

Vikas V. Patel MA, MD

Professor, Executive Vice Chair, Department of Orthopaedic Surgery
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EDUCATION

The Spine Institute at St. John's Hospital, Santa Monica, California
Spine Surgery Fellowship, Rick Delamarter, Hyun Bae, Ed Dawson Aug. 2003-July 2004
University of California, San Francisco Department of Orthopaedic Surgery
Internship, General Surgery 1997-1998
Residency, Orthopaedic Surgery 1998-2003
Washington University School of Medicine, St. Louis, Missouri
Masters in Biomedical Sciences 1997
Doctor of Medicine 1992-1997
University of Illinois, Champaign-Urbana, Illinois
Bachelor of Science, Mechanical Engineering 1987-1991
Technical University of Munich, Munich, Germany
Engineering 1989-1990

ACADEMIC APPOINTMENTS

- Professor, Executive Vice Chair, Department of Orthopedic Surgery, CU SOM - May 2019- Present
- Professor, Chief of Orthopaedic Spine Surgery, Department of Orthopaedic Surgery, CU SOM - July 2014 to April 2019
- Associate Professor, Chief of Orthopaedic Spine Surgery, Department of Orthopaedic Surgery, CU SOM - June 2009 to July 2014
- Assistant Professor, Orthopaedic Spine Surgery, Department of Orthopaedic Surgery, CU SOM - September 2004 to May 2009
- Graduate Faculty, University of Colorado Denver, Bioengineering - March 2014 to Present
- Faculty: AO North America - 2008 to Present

PREVIOUS EMPLOYMENT

Engineer – Baxter Healthcare Renal Division, Chicago Illinois 1991-1992

HOSPITAL, GOVERNMENT OR OTHER PROFESSIONAL POSITIONS

Clinical Co-Chair - ASTM F04.25, Sub-Committee on Spinal Cords 2023-Present

CONSULTING

- Synthes: Cervical spine fusion product development.
- Biomet Spine: Lumbar spine fusion product development.
- Cerapedics: Biologic spine fusion product development.
- Aesculap: Pedicle screw system development
- Lanx: Spine surgical practice teaching and medical
- AlloSource: Clinical trial design, New Product Development, Robotic Production Equipment Design

HONORS, SPECIAL RECOGNITIONS AND AWARDS

- Becker's Orthopedics and Spine: Ten Spine Surgeon Leaders of Academic Medicine to Know 2009
- Best Poster Presentations, North American Spine Society Annual Meeting 2010
- WhiteCloud Award for Best Basic Science Paper: SRS International Meeting of Advanced Spine Techniques, 2010

- Russell A. Hibbs Award for Best Basic Science Paper 43rd Annual SRS 2008
- John H. Moe - Best Basic Science Award, Scoliosis Research Society 2004
- Cervical Spine Research Society Top 10 Poster Award, 2008
- AAOS Basic Educator's Course Scholarship 2002
- The Dames Prize for Cell Biology
- Master's in Biomedical Science Scholarship and Stipend, Washington University
- Bone and Joint Decade Young Investigator's Recipient
- University of Colorado Hospital Inspired Kindness Award 2011
- Minor: Strathmore's Who's Who in America 2007, 2008, 2009, 2010
 - America's Top Orthopedists, 2009, 2010, 2011, 2012
 - Best Doctors in America: 2011
 - Marquis Who's Who 2010, 2011, 12
 - Who's Who in Science and Engineering, 2012.
 - Colorado Biz, Best Doctors, 2012
- Nominated: Best Paper SICOT 2010
- Scoliosis Research Society Travelling Fellowship 2013
- University of Colorado Hospital Pioneer Award 2014
- Becker's Spine Review: 28 Spine Leaders at Academic Medical Centers 2014
- SICOT Hull Deformity Award: Patient Specific Spine Rods (PSSR) Decrease Rate of Mechanical Complications (MC) after Correction of Adult Spine Deformity (ASD) Nov 2018

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS –

- American Academy of Orthopaedic Surgery
- Colorado Medical Society
- Scoliosis Research Society
- Western Orthopaedic Association
- AO North America
- American Association of Neurologic Surgeons
- Society International of Orthopaedic Surgery and Traumatology
- American Orthopaedic Association
- Sacroiliac Medical Expert Group e.V.
- American Society for Testing and Materials

COMMITTEE AND SERVICE RESPONSIBILITIES

UNIVERSITY/INSTITUTIONAL

Present:

UCHealth New Products committee 2023- present

Past:

- Member Orthopedic Department Faculty Research Committee
- Member Orthopedic Department Marketing Committee
- Member Spine Center Leadership
- Spine Fellowship Co-Director
- Director – Orthopedic Department Governance Committee 2019
- Resident Spine Surgery Rotation Co-Director
- Resident Spine Core Curriculum Educational Director

Research Advisory Committee

Clinical Leadership Committee Task Force for Quality, Safety and Process Improvement

Physical Therapy Scholarship Advisory Board Member
Development Committee for Office of Clinical Research

NATIONAL/INTERNATIONAL

American Academy of Orthopedic Surgery: Adult Spine Evaluation Committee Member - 2024-2027
American Academy of Orthopedic Surgery: Annual Meeting Committee 2019 - present
Scoliosis Research Society: Research Grant Committee 2010 – 2021
Scoliosis Research Society: IMAST Program Committee 2014 - 2021
AO Biologics Committee 2010-2019
North American Spine Society: Public Relations Committee 2009 - 2015
North American Spine Society: Biologics Committee 2010 - 2015
North American Spine Society: Research Committee 2011 – 2015
American Pain Association: Board Member 2016 – Present
The American Board of Orthopaedic Surgery: Oral Examination Examiner, 2017
The American Board of Orthopaedic Surgery: Oral Examination Examiner, 2018

CLINICAL SERVICE

Spine Center, University of Colorado Hospital
Orthopedic Call Coverage, University of Colorado Hospital
Spine Team Surgical Medical Director
University of Colorado Hospital in-patient Spine Service
Denver Health Spine Trauma and Spine Clinic
Denver Veteran's Hospital Call Coverage

VOLUNTEER ACTIVITY

Orthopaedics Overseas: Umtata South Africa, Oct 2001
Rotary International, India Polio Follow Up and Gujarat Earthquake, Jan 2001
Operation Rainbow, Huehuetenango, Guatemala, 2003
University of Colorado Biomedical Engineering Society, Medical Advisor 2011, 2012, 2013
Indo-American Spine Alliance (IASA) 2014 – present

LICENSURE AND BOARD CERTIFICATION

Medical License:

- Colorado, active: 2004-Present
- California, active: 1998-2004, retired 2004

Board Certification:

- American Board of Orthopedic Surgeons 2006-present

INVENTIONS, INTELLECTUAL PROPERTY AND PATENTS HELD OR PENDING

Patel, VV et al. *System and Method For Fastening Of Two Or More Interacting Elements*. US Patent Application 17/002,372; Filed 8-25-2020. Patent No: US 11,832,858 B2. Issued 12/05/2023

Noshchenko, AG. Burger-(Van Der Walt), E. **Patel, VV**. Kleck, CJ. Mai, J. Pub 10-14-2021. ID- US 2021031506 A1. *Patient -Specific Spinal Implants*. US Patent Application 17/266535; Filed 8-8-2019.

Patel, VV. Kleck, C. Bowman, B. John, T. Paganelli, J. Pub 10-22-2020. ID – US 20200330660 A1. *Post-Operative Surgical Site Wound Treatment and Method for Device Removal*. US Patent Application 16/796826; Filed 2-20-2020. Provisional application US 62549357 20170823.

Patel, V. Nanninga, J. Pub 2-20-2020. ID – US 20200054373 A1. *System and Methods for Fastening of Two or More Interacting Elements*. US Patent Application 16/654691; Filed October 16, 2019. Provisional application US 62025163 20140716.

Arnold, B. Bowman, B. Pena, K. **Patel, V.** Pub 1-18-2018. ID – US 20180014939 A1. *Implant and Method for Posterior Sacroiliac Fusion*. US Patent Application 15/653284; Filed July 18, 2017. Provisional application US 62363752 20160718 and US 622448848 20170120.

Park, D. Bartot, M. **Patel, V.** Pub 6-19-2018. ID US 9999224 B2. *Antimicrobial Reverse Thermal Gel and Methods of Forming and Using Same*.

Patel, V. Nanninga, J. Pub 06-15-2017. ID – US 20170164988 A1. *System and Methods for Positioning of two or more Interacting Elements*. US Patent Application 15/325822; Filed January 1, 2013. Provisional application US 62025163 20140716.

Yakacki, C. Carpenter, D. **Patel, V.** Noshchenko, A. Pub 2014. Porous, *Patient-Specific Interbody Fusion Cages with Enhanced Loading Characteristics to Reduce Subsidence*. US Patent Application 62/026,678; Filed July 31, 2014. Provisional patent filed.

Mauldin, RG. **Patel, VV.** Yerby, SA. Sand, P. Pub 10-10-2013. *Impactor*. US Patent ID 20130267961 A1.

