for Orthopaedic Research and Education Foundation
 1999-2001 Member of Research Committee, CSRS
 1999-2001 Spine Committee, AAOS
 1993-1996 Membership Committee of American Spinal Injury Association
 1993-1996 Research Coordinating Committee of Scoliosis Research Society
 1994-1996 Member Research Committee of CSRS (Chairman, 1996)
 1994-1997 Campaign chairman for regional Orthopaedic Research and Education Foundation
 1995-1996 Program Committee of NASS

EDITORIAL BOARD:

Spine: Advisory board (1993-1994), Associate Editor (1995-present)
The Spine Journal: Deputy Editor (2000-2005) Associate Reviewer (2005-present)
Journal of AAOS: (Editorial Review Board, 2000-present)
American Journal of Orthopaedic Surgery: Associate Editor (1996-present)
Contemporary Spine Surgery: Editorial Board (2000-present)
Journal of Orthopaedic Surgery: Editorial Board (2006 to present)
Current Orthopaedic Practice: Reviewer (2008-present)
Asian Spine Journal: Editorial Board (2009 - present)
Clinics in Orthopaedic Surgery: Editorial Board (2010-present)
WWW@SpineUniverse.com: Editorial board (2000-present)

TRAINING OF CLINICAL SPINE FELLOWS: (Director of spine fellowship)

Thomas Andreshak, M.D:	1992-1993
J. Michael Glover, M.D:	1993-1994
Mark Coppes, M.D:	1994-1995
S. Craig Humphreys, M.D:	1995-1996
Louis Jenis, M.D:	1996-1997
Jesse Butler, M.D:	1997-1998
Uyen Van, M.D:	1997-1998
Jeffrey Wise, M.D:	1998-1999
Timothy Yoon, M.D:	1999-2000
Rex Alexander W. Marco, M.D:	1999-2000
James M. Osborn, M.D:	1999-2000
Lukasz Curylo, M.D:	2000-2001
Donald K. Mathews, M.D:	2000-2001
Shane Pak, M.D:	2000-2001
Nicholas Ahn, M.D:	2001-2002
Thomas McNally, M.D:	2001-2002
Ashok Biyani, M.D:	2001-2002
Nitin Khanna, M.D:	2002-2003
Francis H. Shen, M.D:	2002-2003
Gurvinder Singh Deol, M.D:	2002-2003
J. Scott Price, M.D:	2003-2004
Amir Fayyazi, M.D:	2003-2004
Charles Shuff, M.D:	2003-2004
Christian Dubois, M.D.	2003-2004
Prakasam Kalluri, M.D.	2004-2005
Alexander Seldomridge, M.D.	2004-2005
Sameer Mather, M.D.	2004-2005
Robert Lowe, M.D.	2004-2005
Neil Manson, M.D.	2005-2006
Juris Shibayama, M.D.	2005-2006
Patrick Cahill, M.D.	2006-2007
Michael Lee, M.D.	2006-2007
Eric Lin, M.D.	2006-2007
Todd Allen, M.D.	2007-2008
Mustafa Khan, M.D.	2007-2008
Dalip Pelinkovic, M.D.	2007-2008
John Ehteshami, M.D.	2008-2009
Thomas Lawhorne III, M.D.	2008-2009
Hajeer Sabet, M.D.	2008-2009
Mir Haroon Ali, M.D.	2009-2010
Krzysztof B. Siemionow, M.D.	2009-2010
Mohammad Shukairy, M.D.	2009-2010

Colin Harris, M.D.	2009-2010
Elizabeth Kelley Banagan, M.D.	2010-2011
Safdar Khan, M.D.	2010-2011
Issac Moss, M.D.	2010-2011
Thomas Cha, M.D.	2010-2011
Neil Badnani, M.D.	2011-2012
Chadi Tannoury, M.D.	2011-2012
Joe Lee, M.D.	2011-2012
Kasra Ahmadinia, M.D.	2012-2013
Mark Kurd, M.D.	2012-2013
Joseph Lee, M.D.	2012-2013
Anton Jorgensen, M.D.	2013-2014
Eric Sunderberg, M.D.	2013-2014
Hamid Hassanzadeh, M.D.	2013-2014
Martin Quirno, M.D.	2014-2015
Ehsan Tabaraee, M.D.	2014-2015
Steven Presciutti, M.D.	2014-2015
Grant Shifflett, M.D.	2015-2016
Alem Yacob, M.D.	2015-2016
Gregory Lopez, M.D.	2015-2016
Justin Paul, M.D.	2016-2017
Comron Saifi, M.D.	2016-2017
Arya Varthi, M.D.	2016-2017

TRAINING OF INTERNATIONAL POST-DOCTORAL RESEARCH SPINE FELLOWS:

Yassuo Yoshida, M.D:	1991 (Brazil)
Toru Hasegawa, M.D:	1992-1993 (Japan)
Jerzy Pawloski, M.D:	1993 (Poland)
Rongming Xu, M.D:	1993-1994 (China)
J. Y. Ahn, M.D:	1994 (Korea)
A. Inufusa, M.D:	1994-1995 (Japan)
G. Wang, M.D:	1994-1996 (China)
H. Yoshida, M.D:	1995-1996 (Japan)
Sang-Wook Lee, M.D:	1996-1997 (Korea)
J. W. You, M.D:	1996-1997 (Korea)
Y.D. Koh, M.D:	1996 (Korea)
S. Y. Lee, M.D:	1996-1997 (Korea)
Chang-Hoon Jeon, M.D.	1997-1998 (Korea)
Han Kwon, M.D:	1997-1998 (Korea)
B. Chen, M.D:	1997-1999 (China)
A. Fujiwara, M.D:	1998-2000 (Japan)
N. Tanaka, M.D:	1998-1999 (Japan)
Kyung W. Song, M.D:	1999 (Korea)
Joong W. Ha, M.D:	1999-2000 (Korea)
C.Y Lee, M.D:	1999-2000 (Korea)
Luiz Franca, M.D:	1999-2000 (Brazil)
K. Takegami, M.D:	1999-2000 (Japan)
M. C. Chang, M.D:	1999-2000 (Taiwan)
Y. Aota, M.D:	1999-2001 (Japan)
T. Matsumoto, M.D:	1999-2001 (Japan)
W. J. Kim, M.D:	2000-2001 (Korea)
S. T. Jeong, M.D:	2000-2001 (Korea)
Zhenming Hu, M.D:	2000-2001 (China)
Abdullah Tajuddin, M.D:	2000-2001 (Malaysia)
Seok-Woo Kim, M.D:	2001-2002 (Korea)
Yoshiyuki Imai, M.D:	2001-2003 (Japan)

Michiaki Yamada, M.D:	2001-2003 (Japan)
Carlos Felipe Forero, M.D:	2001 (Columbia)
Abdul Yusof Halim, MD:	2001 (Malaysia)
N. Hiranyasthiti, M.D:	2001-2003 (Thailand)
K.W. Kim, M.D:	2001-2003 (Korea)
Koichi Nakagawa, MD:	2002-2004 (Japan)
Masahiko Okuma, M.D:	2002-2004 (Japan)
Tai Hyoung Cho M.D:	2002-2004 (Korea)
Shiwen Song, M.D:	2003-2004 (China)
Kei Myamoto, M.D:	2003-2006 (Japan)
Koji Akeda, M.D:	2003-2005 (Japan)
K. H. Yang, M.D.	2004-5 (Korea)
Sota Kitahara, MD.	2004-5 (Japan)
Takehide Chujyo, M.D.	2004-6 (Japan)
Dinesh Thrawani, M.D.	2004 (India)
Yang S. Lee, M.D.	2004-5 (Korea)
Yasuchika Aoki, M.D.	2004-2006 (Japan)
Yasushi Fujiwara, M.D.	2004 (Japan)
San Bum Koh, M.D.	2004 (Korea)
Ryota Takatori, M.D.	2005-6 (Japan)
Yumiko Abe, M.D.	2005-7 (Japan)
Hiroshi Tonomura, M.D.	2006-2007 (Japan)
K. Song, M.D	2006 (Korea)
H. Asanuma, M.D.	2005-7 (Japan)
Y. Otsuka, M.D.	2006-9 (Japan)
K. Yamaguchi, M.D.	2006-7 (Japan)
Youwen Deng, M.D.	2006-7 (China)
Carlos Cardenas, M.D.	2007 (Peru)
Xaio Lin Zhang, M.D.	2007 (China)
Jae Taek Hong, M.D.	2007-8 (Korea)
Young Joon Kwon, M.D.	2007 (Korea)
Michael Ellman, M.D.	2007-2008 (US)
Ranjith Udayakumar, M.D.	2007-8 (India)
Sang Woo Kim, M.D.	2007-8 (Korea)
Kenichiro Kakutani, M.D.	2007-2008 (Japan)
Keizo Sugisaki, M.D.	2007-2008 (Japan)
Hun-Kyu Shin, M.D.	2008-2009 (Korea)
Ta-Wei Lai, M.D.	2009 (Taiwan)
Tomoyuki Takigawa, M.D.	2008-2010 (Japan)
Jing Ren, M.D.	2008-2009 (China)
Carmella Fernandez, M.D.	2008-2009 (US)
Chun-Yue Duan, M.D.	2008-2009 (China)
Justin Munns, M.D.	2008-2009 (US)
Jinliang Zuo, M.D.	2009-2010 (China)
Zhiqing Fei, M.D.	2010-2011 (China)
Yongming Xi, M.D.	2010-2011 (China)
Geng Cui, M.D.	2010-2011 (China)
Feng Ganjun, M.D.	2009-2011 (China)
Yohei Ishihara, M.D.	2010-2011 (Japan)
Tinghsien Kao, M.D.	2011-2012 (Taiwan)
Chien Chou Pan, M.D.	2011-2012 (Taiwan)
Shu-Hua Yang, M.D.	2011-2012 (Taiwan)
Jisoon Hu, M.D.	2011-2012 (Korea)
Isse Senoo, M.D.	2011-2013 (Japan)
Zhewei Ye, M.D.	2011-2012 (China)
Yusuke Oshita, M.D.	2011-2012 (Japan)

Qingyi He, M.D.	2012-2013 (China)
Xue Xiao Ma, M.D.	2012 (China)
Ashishi Suryawansh, M.D.	2012 (India)
Keira Mori, M.D.	2012-2013 (Japan)
Si Young Park, M.D.	2012-2014 (Korea)
Wang Rui, M.D.	2012-2013 (China)
Ding Chen, M.D.	2012-2013 (China)
Honglei Yi, M.D.	2012-2013 (China)
Ze-min Li, M.D.	2012-2013 (China)
Hidetoshi Nojiri, M.D.	2012-2013 (Japan)
Alender Vandelai, M.D	2013 (Brazil)
Cem Albay, M.D.	2013 (Turkey)
Su-xi Gu, M.D.	2013-2014 (China)
Zhihai Zhang, M.D.	2014 (China)
Lan Xu, M.D.	2013-2014 (China)
Yong Liu, M.D.	2014 (China)
Zinsong Zhou, M.D.	2014-2015 (China)
Xinyu Liu, M.D.	2014-2015 (China)
Jun Zhu, M.D.	2014-2016 (China)
Weijun Liu, M.D.	2014-2015 (China)
Jia Liu, M.D.	2015-2016 (China)
Po Hsin Chou, M.D.	2015-2016 (Taiwan)

RESEARCH GRANTS AND CONTRACTS:

1. Jackson WT, An HS, Rusin JJ: Effects of Different Sizes of Bone Autografts and Allografts on Healing of Metaphyseal Defects in Dogs. Orthopaedic Research and Education Foundation, 1987-1990 (\$70,000)
2. An HS, Evanich C, Lim TH: Effect of bone mineral density on the pull-out strength s of anterior vertebral body screws” Institutional grant The Medical College of Wisconsin, 1992 (\$ 4,000)
3. An HS, Haughton V, Nguyen C, Lynch K: The Use of Gadolinium Magnetic Resonance Imaging to Assess Fusion of the Spine (\$37,000, Squibs, Inc, 1992)
4. Haughton V, An HS, Nguyen C: High dose vs. low dose of gadolinium on the contrast MRI enhancement of the recurrent disc and perineural scar in the canine model (\$40,000, Squibs, Inc, 1992)
5. An HS, TothJ, Lynch K: Effect of Porosity of ceramics on intervertebral fusion (\$65,571, Danek Group, 1993)
6. An HS, Lim TH: Effect of transverse linking devices on the stiffness of transpedicular implants (\$18,600, AME Inc, 1993-1994)
7. An HS, Lim TH, Haughton VM, Nowicki B: Lumbar spinal instability: A correlation between biomechanical, MRI, and anatomic properties of the motion segment. (\$ 35,000, NASS Research Grant Award, 1993-1994)
8. An HS: Relationship between flexion-extension radiographs and MRI of the lumbar spine. (Intramural grant, Medical College of Wisconsin, \$2,800, 1994)
9. An HS, Lim TH: Stability of anterior instrumentation for thoracolumbar spine. (\$30,000, Acromed Inc, 1993-1994)
10. An HS, Lim TH, Harris GF, Haughton VM: Non-Invasive 3-D In vivo Motion Analysis of the Cervical Spine. (\$36,700, Veteran Administration Rehabilitation and Development Service, 1994-1995)
11. An HS, Lim TH: Effect of translaminar facet screws on foraminal dimensions and biomechanical evaluations of various translaminar facet screws. (\$31,800, EBI Inc. 1994-1995)
12. An HS, TothJ, Lim TH: Effect of bone morphogenetic protein on ceramic incorporation of anterior fusion goat model. (\$69,330, Danek Inc. 1995-1996)
13. An HS, Lim TH: The effect of anterior interbody cage on the lumbar intervertebral foramen and lordosis. (\$20,000, Spinetech, Inc, 1995-1996)
14. Riley L, III, An HS: Development of Laparoscopic fusion device in a porcine model. (\$50,000, DePuy Inc, 1995-1996)
15. Harris GF, Lim TH, An HS: Computational Modeling of Head-Neck Motion – Experimental Studies” Funded by the Naval Biodynamics Laboratory throughTulane University (\$33,468, 1995)
16. An HS, Lim TH: The relationship between disc degeneration and segmental spine instability. Orthopaedic Research and Education Foundation (\$80,000, 1996-1998)
17. An HS, TothJ, Lim TH: Enhancement of cervical spine fusion with a porous biphasic hydroxyapatite-tricalcium phosphate ceramic and biocoral loaded with bone morphogenetic proteins. (\$75,000, Intermedics Orthopedics

- Inc, \$75,000, 1996-1997)
18. An HS, Lim TH, McGrady L: The Ideal Amount of Foraminal Distractions for the SpineTech™ Anterior Threaded Cage (\$20,800, Spine Tech, Inc, 1995)
 19. An HS, Lim TH: Effect of Anterior Grafting Devices on the Rotational Stability of the Anterior Spinal Constructs (\$15,100, DePuy Inc, 1996)
 20. An HS: Effects of different temperatures via electrothermal application on the canine lumbar disc model (pilot study) (\$10,000, Oratec Inc, 1996)
 21. An HS, Lim TH: Biomechanical Studies of PLIF vs. Posterior Spinal Implants (\$75,136, DePuy Inc, 1998-1999)
 22. An HS, Lim TH: Biomechanical Comparison between Anterior Cervical Plates (\$77,376 DePuy Inc, 1998-1999)
 23. An HS, Lim TH: Effect of Bone Mineral Density and Thickness of the Endplate on Biomechanical Strength of the Graft-Endplate Interphase (\$25,000, CSRS, 1998-1999)
 24. An HS: Spine Research and Education Grant. (\$10,000, Depuy-Motech, 1998)
 25. Lim TH, An HS: Biomechanical Evaluation of New Transfixation Method in Transpedicular Instrumentation. (\$58,030, Stryker Osteonics Inc, 1998-1999)
 26. An HS, Masuda K, Thonar E, Lim TH: Effect of OP-1 on disc regeneration. in vitro and in vivo experiments (Stryker Biotech, 1998-2000, \$300,000)
 27. An HS, Chang S, Masuda K, Thonar E, Andersson G: Gene gun-mediated gene transfer of Osteogenic protein-1 to promote regeneration of the intervertebral disc in rabbits (\$41,178, NASS, 1999)
 28. An HS: Spine Research and Education Grant. (\$10,000, Stryker Howmedica Osteonics Spine, 1999)
 29. An HS: Effect of Bonesource calcium phosphate cement on the incorporation of the vertebral defects and compressive strength of vertebroplasty and screw-bone interphase. (Stryker Inc, \$178,358, 2000-2002)
 30. An HS: Effect of Proceed™ on anti-adhesion properties in a canine laminectomy model. (Fusion Medical Technologies, \$84,333, 2000-2001)
 31. An HS, Masuda K, Thonar E, Lim TH, Nguyen C, Andersson GB: Effect of OP-1 on Intervertebral disc degeneration: An in vivo investigation using discotomy rabbit model. (Stryker Biotech, \$345,282, 2000-2001)
 32. An HS: Spine Research and Education Grant (\$10,000, DePuy Acromed, 2000)
 33. An, HS: Spine Research and Education Grant (\$20,000, Seikekagu Inc, 2000)
 34. Andersson G, An HS: Low Back Pain: A Multicenter Trial. PI: James Weinstein (\$40,340, NIH/NIAMS Consortium 1 U01 AR45444-01 1999-2003)
 35. Andersson G, An HS: National Spine Network Multicenter Trial on Spinal Cord Stimulator (Medtronic, \$23,846, 2000-2002)
 36. An HS, Masuda K, Thonar E, Andersson G, Glant T: Regeneration of the Intervertebral Disc Matrix: Effects of Growth Factors and Gene Gun Mediated Gene Transfer of Growth Factors to Intervertebral Disc Cells. Part of Program Project Grant (NIH, \$1,075,458, 2001-2005)
 37. Thonar E, An HS, Szabo G, Masuda K, Andersson G: Gene Expression of Matrix Components and Growth Factors in the Normal and Degenerated Nucleus Pulposus and Annulus Fibrosus of the Intervertebral Disc. Part of Program Project Grant (NIH, \$955,736, 2001-2005)
 38. Andersson G, An H, Lim TH, Natarajan R, Lavender S: Effect of Repetitive Torsional Moments on the Lumbar Motion Segment Part of Program Project Grant (NIH, \$901,901, 2001-2005)
 39. An HS, Lim TH, Andersson G: In vivo Analysis of the Segmental Spine Motion of the Lumbar Spine. Part of Program Project Grant (NIH, \$527,582, 2001-2005)
 40. Andersson G, An HS, Lim TH, Szabo G: Biomechanics and Biochemistry Cores. Part of Program Project Grant (NIH, \$1,600,000, 2001-2005)
 41. An HS: Effect of OP-1 device on Posterolateral Fusion of the Lumbar Spine: A Multicenter Study. (Stryker Biotech, \$ 40,000, 2001-2002)
 42. Andersson G, An HS: A Randomized Controlled Study to Evaluate Kyphoplasty. (Kyphon Inc, \$20,000, 2000-2002)
 43. An HS: Effect of AGF (Autologous Growth Factor) on Posterolateral Fusion of the Lumbar Spine. A Multicenter Study (Interpore, Inc, 2001-2002)
 44. An HS: Spine Research and Education Grant (\$20,000, U&I America, Inc, 2002)
 45. An HS, Masuda K, Thonar E, Lim TH, Nguyen C, Andersson GB: Effect of OP-1 on Intervertebral disc degeneration induced by C-ABC injection. (Stryker Biotech, \$60,000, 2003)
 46. An HS: Spine Research and Education Grant (\$25,000, Zimmer Spine, Inc, 2003)
 47. An HS, Zhang Y, Phillips F, Masuda K, Andersson G: The role of the spinal cord in modulating discogenic low-back-pain. Rush University Special Funding Award on Spinal Cord Research , \$100,000, 2003-2004
 48. An HS, Masuda K, Phillips F, Andersson G: The role of cytokines in discogenic low-back-pain. Stryker Biotech,

Inc. \$100,000, 2004-2005

49. Masuda K, An HS: Effect of CPA on intervertebral disc degeneration – feasibility Study (Phase I) Kureha Pharmaceutical. \$38,450 2003-2004
50. Masuda K, An HS: Effect of Platelet-rich Plasma (PRP) on the Matrix Metabolism of IVD Cells DePuy Spine. \$15,172 (2003-2004)
51. An HS, Masuda K: Evaluation of Anti-adhesion properties of FloSeal in a Canine Laminectomy Model Baxter, Inc, \$52,243 2003-2004
52. Masuda K, An HS: Effect of NF-kB Oligonucleotide on Intervertebral Disc Degeneration: an in vivo study using the rabbit annular needle puncture model Angen Inc. (\$168,3590, 2005-2006)
53. An HS, Phillips F, Ochia R, Inoue N: The role of the endplate fracture in the pathogenesis of intervertebral disc degeneration. Zimmer Spine Inc, (\$50,000, 2005)
54. Masuda K, An HS: Effect of growth differentiation factor 5 on the repair of intervertebral Disc: in vitro and in vivo pilot studies. Depuy Spine (\$55,000, 2005-6)
55. Masuda K, An HS: Nucleoplasty Using Photopolymerized Collagen-hyaluronic Acid Material in the Mini-pig Nucleus Defect Model. Zimmer Spine (\$242,113) 2006-7
56. An HS: Three dimensional facet kinematics in healthy and degenerated lumbar intervertebral discs. Stryker Spine, (\$80,354, 2006-2007)
57. An HS: Spine Research and Education Grant (\$75,000, DePuy Spine, Inc, 2006-7)
58. An HS: Spine Research and Education Grant (\$52,610, Medtronic, Inc, 2006-7)
59. Inoue N, An HS, Williams J, Andersson G: Relationship between disc and facet degeneration and in vivo lumbar kinematics (Part of Program Project Grant NIHAR48152, 8/1/06-7/31/2011, \$7,391,966)
60. Masuda K, An HS, Cs-Szabo G, Thonar E: Autocrine and Paracrine Control of Homeostasis of the Intervertebral Disc (\$214,650/year. Part of Program Project Grant NIH AR48152, 8/1/06-7/31/2011, \$7,391,966)
61. An HS, Masuda K, Thonar E, Andersson G: Biological Treatment Strategies by Growth Factors and Cytokine Inhibitors. (\$218,091 per year, Part of Program Project Grant NIHAR48152, 8/1/06-7/31/2011, \$7,391,966)
62. Cs-Szabo G, Masuda K, An HS: Core B: Biological Research Core. (\$152,950 per year, Part of Program Project Grant NIHAR48152, 8/1/06-7/31/2011, \$7,391,966)
63. Natarajan R, Inoue N, Andersson G, An HS: Core A: Biomechanical Research Core (\$150,900 per year, Part of Program Project Grant NIHAR48152, 8/1/06-7/31/2011, \$7,391,966)
64. Masuda K, An HS: Nucleoplasty using Photopolymerized Collagen-hyaluronic Acid Material in the Mini-pig Nucleus Defect Model,” \$242,113 Zimmer Spine, 2006-7
65. Masuda K, An HS: Effects of Serum-free Bone Morphogenetic Protein-7 on the Matrix Metabolism of Bovine Intervertebral Disc Cells \$63,700, Stryker Biotech, 2006-7
66. Masuda K, An HS: Effect of Serum-free BMP-7 on the Repair of the Intervertebral Disc: An *In Vivo* Study in a Rabbit Annular Puncture Model, \$382,098 Stryker Biotech, 2006-7
67. Masuda K, An HS: Effect of Growth Differentiation Factor-5 on the Repair of Intervertebral Disc: *In Vivo* Pilot Study in a Rabbit Intervertebral Disc Degeneration Model, DePuy Spine \$421,177. 2005-7
68. An HS: Spine Research and Education Grant (\$75,000, DePuy Spine, Inc, 2007-8)
69. An HS: Spine Research and Education Grant (\$50,000, Medtronic, Inc, 2007-8)
70. An HS: Biomechanical Evaluation of Posterior Translaminar Screws of C7 (\$50,000, DePuy Spine, Inc, 2008-9)
71. An HS: Spine Research and Education Grant (\$75,000, DePuy Spine, Inc, 2007-8)
72. An HS: Effect of X-close on the Annulus Fibrosus Closure and Recurrence Rate: A prospective multi-center Study. Anulex Technologies (\$13,000, 2008-2009)
73. An HS: Effect of Bioactive Vitoss on the Posterolateral Lumbar Fusion: A prospective multi-center study. Orthovita Inc.(\$60,770, 2009-2010)
74. An HS: Spine Research and Education Grant (\$75,000, Synthes Inc, 2009-2010)
75. An HS, Zhang Y, Thonar E, Chee A: Biological Treatment Strategies by Growth Factors and Cytokine Inhibitors. (\$250,000, Stimulus supplementary grant, Program Project Grant NIH AR48152, 8/1/09-7/31/2011)
76. An HS: Spine Fellowship Education Grant, Orthopaedic Research and Education Foundation (\$75,000, 2010-2011)
77. An HS, Im-Sampen, Zhang, Y, Chee A: Development of Rat Discogenic Pain Model and Molecular Therapy Intervertebral Disc Degeneration and Pain. (Synthes Inc, \$350,000, 2010-2011)
78. An HS, Singh K, Khan S, Zhang Y, Chee A: Use of Actifuse in the Posterolateral Fusion in the Rabbit Model. (Baxter Inc, \$177,258, 2010-2011)
79. An HS, Singh K, Espinoza A, Inoue N: Biomechanical Effects of In situ Distracting Corpectomy Cage in the

- Cervical Spine (Globus Inc. \$42,250, 2010)
80. An HS, Moss I, Chee A, Zhang Y: Chondrogenic Differentiated Neonatal Human Dermal Fibroblast Transplantation for Intervertebral Disc Degeneration: *In Vivo* Repair and Regeneration Effects (SpinalCyte Inc, \$99,400 2010-2011)
 81. An HS, Cha T, DeWald C: Orthopaedic Research and Education Foundation Scientific Forum/Spine Care Grant, \$15,000, 2011-2012
 82. An HS: Omega Spine Fellowship Grant. \$50,000, 2011-2012
 83. An HS, Zhang Y, Chee A: Reparative Regenerative and Anti-inflammatory Effects of E-Matrix on Bovine Nucleus Pulposus Cells, Human Mesenchymal Stem Cells and Cultured Neurons" Pioneer Inc, \$19,500, 2011-2012
 84. Inoue N, An HS, Espinoza A, Triano J: Biology of Manual Therapy (1R01AT006692-01A1, NIH, \$1,912,000 2012-2017)
 85. An HS: Spine Fellowship Education and Research Grant: \$40,000, Medyssey, Inc, 2012-17.
 86. An HS, Chee A: Chondrogenic Differentiated Neonatal Human Dermal Fibroblast Transplantation for Intervertebral Disc Degeneration: *In Vivo* Repair and Regeneration Effects (SpinalCyte Inc, \$413,431, 2014-2015)
 87. An HS: Spine Fellowship Grant, AO Spine, \$150,000, 2015-2017
 88. An HS, Di Chen, Chee A: Peptide Treatment for Intervertebral Disc Degeneration and Low Back Pain. Yuhan Inc., \$104,927, 2015-2016
 89. An HS, Chee A, Inhibition of macrophages in rabbit intervertebral disc. AO Spine, \$125,000 2014-2016

VISITING PROFESSORSHIP

1. Visiting Professor "Complication of Disc Surgery" The Medical College of Ohio, 5-18-91
2. Visiting Professor "Advances in Spinal Fusion" Northwestern University, Chicago, Illinois, March 26, 1993
3. Visiting Professor "Spinal Instrumentations" University of Virginia, Charlottesville, VA, March 31, 1993.
4. Visiting Professor "Current Advances in Spinal Instrumentation" University of West Virginia, June 5, 1994
5. Visiting Professor "Spinal Deformities" University of California at San Francisco. Oct. 10, 1994
6. Visiting Professor "Complication of Spinal Deformity Surgery" and "Current Controversies of Spinal Instrumentation" University of Alabama, Birmingham Nov. 4, 1994.
7. Visiting Professor "Spinal Fusion and Instrumentations" Department of Orthopaedics, Brown University College of Medicine Providence, RI March 29, 1995
8. Visiting Professor. "What is New with Lumbar Disc Disease," and "Current Controversies on Spinal Instrumentation" Michigan State University, Flint, MI 5-1, 1996
9. Visiting Professor "Treatment of Degenerative Lumbar Disc Disease and Thoracolumbar Spine Fractures" Yonsei University College of Medicine Seoul, Korea May 29, 1996
10. Visiting Professor "Spinal Instrumentation" Harvard Medical School, Boston, MA June 12, 1996
11. Visiting Professor "Spinal Deformities in Sagittal Plane" Northwestern University, Chicago, Illinois Nov 15, 1996
12. Visiting Professor "Thoracolumbar Kyphosis" William Beaumont Hospital, Detroit, MI Sept. 15, 1997
13. Visiting Professor "Surgical Treatment of Deformities and Thoracolumbar Trauma" University of Chicago Medical Center, Chicago, IL Oct. 8, 1997.
14. Visiting Professor "Spinal Instrumentation for Kyphotic Deformities and Trauma", University of Louisville Medical Center, Louisville, KY Nov. 4, 1997
15. Visiting Professor "Spinal Instrumentation for Deformities and Trauma." New England Baptist Medical Center, Boston, MA Nov. 26, 1997
16. Visiting Professor. "Advances in Lumbar Disorders." Medical College of Ohio, Toledo, OH March 30, 1998
17. Visiting Professor. "Disc Degeneration; Basic Science and Clinical Aspects." Yale University Medical Center, New Haven, CT May 14, 1999
18. Visiting Professor. "Lumbar disc disease" University of Chicago Medical Center, Chicago, IL Sept. 8, 1999.
19. Visiting Professor. "Advances in Lumbar Spine Surgery" Harvard University Medical School (Brigham and Women's Hospital) Boston, MA Dec. 1, 1999
20. Visiting Professor "Degenerative Lumbar Disorders" Northwestern University, Chicago, Illinois April 21, 2000
21. Visiting Professor "Pathogenesis and Treatment Options for Lumbar Disc Disease" University of Louisville Medical Center Louisville, KY May 10, 2001
22. Visiting Professor "Current Advances in Research for Intervertebral Disc Disease" University of Pittsburgh Medical Center, Pittsburgh, PA May 16, 2001