EDITOR, REVIEW AND REFEREE WORK

Present:

Associate Editor: Orthopedics

Expert Peer Reviewer: U.S. FDA Office of Women’s Health Intramural Grant Program 2022 – present (by invitation)

Grant Reviewer: Food and Drug Administration, Office of Women’s Health

Reviewer: Spine

Reviewer: Orthopedics

Reviewer: Clinical Orthopedics and Related Research

Reviewer: Medical Engineering and Physics

Reviewer: Current Orthopaedic Practice

Reviewer: BMC Musculoskeletal Disorders

Journal Review Board:

Editorial Board: Orthopedics

Editorial Board: Orthopedics Today

Editorial Board: Spine Surgery Today

Editorial Board: Healio

Past:

Reviewer: Journal of Comparative Effectiveness Research

Grant Reviewer: National Medical Research Council, Singapore 2009-2011, 2014, 2015

Program Reviewer: Medical Education Resources 2011

NASS Abstract Reviewer: Annual Meetings 2010 and 2011, 2012, 2015

SRS Abstract Reviewer: Annual Meeting 2014, 2015

IMAST Abstract Reviewer: Annual Meeting 2014, 2015
Reviewer: Journal of Orthopaedic Research 2017

INVITED EXTRAMURAL LECTURES, PRESENTATIONS AND VISITING PROFESSORSHIPS

LOCAL

1. Physical Therapy Core Curriculum Lecture - October 2004
2. Physical Medicine and Rehabilitation Core Curriculum Lecture - December 2004
3. Neurosurgery Core Curriculum Lecture: Biologics October 2006
4. University of Colorado Grand Rounds: Artificial Disc Replacement 2005
5. Geriatric Medicine Grand Rounds Oct. 2006: The Aging Spine
6. Resident Course March 2007: Treating the Aging Spine
7. Physical Medicine and Rehabilitation Department Core Curriculum May 2008: Spine Surgery Indications and Treatments
8. Department of Rheumatology Fellow Lecture Series February 2007 - 2008: Spine Surgery Review
9. Resident's Spine Course, Degenerative Lumbar Spine, May 2008: Lumbar Spine Case Discussion Leader
10. University of Colorado OR Personnel April 2009: Spine Surgical Approaches
11. University of Colorado, Dept. of Mechanical Engineering, Medical Device Design Course Lecture February 23, 2010
12. Orthopedic Resident Core Curriculum January 2011: Primary and Metastatic Spine Tumors
13. Department of Rheumatology, Rheumatology and Spine Surgery Lecture March 29, 2011
14. Department of Bioengineering Spine Section Course BIOE 5011 - Lectures and Practical Workshop, 3/29-3/31/11
15. Low Back Pain's Missing Piece – Diagnosing the Sacroiliac Joint, Jan. 24, 2011
16. Orthopaedic Surgery and Regenerative Medicine, Yesterday and Today, Gates Center, March 22, 2012.
17. Bioengineering PhD Program, BIOE 5041 Lecturer, April 2012: Spine Surgery
18. Grand Rounds for the Department of Neurosurgery, University of Colorado, August 13, 2013
19. Department of Rheumatology, Rheumatology and Spine Surgery Lecture, University of Colorado, May 6, 2015
20. Rocky Mountain Society for Integrative Medicine's Back Pain panel discussion, Knoebel Institute for Healthy Aging, Denver University, June 13, 2017
21. Orthopedic Resident Core Curriculum Anatomy Lab, August 9, 2017
22. Physician Assistants in Orthopaedic Surgery, Lecture: Motion Preservation in Spine Surgery, Denver, CO, July 26, 2022
23. Bioengineers class, Lecture: Engineering and Spine Surgery, University of Colorado, SOM, Division of Cardiology, February 21, 2023

REGIONAL

1. Colorado State University, Dept. Mechanical Engineering Nov. 2005: Spine Biomechanics
2. Colorado Spine Symposium, 16th Annual: Biomechanical Evaluation of Floating and Fixed Center of Rotation Total Disc Replacements: Facet Joint Loads Nov 2005
3. 16th Annual Colorado Spine Symposium Nov. 4, 2005: Biomechanics of Artificial Disc Replacement
4. Radiology Technologist's Review 2005: Spinal Disorders Review
5. Colorado State University, Dept. Mechanical Engineering Nov 2006, 2007, 2008, 2009 - Spine Biomechanics
6. Colorado Spine Symposium, 18th Annual: Sept 2007 - Trans-1 Screw Fixation

7. Channel 7 Colorado and Company, Denver CO, 2005 - Anterior Spinal Fusion
8. Channel 7 News, Denver CO, 2007 - Interspinous Spacer Minimally Invasive Surgery
9. Channel 7 News, Denver CO, 2008 - Minimally Invasive Anterior Fusion and Physician Education
10. Channel 7 News, Denver CO, 2008 - Lumbar Spinal Disc Replacement
11. Rocky Mountain Resident's Forum 05/2009: Hemostasis in Spine Surgery, TLIF/PLIF demonstration, Cases
12. Rocky Mountain Resident Forum: Treatments in Thoracolumbar Trauma
13. Biomechanics of Thoracolumbar Fixation. Cadaver Demonstration, Lab Instructor
14. Colorado State University, Dept. Mechanical Engineering Nov. 2010: Spine Biomechanics
15. Fox News, January 2012, Intraoperative Computer Assisted Surgical Navigation
16. Channel 9 News, Denver CO, July 3, 2013: Back Pain Procedure Offers Less Pain Shorter Recovery time
17. Fox 31 News, Denver, CO, January 17, 2014: Community Rallies Around Colorado Crossfit Athlete Paralyzed During Competition
18. Fox 31 News, Denver, CO, January 18, 2014: Community Bands Together to be "Ogar Strong" for Paralyzed Crossfit Athlete
19. Associated Press, January 28, 2014: Super Bowl Marks Milestone for Manning
20. Channel 7 News, Denver, CO, June 9, 2014: Colorado's Olympic Swimmer Amy Van Dyken-Rouen Severed Spine in ATV Crash
21. Denver Post, Denver, CO, June 9, 2014: Amy Van Dyken-Rouen, 6-Time Olympic Gold Medalist, Severs Spinal Cord in ATV Crash
22. Fox 31 News, Denver, CO, June 10, 2014: A Closer Look at Amy Van Dyken's Spinal Cord Injury
23. Vail Symposium, Vail CO, January 28, 2016: Stem Cells: Exploring the Research Perspective

NATIONAL

1. AO OR Personnel Course – Spine Surgery May 21-22, 2005: Anterior Lumbar Plating
2. Synthes Resident and Fellows Course – Cervical Spine Trauma Oct 15-16, 2005:
 - i. Biomechanics of Cervical Spine Trauma
 - ii. Case Discussion Leader
 - iii. Table Instructor
3. Synthes Resident and Fellows Course – Degenerative Lumbar Spine May 15-16, 2005:
 - i. Biomechanics of Lumbar Spine
 - ii. Lumbar Spine Degeneration
 - iii. Case Discussion Leader
 - iv. Table Instructor
4. Colorado Family Medicine Review Course Nov. 4, 2005:
 - i. Minimally Invasive Spine Surgery
5. Fall Orthopaedic Summit – Section Director: Minimally Invasive Surgery; September 15-17, 2005: Minimally Invasive Spine Surgery
6. Colorado Family Practice Review Nov. 2005
 - i. New Spine Technology for Primary Care
7. Colorado Family Practice Review May. 2005
 - i. New Spine Technology for Primary Care
8. AO North America National Resident's Spine Course Nov 2007
 - i. Spinal Biomechanics
 - ii. History and Physical, Imaging and Diagnostics
 - iii. Case Discussion Leader
 - iv. Table Instructor
9. AAOS Maintenance of Certification Course Nov 2007

- i. Pain Management
 - ii. Trauma: Cervical, Thoracic, Lumbar
 - iii. Spinal Cord Injury and Rehabilitation
 - iv. Spinal Infection
- 10. ProDisc-L National Physician Training, Jan 2008
 - i. Design Rationale
 - ii. Table Instructor
- 11. DePuy National Spine Fellows Course
 - i. Table Instructor
- 12. ProDisc-L National Physician Training, Jan 2008
 - i. Design Rationale
 - ii. Complications
 - iii. Table Instructor
- 13. AAOS Maintenance of Certification Course Nov 2008
 - i. Pain Management
 - ii. Trauma: Cervical, Thoracic, Lumbar
 - iii. Spinal Cord Injury and Rehabilitation
 - iv. Spinal Infection
- 14. AO North America National OR Personnel Course 2008
 - i. Course Co-Chairman, Spine Section
 - ii. Cervical Surgical Anatomy
 - iii. Lumbar Degenerative Disease
- 15. Society of Air Force Clinical Surgeons 04/2009
 - i. Hemostasis in Spine Surgery: State of the Art
 - ii. Disc Replacement and Motion Preservation Update
- 16. 1st Annual Operating Room Spine Course, Sept. 2009
 - i. Course Chairman. Course for operating room personnel
- 17. AAOS Maintenance of Certification Course Nov 2009
 - i. Trauma: Cervical, Thoracic, Lumbar
 - ii. Spinal Cord Injury and Rehabilitation
 - iii. Spinal Infection
- 18. Colorado Family Medicine Review Course June 2010
 - i. Low Back Pain
- 19. Colorado Family Medicine Review Course October 2010
 - i. Low Back Pain
- 20. AAOS Maintenance of Certification Course Nov 2010
 - i. Trauma: Cervical, Thoracic, Lumbar
 - ii. Spinal Cord Injury and Rehabilitation
 - iii. Spinal Infection
- 21. John McCulloch Memorial 19th annual Winter Spine Conference
- 22. Visiting Professor. Lecture: Lumbar Pseudarthrosis, Feb 2011
- 23. Sacroiliac Joint Surgery Society, 1st annual meeting, 2/2012: Pre-operative protocol with discussion.
- 24. Sacroiliac Joint Surgery Intraoperative Navigation, University of Colorado 2/28/2012 and 5/16/2012
- 25. American Association of Orthopedic Surgery, Maintenance of Certification Course, 2012 Section Director
- 26. American Association of Orthopedic Surgery, Maintenance of Certification Course, 2012 Lectures: Spine Trauma
- 27. Cutting Edge MD TV Series, 6th Episode – Herniated Disc, Fox Sports Network, 2014
- 28. SI Bone National Training Course, Minimally-Invasive Sacroiliac Fusion with the iFuse Implant System, lecture and live surgery, February 7, 2014