23. Visiting Professor "Current Treatment of Spinal Tumors" Loyola University Medical Center, April 2, 2003.
24. Visiting Professor "Spinal Tumors: Diagnosis and Treatment" Evanston Medical Center, Sept 3, 2004
25. Visiting Professor "Cervical Spine Instrumentation" and "Lumbar Disc Degeneration: Basic Science and Clinical Considerations. University of Michigan, Ann Arbor, MI, Nov. 11-12, 2004
26. Visiting Professor "Cervical Radiculopathy and Myelopathy," "Lumbar Intervertebral Disc Degeneration: Basic Science and Clinical Considerations" University of Pennsylvania, Philadelphia, PA Jan 19, 2006
27. Visiting Professor "Spinal Tumors," and "Disc Degeneration: Clinical and Basic Science Advances" Case Western Reserve University Hospitals, April 26, 2006
28. Visiting Professor "Lumbar Disorders: Basic Science and Clinical Considerations," "Spinal Tumors," and "Intervertebral Disc Degeneration Models: Relevance to Human Disc Degeneration" University of Hong Kong Department of Orthopaedic Surgery, Nov. 1-3, 2006
29. Visiting Professor "Lumbar Disorders: Basic Science and Current Practice," "Cervical Spine Instrumentation" Minnesota Orthopaedic Society and Twin Cities Spine Center, Minneapolis, MN May 11-12, 2007
30. Visiting Professor "Lumbar Spinal Disorders: Current Techniques of Treatment" University of Wisconsin Madison, WI Sept 25, 2007
31. Visiting Professor "Lumbar Spinal Disorders: Advances in Basic Science Research" University of California at Davis, Sacramento, CA Dec 12, 2007
32. Visiting Professor "Surgical Techniques for Spinal Tumors," "Lumbar Degenerative Disc Disorders" University of Rochester, Rochester, NY April 9-10, 2008
33. Visiting Professor, "Cervical Spine Instrumentation" University of Virginia, June 10, 2008
34. Visiting Professor "The 52nd Edward T. Smith Orthopaedic Lectureship. University of Texas Orthopaedic Surgery, Houston, TX Nov. 7-8, 2008.
35. Visiting Professor "Lumbar Disc disorders: Current Treatment and Basic Science Research " New York Presbyterian Medical Center at Columbia University. New York, NY Feb. 24, 2010
36. Visiting Professor " Lumbar Spinal Disorders: Advances in Basic Science Research" Henry Ford Hospital, Detroit, MI April 1, 2010
37. Visiting Professor "Spinal Tumors: Surgical Treatment," "Cervical Radiculopathy and Myelopathy," "Current Advances in the Treatment of Lumbar Disc Disorders" University of Toledo School of Medicine, Toledo, OH, Oct. 1-2, 2010
38. Visiting Professor " Lumbar Disc disorders: Current Treatment and Basic Science Research" University of Maryland Medical Center, Baltimore, MD May 19-20, 2011
39. Visiting Professor "Degenerative Spinal Disorders: Treatment Controversies" University of Connecticut, Hartford, CT Feb. 22, 2012
40. Visiting Professor "Degenerative Spinal Disorders: Current Treatment Updates," "Cervical Myelopathy and Radiculopathy," University of California at San Francisco, March 27, 2012
41. Visiting Professor "Degenerative Spinal Disorders: Current Treatment Updates," "Cervical Myelopathy and Radiculopathy," Cedar Sinai Medical Center, Los Angeles, CA, Sept 11-12, 2012.
42. Visiting Professor "Degenerative Spinal Disorders: Current Treatments and Basic Science Research" Brown University Medical Center, Providence, Rhode Island May 1, 2013
43. Visiting Professor "Degenerative Spinal Disorders: Current Treatments and Basic Science Research" Ohio State University Medical Center, Columbus, OH June 7, 2013
44. Visiting Professor "Degenerative Spinal Disorders," University of Texas, San Antonio, TX, Sept 30, 2013
45. Visiting Professor "Surgical Management of Cervical Radiculopathy and Myelopathy," "Surgical Treatment of Spinal Tumors" Washington University Medical Center, St. Louis, MO Feb 21, 2014
46. Visiting Professor "Surgical Management of Cervical Radiculopathy and Myelopathy," "Lumbar Disc Disorders: Current Treatment and Basic Science Research" University of Pennsylvania, Philadelphia, PA June 26, 2014
47. Visiting Professor "Surgical Management of Cervical Radiculopathy and Myelopathy," "Lumbar Disc Disorders: Current Treatment and Basic Science Research" Cornell University Medical Center NY, NY July 16, 2014
48. Visiting Professor "Degenerative Spinal Disorders: Current Treatments and Basic Science Research" William Beaumont Hospital, Detroit, MI May 1, 2015
49. Visiting Professor "Surgical Options for Cervical Spondylotic Myelopathy and Radiculopathy," "Degenerative Lumbar Disorders: Current Treatment and Basic Science Research" UCLA Medical Center, Oct 5-6, 2015
50. Visiting Professor "Degenerative Lumbar Disorders: Controversies" Mt. Sinai Medical Center, NY, NY May 12, 2016
51. Visiting Professor "Degenerative Disc Disease: Current Treatment and Basic Science Research" Massachusetts General Hospital 6th Annual International Spine Symposium, Oct. 25, 2016

INTERNATIONAL INVITED PRESENTATIONS

1. Program Chairman for scientific sessions on "MRI of the Spine" and "Spinal Stenosis" during Society for International Congress of Orthopaedics and Traumatology (SICOT), Sept. 2, 1993, Seoul, Korea
2. "Complications in Adult Spinal Deformity Surgery" at Society for International Congress of Orthopaedics and Traumatology (SICOT), Sept. 2, 1993, Seoul, Korea
3. "Bone Graft Substitutes" Cappagh Orthopedic Hospital and Our Ladies Hospital for Sick Children, Dublin, Ireland, SRS traveling fellowship May 8, 1995
4. "Bone Graft Substitutes" Nuffield Orthopaedic Center, Oxford University, Oxford, U.K, SRS traveling fellowship. May 10, 1995
5. "Current Advances in MRI of the Spine" Malmö University Hospital, Malmö, Sweden, SRS traveling fellowship May 12, 1995
6. "Biomechanics of Transpedicular Spine Fixation" Langensteinbach Rehabilitation Krankenhaus (Professor J. Harms), Germany, SRS traveling fellowship Germany May 18, 1995
7. "Bone Graft Substitutes" University of Verona, Italy, SRS traveling fellowship, May 21, 1995
8. "Biomechanics of spinal trauma and instrumentation" Trousseau Hospital and St. Vincent de Paul Hospital (Professor. Jean Dubousset) Paris, France, SRS traveling fellowship, May 24, 1995
9. "Spinal Instrumentation for trauma and deformities." The president's guest keynote speaker at the Korean Spine Society, Seoul, Korea May 29, 1996
10. "Outpatient Lumbar Surgery Technique" Symposium on Lumbar Radiculopathy. May 31, 1997 Kobe, Japan
11. Workshop Instructor "Stryker Spinal Invitational Symposium" Sept. 27, 1999 Ilha de comandatuba, Brazil
12. "Thoracolumbar Spine Instrumentation," "Cervical Spine Instrumentation," "Anterior or Posterior Surgical Procedures for Cervical Degenerative Disorders," "ALIF, PLIF or 360° for Lumbar Degenerative Disease," and "Occipitocervical Fusion Techniques" Speaker at AMOT (Association for Mexican Orthopaedics and Traumatology) 11-9 to 11-13, 1999 Guadalajara, Mexico,
13. "Effect of OP-1 on Disc Regeneration" International Symposium of Interbody Cages and Intradiscal Therapies 3-31-00 to 4-1-00 Barcelona, Spain
14. "Spinal Deformities in the sagittal plane," and "Lumbar disc degeneration and regeneration" at Spine Society of Australia 4-6 to 4-7, 2000 Adelaide, Australia
15. "Use of OP-1 for Intervertebral Disc Repair and Regeneration" 4th International OP-1 Conference 3-23 to 3-25, 2001 Vancouver, Canada
16. "Use of Bone Grafts and Graft Substitutes for Spinal Fusion" and "Intervertebral Disc Metabolism and Effects of Growth Factors on Disc Matrices" International Symposium on Interbody Fusion and Advanced Techniques 3-29 to 3-31, 2001 Hong Kong
17. "Current Treatment of Cervical Disc Disease" and "Long-term Results of Cervical Spine Fusions" at 2001 Spinal Surgery Association, Republic of China, Taipei, Taiwan, April 21, 2001
18. "Cervical Spine Injury" Veteran's General Hospital of Yangming Medical College, Taipei, Taiwan. April 23, 2001
19. "Advances in Lumbar Spine Surgery" at Keio University School of Medicine, Tokyo, Japan 10-15-01
20. "Lumbar Disc Degeneration" at Kawasaki Medical College, Okayama, Japan 10-17-01
21. "Progress in Intervertebral Disc Regeneration," "Tissue Engineering of the Intervertebral Disc" Research Japan Orthopaedic Association, Hiroshima, Japan 10-18 to 10-19, 2001
22. "Lumbar Spine Disorders: Current Advances" at Wakayama Medical College, Wakayama City, Japan 10-22-01
23. "Lumbar Disc Disease: Basic Science and Clinical Considerations," "Spinal Instability and Instrumentation" The 4th Biennial Korea-Japan Conference on Spinal Surgery, Gyeongju, Korea Sept. 18-20, 2003
24. "Spinal Tumors: Diagnosis and Treatment" Samsung Medical Center, Seoul, Korea Sept. 16, 2003
25. "Kyphotic Deformities of Thoracolumbar Spine" Eujil University Medical Center. Daejeon, Korea April 20, 2004
26. "Surgical Techniques in the Cervical Spine" Yonsei University College of Medicine Seoul, Korea May 29, 1996
27. "Cervical Spine Instrumentation: Indications and Techniques" "Biological Treatment for Lumbar Degenerative Disc Disease" Korean Orthopaedic Association Jeju Island, Korea April 22, 2004
28. "Biological Disc Repair or Regeneration" and "Degenerative Spondylolisthesis: Is Instrumentation Necessary" Hellenic Spine Society, Samos Island, Greece, Sept 16-19, 2004
29. "Surgical Strategies for Disc Degeneration: Is Lumbar Spine Fusion a Gold Standard? Combine ORS and Canadian ORS, Oct. 11, 2004 Banff, Canada
30. "Intervertebral Disc Disease: Biomechanical and Biological Considerations: 20th Japanese Orthopaedic Association Research Meeting, Ise City, Japan Oct. 20-21, 2005

31. "Lumbar Spine Surgery: Basic Science to Clinical Practice" Department of Orthopaedic Surgery, Chiba University Chiba City, Japan Oct. 18th, 2005
32. "Cervical Spine Instrumentation: Recent Advances" 2006 Qingdao International Congress on Spine and Joint Reconstruction. Qingdao, China Nov. 3-5, 2006
33. Chair of the International Spine Symposium. Moderator, "Posterior Motion Preservation Surgery," "Effect of Growth Factors on Intervertebral Disc Degeneration and Repair" Lisbon, Portugal, April 19-21, 2007
33. "Lumbar Disc Disease: Current Advances in Surgery and Basic Science Research . Japan Spine Society, Kanazawa, Japan April 24-26
34. "Surgical Treatment of Kyphotic Deformities" Gifu University Medical Center, Gifu, Japan April 27-28, 2007
35. "Surgical Techniques for Spinal Tumors," "Lumbar Degenerative Disc Disorders" Korean Society of Spine Surgery, Seoul, Korea April 4-5, 2008
36. "Pitfalls of Spinal Surgery in the Osteoporotic Patient," "Biological Therapies for Intervertebral Disc Degeneration" Korean Spinal Neurosurgical Society, Seoul, Korea Sept 5-6, 2008
37. "Novel Treatments for Lumbar Degenerative Disc Disorders" International Society for the Minimally Invasive Spine Surgery, Istanbul, Turkey April 1-2, 2010
38. "Cervical Spinal Tumors" Korean CSRS, Seoul, Korea, July 3-4, 2010
39. "Pathogenesis of Lumbar Spinal Stenosis" SpineWeek, Amsterdam, Netherlands June 1, 2012
40. "Intervertebral Disc Repair and Regeneration, Including Stem Cells" International Society for the Advancement of Spine Surgery, Vancouver, Canada April 4, 2013
41. "Degenerative Scoliosis: Individualized Surgical Treatment," "Surgical Treatment Options for Cervical Radiculopathy" Chinese Orthopaedic Association, Beijing, China Nov. 6-8, 2013
42. " Spinal Instrumentation for Surgery for Degenerative Disc Disorders," "Sagittal Deformity of the Thoracolumbar Spine" Chinese Society for the Study of the Lumbar Spine. Shanghai, China April 3-6, 2014
43. "Lumbar Degenerative Disorders: Advances in Surgical Treatment and Basic Science Research" Japanese Orthopaedic Association. Kobe, Japan May 24, 2014
44. "Cervical Radiculopathy and Myelopathy: Surgical Treatment," "Degenerative Scoliosis: Surgical Options" Korea University Medical Center, Seoul, Korea June 3, 2014
45. "Translational Research in Intervertebral Disc Degeneration" Korean Spinal Basic Research Society, June 6, 2014, Seoul, Korea.
46. "Degenerative Scoliosis: Surgical Options" World Spine Essay 2015, June 5-7, 2015 Bali, Indonesia
47. "Cervical Radiculopathy: Treatment Options," "Red Flags in Patients with Degenerative Lumbar Disorders" AO Spine, Davos, Switzerland, December 11-14, 2015
48. "Degenerative Scoliosis" and "Cervical Spine Tumors" World Spine Essay and Thailand Spine Society, Pattaya, Thailand.
49. "Cervical Spondylotic Myelopathy", "Degenerative Scoliosis" Experts in Spine Surgery, June 24, 2016 Jeju Island, Korea
50. "High-grade Spondylolisthesis" Catholic University Medical Center, Seoul, Korea June 21, 2016
51. "Degenerative Scoliosis: Surgical Options" Shanghai 10th People's Hospital. Shanghai, China July 14, 2016
52. "Sagittal Deformities of the Thoracolumbar Spine" 28th National Conference on Spine and Spinal Cord. Yantai, China July 16, 2016.
53. "Sagittal Deformities of the Thoracolumbar Spine" Visiting Professor, Department of Neurosurgery, Catholic University Medical Center, Seoul, Korea November 9, 2016
54. "Primary Tumors of the Cervical Spine: Surgical Treatment", "Osteotomy of the Cervical Spine" Asia Pacific Cervical Spine Society, Seoul, Korea, Nov. 11-12, 2016

PUBLICATIONS (ORIGINAL PEER-REVIEW PAPERS)