29. The Winter Clinics for Cranial and Spinal Surgery, Experience with the Minimally Invasive Sacroiliac Fusion from a Lateral Approach, February 25, 2014
30. Washington Post Blogs, Washington, DC, June 10, 2014
31. Olympic Swimmer Amy Van Dyken Severs Spine in ATV Accident
32. USA Today, Englewood, CO, October 16, 2014
33. Injury to Nervous System Doesn't Mean End of an NFL Career
34. AAOS Maintenance of Certification Course December 2014
 - i. Lumbar Degenerative Diseases
 - ii. Cervical Degenerative Diseases
 - iii. Spinal Cord Trauma and Spinal Cord Injury
 - iv. Spine Deformity and Special Considerations
 - v. Bacterial Spine Infections
35. AAOS Maintenance of Certification Course December 2015
 - i. Lumbar Degenerative Diseases
 - ii. Cervical Degenerative Diseases
 - iii. Spinal Cord Trauma and Spinal Cord Injury
 - iv. Spine Deformity and Special Considerations
 - v. Bacterial Spine Infections
36. Stryker Spine MedED Resident and Fellow Cervical and Lumbar Education, March 12, 2016
 - i. Cervical Surgical Techniques
 - ii. Cervical Case Presentations
 - iii. Lumbar Indications for Surgery
 - iv. Lumbar Case Presentations
37. Stryker Spine MedED The Great Debate: Advanced Techniques and Training, May 20, 2016
 - i. Diagnosis and Treatment Options for Juxtafusion Disease in a Patient with Flat Back Syndrome, Presentation 1 & 2
38. Miller Orthopedic Surgery Board Review Part II, May 30, 2016
 - i. Spine Surgery Sub-Specialty Highlight Lecture and Mock Presentations
39. AAOS Maintenance of Certification Preparation and Review Course November 19, 2016
 - i. Spine Infections
 - ii. Thoracic and Lumbar Trauma
40. AAOS Maintenance of Certification Preparation and Review Course December 1-3, 2016
 - i. Degenerative Conditions Lumbo - Spine
 - ii. Degenerative Diseases Cervical Spine
 - iii. Spinal Trauma
 - iv. Spine Deformity, Infections Involving the Spine
41. Merc Research Annual Musculoskeletal Education and Research Center Symposium August 25-26, 2017
 - i. The Future of Robotics
42. VuMedi/LSRS Webinar, January 8, 2018
 - i. Diagnostic Workup/Selecting Patients for SIJ Fusion
43. 3rd International Conference on Sacroiliac Joint Surgery, February 21-24, 2-18, A Review of the Literature and Current Treatments
44. 3rd International Conference on Sacroiliac Joint Surgery, February 21-24, 2-18, A New SIJ Questionnaire
45. 3rd International Conference on Sacroiliac Joint Surgery, February 21-24, 2-18, Technical Considerations and Pitfalls – Lateral Approach
46. 3rd International Conference on Sacroiliac Joint Surgery, February 21-24, 2-18, Lateral vs. Posterior Approach
47. 3rd International Conference on Sacroiliac Joint Surgery, Review of the Literature and Current Treatments, USF Health CAMLS, Tampa, FL, February 21-24, 2018

48. 3rd International Conference on Sacroiliac Joint Surgery, A New SIJ Questionnaire, USF Health CAMLS, Tampa, FL, February 21-24, 2018
49. AAOS 2018 Annual Meeting, Looking Beyond the Curve: Classification and Treatment of Spinal Deformity in the Orthopaedic Clinic, New Orleans, LA, March 6-10, 2018.
50. AAOS 2018 Annual Meeting, Pragmatic Learning for New Techniques and Technologies in Spine Surgery, New Orleans, LA, March 6-10, 2018.
51. AAOS 2018 Annual Meeting, What is the Role of Anterior, Oblique, Posterior, and Laterally Based Surgery: How Can They Help?, New Orleans, LA, March 6-10, 2018.
52. AAOS 2021 Annual Meeting, Economics of Lumbar Disc Replacement, San Diego, CA August 31 – September 3, 2021.
53. AAOS 2021 Annual Meeting, Lumbar Disc Replacement Outcomes, San Diego, CA August 31 – September 3, 2021.
54. AAOS 2021 Annual Meeting, Paper 481 - Minimally Invasive Proximal Screw Stabilization in Long Posterior Instrumented Spinal Fusion for Prevention of Proximal Junctional Kyphosis and Failure, San Diego, CA August 31 – September 3, 2021
55. AAOS 2021 Annual Meeting, P0376 | Sacroiliac (SI) Joint-Specific Disability Questionnaire: The Denver SI Joint Questionnaire Initial Validation, San Diego, CA August 31 – September 3, 2021.
56. Annual Meeting of the Cannabis Research Conference. Preliminary Data Comparing the Efficacy of Acute Vaporized Cannabis to Oral Oxycodone and Placebo for Chronic Spine Pain. Virtual Conference, August 8-10, 2022. Morris AWJ, Netsanet R, Bainbridge J, **Patel VV**, Rzasal Lynn R, Lindley EM.
57. Ankit Hirpara, BA, Cheryl Ackert-Bicknell, PhD, Vikas Patel, MD. Understanding the Impact of Low-Density Lipoprotein Levels and Lipid-Lowering Agents on Rates of Pseudarthrosis After Anterior Cervical Discectomy and Fusion. NASS 2024. Chicago, IL, Sept. 25-28, 2024.

INTERNATIONAL

1. North American Spine Society: PreCourse Spine Biologics and Research: Biologics for the Treatment of Spinal Disorders, Oct 2007
2. Tissue Engineering and Regenerative Medicine Annual Meeting: Porto, Portugal, 2008. Clinical and Basic Science Interactions of Fibrin Glue and Bone Morphogenetic Protein.
3. North American Spine Society: PreCourse Spine Pain Management: Discogenic and Psychologic Pain, Oct 2008
4. Wooridul Hospital Group, Seoul Korea, Feb 2009. Hemostasis in Spine Surgery
5. AO Spine TK Users Group Meeting 2009. Case Presentations
6. North American Spine Society Annual Meeting, 2009. Spine and Sports Symposium: Implications for the Senior Athlete, How does competitive sport affect surgical decision making in multilevel cervical disease
7. American College of Spine Surgeons, Annual Meeting June 2010. Lumbar Pseudarthrosis
8. Indian Medical Association, Mehsana, India Oct 12, 2010. Low Back Pain
9. Asia Pacific Orthopedic Association: Taipei, Taiwan, Nov 4-6, 2010. Symposium, Hemostasis in Spine Surgery
10. Advanced Techniques for Complex Spinal Resection and Reconstruction: A Hands-on Human Anatomic Specimen Course: August 3-4, 2012 (AO)
11. North American Spine Society 2012 Annual Meeting: Biologics Pre-Course Chairman
12. North American Spine Society 2012 Annual Meeting: Thoracolumbar Complications of rhBMP-2 Use
13. North American Spine Society 2012 Annual Meeting: Growth Factors in Spine Surgery
14. North American Spine Society 2012 Annual Meeting: Breaking Developments in Surgical Biology
15. North American Spine Society 9th Spine Summit, Feb 28-March 2, New Technology Symposium Presenter/Chair: SI joint fusion

16. North American Spine Society Webinar: Potential Risks of rh-BMP-2 Use in Spine Surgery, August 21, 2013
17. SRS Traveling Fellowship: Pitfalls and Prevention of Complications in Adult Deformity Surgery, Istanbul Turkey, Nizhniy Novgorod, Bristol United Kingdom, Lyon France, August 30 to September 17, 2013
18. North American Spine Society: Section on Biologics and Basic Research Webinar Series: BMP: Risk Management Strategies, August 21, 2013
19. SRS Traveling Fellowship: Spinal Fusion: Optimizing the Mechanical Fixation to Meet the Biology of the Patient, Istanbul Turkey, August 30, 2013
20. SRS Traveling Fellowship: Modern 3-D Imaging and Computer Navigation in Spine Surgery, Zurich Switzerland, September 13, 2013
21. North American Spine Society 2013 Annual Meeting: Section on Biologics and Research: Stem Cell Procedures, Cell Enhanced Allografts (Osteocell, Trinity) Are as Good as BMP and Cheaper: Con, October 9, 2013
22. North American Spine Society 2013 Annual Meeting: Section on Biologics and Basic Science: Update on rhBMP-2: Current Usage, YODA Findings and Risk Management, October 11, 2013
23. AO Spine Latin America Symposium – Bone Biomaterial: BMP the Good and the Bad, Mexico City, Mexico, June 14, 2014
24. AO Spine Latin America Symposium – Bone Biomaterial: BMP or DBM? A New Step In-between: Cellular Allografts, Mexico City, Mexico, June 14, 2014
25. Association of Spine Surgeons of India Visiting Professor Bharati Didyapeeth University Medical College, Department of Orthopedic Surgery, January 20 – 21, 2015
26. Association of Spine Surgeons of India: Cervical, Thoracic and Lumbar Spine Trauma, Bharati Didyapeeth University Medical College, Department of Orthopedic Surgery, January 21, 2015
27. Pune Spine Society: Lumbar Pseudoarthrosis, Pune India, January 22, 2015
28. Association of Spine Surgeons of India Annual Meeting (ASSICON): Dynamic Stabilization for Multilevel Degenerative Disc Disease, Pune India, January 24, 2015
29. The International Society for the Advancement of Spine Surgery 2015 Annual Meeting: TDR vs. Fusion Panel, San Diego, California, April 16, 2015
30. The International Society for the Advancement of Spine Surgery 2015 Annual Meeting: Spine Talk – Treatment of L4-5 Degenerative Spondylolisthesis (Moderator), San Diego, California, April 16, 2015
31. Essentials In Spine: Spinal Osteotomies, An Advanced Level BioSkills Experience: Thoracolumbar Osteotomies – Principles of Different Types of Osteotomies with Decision Making, Bangalore, India, September 19, 2015
32. Essentials In Spine: Spinal Osteotomies, An Advanced Level BioSkills Experience: Cadaveric Demonstration: Thoraco-Lumbar PSO and SPO (Ponte's) – Surgical Technique (Positioning to Closure), Tips and Pearls, Bangalore, India, September 19, 2015
33. 2nd International Extreme Sports Medicine Congress, Spine Injuries in the Extreme Sports Athlete: Treating the tingling, June 10, 2016
34. 2nd International Conference on Sacroiliac Joint Surgery and annual meeting: Statistical shape modelling of the SIJ, Hamburg, Germany, September 16, 2016
35. 2nd International Conference on Sacroiliac Joint Surgery and annual meeting: Different revision techniques after a failed SIJ fusion - How do we accomplish fusion in case of a pseudoarthrosis and when do we switch one method for another? Hamburg, Germany, September 17, 2016
36. 2nd International Conference on Sacroiliac Joint Surgery and annual meeting: Lateral based system, iFuse, Hamburg, Germany, September 17, 2016
37. Annual Meeting of EUROSPINE, Quality of life and sagittal alignment after surgical correction of adult spinal deformity with posterior instrumentation, Dublin, Ireland, October 11-13, 2017.
38. Annual Meeting of the International Society for the Advancement of Spine Surgery (ISASS): Quality of Life and Sagittal Alignment after Surgical Correction of Adult Spinal Deformity with Posterior

- Instrumentation and Simultaneous Translation on Two Rods technique, Orlando, Florida, October 25-28, 2017.
39. 38th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT): Blockade of Osteoclast-Mediated Bone Resorption with a RANKL Inhibitor Enhances Spinal Fusion, Cape Town, South Africa, November 30-December 2, 2017.
 40. 38th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT): Spine Fusion and rhBMP in a Vitamin D deficient rat model, Cape Town, South Africa, November 30-December 2, 2017.
 41. 38th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT): Surgical Planning And Patient-Specific Rods (PSR) Improve Correction Of Sagittal Imbalance In Adult Spinal Deformity (ASD), Cape Town, South Africa, November 30-December 2, 2017.
 42. 38th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT): Quality of life and sagittal alignment after surgical correction of adult spinal deformity (ASD) with posterior instrumentation, Cape Town, South Africa, November 30-December 2, 2017.
 43. 39th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT), Cauda Equina Syndrome, Montreal, CA October 10-13, 2018.
 44. 39th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT), Safety in Spine Surgery and Trauma, Montreal, CA October 10-13, 2018.
 45. 40th Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT): Motion Preservation Successes and Failures, December 4-7, 2019.
 46. AAOS 2021 Annual Meeting, International Instructional Course Lecture: Current State of Total Disc Replacement: Economics of Lumbar Disc Replacement, San Diego, CA August 31 – September 3, 2021.
 47. AAOS 2021 Annual Meeting, International Instructional Course Lecture: Lumbar Disc Replacement Outcomes, San Diego, CA August 31 – September 3, 2021.
 48. International Society for the Advancement of Spine Surgery. June 1- 3, 2023. Adjunctive Use of Bone Growth Stimulation in Cervical Spine Fusion in Patients at Risk for Pseudarthrosis
 49. International Society for the Advancement of Spine Surgery. Clay Hoffman, BS, Zohaib Sherwani, MD, Vikas V. Patel, Shahbaaz Sabri, MD, David Ou-Yang, MD, Christopher J. Kleck, MD. Range of Horizontal Gaze Following Multilevel Posterior Cervical Fusion Across the Cervicothoracic Junction. ISASS Annual Meeting 2023. San Francisco, CA, June 3, 2023.
 50. Global Spine Congress. Andres Bonilla; Kim Lebsack; James Johnson; Kevin Labus; Benjamin Gadomski; Holly Stewart; Howard Seim; Celeste Abjornson; **Vikas Patel**; Jeremiah Easley: “Safety and Functionality assessment of Antimicrobial Surface Modified Spinal Stabilization Devices”. Oral Presentation GSC Annual Meeting, May 16, 2024. Bangkok, Thailand.
 51. 11th Interdisciplinary World Congress on Low Back & Pelvic Girdle Pain. Peter G. Whang, **Vikas Patel**, Bradley Duhon, Bengt Sturesson, Daniel Cher, W. Carlton Reckling, Robyn Capobianco and David Polly. Oral abstract presentation of “Minimally Invasive SI Joint Fusion Procedures for Chronic SI Joint Pain: Systematic Review and Meta-Analysis of Safety and Efficacy”. Melbourne, Australia; November 2nd, 2023
 52. **Vikas Patel**, Todd Lansford, Marc Weinsten, Peter Campbell, Amir Vokshoor, Joshua Wind, Andrew Beaumont, Hamid Hassanzadeh, Kristen Radcliff, Ilyas Aleem, Domagoj Coric. Adjunctive Use of Bone Growth Stimulation in Cervical Spine Fusion in Patients at Risk for Nonunion. *CSRS 2023*. Las Vegas, NV, Nov. 30, 2023.
 53. Clay Hoffman, MD, Michael Nocek, BA, Zohaib Sherwani, MD, Vikas V. Patel, MD, Shahbaaz Sabri, MD, David Ou-Yang, MD, Christopher J. Kleck, MD. Range of Horizontal Gaze Following Multilevel Posterior Cervical Fusion Across the Cervicothoracic Junction. IMAST 2024. San Diego, CA, Apr. 10-14, 2024.
 54. Evalina Burger, MD, Vikas Patel, MD, Michael Steinmetz, MD, William C. Welch, MD, Ahmad Nassr, MD, Domagoj Coric, MD. Lumbar Facet Arthroplasty for Spondylolisthesis and Stenosis:

Three Year Outcomes from a Prospective FDA Randomized Clinical Trial. ISASS 2024. Miami, FL, Apr. 26-28, 2024.

55. Ankit Hirpara, BA, Cheryl Ackert-Bicknell, PhD, Brandon Bennett, MD, **Vikas Patel, MD**. Understanding the Impact of Low-Density Lipoprotein Levels and Lipid-Lowering Agents on Rates of Pseudarthrosis After Anterior Cervical Discectomy and Fusion. ISASS 2024. Miami, FL, Apr. 26-28, 2024.
56. CSRS meeting 12/2024

TEACHING RECORD

- BIOE 5041 - Clinical Experiences for Bioengineers 2017-2022
- Orthopedic Resident Core Curriculum Spine Section Director 2004 - 2016
- Orthopedic Resident Spine Surgery Clinical Education Section Director: 2004-2016: Supervision, bedside teaching, outpatient clinic teaching, and surgical teaching 24 hours/week.
- Fellowship Director for Spine Surgery Fellowship 2008 - 2018. Co-developed the fellowship starting in 2007 and obtained ACGME accreditation in 2010.
- Orthopedic Resident Spine Trauma Course Director and Lecturer for weekly lectures: Aug-Nov 2005
- Monthly Spine Journal Club, co-organizer and frequent moderator/
- Physical Medicine and Rehabilitation Resident Elective Clinical Instructor: 2 week blocks of clinical and surgical teaching twice / year 2006-2012
- Physical Medicine and Rehabilitation Spine Fellow Elective Clinical Instructor: 6 week block 2007
- Rheumatology Fellow Elective Clinical Instructor: 6-week block 2006.
- Primary Care Physician CME Accredited Evening Lecture Series: Developed, directed, and administered monthly lecture series for the 12 months of 2005.
- Primary Care Physician CME Accredited Webcast Lecture Series: Developed, directed, and administered monthly lecture series via interactive web-based format allowing access from anywhere in world. Jan 2006 – 2012
- Developed Spine Surgery Resident Rotation Guideline Packet 2006
- Posterior Cervical Fixation, Director, cadaver workshop March 2005
- Compiled and Developed patient education packets for pre-surgery education 2009
- Medical School Orthopedics 6620 class lecturer, 2005, 2006, 2007, 2008, 2009
- Medical Student Clinical Education in Spine Center: Regular students rotating in clinic
- Developed National Teaching Program for physician education for minimally invasive anterior spinal fusion surgery technique, Trans-1 2010
- Mentored Scholarly Activity mentor for medical school students, Engineering students and residents: Dale Cassidy, Laura Brown, Aris Sophocles, Scott Golembeski, Alex Yaszemski, Blake Sherman, Matt McCullough, Whitney Strom, Liz Robinson, Grant Armour, Sami Jaafar, Brianna Patti, Ryan Farmer, Patrick Obrien, Doug Kasow, Mike Zimkowski, Morgan Hill, Alireza Hemmati, Yalda Nazeri, Brett Matoian, Damian Illing, Cameron Barton, Kenneth Milligan, Chris Johnson, Ben Saccamano, Ryan Martyn, Zach Wuthrich, Brandi Krieg
- Mentored Indo-American Spine Alliance Fellow, Shakti Goel, 2017