1. Namey TC, and An HS: Sorting out The Causes of Sciatica, *Mod Med* p.132-143, Oct., 1984
2. An HS, Howard JM, Kim K: Fracture of Abdominal Heterotopic Ossification *Ohio State Med. J.* 81, 591-593, 1985
3. Namey TC, An HS: Emergency Diagnosis and Management of Sciatica: Differentiating the Nondiscogenic causes. *Emerg. Med. Rep.* 6(22), 169-178, 1985
4. An HS, Ebraheim NA, Kim K, Jackson T, Kane JT: Heterotopic Ossification and Pseudoarthrosis in the shoulder Following Encephalitis: A Case Report and Review of Literature. *Clin. Orthop.* 219, 291-298, 1987.
5. An HS, Namey TC, Kim K: Essential Cryoglobulinemia Associated with Persistent Synovitis of the Knee. *Clin. Orthop.* 215:70-74, 1987
6. An HS, Simpson JM, Jackson WT: "Acute Anterior Compartment Syndrome in the Thigh: A Case Report and Review of Literature" *J. Orthop. Trauma* 1, 180, 1987

7. An HS, Jackson WT, Ebraheim N, Hawthorne K: "Case Report: Transient Simultaneous Sciatic and Femoral Nerve Palsy Secondary to Iliacus and Gluteal Hematomas Following Heparinization for Pulmonary Embolus in a Patient with Posterior Hip Dislocation" *J. Orthop. Trauma* 1, 174, 1987
8. An HS, Jackson WT: Osteolysis of pubic Symphysis Simulating Malignancy: A Case Report and Review of Literature. *Orthopaedics*. 11,951-954,1988
9. Ebraheim NA, An HS, Jackson WT, et al: Scapulothoracic Dissociation *J. Bone Jt. Surg* 70A:428-433, 1988
10. An HS, Southworth S, Jackson WT: Cigarette Smoking and Dupuytren's contractures. *J. Hand Surg* 13A, 872-874, 1988
11. An HS, Hawthorne K, Jackson WT: Cigarette Smoking and Reflex Sympathetic Dystrophy. *J. Hand Surg* 13A, 458-460, 1988
12. An HS, Vonderbrink J, Ebraheim NA, Shiple F, Jackson WT: Scapulothoracic Dissociation in a child with Normal Neurovascular Status *J. Orthop. Trauma* 2,36-38,1988.
13. An HS, Wojcieszek J: Simultaneous Intertrochanteric and Subcapital Fracture of the Hip: A Case Report and Review of Literature. *Orthopaedics* 12:721-723, 1989.
14. An HS, Ebraheim N: The Value of Internal Oblique Radiographic Views in Posterolateral Grafting of the Tibia. *Clin. Orthop.* 219:209, 1989
15. An HS, Loder RT: Intra-articular Entrapment of Olecranon Fracture in a Child. *Orthopaedics* 12:289-291, 1989
16. Ebraheim NA, An HS: Roy-Camille plating of the Posterior Cervical Spine: Techniques and indications. *J. Orthop. Trauma* 3:19-23, 1989.
17. Simpson MJ, Ebraheim NA, An HS, Jackson WT: Posterolateral Bone Graft of the Tibia. *Clin. Orthop.* 251:200-206, 1990
18. An HS, Vaccaro A, Simeone F, Balderston R: Herniated Disc Disease in Patients over 50 years. *J. Spin. Dis.* 3:143-146, 1990
19. Frogameni A, An HS: A Comparative Study between Coventry wedge osteotomy and MaQuet Dome osteotomy of the proximal tibia for varus Gonarthrosis. *Amer. J. Knee Surg.* 3:161-167, 1990
20. Kupcha P, An HS, Cotler J: Gunshot injuries of the spine. *Spine* 15:1058-1063, 1990
21. Vaccaro AR, Cotler JM, An HS, Horenstein PA: Anterior surgical exposure of the cervicothoracic juncture for decompression and fusion of the unstable spine. *Jefferson Orthop J.* 19:26-33, 1990
22. Ebraheim NA, Rusin J, An HS, et al: CT Guided Percutaneous Fixation for High Grade Slipped Capital Femoral Epiphysis: A New Technique. *Orthopaedics*. 14:859-864, 1991
23. An HS, Mikhail WE, Jackson, WT, Tolin B, Dodds GA: Effects of Hypotensive Anesthesia, Nonsteroidal Anti-inflammatory Drugs and Methylmethacrylate on Bleeding in Total Hip Patients. *J. Arthroplasty* 6:245,1991
24. An HS, Vaccaro A, Dolinskas C, Balderston R, Cotler J: Distinction between Spinal Infection and Spinal Tumors by MRI. *Spine* 16:S334-338, 1991
25. An HS, Vaccaro A, Cotler JM: Low Lumbar Burst Fractures: Comparison among Body Cast, Harrington Rods, Luque Rods, or Steffee Plates. *Spine* 16:S440-444, 1991
26. An HS, Renner K, Gordin R: Anatomic Consideration for Plate-Screw Fixation of the Cervical Spine. *Spine* 16:S548-551, 1991
27. An HS, Simpson MJ, Ebraheim NA et al: Low Lumbar Burst Fractures. *Orthopaedics* 15:367-373,1992
28. Vaccaro AR, An HS, Lin S, et al: Noncontiguous injuries of the spine. *J. Spin. Dis.* 5:320-329, 1992
29. An HS: Internal fixation of the cervical spine. *Sem. Spin. Surg.* 4: 142-152, 1992
30. Vaccaro AR, An HS, Cotler JM, Glowacki K: Dislocation of the Cervical Spine due to Trauma after a Previous Upper Thoracic Fusion for Scoliosis: a Case Report. *Jefferson Orthopaedic Journal*, 1992
31. An HS, Munk R: Osteomyelitis of the Posterior Element of the Cervical Spine in an Infant: A Case Report and Review of Literature" *Orthopaedics* 16:618-620, 1993
32. Cotler J, Herbison GJ, Nasuti JF, Ditunno JF, An HS, Wolff BE: Closed reduction of traumatic cervical spine dislocation using traction weights up to 140 pounds. *Spine* 18:386-390, 1993
33. Vaccaro AR, An HS, Cotler JM, Ahmad S, Jordan AG: Recurrent Cervical Subluxations in a Patient with Gout and Endstage Renal Disease: *Orthopaedics* 16:1273-1276, 1993.
34. Simpson JM, Silveri C, Simeone FA, An HA: Thoracic disc herniations. Re-evaluation of the posterior approach using a modified costotransversectomy. *Spine* 18:1872-1877, 1993.
35. Albert T, Levine M, An HS, Cotler JM: Concurrent Thoracolumbar fractures and sacral fractures. *Spine* 18:1285-1291, 1993
36. An HS, Evanich C, Nowicki B, Haughton V: Ideal thickness of Smith-Robinson anterior cervical interbody graft. *Spine* 18:2043-2047,1993.
37. An HS, Haughton V: Imaging considerations of lumbar spinal stenosis. *Sem. CT Ultras MRI.* 14:414-424, 1993

38. Hasegawa T, An HS, Haughton V: Anatomic considerations of lumbar spinal stenosis. *Sem. CT, Ultras, and MRI*. 14:404-413, 1993
39. Albert T, Balderston RA, Heller JG, Herkowitz HN, Garfin SR, Tomany K, An, HA, Simeone FA: Upper lumbar disc herniation. *J. Spin. Dis.* 6:351-359, 1993
40. Simpson JM, Silveri C, Simeone FA, Balderston BA, An HS: Results of laminectomy in diabetic patients with lumbar herniated disc or stenosis. *J. Bone Joint Surg* 75A:1823-1829, 1993
41. Haughton VM, Nguyen CM, Ho KC, An HS: MRI contrast enhancement: An experimental study in post-laminectomy epidural fibrosis. *Amer J Neurorad* 14:997-1002, 1993.
42. Craft DV, Cotler JM, Bauerle WB, An HS: Halo management of displaced type II odontoid fractures. *Jefferson Orthop Journal* 22: 53-61, 1993.
43. An HS, Glover JM: Spinal stenosis: Historical perspectives, classifications, and pathoanatomy. *Sem. Spin. Surg.* 6:69-77, 1994.
44. Nguyen C, An HS, Khang-Cheng H, Haughton VM, Hasegawa T: Utility of high-dose contrast enhancement for detecting recurrent herniated intervertebral disks. *Amer J Neuroradiology* 15:1291-1297, 1994
45. An HS, Vaccaro A, Cotler JM: Spinal Disorders at the Cervico-thoracic Junction. *Spine* 15:2557-2564, 1994
46. An HS, Silveri, C. P, Simpson J. M, Simmons C, File, P, Simeone F. A, and Balderston R. A: Comparison of Smoking habits between Patients with surgically Confirmed Herniated Lumbar and Cervical Disease and Controls. *J Spin Dis* 7:369-373, 1994
47. An HS, Nguyen C, Ho KC: Gadolinium-MRI in the canine spine model: Contrast enhancement and kinematics in the herniated disc versus scar in dogs. *Spine* 19:2089-2094, 1994
48. An HS, Xu R, Lim TH, McGrady L, Wilson C: Prediction of bone graft strength using dual energy x-ray absorptiometry. *Spine* 19:2358-2363, 1994
49. Lim TH, An, HS, EvanichC, Hasanoglu C, Wilson C: Effect of bone mineral density on the pull-out strength of the vertebral screw *J. Spin Dis* 8:121-125, 1995
50. Hasegawa T, An HS, Haughton VM, Nowicki, B: Lumbar foraminal stenosis: Critical heights of the intervertebral discs and foramina: A cryomicrotome study in cadavera. *J Bone Joint Surg* 77A: 32-38, 1995
51. Nguyen C, Haughton VM, Ho KC, An HS, Myklebust JB, Hasegawa T, Xu R, Harb JM: Contrast enhancement in spinal nerve roots: an experimental study. *Amer J Neuroradiol* 16:265-268, 1995
52. Vaccaro AR, Rizzolo SJ, Balderston RA, Allardyce TJ, Garfin SR, Dolinskas C, An HS: Placement of pedicle screws in the thoracic spine. Part II: an anatomical and radiographic assessment. *J Bone Joint Surg* 77A:1200-1205, 1995
53. Lim TH, An HS, Hasegawa T, McGrady L, Hasanoglu KY, Wilson CR: Prediction of fatigue screw loosening in anterior spinal fixation using dual energy x-ray absorptiometry. *Spine* 20:2565-2569, 1995
54. An HS, Lynch K, TothJ: Comparison between allograft and autograft in adult posterolateral lumbar spine fusion. *J Spin. Dis.* 8:131-135, 1995
55. Toth JM, An HS, Lim TH, Lundberg W, Ran Y, Weiss N, Xu R, Lynch K: Evaluation of porous calcium phosphate ceramics for anterior cervical interbody fusion in a caprine model. *Spine* 20:2203-2210, 1995
56. An HS, Simpson JM, Glover JM, Stephany J: Comparison between allograft plus demineralized bone matrix vs. autograft in anterior cervical fusion. A prospective randomized multi-center study. *Spine* 20:2211-2216, 1995
57. An H. S, Andreshak T, Nguyen C, Williams A, Daniels D: Can we differentiate metastatic disease and compression fractures of the spine by MRI: A clinical and canine study. *Spine* 20:1776-1782, 1995
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111. Aota Y, Ohnari K, Yoshikawa K, Fujiwara A, An HS: Morphology of the dorsal root ganglion in patients with herniation of the nucleus pulposus: Assessment using magnetic resonance myelography. Poster at ISSLS, 4-9-00, Adelaide, Australia
112. Fujiwara A, Tamai K, An HS, Lim TH, Yoshida H, KurihaShi A: The association between facet joint osteoarthritis and its orientation and tropism in the lumbar spine. ISSLS, 4-9-00, Adelaide, Australia
113. Park A, An Hs, Wise J, Goldberg E; Use of modern instrumentation for treatment of cervical spondylotic myelopathy. Mid-American Orthopaedic Association, 2-28-00, Scottsdale, AZ
114. An HS, Lim TH, Andersson GBJ: Effect of rod and screw sizes on the biomechanical stability of a pedicle screw construct. Mid-American Orthopaedic Association, 2-28-00, Scottsdale, AZ
115. Matsumoto T, Masuda K, An HS, Andersson GBJ, Rueger DC, Thonar E: Tissue engineered intervertebral disc: enhancement of formation with OP-1. NASS, 10-28-00 New Orleans, LA
116. Lee SC, An HS, Fujiwara A, Renner SM, Yoon T, BrebachHG, Andersson BJ: Effects of pedicle screw-rod distraction, posterior lumbar interbody graft distraction and interbody graft plus posterior compression on lumbar foraminal dimensions and lordosis. NASS, 10-28-00 New Orleans, LA
117. Takegami K, Masuda K, Thonar EJ, Kamada H, Cahn, Andersson GBJ, Rueger DC, An HS: Effect of intradiscal injection of OP-1 in the rabbit. NASS, 10-28-00 New Orleans, LA
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119. Yoon T, Natarajan R, An Hs, Andersson G; Adjacent disc biomechanics after anterior cervical discectomy and fusion in kyphosis. CSRS 11-30-00 Charleston, SC
120. Natarajan RN, Yoon S, An H, Andersson G: Sagittal alignment of ACDF influences adjacent disc biomechanics. ORS 2-26-01 San Francisco, CA
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122. Matsumoto T, Masuda K, An H, Chen S, Williamson A, Sah R, Andersson G, Thonar E; Formation of transplantable disc-shaped tissues by nucleus pulposus and annulus fibrosus cell: biochemical and biomechanical properties. ORS 2-26-01 San Francisco, CA
123. Cs-Szabo G, Ragasa-San Juan D, Turumella V, Masuda K, Thonar E, An H: Expression levels of extracellular matrix components of the intervertebral disc change differently in the annulus fibrosus and nucleus pulposus during tissue degeneration. ISSLS, 2-19-01 Edinburgh, Scotland, UK, and NASS 11-1-01 Seattle, WA
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UK, and NASS 11-2-01 Seattle, WA