THESIS COMMITTEES

1. Mike Zimkowski: MA and PhD (CU) 2009-2011
2. Nina Vollmer: PhD (Mines) 2010-2013
3. Lillian Chatham: MA (CU Bioengineering) 2014
4. Maria Bortot: MA (CU Bioengineering) 2014
5. Anna Laura Nelson: MA (CU Bioengineering) 2014
6. Ryan Arce: MA (CU Bioengineering) 2015
7. James R. Bardill: MA (CU Bioengineering) 2015

8. Madia Stein: MA (CU Bioengineering) 2016
9. Songyuan Gu: MA (CU Biomedical Science and Biotechnology) 2017
10. Trevor Pier: 2018
11. Zach Wuthrich: MA (CU Biomechanical Science) 2019
12. Lana Bowers, MS (Bioengineering) 2020

ACADEMIC ACTIVITIES

- Judge for University of Colorado, Denver Research and Creative Activities Symposium, 2010
- Developed National Teaching Program for Operating Room Personnel education in spine surgery. Presented 11/2009, 6/2010, 7/2010,
- Bioengineering PhD Program, BIOE 5041 Lecturer 2010-2018
- Bioengineering PhD Program, BIOE 5041 Lecturer -Operating room experience facilitator 2010-present
- North American Spine Society 2012 Annual Meeting: Biologics Pre-Course Chairman
- NASS 9th Spine Summit, Feb 28-March 2, 2013, New Technology Symposium Presenter/Chair: SI joint fusion
- Cervical Spine Anatomy, Feb 20, 2013
- Cervical Spine Anatomic Dissection and Surgical Procedure Lab, Feb 20, 2013
- Rocky Mountain Medical Technology Conference, Feb 25, 2012, Medical Advisory Board, University of Colorado, Boulder, School of Engineering
- AAOS Maintenance of Certification Course 2008-2013
- CU Biomedical Engineering Society, medical advisor, 2011-2016
- Co-Chair AAOS Maintenance of Certification Course 2013-2016
- ABOS Board Examiner 2018
- ABOS Board Examiner 2019
- ABOS Board Examiner 2020
- ABOS Board Examiner 2021
- ABOS Board Examiner 2022, August
- ABOS Board Examiner 2024, July

PEER REVIEWED GRANTS

1. Colorado Office of Economic Development and International Trade SPARK, Novelty Cages Accommodating Individual Endplate Architecture, State, \$150,000, (PI: Dr. Vikas V. Patel), 7/1/23-4/30/25
2. Surgalign Spine Technologies, A 2- and 5-Year Evaluation of Clinical Outcomes in the Treatment of Degenerative Spinal Stenosis with Concomitant Low Back Pain by Decompression With and Without Additional Stabilization Using the coflex(R) Interlaminar Technology for FDA Actual Conditions of Use Study, \$235,421.00, 5/10/23-5/9/28
3. Spark Project Grant, “Novelty Cages Accommodating Individual Endplate Architecture”, \$100,000.00, 5/2023 (PI: Dr. Vikas V. Patel), 5/10/23-5/9/28
4. Orthofix, Inc., M6-C™ Artificial Cervical Disc Two-Level IDE Pivotal Study: A Prospective, Concurrently Controlled, Multi-Center Study to Evaluate the Safety and Effectiveness of the Spinal Kinetics M6-C™ Artificial Cervical Disc Compared to Anterior Cervical Discectomy and Fusion (ACDF) for the Treatment of Contiguous Two-Level Symptomatic Cervical Radiculopathy, \$309,738.79, (PI: Dr. Vikas V. Patel), 2/8/23 - 2/7/28

5. A Multi-Center Post-Market Retrospective Data Collection Protocol to Evaluate the Real World Performance of Orthofix Spine Stim Devices Compared to Control (RWE Spine Study), \$133,147 (PI: Dr. Vikas V. Patel), 10/14/22-10/13/27
6. Pfizer, A PHASE 3, PLACEBO-CONTROLLED, RANDOMIZED, OBSERVER-BLINDED STUDY TO EVALUATE THE EFFICACY, SAFETY, AND TOLERABILITY OF A CLOSTRIDIUM DIFFICILE VACCINE IN ADULTS 50 YEARS OF AGE AND OLDER, \$15,440 (PI: Dr. Vikas V. Patel)
7. Alyve Medical, Inc., Non-invasive evaluation of upper and lower body function with Showmotion, (PI: Dr. Vikas V. Patel), 1/13/20-1/12/25
8. SI Bone, SALLY: Study of bone growth in the Sacroiliac Joint after minimally invasive surgery with titanium implants ceding to Aspire IRB, \$22,451 (PI: Dr. Vikas V. Patel) 7/31/17-7/30/2024
9. Spinal Kinetics, Inc., M6-C Artificial Cervical Disc IDE Post-Approval Study, \$19,200 (PI: Dr. Vikas V. Patel) 5/14/20 - 5/13/25
10. ReActiv8 Stimulation Therapy vs Optimal Medical Management: A Randomized Evaluation (RESTORE), \$355,756 (PI: Dr. Vikas V. Patel) 1/14/22-1/13/26
11. Mitsubishi Tanabe, A Phase 2a, Randomized, Double-blind, Placebo-controlled Study to Assess the Efficacy and Safety of MT-3921 in Subjects with Acute Traumatic Cervical Spinal Cord Injury, \$4,352 (PI, Kleck; CO-PI Dr. Vikas V. Patel) 2022
12. UCD/COLOSEM Lower-Extremity Bony Alignment and Body Habitus Using EOS, \$24,798 (PI: Dr. Christopher J. Kleck; CO-PI Dr. Vikas V. Patel) March 2021-February 2027
13. NuVasive Prediction of Postoperative Global Sagittal Alignment Using Musculoskeletal Modeling – Validation Study, \$45,800 (PI Witt-Jens; CO-PI Dr. Vikas V. Patel), July 2019-July 2024
14. Lower-Extremity Bony Alignment and Body Habitus Using EOS, \$24,798 (PI: Dr. Christopher J. Kleck; CO-PI Dr. Vikas V. Patel)
15. A Double Blind, Placebo-Controlled Crossover Study Comparing the Analgesic Efficacy of Cannabis versus Oxycodone, PI Emily Lindley, Investigator, Colorado Department of Public Health and Environment (CDPHE) Medical Marijuana Research Grant 2016-2019 \$743,122
16. Bioscience Discovery and Evaluation Grant, PI DaeWon Park, CI, Colorado Office of Economic Development and International Trade, 2014-2015
17. Porous, Patient Specific Interbody Fusion Cages with Enhanced Loading Characteristics, CI, National Institute for Arthritis and Musculoskeletal and Skin Diseases for 2014-2016, 3% effort, \$176,125
18. Revitalization of Bone Allograft with Induced Pluripotent Stem Cells to Enhance Spinal Fusion, CI Musculoskeletal Transplant Foundation, 2/1/2014 to 1/31/2015, 3% effort, \$100,000
19. Fellowship Grant in Spine Care for 2015-2016, PI, Globus Medical, Industry, 8/1/2015 to 7/31/2016, 1% effort, \$67,022

20. Fellowship Grant in Spine Care for 2014-2015, PI, OMeGA, Industry, 8/1/2014 to 7/31/2015, 1% effort, \$15,000
21. Fellowship Grant in Spine Care for 2013-2014, PI, OREF, Industry, 8/1/2013 to 7/31/2014, 1% effort, \$31,290
22. Fellowship Grant in Spine Care for 2012-2013, PI, OREF, Industry, 8/1/2012 to 7/31/2013, 1% effort, \$34,324
23. Fellowship Grant in Spine Care for 2011-2012, PI, OREF, Industry, 8/1/2011 to 7/31/2012, 1% effort, \$54,250
24. Fellowship Grant in Spine Care for 2011-2012, PI, Synthes, Industry, 8/1/2011 to 7/31/2012, 1% effort, \$32,500
25. Fellowship Grant in Spine Care for 2010-2011, PI, OREF, Industry, 8/1/2010 to 7/31/2011, 1% effort, \$69,500
26. American Association of Hip and Knee Surgeons, 2002, Three Dimensional Morphologic and Kinematic MRI Analysis of the Knee. \$25,000
<http://www.aahks.org/member/research/AAHKSRResearchGrantsandAwardRecipients.asp>