125. Lim TH, Brebach HGT, Renner SM, Kim WJ, Kim JG, Andersson GBJ, An HS: Effect of injectable calcium phosphate cement on the compressive vertebral body strength in vertebroplasty. ISSLS 2-2001 Edinburgh, Scotland, UK, NASS, 11-2-01 Seattle, WA
126. Aota Y, Masuda K, Homandberg G, Thonar E, An HS: Fibronectin fragments upregulate proteoglycan synthesis by intervertebral disc cells – A comparison with articular chondrocytes. Poster at the ISSLS. 2-19-01 Edinburgh, Scotland, UK
127. Jeon CH, An HS: The immunologic expression of MMP-1, collagenase-1 and MMP-3 (stromelysin-1) in the neonatal lumbar disc. ISSLS, 2-19-01 Edinburgh, Scotland, UK
128. Matsumoto T, An H, Thonar E, SaHR, Andersson G, Rueger DC, Masuda K: Tissue engineered intervertebral disc cultured with osteogenic protein-1. ISSLS, 2-19-01 Edinburgh, Scotland, UK
129. Jeon CH, Kim HK, An H: The correlation between the clinical outcomes and the neovascularization and bFGF expression in the herniated disc tissues. ISSLS, 2-19-01 Edinburgh, Scotland, UK
130. Kim WJ, Katolik LI, Lim TH, Renner SM, Andersson GJB, An HS: Effect of calcium phosphate injection method and timing on pedicle screw fixation. NASS 11-1-01 Seattle, WA
131. Aota Y, Masuda K, Nguyen C, HZ, Matsumoto T, Thonar E, An HS: A novel rabbit model of mild progressive disc degeneration. NASS 11-1-01 Seattle, WA.
132. Lee CK, Roseland NJ, Wetzel T, Andersson G, Pelozo JH, RaShbaum RF, Yuan HA, Phillips FM, An HS: Two year post-treatment evaluation of pain levels and location of pain after intradiscal electrothermal annuloplasty (IDET) to treat discogenic low back pain. NASS 11-1-01 Seattle, WA
133. Masuda K, Takegami K, Kim J, Lim TH, Andersson G, Thonar E, An HS: A novel culture system for the whole intervertebral disc with endplates: an in vitro model for testing biological and biomechanical effects. CSRS, 11-29-01 Monterey, CA. Lecture at the Federation of Spine Society, AAOS 2-17-02, Dallas, TX. ORS 2-11-02, Dallas, TX
134. Vermes C, Galante G, An HS, Hallab N, Glant T, Jacobs J, Andersson G, Roebuck K: Research edding of osteoblast cell surface expressed, nonfunctional interleukin receptor-6 results in activation of GP-130 mediated signaling in osteoblasts. ORS 2-11-02, Dallas, TX
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136. Masuda K, Matsumoto T, Andersson G, Thonar E, An HS: Effect of Osteogenic Protein-1 on the metabolism of proteoglycan of intervertebral disc cells in aging. ORS 2-11-02, Dallas, TX
137. Masuda K, Aota Y, Homandberg G, Imai Y, Thonar E, An HS: Fibronectin fragments have different effects on proteoglycan synthesis by cells from annulus fibrosus, nucleus pulposus, and articular cartilage. ORS 2-11-02, Dallas, TX
138. Masuda K, Matsumoto K, An HS, Andersson G, Thonar E: Gene gun mediated transfer of osteogenic protein-1 gene to intervertebral disc and articular cartilage tissues. ORS 2-11-02, Dallas, TX
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141. Lim TH, Renner S, An HS, Kim WJ, Katolik L, Kim J, Andersson G: Augmentation of pedicle screw fixation strength using an injectable calcium phosphate cement as a function of injection timing and method. ORS 2-11-02, Dallas, TX
142. Matsumoto T, An HS, Andersson G, Thonar E, Masuda K: Effect of OP-1 on the metabolism of proteoglycan by intervertebral disc cells at different ages. ISSLS, 5-2002, Cleveland
143. Imai Y, An HS, Matsumoto T, Nguyen C, Andersson G, Thonar E, Masuda K: Intervertebral disc regeneration with rhOP-1 following C-ABC chemonucleolysis: An in vivo study using the rabbit model. ISSLS. 5-15-2002, Cleveland, OH
144. Kim KW, Lim TH, Kim JG, Jeong ST, An HS: Origin of chondrocytes and fibroblasts in the nucleus pulposus replacing the notochordal nucleus pulposus with fibrocartilage. ISSLS, 5-15-2002, Cleveland, OH
145. Ahn NU, King RS, Nho S, Crane B, Ahn UM, Hiranyashiti N, Buchowski J, Lee G, Goldberg E, Andersson G, An HS: Smoking, smoking cessation, and wound complications after lumbar spine surgery. ISSLS, 5-15-2002, Cleveland, OH SRS, 9-19-02, Seattle. WA and NASS, 10-30-02, Montreal, CN
146. Imai Y, An HS, Thonar E, Andersson G, Masuda K: Recombinant human osteogenic protein-1 upregulates extracellular matrix metabolism by human annulus fibrosus and nucleus pulposus cells. NASS, 10-30-02,

Montreal, CN

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148. Imai Y, An HS, Nguyen, Muehleman C, Thonar E, Andersson G, Masuda K: Chondroitinase ABC-induced intervertebral disc degeneration is minimized when the Enzyme is co-injected with OP-1. NASS, 10-30-02, Montreal, CN
149. Ahn N, Imai Y, An HS, Yamada M, Masuda K: Effect of nutrient concentration and OP-1 on the metabolism of intervertebral disc: in vitro organ culture study. Poster at Scoliosis Research Society, 9-19-02, Seattle. WA. NASS, 10-30-02 Montreal, CN, and ISSLS, 5-14-03, Vancouver, CN, CSRS, 12-5-02 Miami, FL
150. Samartzis D, Lyon C, Phillips M, Goldberg E, An HS: Comparison of non-plating to plating in one-level anterior cervical discectomy and fusion. CSRS, 12-5-02 Miami, FL
151. Muehleman C, Masuda K, Imai Y, Aota Y, Thonar E J-MA, Andersson GBJ, An HS. Histological assessment of a novel needle puncture model: A mild, progressive intervertebral disc degeneration. ORS, 2-2-03 New Orleans, LA.
152. Yamada M, An H, Thonar E, Pichika R, Imai Y, SaHR, Masuda K: Bioreactor cultivation has effects on proteoglycan synthesis by chondrocytes in alginate beads. ORS, 2-2-03, New Orleans, LA.
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154. Okuma M, An H, Thonar E, SaHRL, Pichika R, Yamada M, Imai Y, Masuda K: Microgravity stimulates cell proliferation but suppresses proteoglycan metabolism: utilization of a rotary cell culture system for annulus fibrosus cells in alginate. ORS, 2-2-03, New Orleans, LA and ISSLS, 5-14-03, Vancouver, CN
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156. Imai, Y, An, H, Thonar, E, Andersson, G, Masuda, K: Recombinant human osteogenic protein-1 upregulates extracellular matrix metabolism by human annulus fibrosus and nucleus pulposus cells. ORS, 2-2-03, New Orleans, LA and ISSLS, 5-14-03, Vancouver, CN, Spine Across the Sea: a combined the NASS and Japanese Spine Society, July 27, 2003 Maui, Hawaii
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159. Turner TM, Urban RM, Lim TH, Tomlinson MJ, Hall DJ, Renner SM, An HS: Vertebroplasty using injectable calcium phosphate cement compared to polymethylmethacrylate in a unique canine vertebral body large defect model. ORS, 2-2-03, New Orleans, LA. and ISSLS, 5-14-03, Vancouver, CN
160. Imai Y, An HS, Thonar EJ, Lenz ME, Pichika R, Andersson G, Masuda K: The quantification of cytokine-induced matrix catabolism in tissue engineered intervertebral discs. ISSLS, 5-14-03, Vancouver, CN
161. Jeon CH, An HS, Kim DJ, Lee HM, Kim YC: Macrophage infiltration and immunoexpression of matrix metalloproteinase-1 and matrix metalloproteinase-3 in intervertebral disc. ISSLS, 5-14-03, Vancouver, CN
162. Hasegawa T, Inufusa A, Mikawa Y, Lim TH, An HS: An experimental study of hydroxyapatite-coated pedicle screws in the osteoporotic lumbar spine. ISSLS, 5-2003, Vancouver
163. Masuda K, Imai Y, Okuma M, Nakagawa K, Ymada M, Muehleman C, Thonar E, Andersson G, An H: A novel therapeutic approach: the injection of OP-1 following chondroitinase-ABC chemonucleolysis results in recovery of disc height in the rabbit. Spine Across the Sea: a combined the NASS and Japanese Spine Society, July 27, 2003 Maui, Hawaii. NASS, San Diego, CA 10-22, 2003-10-27
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 338. Natarajan R, Qasim M, An H, Andersson GBJ: Effect of Progressive Increase in Radial Lesion Size on Lumbar Intervertebral Disc Biomechanics Depends on the Integrity of Surrounding Annular Fibers. International Society for the Study of the Lumbar Spine, Auckland, New Zealand, April 14, 2010
 339. Ren J, Zhang Y, Chee A, An HS: Effects of Local Anesthetic and Nonionic Contrast Agents on Bovine Intervertebral Disc Cells Cultured in Alginate. ISSLS, Auckland, New Zealand, April 14, 2010, Spine ' Arthroplasty Society, New Orleans, LA April, 2010, NASS, Orlando, FL, Oct. 2010, CSRS, Charlotte, NC, 2010
 340. Yoshikawa T, Masuda K, Bae WC, Kakutani K, Bydder M, An HS: Effect of Bone Morphogenetic Protein-7 on Chronic Intervertebral Disc Degeneration in a Mature Rabbit Model. ISSLS, Auckland, New Zealand, April, 2010
 341. Zhang Y, Drapeau S, An HS, Markova D, Lenart B, Anderson G: Histological Features of the Degenerating Intervertebral Disc in the Goat Disc Injury Model. ISSLS, Auckland, New Zealand, April 14, 2010 Spine Arthroplasty Society, New Orleans, LA April 27, 2010
 342. Espinoza Orias, An HS, Andersson G, Inoue N: In Vivo Measurement of Lumbar Vertebral Endplates 3D Surface Area in Healthy Volunteers. ISSLS, Auckland, New Zealand, April 14, 2010
 343. Siemionow K, An HS, Masuda K, Andersson G, Cs-Szabo G: The Effects of Age, Sex, Race, and Weight on the Rate of Intervertebral Disc Degeneration. NASS, Orlando, FL, Oct. 5, 2010
 344. Takigawa T, Simon P, Espinoza A, Hong JT, Ito Y, Inoue N, An HS: Biomechanical Comparison of Occiput-C1-C2 Fixation Techniques: C0-C1 Transarticular Screw and Direct Occipital Condyle Screw. CSRS, Charlotte, NC, Dec. 1, 2010
 345. Ehteshami JR, Natarajan R, An HS: The Effects of Endplate Distraction during Cervical Spine Arthroplasty and Endplate Stress. CSRS, Charlotte, NC, Dec. 1, 2010
 346. Cs-Szabo G, Gerard D, Park S, Pietryla D, Andersson GBJ, An H: Age- and Anatomical location-dependent Change of Sensitivity to TNF-alpha of Human Intervertebral Disc Cells. ORS, Long Beach, CA Jan. 13, 2011
 347. Cs-Szabo G, Gerard D, Park S, Lundgren M, Krawczak D, Lewis J, An H: Biglycan over-expressed by the annulus fibrosus cells promotes repair-related mechanisms. ORS, Long Beach, CA Jan. 13, 2011
 348. Takigawa T, Simon P, Espinoza Orias, A A, Hong J T, Ito Y, Inoue N, An HS: Biomechanical Analysis of Novel Occiput-C1-C2 Fixation Techniques. ORS. Long Beach, CA Jan. 13, 2011
 349. Takigawa T, Espinoza AA, Sugisaki K, Natarajan RN, Wimmer MA, Ito Y, Andersson GBJ, An HS, Inoue N: Relationship between Facet Capsule Strain and Lumbar Kinematics. ORS, Long Beach, CA Jan. 13, 2011
 350. Natarajan RN, Qasim M, An H, Andersson GBJ: Integrity of Annular Fibers Surrounding Annular Lesion Affects Lumbar Intervertebral Disc Biomechanics. ORS. Long Beach, CA Jan. 13, 2011
 351. Espinoza AO, Siemionow K, An HS, Andersson G, Inoue N: Degeneration in facet joints and intervertebral discs accelerates after the fourth decade. ISSLS, Goteburg, Sweden June 15, 2011
 352. Simon P, Espinoza AO, An HS, Andersson G, Inoue N: In vivo topographic analysis of lumbar facet joint space width distribution in healthy and symptomatic subjects. ISSLS, Goteburg, Sweden June 15, 2011
 353. Espinoza AO, LaBelle M, An HS, Andersson G, Inoue N: Changes in 3D endplate geometry associated with disc degeneration. ISSLS, Sweden June 15, 2011
 354. Lenart GA, Al-Shihabi L, Chee A, Park C, Zhang Y, An HS: Local anesthetics are cytotoxic to intervertebral disc cells in cultured rabbit explants. ISSLS, Goteburg, Sweden June 15, 2011. NASS, Nov. 3, Chicago, IL 2011
 355. Cs-Szabo G, Gerard D, Park SY, Pietryla D, Andersson G, An HS: Response of human IVD cells to TNF-alpha is dependent on the age of the donor and the anatomical location of the cell. ISSLS, Goteburg, June 15, 2011
 356. Natarajan R, An HS, Andersson G: Relevance of disc tissue composition, morphology and annular lesions with respect to lumbar disc degeneration. ISSLS, Goteburg, Sweden June 15, 2011
 357. Lenart B, Zhang Y, Ren J, An HS: Histological features of mammalian endplates of the spine: from mice to men. International Society for the Study of the Lumbar Spine Goteburg, Sweden June 15, 2011
 358. Andersson G, Markova F, An HS, Markov V, Saitta B, Chee A, Enomoto-Iwamoto M, Gupta C, Thonar E, Zhang Y: Human umbilical cord blood derived mesenchymal stem cells in the cultured rabbit intervertebral disc-a cell therapy approach. ISSLS, Goteburg, Sweden June 15, 2011
 359. Shi P, An HS, Markova D, Anderson DG, Chee A, Harley D, Chen EY, Zhang Y: Interleukin-8 present in disc tissues from patients with discogenic back pain can stimulate substance P release by cultured sensory neurons. International Society for the Study of the Lumbar Spine Goteburg, Sweden June 15, 2011
 360. An HS, Hong JT: Comparison of ipsilateral and contralateral canal decompression using an unilateral

- laminotomy approach for single or multilevel lumbar stenosis. ISSLS, Goteburg, Sweden June 15, 2011
361. Kim JS, Kroin J, An HS, Li X, Yan DY, Farag M, Im Sampen HJ: Enucleated nucleus pulposus-induced intervertebral disc degeneration as an animal model for chronic low back pain. NASS, Chicago, Nov. 3, 2011.
 362. Simon P, Espinoza A, An HS, Andersson G, Inoue N: 3D facet joint gap decrease in distribution patterns is age-dependent. NASS Chicago, IL Nov. 3, 2011
 363. Hong JT, An HS, Espinoza A, Inoue N, Takigawa T: Biomechanical evaluation of salvage pedicle screw fixation techniques for the instrumentation around cervicothoracic junction. CSRS, Scottsdale, AZ Dec. 8, 2011
 364. Khan SN, Biswas D, Ntummy F, Heligman A, Cha T, An HS: High cervical (C3,C4) radiculopathy: clinical characteristics and results of surgical treatment. CSRS, Scottsdale, AZ Dec. 8, 2011
 365. Hong JT, An HS: Biomechanical and morphometric evaluation of occipital condyle for occipitocervical segmental fixation. CSRS Scottsdale, AZ Dec. 8, 2011
 366. Mammoser, N, Espinoza A, An, H, Andersson, G, Inoue N: Effects of Torsion on Disc Height Distribution: An In Vivo Study. ORS. San Francisco, CA, Feb. 5, 2012, ISSLS, Amsterdam, Netherlands May 29, 2012
 367. Scanzello CR, Markova DZ, Adams, SF, Anderson DG, An HS, Zhang Y: Fibronectin Splice Variation in Human Knee Cartilage, Meniscus and Synovial Membrane: Association with Cartilage Degeneration. ORS. San Francisco, CA, Feb. 5, 2012
 368. An, JS, Espinoza A, An HS, Andersson GB, Inoue N: Effects of Age and Spinal Level on the Dimensions of the Lumbar Spinal Canal Measured in vivo. ORS. San Francisco, CA, Feb. 5, 2012
 369. Ishihara Y, Espinoza AA, An HS, Andersson GB, Sugisaki K, Simon P, Inoue N: Age-related Changes in Pedicle Morphology: Correlation with Lumbar Canal Diameter. ORS. San Francisco, CA, Feb. 5, 2012, ISSLS, Amsterdam, Netherlands May 29, 2012
 370. Ishihara Y, Espinoza AA, An HS, Andersson GB, Inoue N: Effects of Age and Level on the Lumbar Facet Joint Position. ORS. San Francisco, CA, Feb. 5, 2012, ISSLS, Amsterdam, Netherlands May 29, 2012
 371. Espinoza AA, An HS, Andersson GB, Inoue N: Influence of Disc Degeneration on Endplate Concavity. ORS. San Francisco, CA, Feb. 5, 2012
 372. Zhang Y, Markova DZ, Ruel N, Adams SL, An HS, Thonar E, Zack M, Scanzello CR, Anderson DG: Fibronectin Fragments in Human Intervertebral Disc Tissue and their Effects on Disc Cells. ORS, San Francisco, CA, Feb. 5, 2012
 373. Ellman M, Kim JS, Li X, Kroin JS, Zheng Q, Cs-Szabo G, An HS, Chen D, Ding M, Pratap J, van Wijnen AJ, Im HJ: Pathophysiological Role of PKC delta-Runx2 axis in Spondylosis: in vitro and in vivo studies. ORS, San Francisco, CA, Feb. 5, 2012
 374. Zhang Y, Chee A, Shi P, Chen EY, Moss I, He TC, Thonar E, An HS: Allogeneic Articular Chondrocyte Survived in the Degenerating Rabbit Intervertebral Disc In Vivo: Implications for Cell Therapy with Allogeneic Cells. ORS. San Francisco, CA, Feb. 5, 2012, ISSLS, Amsterdam, Netherlands May 29, 2012
 375. Simon P, Espinoza AA, An HS, Andersson GB, Inoue N: 3D Facet Joint Space Width Distribution: Comparison with Age, Level and Lower Back Pain Symptom. ORS. San Francisco, CA, Feb, 2012
 376. Kim JS, Li X, An HS, An JS, Dittakavi T, Cs-Szabo G, An S, van Wijnen AJ, Im HJ: Inhibition of TLR adaptor signaling molecule, MyD88 on intervertebral disc homeostasis: in vitro, ex vivo studies. ORS, San Francisco, CA, Feb. 5, 2012
 377. Natarajan R, An HS, Andersson GB: Change in Disc Material Property (from Grade II to Grade V) Has Larger Effect on Lumbar Disc Biomechanics Than Effect Due to Change in Disc Geometry. ORS, San Francisco, CA, Feb. 5, 2012
 378. Hong JT, An HS, Inoue N, Takigawa T: Biomechanical Evaluation of Salvage Pedicle Screw Fixation Techniques for the Instrumentation around Cervicothoracic Junction. CSRS-European Section. SpineWeek, Amsterdam, Netherlands, May 28, 2012
 379. Hong JT, Lee HJ, Lee SW, An HS, Park CK: Analysis of Measurement Accuracy for Craniovertebral Junction Pathology- Most Reliable Method for Cephalometric Analysis. CSRS-European Section. SpineWeek, Amsterdam, Netherlands, May 28, 2012
 380. Qasim M, Natarajan RN, An HS, Andersson G: Prediction of Rapid Progression of Failure in a Lumbar Disc under Cyclic Loading- Continuum Damage Mechanics Formulation in a Finite Element Model. ISSLS, Amsterdam, Netherlands May 29, 2012
 381. Espinoza A, Soni G, Andersson G, An HS, Inoue N: VAS Scores and Torso Motions in Low-back-pain Symptomatic Patients. ISSLS, Amsterdam, Netherlands May 29, 2012
 382. An JS, Espinoza A, Andersson G, An HS, Inoue N: Image-based 3D-Characterization of the Lumbar Spinal Canal Geometry in vivo. ISSLS, Amsterdam, Netherlands May 29, 2012
 383. Shi P, An HS, Chen ER, Hartley D, Chee A, Thonar EJ, Zhang Y: Cultured Primary Sensory Neurons from the

Rabbit Dorsal Root Ganglion Respond to Capsaicin: An in vitro model for Inflammatory Pain. ISSLS, Amsterdam, Netherlands May 29, 2012

384. Pan CC, Simon P, Espinoza A, Takatori R, An HS, Andersson G, Inoue N: Differences in lumbar facet joint subchondral bone density between asymptomatic and low back pain subjects. NASS, Dallas, TX Oct 24, 2012
385. Chee A, Shi P, An HS, Markova D, Anderson G, Zhang Y: Interleukin-8 present in intervertebral disc tissues from patients with discogenic back pain can stimulate substance P release by cultured sensory neurons. NASS, Dallas, TX Oct 24, 2012
386. Zhang Y, Chee A, Shi P, Moss I, An HS: Allogenic articular chondrocytes survived in the degenerating rabbit intervertebral disc. NASS, Dallas, TX Oct 24, 2012
387. Chee A, Zhang Y, Shi P, Ruel N, Kao J, Yang SH, Cha T, Moss I, An HS: Intervertebral disc repair and regeneration using neonatal human dermal fibroblasts in the rabbit model. AAOS, Chicago, IL, March 18, 2013. ISASS, Vancouver, Canada Apr 4, 2013, ISSLS, Phoenix, AZ, May 12, 2013
388. Nojiri H, Espinoza A, Fogg L, Andersson G, An HS, Inoue N: Decreasing disc height affects lumbar segmental lordosis in the aging lumbar spine. ISSLS, Seoul, Korea June 5, 2014
389. Nojiri H, Espinoza A, Fogg L, Andersson G, An HS, Inoue N: Lumbar disc and facet joint degeneration: a longitudinal in vivo study. ISSLS, Seoul, Korea June 5, 2014
390. Chee A, Liu D, Shi P, Chen D, An HS: Chemokine expression by annulus fibrosus and nucleus pulposus. ISSLS, Seoul, Korea June 5, 2014
391. Tabaraee E, Kurd MF, An HS: Oblique sagittal reconstructions of cervical CT scans: an accurate and efficient method for assessing true foramina dimensions. NASS, Chicago, IL Oct 14, 2015
392. Tabaraee E, An HS: Three-level anterior cervical discectomies and fusion: radiographic changes over time. NASS, Chicago, IL Oct 14, 2015
393. Liu W, Liu D, Zheng J, Shi P, Chou PH, Oh C, Chen D, An HS, Chee A: Annulus fibrosus cells express and utilize CCR5 for migration. NASS, Boston, MA Oct 26, 2016.
394. Shi P, Chee A, Liu D, Chen D, Li Z, Oh C, Chen D, Andersson GBJ, An HS: Chemokine Receptor Antagonists Can Inhibit Macrophage Migration Induced by Annulus Fibrosus and Nucleus Pulposus Cells. ISASS, San Diego, CA, April 16, 2015; ISSLS, San Francisco, CA June 8, 2015.
395. He J, Liu J, Zhu X, Espinoza Orías AA, An HS, Inoue N. Comparison of Lumbar Foraminal Dimensions Measured by 3D CT Bony Model and 3D MRI Foraminal Cast Model. ORS, Orlando, FL March, 2016
396. He J, Nakajima T, Espinoza Orías AA, An HS, Inoue N. Characterizing Lumbar Multifidus Fatty Infiltration with MRI: Is there a correct Region of Interest? ORS, Orlando, FL March 5, 2016
397. Basques BA, Shifflett GD, Fice MP, Espinoza Orías AA, Inoue N, An HS. The Kinematics And Spondylosis Of The Lumbar Spine Vary Depending On The Levels Of Motion Segments In Individuals With Low Back Pain. Orlando, FL March 5, 2016, NASS, Boston, MA Oct 26, 2016.

NATIONAL INSTRUCTIONAL COURSE LECTURES, SYMPOSIUMS, WORKSHOPS

1. Lumbar disc disease: Office management of low back pain and sports injuries (8th symposium of the Spine Study Group, Scottsdale, Arizona, 10-18-1991)
2. Pediatrics and Spinal Deformity (moderator at Spine Study Group, Scottsdale, Arizona, 10-18-1991)
3. Basic Science of Spinal Instrumentation (Comprehensive Review of Spinal Disorders by AAOS, Nov. 1, 1991, Philadelphia)
4. Treatment of Complications of Cervical Disc Disease (Instructional Course Lectures at the AAOS, Washington D.C, Feb., 1992)
5. National Sports Physician's Conference: lectures on "Athletic Spinal Disorders," and "Physical Examination of the Spine" Orlando, Florida April 14, 1992.
6. EBI Symposium on Bone Healing: "Spinal Instrumentation of the Lumbar Spine" April 22, 1994, Parsippany, NJ
7. Symposium speaker at the American Spinal Injury Association: "Tongs and Halo treatment for the acutely injured cervical spine" April 25, 1994 Philadelphia, PA
8. Speaker at the AAOS: Trauma Update for Orthopaedic Physician Assistants. "Management of Acute Spinal Trauma" July 6, 1994 Milwaukee, WI
9. Speaker at the 18th American Society of Orthopaedic Physician Assistants. "Spinal Instrumentation" July 8, 1994 Milwaukee, WI
10. Instructional Course Lecturer. "Acute Management of Cervical Spine Injuries" AAOS. Orlando, FL Feb. 16, 1995
11. Symposium Moderator. "Federation for Spine Societies" at the AAOS Orlando, FL Feb. 19, 1995
12. Moderator for scientific session during NASS, Washington D.C, Oct. 20, 1995

13. Speaker at the American Academy of Orthopaedic Surgeon's Comprehensive Review. "The Cervical Spine" San Francisco, Nov. 18, 1995
14. An, HS: "Management of Adult Scoliosis" Comprehensive Spine Review, Nov. 11, 1995, Chicago, Illinois
15. An, HS: Initial Management of Cervical Injuries with Tongs and Halo. Instructional Course Lecture at the AAOS. Atlanta, GA Feb. 24, 1996
16. An HS: Symposium Director for Lumbar Disc Disease: Mid-American Orthopaedic Association, San Antonio, TX, April 24-28, 1996
17. An HS: Session moderator on Biomechanics for NASS. Vancouver, B.C. Oct. 23, 1996
18. Speaker at the American Academy of Orthopaedic Surgeon's Comprehensive Review. "The lumbar spinal disorders" Chicago, Dec. 14, 1996
19. An HS: Cervical Radiculopathy. ICL at the CSRS. Palm Beach, FL, Dec. 8, 1996
20. An, HS: Initial Management of Cervical Injuries with Tongs and Halo. Instructional Course at the AAOS. San Francisco, CA Feb. 24, 1997
21. An HS: Cervical Spine Plate Designs. Advanced Techniques in Spine Surgery. Squaw Valley, CA, March, 1997
22. An HS: Sagittal Spine Deformities. Advanced Techniques in Spine Surgery. Squaw Valley, CA, March 23, 1997
23. An HS: Technical Points in Cervical Spine Surgery. Squaw Valley, CA, March 23, 1997
24. An HS: Symposium Director for Spinal Instrumentation: Mid-American Orthopaedic Association, Hilton Head, NC, April 24-28, 1996
25. An HS: Surgical Management of Cervical Radiculopathy and Myelopathy. Spinal Surgery: Current Concepts and Techniques, Chicago, Illinois June 21, 1997
26. An HS: Kyphotic Deformities. Current Concepts and Techniques. Chicago, Illinois June 21, 1997
27. An HS: A New Anterior Cervical Plate. Current Concepts and Techniques, Chicago, Illinois June 21, 1997
28. An HS: Bone Graft and Bone Graft Substitutes: "What Progress Have We Made in Spinal Deformities in the Last Ten Years?" Scoliosis Research Society Instructional Course. Sept. 24, 1997
29. An HS: "Lumbar Spine Stenosis and Spondylolisthesis," "Technique of Central and Lateral Decompression," Practical Strategies in Spine Surgery: current Applications and Techniques. AAOS, Rosemont, IL Nov. 1997
30. An HS: "Surgical Treatment of Cervical Radiculopathy and Myelopathy," "Thoracolumbar Spine Fractures," "Moderator for Cervical Myelopathy Cases." Spinal Surgery—Current and Innovative Theory and Techniques, Jan. 24-27, 1998, Snowmass, CO
31. An, HS: Initial Management of Cervical Injuries with Tongs and Halo. Instructional Course at the AAOS. New Orleans, March 19. 1998
32. An HS: Biomechanics of Spinal Implants, and Spinal Instrumentation for Thoracolumbar Spine Trauma (ISOLA Instrumentation: Principles and Practice) Kansas City May 29, 1998
33. An HS; Moderator for Degenerative Spondylolisthesis Session. ISSLS Brussels, Belgium June 12, 1998
34. An HS: Lectures on Lumbar stenosis and Kyphotic Deformities. Spine Surgery: Current Concepts and Techniques. San Francisco, July 18, 1998
35. An HS: Lecture on Techniques of Anterior Cervical Plating: Spine Surgery Workshop. St. Louis, MO Aug. 10, 98
36. An HS: Moderator for Spinal Stenosis Session at NASS. San Francisco, CA 11-30-98
37. An HS: Moderator, Laboratory instructor and Lecture on "Posterior Lumbar Interbody Fusion" at AAOS course on Contemporary Issues in Advanced Spinal Surgery. Nov. 20-22, 1998
38. An HS: A debate on "Technology has exceeded Reason" The Management of Vertebral Intercorporeal Disorders. Group International Cotrel-Dubousset. Chicago, IL Dec. 6, 1998
39. An HS: "Osteomyelitis of the Spine," "Spinal Tumors", and "Rheumatoid Arthritis and Ankylosing Spondylitis" NASS Resident Review Course. New Brunswick, NJ Jan. 22-23, 1999.
40. An HS: Instructional Course Lecture on "Failed Back Syndrome" AAOS, Anaheim, CA Feb. 8, 1999
41. An HS: Cervical Radiculopathy. Ski with Big Time Spine. Snowbird, Utah March 7, 1999
42. An HS: Surgical Approaches for Cervical Myelopathy. Ski with Big Time Spine. Snowbird, Utah March 7, 1999
43. An HS: Controversial Issues in Lumbar Disc Surgery. Ski with Big Time Spine. Snowbird, Utah March 7, 1999
44. An HS: Frontiers in Spinal Surgery; Biologics and Biomaterials. Kona, Hawaii, June 22, 1999
45. An HS: 1. Posterior Lumbar Interbody Fusion Techniques 2. Posterior Laminoforaminotomy Technique of the Cervical Spine. Practical Strategies in Spine Surgery. AAOS Rosemont, IL Aug. 6-8, 1999
46. An HS: Biomechanics of Spinal Instrumentation, Spinal Tumors, Infections, Rheumatoid Arthritis and Ankylosing Spondylitis. Spine Care Review Course at NASS, Chicago, Oct. 24, 1999
47. An HS: Basic Science Session Moderator. CSRS. Seattle, WA Dec. 16, 1999
48. An HS: "Intradiscal Electrothermal Therapy for Chronic Lumbar Degenerative Disc Disease," "Flat-back Syndrome" State of the Art in Spinal Fusion 2000, Wistler, BC., Canada February 18, 2000