NON-PEER REVIEWED GRANTS

1. 3Spine clinical trial titled “An Interventional, Multi-Center Investigation of Single-Level Transforaminal Lumbar Interbody Fusion (TLIF) Stabilized with Pedicle Screws”. PI, Vikas Patel, Grant 2021-2026, \$353,835
2. Patel, Synthes, Biomechanical Evaluation of Anterior Cage-Plate Fixation (ALIF cage and ATB Plate or Synfix) Versus Iliac Screws with TLIF, \$53,063, 5/1/12 – 5/1/15
3. Patel, CU Innovations/Pilot, Novel Cages Accommodating Individual Endplate Architecture, \$100,000, 7/11/18 – 7/11/20
4. Patel, Lanx, Inc., A Multi-Center Prospective Randomized Study Comparing Supplemental Posterior Instrumentation, ASPEN Spinour Process System versus Pedicle Screw Fixation, in Lateral Interbody Fusion (LLIF) or Anterior Lumbar Interbody Fusion (ALIF), \$7,370, 9/21/12 – 9/20/15
5. Patel, Medtronic, Prospective Study of Pedicle Screw Placement Using the O-arm and Navigated Instrumentation, \$63,504, 12/29/11 – 1/17/16
6. Patel, Globus Medical, 2015 Fellowship, \$67,022, 3/24/15 – 7/31/16
7. Patel, SI-BONE, INSITE: Investigation of Sacroiliac Fusion Treatment, \$74,003, 12/4/12 – 12/3/16
8. Patel, Aesculap Implant Systems, Clinical Study to Evaluate the Safety and Effectiveness of the Aesculap Activ-L Artificial Disc in the Treatment of Degenerative Disc Disease, \$1,457,517, 11/28/07 – 3/1/17
9. Patel, Stryker, AAOS 2017 Annual Meeting, \$1,000, 3/1/17 – 3/31/17

10. Patel, Vertiflex, A Prospective, Multicenter, Randomized Study Comparing VertiFlex Superior Interspinous Spacer (ISS) to the X-STOP Interspinous Process Decompression (IPD) System in Patients with Moderate Lumbar Spinal Stenosis, \$668,904, 3/2/09 – 7/21/17
11. Patel, Globus, 16-17 Fellowship, \$40,556.96, 8/1/16 – 7/31/17
12. Patel, Orthofix, A Retrospective Study Evaluating the Efficacy of the Orthofix Cervical-Stim Bone Growth Stimulator in Patients that Have Undergone Cervical Fusion Surgery and are at High-risk for Non-fusion, \$58,229, 9/2/14 – 9/1/17
13. Patel, Integra LifeSciences Corporation, DuraSeal Exact Spine Sealant, \$39,012, 9/29/14 – 9/28/17
14. Patel, Orthofix, Safety and Efficacy of Pulsed Electromagnetic Fields (Cervical-Stim) as an Adjunct to Enhance Union in Conservatively Treated Type II Fractures of the Odontoid Process, \$16,307, 3/12/15 – 3/11/18
15. Patel, Globus, 17-18 Fellowship, \$75,000, 8/1/17 – 7/31/18
16. Patel, Orthofix, Retrospective Study evaluating the efficacy of the Orthofix Spinal-Stim bone growth stimulator in patients who have undergone lumbar fusion surgery with adjunctive use of the Spinal-Stim device, \$26,566, 9/15/15 – 9/14/18
17. Patel, Medicea, 17-18 Fellowship, \$81,384, 2/1/18 – 1/31/19
18. Patel, OMeGA, 17-18 Fellowship, \$16,000, 8/1/18 – 7/31/19
19. Patel, Globus, 17-18 Fellowship, \$75,000, 8/1/18 – 7/31/19
20. Patel, Mainstay Medical, ReActiv8 Implantable Neurostimulation System for Chronic Low Back Pain, \$206,202, 3/29/17 – 3/28/20
21. Patel, Colorado Office of Economic Development and International Trade, Cervical Plate Design Finalization, Validation, and Regulatory Approval, \$115,762, 7/2/17 – 4/30/20
22. Patel, Pfizer Pharmaceuticals, A Phase 3, Placebo-controlled, randomized, observer-blinded study to evaluate the efficacy, safety, and tolerability of a Clostridium Difficile Vaccine in adults 50 years or age and older, \$24,974, 5/23/17 – 5/22/20
23. Patel, Spinal Kinetics, Prospective, Concurrently Controlled, Multi-Center Study to Evaluate the Safety and Effectiveness of the Spinal Kinetics M6-C Artificial Cervical Disc Compared to Anterior Cervical Discectomy and Fusion ACDF) for the Treatment of Symptomatic Cervical Radiculopathy, \$163,661, 2/16/15 – 2/15/21
24. Patel, Orthofix, A Multi-Center, Open-Label, Prospective Study of SpinalStim (MOP-SS) as Adjunctive Cre following Lumbar Fusion Surgery, \$11,840, 4/9/18 – 4/8/21
25. Patel, Pfizer Pharmaceuticals, A Phase 2b, Randomized, Double-Blind, Placebo-Controlled study to evaluate the safety and efficacy of Staphylococcus aureus 4-antigen vaccine (SA4Ag) in adults undergoing elective posterior instrumented lumbar spinal fusion procedures, \$529,490, 5/5/15 – 5/4/21

26. Patel, Premia, Clinical Study Protocol to Assess the Safety and Effectiveness of the Premia Spine TOPS System, \$7,205, 7/14/17 – 7/14/22
27. Patel, SI-BONE, SALLY, \$19,778, 7/31/17 – 7/30/22
28. Patel, Orthofix, A Multi-Center, Open-Label, Prospective Study of CervicalStim device as Adjunctive Care following Cervical Fusion, \$10,688
29. DuraSeal TM Exact Spine Sealant System Post Approval Study, PI, Integra Life Sciences Corporation, Industry, 9/29/2014 to 9/28/2017, 5% effort, \$36,393
30. Cervical Stim Retrospective (CDA – Orthofix Cervical Stim Retrospective Protocol), PI, Orthofix, Inc., Industry, 9/2/2014 to 9/1/2017, 5% effort, \$83,457
31. Odontoid: Safety and Efficacy of Pulsed Electromagnetic Fields (Cervical Stim) as an Adjunct to Enhanced Union, PI, Orthofix, Inc., Industry, 3/2/2015 to 2/15/2018, 5% effort, \$10,433
32. Retrospective Study Evaluating the Efficacy of the Orthofix Spinal-Stim Bone Growth Stimulator in Patients Who Have Undergone Lumbar Fusion Surgery with Adjunctive Use of the Spinal-Stim Device, PI, Orthofix, Inc., Industry, 9/5/2015 to 9/14/2018, 5% effort, \$18,900
33. A Phase 2b Randomized, Double-blind, Placebo Study to Evaluate the Safety and Efficacy of Staphylococcus, PI, Pfizer, Inc., Industry, 5/5/2015 to 5/1/2018, 5% effort, \$10,099
34. Prospective, Concurrently Controlled, Multi-Center Study to Evaluate the Safety and Effectiveness of the Spinal Kinetics M6-C Artificial Cervical Disc Compared to ACDF for the Treatment of Symptomatic Cervical Radiculopathy, PI, Spine Kinetics, Inc., Industry 2/15/2015 to 2/15/2018, 5% effort, \$16,099
35. Three dimensional accuracy of Stealth Surgical Navigation with O-Arm Imaging, PI, Medtronic Sofamor-Danek, Industry, 12/29/2011 to 1/17/2015, 3% effort, \$63,504
36. Activ-L Artificial Disc. CT, PI, Aesculap, Inc., Industry, 11/28/2007 to 7/31/2015, 5% effort, \$1,180,140
37. Biomechanical Cervical Disc Replacement Facet Force, PI, Synthes, Industry, 6/1/2011 to 9/30/2013, 3% effort, \$47,397
38. Investigation of Sacroiliac Fusion Treatment – INSITE - CT, PI, SI Bone, Industry, 12/4/2012 to 12/3/2016, 3% effort, \$54,904
39. ISSIS Clinical Trial, PI, Vertiflex, Industry, 3/2/2009 to 7/31/2016, 5% effort, \$524,219
40. The Relationship between Sagittal Plane Correction and Quality of Life in Adult Deformity Patients Treated with Posterior Instrumentation-CT, CO-I, Medicea, Industry, 7/31/2012 to 7/31/2016, 3% effort, \$49,107
41. Biomechanical Evaluation of Anterior Cage-Plate Fixation (ALIF cage and ATB Plate or Synfix) Versus Iliac Screws with TLIF., CO-I, Synthes, Industry, 5/1/2012 to 5/01/2015, 3% effort, \$53,063
42. Effects of vitamin D deficiency on lumbar spine fusion and the role of rhBMP-2, CO-PI, Medtronic, Industry, 11/15/2012 to 11/14/2014, 1% effort, \$28,932