49. An HS: Instructional Course Lecture on "Failed Back Syndrome" AAOS, Anaheim, CA March 18, 2000
50. An HS: "Biomechanics of Spine and Spine Instrumentation," "Review of Spinal Tumors, Infections and Arthritis" Essentials for Spine Care" at NASS 10-29-00 New Orleans, LA
51. An HS; "Moderator for Fusion-bone graft substitutes" NASS, 10-28-00 New Orleans, LA
52. An HS: "Lumbar Decompression Techniques for Spinal Stenosis," " Lumbar Fusion and Pedicle Screw Instrumentation: a demonstration of surgical techniques," and "Surgical Instructor for Spinal Techniques" Contemporary Issues in Advanced Spinal Surgery AAOS Learning Center Chicago, IL Nov. 10-12, 2000
53. An HS: "Pathogenesis and Natural History of Lumbar Degenerative Disorders," "Lumbar Sagittal Plane Deformity," "Rheumatoid Arthritis and Ankylosing Spondylitis," and "Tissue Engineering of the Intervertebral Disc" Controversies and Challenges in Spine Surgery, Naples, FL Dec. 8-10, 2000
54. An HS: "Causes and Prevention of Failed Back Syndrome" AAOS Instructional Course Lecture. San Francisco, CA March 1, 2001
55. An HS: "Microsurgery for Cervical Radiculopathy" AAOS Instructional Course Lecture. San Francisco, CA Feb. 28, 2001
56. An HS. "Metabolism of Intervertebral Disc and Effects of Growth Factors" AAOS Symposium. San Francisco, CA March 2, 2001
57. An HS: Course Chairman, "Management of Spinal Pathologies" Lectures on "Pathogenesis of Lumbar Disc Disease," "Artificial Discs and Biological Regeneration of the Intervertebral disc," "Kyphotic Deformities and Spondylolisthesis." Key Largo, FL May 4-5, 2001
58. An HS: "Biomechanics of Spine and Spinal Instrumentation" In Essentials in Spine Care at NASS Seattle, WA, 11-2-01
59. An HS: Lectures on "Microsurgical Cervical Laminoforaminotomy," "Transforaminal Lumbar Interbody Fusion," and "Anterior Approaches to the Cervicothoracic Junction." Laboratory Instructor. Advanced Techniques and Current Concepts in Spine Surgery AAOS Orthopaedic Learning Center, Rosemont, IL 11-16 to 18, 2001.
60. An HS: Physiology of Bone Graft and Bone Graft Substitutes. Cervical Spine Instructional Course at CSRS. Monterey, CA, 12-1-01
61. An HS: "Posterior Surgical Approaches for Cervical Spondylotic Radiculopathy and Myelopathy" Instructional Course Lecture at AAOS Dallas, TX, 2-15-02
62. An HS: "Anterior Microsurgical Procedures for Cervical Spondylotic Radiculopathy and Myelopathy" Instructional Course Lecture at AAOS Dallas, TX 2-18-02
63. An HS: Moderator for Spine Session at ORS Dallas, TX 2-16-02
64. An HS: Moderator for Spine Session at AAOS Dallas, TX 2-16-02
65. An HS: "Failed Back Syndrome" and Instructor for Practical Strategies in Spine Surgery: Current Applications and Techniques. AAOS Learning Center Chicago, IL June 28-30, 2002
66. An HS: "Biologic Disc Replacement" Dynamic Spine Stabilization Symposium, Dallas, TX, Oct. 12, 2002
67. An HS: "Biomechanics of Spinal Instrumentation" Essentials in Spine Care, NASS, Montreal, Canada, Oct, 2002
68. An HS: "Moderator for Disc Session" ORS New Orleans, LA 2-1-03
69. An HS: An HS: Moderator at AAOS, New Orleans, LA, 2-5-03
70. An HS: "Anterior Microsurgical Procedures for Cervical Spondylotic Radiculopathy and Myelopathy," "Posterior Cervical Approaches for Cervical Radiculopathy and Myelopathy." Instructional Course Lectures at AAOS New Orleans, LA 2-6-03 and 2-7-03.
71. An HS: "Bone Grafts and Bone Graft Substitutes," "High-Grade Spondylolisthesis." Moderator for Complex Spinal Deformities. Spine Study Group, Palm Beach, FL 5-1-03
72. An HS: Moderator for Session at International Study for the Study of the Lumbar Spine. Vancouver, CA 5-14-03
72. An HS: Moderator for Spinal Fusion Session. NASS, San Diego, CA 10-22, 2003-10-27
73. An HS: "Biological Disc Repair" Stryker Invitational Symposium, NASS, San Diego, CA 10-22, 2003-10-27
74. An HS: "Anterior Microsurgical Procedures for Cervical Spondylotic Radiculopathy and Myelopathy," "Posterior Cervical Approaches for Cervical Radiculopathy and Myelopathy." Instructional Course Lectures at AAOS San Francisco, CA, 3-11-04.
75. An HS: Moderator for Intervertebral Disc Biology session ISSLS (Spineweek), Porto, Portugal, 5-30-2004.
76. An HS: "Disc Regeneration," and " Cervical Decompression Techniques," Current Technology and Future Innovations in Spine Surgery. NY, NY, Oct. 8-9, 2004
77. An HS: "Surgical Strategies for Lumbar Disc Degeneration" ORS 5th Combined Canada, USA, Japan, and Europe Oct. 10-13, 2004
78. An HS: "Gene Therapy in Spine Surgery" Symposium at CSRS, Boston, MA, Dec. 10-13, 2004
79. An HS: "Cervical Laminoplasty" and "Complications of Laminoplasty" NASS Cervical Fixation Course. Chicago,

IL, 1-22-05

80. An HS: Moderator at AAOS, Washington DC, Feb. 23, 2005
81. An HS: "Posterior Cervical Approaches for Cervical Radiculopathy and Myelopathy." Instructional Course Lectures at AAOS Washington DC, Feb. 23, 2005
82. An HS: "Growth Factors for Intervertebral Disc Repair" Advances in Spine Technology, Los Cabos, St. Luca, Mexico July 13, 2005
83. An HS: "Fractures of the Lower Cervical Spine" Chicago Trauma Symposium, Chicago, IL Aug. 11, 2005
84. An HS: "Relevance of in vitro and in vivo intervertebral disc experimental models" Intervertebral Disc Disease Symposium by AAOS and National Institute of Health. Organizers (Andersson, G, An HS, Oegema, T, Setton L) Sept. 16, 2005
85. An HS: Moderator for Biologics session, NASS 9-28-05 Philadelphia, PA
86. An HS, "Cervical Laminoplasty," "Biologic Disc Repair" Complex Spinal Problems. 1-2006 Beaver Creek, CO
87. An HS: "Intervertebral Disc Disease: Basic Science and Effect of Growth Factors" American Society of Neuroradiology. May 1, 2006, San Diego, CA
88. An HS: "Biological Treatment Strategies for Disc Degeneration," "Surgical Techniques of Spinal Tumors" Spine Study Group: New Technology Concepts and Controversies, May 18-21, Palm Beach, FL
89. An HS: "Lower Cervical Spine Fractures" Chicago Trauma Symposium July 27, 2006 Chicago, IL
90. An HS: "Complications of Spinal Tumor Surgery" Complications of Spine Operations. Sept 23, 2006 Chicago, IL
91. An HS; Moderator of Intervertebral Disc Session. ORS. San Diego, CA 2-11-07
92. An HS: Moderator at a Spine Session. AAOS. San Diego, CA 2-14-07
93. An HS: "Posterior Laminectomy, Laminoplasty vs. Laminectomy/fusion for Cervical Spondylotic Myelopathy," "Tumors of the Cervical Spine: Surgical Techniques" Complex Surgical Techniques in Treating Cervical Spine Pathology Denver, CO, 9-27-2007
94. An HS: "Degenerative Scoliosis: Surgical Treatment," and "Thoracolumbar Osteotomies for Deformity Correction," Contemporary Techniques in Spinal Surgery 2007, AAOS Orthopaedic Learning Center, Rosemont, IL 11-8, 2007
95. An HS: "Fusion Related Problems: Kyphosis and Pseudarthrosis" Instructional Course Lecture: Cervical Spine Complications. AAOS. Meeting San Francisco, CA 3-5-08
96. An HS: "Reversing Disc Degeneration using Proteins, Genes and Cells" Segal North American Osteoarthritis Workshop (SNOW) May 3-4, 2008
97. An HS: "Animal Models of Intervertebral Disc Degeneration and Biological Regeneration" Musculoskeletal Biology and Bioengineering. Gordon Research Conference, Andover, NH July 27-31, 2008
98. An HS: "Degenerative Scoliosis: Surgical Treatment," and "Thoracolumbar Osteotomies for Deformity Correction," Contemporary Techniques in Spinal Surgery 2008, AAOS Orthopaedic Learning Center, Rosemont, IL 9-19, 2008
99. An HS: "Cervical Osteotomy," "Regenerative Techniques for Intervertebral Disc Degeneration" Instructional Course and Symposium at CSRS, Austin, TX Dec.4-6, 2008
100. An HS: "Fusion Related Problems: Kyphosis and Pseudarthrosis" Instructional Course Lecture: Cervical Spine Complications. AAOS. Meeting Las Vegas 2-25-09
101. An HS: Moderator of Spine Session. AAOS. Las Vegas 2-25-09
102. An HS: "Odontoid Fractures in the Elderly" Contemporary Techniques in Spinal Surgery 2009, AAOS Orthopaedic Learning Center, Rosemont, IL 11-5, 2009
103. An HS: "Athletic Cervical Spine Injury: Return to Play," "BMPs in Intervertebral Disc Repair or Regeneration," "Stem Cell Treatment for Intervertebral Disc Degeneration," Moderator in Spine Biologics Session, Symposiums at NASS, San Francisco, CA Nov 10-14, 2009
104. An HS: "Degenerative cascades in degenerative disc disease and deformity," "Biologics: current use and future development" Spine Summit 2010, Steamboat, CO, Jan 10-14, 2010
105. An HS: "Lateral mass fixation techniques and complications" CSRS Technical Workshop at Practical Anatomy and Surgical Education. St. Louis University, MO, Jan. 27-30, 2010
106. An HS: "Lumbar Spinal Stenosis and Deformity: When to Operate?" "Revision Cervical Spine Surgery" Spine Study Group, Palm Beach, FL May 13-16, 2010
107. An HS: "Surgical Management of Cervical Kyphosis and Cervical Spinal Tumors" AO Spine Advanced Concepts in the Management of the Spinal Disorders. Chicago, IL Aug 21-23, 2010
108. An HS: "Compliance, Time Efforts, Audits, HIPAA, IRB, IACUC" Clinician Scientist Development Program. ORS, OREF and AAOS Combined Program, Chicago, IL Oct. 17-19, 2010
109. An HS: "Kyphoplasty," "Lumbar Spinal Stenosis: Evidence for Treatment Options and Complications"

Contemporary Techniques in Spinal Surgery 2009, AAOS and Lumbar Spine Research Society Combined Program Orthopaedic Learning Center, Rosemont, IL 10-21, 2010

110. An HS: "Intervertebral Disc Repair and Regeneration by Intradiscal Injection of Growth Factor or Cytokine Inhibitors" Kappa Delta Award, ORS, Long Beach, CA Jan. 16, 2011
111. An HS: "Tissue Engineering: Intervertebral Disc" Federation of Spine Associations. AAOS, Feb. 19, 2011
112. An HS: "Occipito-cervical and Cervico-thoracic Fixations: Indications and Techniques" Adult Spinal Deformity: Skull to Sacrum NASS Learning Center, Burr Ridge, IL Apr. 29-30, 2011
113. An HS: "Posterior Fixation for Thoracolumbar Burst Fractures," "Laminectomy and Posterolateral Fusion is the Gold Standard for Degenerative Spondylolisthesis" Spine Study Group, Palm Beach, FL May 20, 2011
114. An HS: "Cervical Spine Surgery in Rheumatic Diseases" American College of Rheumatology, Chicago, IL Nov. 7, 2011
115. "Problems of Bone Morphogenetic Proteins in Spine Surgery" Osteobiologics Use in Spine Surgery, Santa Monica, CA Oct. 28-29, 2011
116. "Controversy of Graft Material for Anterior Discectomy and Fusion" CSRS Scottsdale, AZ Dec. 8, 2011
117. An HS: "Occipito-cervical and Cervico-thoracic Fixations: Indications and Techniques" Adult Spinal Deformity: Skull to Sacrum NASS Learning Center, Burr Ridge, IL March 16-17, 2012
118. An HS: "Anterior cervical discectomy and fusion techniques" "Ossification of Longitudinal Ligament and Dural Tears" Diagnosis and Treatments in Cervical Spine Surgery NASS Learning Center, Burr Ridge, IL May 18-19, 2012
119. An HS: "BMP Associated Spinal Complications," "Growth Factors for Intervertebral Regeneration" Korean American Spine Society. Los Angeles, CA June 28-30, 2012
120. An HS: "Osteopenic Patient: Approaches and Solutions," "High Grade Spondylolisthesis: Reduction vs. In situ Fusion" Next Horizon in Deformity Surgery: Sacropelvic Complex. Chicago, IL Aug 25, 2012
121. An HS: "Local Bone Graft as the Gold Standard for Lumbar Spine Fusion" Second Annual Biologics Collaborative Evidence in Spine and Orthopaedics. Santa Monica, CA Oct. 6, 2012
122. An HS: "Academic Spine Surgeon: A Career Path" Young Spine Surgeon Forum, NASS, Dallas, TX Oct 24, 2012
123. An HS: "Pedicle Subtraction Osteotomy at C7 for Chin on Chest Deformity" 17th Instructional Course, CSRS, Dec 5, 2012
124. An HS: "Laminoplasty vs. Laminectomy/Fusion for Cervical Spondylotic Myelopathy" Association for Collaborative Spine Research San Diego, CA, Feb 15, 2013
125. An HS: "Treatment of Cervical Spine Tumors" Association for Collaborative Spine Research San Diego, CA, Feb 15, 2013
126. An HS: "Translational Research in Spine Surgery" 13th Annual Symposium on Current Concepts in Spinal Disorders. Las Vegas, NV Feb. 1, 2014
127. An HS: "Lateral Mass Screw Fixation Techniques of the Cervical Spine" 7th Annual Cervical Spine Research Society Hands-on Cadaver Course. St. Louis, MO Feb 20-22, 2014
128. An HS: "Ossification of the Posterior Longitudinal Ligament in the Cervical Spine" Cervical Spine Research Society Symposium, Orlando, FL Dec 2, 2014
129. An HS: "Intervertebral Disc: Degeneration and Pain Treatment Strategies" Orthopaedic Research Society Spotlight Speaker, Las Vegas, NV Mar 28, 2015
130. An HS: "Ossification of the Posterior Longitudinal Ligament in the Cervical Spine" Federation of Specialty Societies at AAOS. March 28, 2015
131. An HS: Moderator at Cervical Spine Research Society, San Diego, CA December 3, 2015
132. An HS: Moderator at AO Spine Fellows Forum. Banff, Canada March 31, 2016
133. An HS: "High Grade Spondylolisthesis, Spine Study Group, Miami, FL May 6, 2016.
134. An HS: "Lessons Learned from 28 years of practice in Treating Patients with LBP" KASS, July 8, 2016
135. An HS: "Adjacent segment degeneration following ACDF: Biomechanics or Biology?" NASS, Oct. 25, 2016