43. Validation of a New Sacroiliac-Joint Specific Disability Questionnaire, CO-I, SI Bone, Industry, 3/4/2012 to 3/3/2015, 1% effort, \$48,834
44. Rabbit Study Protocol CR-055: P-15 ABM Formulations in a Rabbit Femur Drill Hole Healing Study, PI, Cerapedics, Industry, 4/1/2009 to 12/31/2009, 3% effort, \$23,048
45. Evaluation of Blood Platelet Concentrate Methodology with ABM/P-15., PI, Snoasis Medical, Industry, 2/1/2010 to 5/31/2010, 3% effort, \$10,240
46. In vitro biomechanical evaluation of adjacent level facet joint forces relative to pedicle screw head size, PI, Aesculap, Industry, 1/1/2005 to 12/31/2005, 3% effort, \$19,841
47. Inflammatory effects of BMP with protective and bone limiting effects of Fibrin Glue, PI, Medtronic, Industry, 2/3/2006 to 4/30/2009, 3% effort, \$21,055
48. Post market Surveillance of Clinical and Functional Outcomes with Post-Operative Adjunctive use of Cervical-Stim or Spinal Stim, PI, Orthofix, Industry, 6/1/2008 to 5/31/2011, 3% effort, \$18,849
49. A Clinical evaluation of cervical STIM and Spinal-STIM, PI, Orthofix, Industry, 1/27/2006 to 1/26/2009, 3% effort, \$2,050
50. BMP Diffusion from a Novel Bone Graft Substitute, PI, Globus Medical Inc., Industry, 7/5/2007 to 7/4/2008, 3% effort, \$9,435
51. EBIS Lumbar Anterior Plate System, PI, Biomet, Industry, 4/16/2007 to 4/15/2008, 3% effort, \$15,873
52. Facet force relative to disc degeneration and disc replacement, PI, Synthes, Industry, 5/31/2007 to 8/31/2008, 3% effort, \$31,577
53. The effect of auto claving on metal memory, PI, DePuy, Industry, 8/1/2007 to 12/31/2008, 3% effort, \$6,000
54. Fellowship Grant in Spine Care for 2011-2012, PI, OREF, Industry, 8/1/2011 to 7/31/2012, 1% effort, \$54,250
55. Fellowship Grant in Spine Care for 2008-2010, PI, Synthes, Industry, 9/1/2008 to 8/31/2010, 1% effort, \$121,837
56. Fellowship Grant in Spine Care for 2010-2011, PI, Synthes, Industry, 9/1/2010 to 8/31/2011, 1% effort, \$65,000
57. EPhysical Capacity Outcomes Study PD-L and ALIF, PI, Synthes, Industry, 11/20/2009 to 10/31/2011, 3% effort, \$15,407
58. Synthes ED Support, PI, Synthes, Industry, 1/1/2011 to 1/31/2011, 1% effort, \$2,600.
59. Retrospective Multicenter Clinical Evaluation of Fusion and Complications for Single Lvl AxialLIF and ALIF Subjects, PI, Trans 1, Industry, 4/27/11 to 12/31/2012, 3% effort, \$31,561

60. Synthes AO Spine, PI, Synthes, Industry, 8/1/2012 to 8/30/2012, 1% effort, \$1,500
61. Lanx Aspen Spinous Process Clamp CT, PI, Lanx, Industry, 09/21/2012 to 9/20/2015, 3% effort, \$7,240
62. Skull to sacrum course, PI, Medtronic, Industry, 4/1/2013 to 4/8/2013, 1% effort, \$2,000
63. Nubac Disc Arthroplasty, CO-I, Pioneer Surgical Company, Industry, 7/1/2009 to 6/30/2012, 3% effort, \$26,678
64. Facet Force Disc Degen/Metal Memory, Co-PI, Showa Ika Kohgyo Co. LTD, Industry, 10/1/2007 to 12/1/2008, 3% effort, \$70,453

CLINICAL TRIALS

1. Activ-L Artificial Disc. CT, PI, Aesculap, Inc., 11/28/2007 to 7/31/2015
2. Investigation of Sacroiliac Fusion Treatment – INSITE - CT, PI, SI Bone, 12/4/2012 to 12/3/2015
3. ISSIS Clinical Trial, PI, Vertiflex, 3/2/2009 to 7/31/2016
4. Validation of a New Sacroiliac-Joint Specific Disability Questionnaire, CO-I, SI Bone, 3/4/2012 to 3/3/2015
5. Post market Surveillance of Clinical and Functional Outcomes with Post-Operative Adjunctive use of Cervical-Stim aor Spinal Stim, PI, Orthofix, 6/1/2008 to 5/31/2011
6. A Clinical evaluation of cervical STIM and Spinal-STIM, PI, Orthofix, 1/27/2006 to 1/26/2009
7. EPhysical Capacity Outcomes Study PD-L and ALIF, PI, Synthes, 11/20/2009 to 10/31/2011
8. Retrospective Multicenter Clinical Evaluation of Fusion and Complications for Single Lvl AxiaLIF and ALIF Subjects, PI, Trans 1, 4/27/11 to 12/31/2012
9. Lanx Aspen Spinous Process Clamp CT, PI, Lanx, 09/21/2012 to 9/20/2015
10. Nubac Disc Arthroplasty, CO-I, Pioneer Surgical Company, 7/1/2009 to 6/30/2012

BIBLIOGRAPHY

Peer Reviewed Journal Articles

1. FY25
2. **Patel V**, Wind JJ, Aleem I, Lansford T, Weinstein MA, Vokshoor A, Campbell PG, Beaumont A, Hassanzadeh H, Radcliff K, Matheus V, Coric D. Adjunctive Use of Bone Growth Stimulation Increases Cervical Spine Fusion Rates in Patients at Risk for Pseudarthrosis. Clin Spine Surg. 2024 May 1;37(4):124-130. doi: 10.1097/BSD.0000000000001615. Epub 2024 Apr 11. PMID: 38650075;

3. Hipp J, Grieco T, Newman P, **Patel V**, Reitman C. Reference Data for Diagnosis of Spondylolisthesis and Disc Space Narrowing Based on NHANES-II X-rays. *Bioengineering* (Basel). 2024 Apr 8;11(4):360. doi: [10.3390/bioengineering11040360](https://doi.org/10.3390/bioengineering11040360). PMID: 38671782; PMCID: PMC11048070.
4. Whang PG, **Patel V**, Duhon B, Stuesson B, Cher D, Reckling WC, Capobianco RV and Polly D. Minimally Invasive SI Joint Fusion Procedures for Chronic SI Joint Pain: Systematic Review and Meta-Analysis of Safety and Efficacy. *International Journal of Spine Surgery* October 2023, 8543; DOI: <https://doi.org/10.14444/8543>
5. Weinstein MA, Beaumont A, Campbell P, Hassanzadeh H, **Patel V**, Vokshoor A, Wind K, Radcliff K, Aleem I, and Coric D. Pulsed Electromagnetic Field Stimulation in Lumbar Spine Fusion for Patients With Risk Factors for Pseudarthrosis. *International Journal of Spine Surgery* October 2023, 8549; DOI: <https://doi.org/10.14444/8549>
6. Abjornson C, Gadomski B, Katz J, **Patel V**. P4. Evaluating a novel antimicrobial pedicle screw surface in an ovine model. *The Spine Journal* September 2023, Volume 23, Issue 9, Pages S110-S111; <https://doi.org/10.1016/j.spinee.2023.06.229>
7. Hassanzadeh H, Baber J, Begier E, Noriega DC, Konishi H, Yato Y, Wang MY, Le Huec JC, Patel V, Varga P, Liljenqvist U, Conly J, Sabharwal C, Munjal I, Cooper D, Radley D, Jaques A, Patton M, Gruber WC, Jansen KU, Anderson AS, Gurtman A; STaphylococcus aureus suRgical Inpatient Vaccine Efficacy Investigator Team. Efficacy of a 4-Antigen Staphylococcus aureus Vaccine in Spinal Surgery: The STaphylococcus aureus suRgical Inpatient Vaccine Efficacy (STRIVE) Randomized Clinical Trial. *Clin Infect Dis*. 2023 Jul 26;77(2):312-320. doi: 10.1093/cid/ciad218. PMID: 37125490; PMCID: PMC10371312.
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35. Kleck CJ, Burger EL, **Patel VV**. OneStep Technique for Minimally Invasive Placement of Pedicle Screws with O-Arm and Stealth Navigation. *13th Annual Meeting of the Combined Orthopedics Associations (COMOC)*. Cape Town, South Africa, April 11-15, 2016.

36. Barton C, Noshchenko A, **Patel VV**, Cain CMJ, Kleck CJ, Burger EL. Factors Associated with Mechanical Complications Including Proximal Junctional Failure after Osteotomy for Adult Spinal Deformity. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
37. Kleck CJ, Glueck D, Lind K, Petersen B, Williams A, **Patel VV**. 3D Morphologic Assessment Of Normal And Abnormal Si Joints And The Potential Implications In The Development Of Pain Syndromes. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
38. Barton C, Noshchenko A, **Patel VV**, Cain CMJ, Kleck CJ, Burger EL. Risk Factors Associated with Rod Fracture After Osteotomy for Adult Spinal Deformity. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
39. Noshchenko A, Lindley EM, Burger EL, Cain CM, **Patel VV**. Long Term Patient-Centered Clinical Outcomes of Lumbar Arthrodeses in Degenerative Disc Disease: A Systematic Review with Meta Analysis. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
40. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Rates of Complications and Required Additional Surgical Interventions after Surgical and Nonsurgical Treatment in Lumbar Spondylosis: A Systematic Review with Meta Analysis. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
41. Kleck CJ, Illing D, Lindley EM, **Patel VV**, Barton C, Baldini T, Cain CMJ, Burger EL. A Comparative Analysis of Lumbo-sacral Fixation Strengths: What is Best in a Long Fusion? 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
42. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. What is the Clinical Relevance of Nonunion after Lumbar Arthrodesis? A Meta-Analysis of the YODA Project Database. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
43. Martyn R, Zaghoul K, Lindley EM, Kleck CJ, Cain CMJ, Burger EL, **Patel VV**. Pedicle Screw Placement in Spine Surgery: A retrospective review of O-arm/Stealth vs Non-Computerized Navigation Techniques. 13th Annual Meeting of the Combined Orthopedics Associations (COMOC). Cape Town, South Africa, April 11-15, 2016.
44. Davis B, Sauque M, Sweeney K, Baldini, T, Kogut I, Bilousova G, **Patel VV**, Payne, K. Revitalization of Bone Allograft with Human Induced Pluripotent Stem Cells for Improved Bone Formation. 16th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). Las Vegas, Nevada, April 6-9, 2016.
45. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. What is the Clinical Relevance of Nonunion after Lumbar Arthrodesis? A Meta-Analysis of the YODA Project Database. Annual Meeting of the International Society for the Advancement of Spine Surgery (ISASS). Las Vegas, Nevada, April 6-8, 2016.