LOCAL OR REGIONAL PRESENTATIONS

1. An, HS: "Herniation of the intervertebral disc in the elderly" Wisconsin Orthopaedic Society (Nov., 1989)
2. An, HS: "Low Lumbar Burst Fractures" Wisconsin Orthopaedic Society (Nov., 1990)
3. Orthopaedic Updates for Primary Physicians (Course director and lectures on "Management of back and neck pain" for State Medical Society of Wisconsin in Green Bay, WI, April, 1990)
4. Sports Symposium: "Examination of the spine" and "Athletic spine injuries" (Milwaukee, WI, May, 1990)
5. Program director of Back Symposium for Practicing Physicians: Lectures on "Diagnosis and management of

- back and neck pain," "Sports Injuries to the Spine," "Physical examination of the spine," "Tumors, infections, and arthritis of the spine" at The Medical College of Wisconsin Sept, 1990
6. An, HS: "North American Traveling Fellowship Experience" Milwaukee Orthopaedic Society (Jan., 1991)
 7. An, HS: "Distinction between Spinal Tumors and Infections by MRI" Wisconsin Orthopaedic Society" (May, 1991)
 8. An, HS: "Internal fixation of the cervical spine", North American Traveling Fellowship Milwaukee, WI (Oct., 1991)
 9. Second Spine Symposium (Degenerative Disc Diseases of the Spine: program director and lectures on "Pathogenesis and evaluation of lumbar disc disease," "Cervical disc disease," "Physical examination of the spine," "Complications of disc surgery," (Sept, 1991)
 10. Blount Pediatric Orthopaedic Symposium: lecture on "Spondylolisthesis" in Lake Geneva, Oct., 1991
 11. Program director of State Medical Society of Wisconsin (Orthopaedic Section), Sports Injuries and lecture on "Back injuries" in Milwaukee, WI, 4/91
 12. Program organizer for North American Traveling Fellows at Medical College of Wisconsin, Milwaukee, WI, 10/91
 13. Program director of State Medical Society of Wisconsin (Orthopaedic Section), Geriatric Musculoskeletal Problems. Presentation on Spinal Disorders in the Elderly, April 24, 1992 in Milwaukee, WI
 14. Sports Medicine Symposium: "Examination of the spine" Medical College of Wisconsin, April 7, 1992
 15. Program director of Third Spine Symposium: Spinal Injuries: Lectures on "Cervical Spine Injuries," and "Thoracolumbar fractures" Medical College of Wisconsin, Milwaukee, WI, May 13, 1992.
 16. Program chairman for Resident and Alumni Day for Orthopaedic Department at the Medical College of Wisconsin June 5, 1992
 17. Program director of State Medical Society of Wisconsin (Orthopaedic Section), Common Orthopaedic Injuries. Presentation on Spinal Injuries, April 16, 1992, Lacrosse, WI
 18. An, HS: "Biomechanics of Spinal Instrumentation" Milwaukee Orthopaedic Society (Jan., 1992)
 19. An, HS: "Spinal disorders at the Cervicothoracic Junction" Wisconsin Orthopaedic Society (May, 1992)
 20. An, HS: "Foraminal spinal stenosis" Wisconsin Orthopaedic Society (Nov., 1992)
 21. Sports Medicine Symposium: "Examination of the spine" Medical College of Wisconsin, May 20, 1993.
 22. Program director for American Orthopaedic Association Asian Traveling fellows: scientific program and presentation on "Ideal thickness of Smith-Robinson anterior cervical graft." May 19, 1993
 23. Program coordinator for Resident Thesis Day, Medical College of Wisconsin June 24, 1993
 24. Program Director for Fourth Spine Symposium: " Idiopathic Scoliosis," Milwaukee, WI Oct., 1993
 25. Occupational and Preventive Medicine Society: "Occupational Aspects of LBP" March 21, 1994 Milwaukee, WI
 26. Blount Pediatric Orthopaedic Symposium: "Congenital Cervical Spine Anomalies" April 9, 1994 Milwaukee, WI
 27. Program director for State Medical Society of Wisconsin (Orthopaedic Section), Low-Back Problems. Presentation on Complications of Spinal Surgery, April 15, 1994, Milwaukee, WI
 28. Program director for Fifth Spine Symposium: The Cervical Spine: Lectures on "Complications of Cervical Spine Surgery" Medical College of Wisconsin, Milwaukee, WI, Oct. 19, 1994.
 29. An, HS: "Lumbar Spine Surgery in the Obese Patient" Wisconsin Orthopaedic Society (May. 1994)
 30. Program director for Sixth Spine Symposium: Spine Fusion: "Fusion techniques for trauma and deformities" Medical College of Wisconsin, Milwaukee, WI, Sept. 29, 1995.
 31. Program director for Seventh Spine Symposium: Spinal Deformities: Lecture on "Sagittal Plane Deformities" Milwaukee, WI, Nov. 20, 1996
 32. An HS: "Outpatient Lumbar Spine Surgery" Wisconsin Orthopaedic Society Kohler, WI 5/1/96
 33. Blount Pediatric Orthopaedic Symposium. "Spine Fractures in Children" April 15, 1997
 34. Wisconsin Orthopaedic Society: The Relationship between MRI changes and Flexion/extension Radiographs of the Lumbar Spine in Symptomatic and Asymptomatic Individuals., Kohler, WI 5/2/97
 35. The Endowed Professorship Lecture Series of Rush University. "Bone Grafts and Bone Graft Substitutes for Spinal Fusion" Rush University Medical Center, Chicago, IL July 14, 1998
 36. The Chicago Orthopaedic Review Course: Lectures on " Thoracolumbar Spine Fracture," "Cervical spine Problems in Children," "Tumors/Infections of the Spine," and "Spinal Deformities." Chicago, IL July 15, 1998
 37. The Dept. of Physical Medicine and Rehabilitation Conference. "Rehabilitation following spine surgery" Rush University Medical Center Chicago, IL Aug. 6, 1998
 38. Illinois Orthopaedic Society. "Advances in Cervical and Lumbar Disc Surgery" Chicago, IL 10-16-1998
 39. "Current Advances in Cervical and Lumbar Spine Surgery" Oak Park Hospital, Oak Park, IL 4-21-99 "Disc Regeneration" Research Forum. Rush University Medical Center, Chicago, IL May 19, 1999
 40. "Disc Degeneration: Biomechanical and Biochemical Considerations" AOA and Japanese Orthopaedic Association Exchange Traveling Fellow Conference. Rush University Medical Center, Chicago June 9, 1999
 41. "Advances in the Treatment of LBP and Neck Pain." CME at Rush Spine Center Oak Park Hospital June, 1999

42. Program Chair for Chicago Spine Dinner. Dr. Henry Bohlman (Visiting Professor) July 20, 1999
43. "Program Chairman for Advanced Management of the Cervical Spine" Lectures on 1. Surgical Management of Cervical Myelopathy, 2. Occipitocervical Fusion Techniques, 3. Disorders and Management of Cervicothoracic Junction, 4. Case presentations and moderator. Chicago, IL Sept 17, 99.
44. "Cervical Disc Disease" Midwest Orthopaedic Fall Symposium. Rush University Medical Center. Oct. 28, 1999
45. "Lumbar and Cervical Radiculopathy" Advance Case Management and Practice Strategies on Pain Management and Spine Conditions. Oakbrook, IL Feb. 25, 2000
46. Program Chairman and Moderator for Chicago Spine Group. Chicago, IL July 13, 2000
47. "Biomechanics of Lumbar Degenerative Disorders," and "Indications and Contraindications for Lumbar Spine Surgery" Lumbar Degenerative Spine Symposium, Chicago, IL July 15, 2000
48. "Current Treatment of Degenerative Lumbar Disorders" Physical Therapy Associates Chicago, IL Sept. 27, 2000
49. "Intradiscal Electrothermal Therapy" Illinois Association of Orthopaedic Surgeons Loyola University Medical Center, Nov. 3-4, 2000
50. "Industrial Low Back Pain" Presentation to Rehabilitation Nurses and Physical Therapists Rush University Medical Center Sept. 13, 2001
51. "Lumbar Degenerative Disorders: Industrial and Clinical Considerations" Presentation at Midwest Clinical Conference 2002 by Chicago Medical Society, Chicago, IL March 23, 2002
52. "Current Advances in the Treatment of Lumbar Degenerative Disorders" Presentation to Rehabilitation Nurses and Physical Therapists Rush University Medical Center June 11, 2002
53. "Biological Treatment for Degenerative Disc Disease" Program for American Orthopaedic Association and Japanese Orthopaedic Association Traveling Fellows, Rush University Medical Center Feb 22, 2003
54. "Cement Augmentation for Fractured Vertebrae" Rush University Medical Center, Aug. 29, 2004
55. "Future of Spine Surgery" Rush Spine and Back Center Symposium, Chicago, IL June 4, 2005
56. "Innovation of Spine Surgery" Rush Spine and Back Center Symposium, Chicago, IL May 24, 2006
57. "Complications in Spine Surgery" Illinois Association Orthopaedic Surgery Lake Geneva, WI Oct. 7, 2007
58. "Biological Treatment for disc degeneration" Endowed Chair presentation, Rush University, Oct. 20, 2008
59. "Degenerative lumbar disorders: treatment and rehabilitation" Chicago Rehabilitation Course, Dec. 10, 2009
60. "Surgical Treatments for Degenerative Deformities" Complex Spine Surgery Symposium: Spinal Deformities, Globus Inc., Chicago, IL Aug. 26-27, 2011.
61. "Incidence and Natural History of Adjacent Level Disease after Lumbar Fusion" Spine Study Group Meeting, Chicago, IL March 2-3, 2012
62. "Surgical Treatment of Cervical Spine Tumors." "Degenerative Cervical Radiculopathy and Myelopathy" Simmons Surgical Society, Chicago, IL May 4, 2012
63. "Motion Preservation Procedures for the Cervical Spine Disorders" Rush University Medical Center, Chicago, IL June 19, 2012
64. "Neck Pain Associated with Cervical Spine Disorders" Midwest Orthopaedics at Rush Workers' Injury Seminar, Chicago, IL May 29, 2013

MEDICAL COLLEGE COMMITTEES or RESPONSIBILITIES:

1. Orthopaedic Research Committee (1989-1997)
2. Medical Student Advisor (1991-1997)
3. Advisor to Orthopaedic residents (class of 1996)
4. Orthopaedic Resident Admission Committee (1992-1997)
5. Orthopaedic Resident and Fellow Education Coordinator (1992-1997)
6. Orthopaedic Clinical Strategic Committee (1993-1997)
7. Committee for Ph.D. thesis in biophysics at MCW (Michael Ibrahim): 1992-1995
8. Committee for Ph.D. thesis in biomedical engineering at Marquette University (Junghwa Hong): 1994-1996
9. Committee for master thesis in biomedical engineering (Jason Eck) at Marquette University: 1994-1995
10. Committee for Contract Review for the Clinical Practice Group of Medical College of Wisconsin: 1995-1997
11. NIH training grant Research mentor: John Klein (1994), Nicholas Weiss (1994), Jeffrey Roe (1995), Mark

- Sokolowski (1998) Ashwin Kumar (2003)
12. MCW Clinical Advisory Committee with Hamilton/KSA consultants (1996)
 13. MCW Clinical Practice Group (CPG) Board of Directors (1996)
 14. Chairman, Orthopaedic Academic Council, (1996-1997)
 15. Committee for Ph.D. thesis in Biochemistry at Rush Medical College (R. Liu, 1998–2002)
 16. Rush Group on International Health (2000-2004)
 17. Subcommittee of Graduate Medical Education at Rush Medical College (2001-present)
 18. Research Coordinator for Orthopaedic Surgery Residents (2002-present)
 19. Committee for Ph.D. thesis in biomedical engineering at UIC (Susan Renner, 2003-2005)
 20. Resident Thesis Day Chairman (2003-present)
 21. Steering Committee for Orthopaedic Residency Program – 2003-present
 22. Committee for Ph.D. thesis in Biochemistry (Kalpa Patel) – 2004-2007
 23. Committee for Ph.D. thesis in Biomedical Engineering (Hussain Mozamail, 2004-2007)
 24. Committee for Ph.D. thesis in Biochemistry (Mary Lundgren) – 2008-2010

HOSPITAL AND ORTHOPEDIC DEPARTMENT COMMITTEES:

1. Quality Assurance Committee: Department of Orthopaedics at the Medical College of Wisconsin (1989-1995)
2. The Advisory Board for the Spinal Stabilization Exercise Program at Curative Rehabilitation Center (1990-1997)
3. A member of the MCW Minimally Invasive Surgery Group (1995-1997)
4. Musculoskeletal Center Committee: Development of MCW Spine Institute (1996-1997)
5. Surgical Invasive Procedure Review Committee (1997-present)
6. Rush University Medical Center Strategic Committee: 2004- present
7. Operating Room Value Analysis Committee at Rush University Medical Center, 2005-2006
8. Rush University Medical Center Campus Transformation Committee (2008)
9. Rush Spine Center Marketing Committee (2010-present)
10. Director of Quality Assurance for Orthopaedic Clinical Practice (2008-present)
11. Committee for Bundled Care Program at Rush: (2014 to present)

MEDICAL COLLEGE TEACHING:

1. Third year medical student orthopaedic lecture series (quarterly, 1989-1997, annual, 2011-present)
2. "Orthopaedic Topics" for Department of Physical Medicine and Rehabilitation (Course director, 12-89 to 3-90)
3. Spine Anatomy Lecture Series to Orthopaedic Residents and Fellows (cadaver instructions quarterly, 1992-1997)
4. Multidisciplinary Spine Research Group Conference (monthly, 1992-present)
5. Spine Journal Clubs (bimonthly, 1992-present)
6. Spine Indications Conferences (weekly, 1989-present)
7. Combined Pediatric and Adult Spine Conferences (bimonthly, 1995-1997)
8. Combined Neurosurgery-Orthopaedic Spine Conference (monthly, 2000-present)
9. Orthopaedic Grand Rounds Lecture/Moderator (biannual) and Didactic Lectures (biannual, 1989-present)
10. Core Spine Lectures for Orthopaedic Residents: (monthly, 2013-present)