46. Kleck CJ, Illing D, Lindley EM, **Patel VV**, Barton C, Baldini T, Cain CMJ, Burger EL. A Comparative Analysis of Lumbo-sacral Fixation Strengths: What is Best in a Long Fusion? Annual Meeting of the International Society for the Advancement of Spine Surgery (ISASS). Las Vegas, Nevada, April 6-8, 2016.
47. Barton C, Noshchenko A, **Patel VV**, Cain CMJ, Kleck CJ, Burger EL. Risk Factors Associated with Rod Fracture After Osteotomy for Adult Spinal Deformity. Annual Meeting of the International Society for the Advancement of Spine Surgery (ISASS). Las Vegas, Nevada, April 6-8, 2016.
48. Cain C, Hollenbeck JFM, Fattor JA, **Patel VV**, Burger EL, Rullkoetter PJ. Patient-specific ROM Predicted by Pre-operative Templating after Total Disc Replacement Surgery. Annual Meeting of the International Society for the Advancement of Spine Surgery (ISASS). Las Vegas, Nevada, April 6-8, 2016.
49. Hollenbeck JFM, Cain C, Fattor JA, **Patel VV**, Burger EL, Rullkoetter PJ. Pre-operative Templating for TDR Predicts Post-operative ROM and Could Improve Clinical Outcomes. Annual Meeting of the Orthopaedic Research Society (ORS). Orlando, Florida, March 5-8, 2016.
50. Barton C, Noshchenko A, **Patel VV**, Cain CMJ, Kleck CJ, Burger E. Risk Factors Associated with Rod Fracture After Osteotomy for Adult Spinal Deformity. Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT). Guangzhou, China, September 17-19, 2015.
51. Kleck CJ, Jesse MK, Illing D, Williams A, Petersen B, Milligan K, Glueck D, Lind K, **Patel VV**. 3D Morphometric Analysis Of Normal Sacroiliac Joints: A New Classification Of Surface Shape Variation. Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT). Guangzhou, China, September 17-19, 2015.
52. Noshchenko N, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. What is the Clinical Relevance of Nonunion after Lumbar Arthrodesis? A Meta-Analysis of the YODA Project Database. Annual Meeting of the International Society of Orthopaedic Surgery and Traumatology (SICOT). Guangzhou, China, September 17-19, 2015.
53. Burger EL, Barton C, Noshchenko A, **Patel VV**, Cain CMJ, Kleck CJ. Risk Factors Associated with Rod Fracture After Osteotomy for Adult Spinal Deformity. Annual Meeting of Eurospine. Copenhagen, Denmark, September 2-4, 2015.
54. Burger EL, Barton C, Noshchenko A, **Patel VV**, Cain CMJ, Kleck CJ. Risk Factors Associated with Mechanical Complications Including Proximal Junctional Failure after Osteotomy for Adult Spinal Deformity. Annual Meeting of Eurospine. Copenhagen, Denmark, September 2-4, 2015.
55. Burger EL, Illing D, Razavi-Shearer D, Weitzel NS, Lindley EM, Kleck CJ, Cain CMJ, Jameson LC, **Patel VV**. Preoperative Coagulation Profile Testing to Predict Blood Loss in Complex Spine Surgery: Identifying the Patient at Risk. 15th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). San Diego, California, April 15-17, 2015.
56. Kleck CJ, Perry J, Burger EL, Cain C, **Patel VV**. Minimally Invasive Technique for Placement of Sacroiliac Arthrodesis Implants using O-Arm and Stealth Navigation. 15th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). San Diego, California, April 15-17, 2015.

57. Lindley EM, Razavi-Shearer D, **Patel VV**, Burger EL, Cain CMJ, Finn MA. Medical Marijuana Use Characteristics in Patients With Chronic Spine Pain Disorders. 15th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). San Diego, California, April 15-17, 2015.
58. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Rates of Complications and Required Additional Surgical Interventions after Spinal Arthrodesis versus Alternative Treatment in Lumbar Spondylosis: A Systematic Review with Meta Analysis. 15th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). San Diego, California, April 15-17, 2015.
59. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Long Term Patient-Centered Clinical Outcomes of Lumbar Arthrodeses in Degenerative Disc Disease: A Systematic Review with Meta Analysis. 15th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). San Diego, California, April 15-17, 2015.
60. Cain C, Hollenbeck JFM, Fattor JA, **Patel VV**, Burger EL, Laz PJ, Rullkoetter PJ. Patient-specific templating for ADR identifies factors that influence clinical outcomes. 15th Annual Meeting of The International Society for the Advancement of Spine Surgery (ISASS). San Diego, California, April 15-17, 2015.
61. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Rates of Complications and Required Additional Surgical Interventions after Surgical and Nonsurgical Treatment in Lumbar Spondylosis; A Systematic Review with Meta Analysis. Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Rio de Janeiro, Brazil, November 19-22, 2014.
62. Kleck CJ, Illing D, Lindley EM, Cain CMJ, Burger EL, **Patel VV**. Post-Market Analysis of Pulsed Electromagnetic Field (PEMF) Stimulation Use for Cervical Fusion. Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Rio de Janeiro, Brazil, November 19-22, 2014.
63. Illing D, Perry J, Lindley EM, **Patel VV**, Cain CMJ, Kleck CJ, Burger EL. The Effect of Electronic Medical Record System Implementation on Complication Rate in Adult Spine Deformity Surgery. Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Rio de Janeiro, Brazil, November 19-22, 2014.
64. Kleck CJ, Illing D, Lindley EM, **Patel VV**, Barton C, Baldini T, Razavi-Shearer D, Cain CMJ, Burger EL. A Comparative Analysis of Lumbo-Sacral Fixation Strengths: What is Best in a Long Fusion? Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Rio De Janeiro, Brazil, November 19-22, 2014.
65. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Long Term Patient-Centered Clinical Outcomes of Lumbar Arthrodeses in Degenerative Disc Disease: A Systematic Review with Meta Analysis. Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Rio De Janeiro, Brazil, November 19-22, 2014.
66. Noshchenko A, Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Long Term Patient-Centered Clinical Outcomes of Lumbar Arthrodeses in Degenerative Disc Disease: A Systematic Review with Meta Analysis. 29th Annual Meeting of the *North American Spine Society (NASS)*. San Francisco, California, November 12-15 2014.

67. Burger EL, Illing D, Razavi-Shearer D, Weitzel N, Lindley EM, Kleck CJ, Cain CMJ, Jamison L, **Patel VV**. Preoperative Coagulation Profile Testing to Predict Blood Loss in Complex Spine Surgery: Identifying the Patient at Risk. 29th Annual Meeting of the *North American Spine Society (NASS)*. San Francisco, California, November 12-15 2014.
68. Kleck CJ, Illing D, Lindley EM, **Patel VV**, Barton C, Baldini T, Razavi-Shearer D, Cain CMJ, Burger EL. A Comparative Analysis of Lumbo-sacral Fixation Strengths: What is Best in a Long Fusion? 29th Annual Meeting of the *North American Spine Society (NASS)*. San Francisco, California, November 12-15 2014.
69. Lindley EM, Barton C, Blount T, Burger EL, Cain CMJ, Seim H, Turner AS, **Patel VV**. A Review of Control Group Outcomes in Sheep Fusion Models and Recommendations for Future Studies. 2014 Annual Meeting of the *American Academy of Orthopaedic Surgeons (AAOS)*. New Orleans, Louisiana, March 11-15 2014.
70. Lindley EM, Spiegel B, Zimkowski M, Rentschler M, Blount T, Milligan K, Burger EL, **Patel VV**. A New Method For Clinically Assessing Pain. 2014 Annual Meeting of the *American Academy of Orthopaedic Surgeons (AAOS)*. New Orleans, Louisiana, March 11-15 2014.
71. Lindley EM, Spiegel B, Milligan K, Zimkowski M, Rentschler M, Burger EL, **Patel VV**. A New Method For Clinically Assessing Pain. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
72. Burger EL, Weitzel N, Razavi-Shearer D, Lindley EM, Henry SE, Kleck CJ, Cain CMJ, Noshchenko A, Jamison L, McBeth Z, **Patel VV**. Prospective analysis of coagulation profile testing to predict coagulopathy and morbidity in major spine surgery: Identifying the patient at risk. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
73. Lindley EM, Burger EL, Cain CMJ, **Patel VV**. Fentanyl Iontophoretic Transdermal System and Morphine Intravenous Patient-Controlled Analgesia for Pain Management Following Spinal Surgery. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
74. Lindley EM, Razavi-Shearer D, **Patel VV**, Henry SE, McBeth Z, Burger EL, Cain CMJ, Finn MA. Medical Marijuana Use Characteristics In Patients With Chronic Spine Pain Disorders. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
75. Kleck CJ, LaFleur M, Lindley EM, Clark M, Burger EL, Cain CMJ, Rentschler ME, Razavi-Shearer D, **Patel VV**. Pedicle Screw Precision with 3-Dimensional Imaging, Navigation, and Measurement. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
76. Lindley EM, Barton C, Blount T, Burger EL, Cain CMJ, Seim H, Turner AS, **Patel VV**. A Review of Control Group Outcomes in Sheep Fusion Models and Recommendations for Future Studies. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.

77. **Patel VV**, Lindley EM, Cain CMJ, Burger EL. Cervical Fusion Outcomes with the Use an External Bone Stimulator. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
78. **Patel VV**, Lindley EM, Cain CMJ, Burger EL. Efficacy of an External Bone Stimulator in Promoting Lumbar Fusion. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
79. Lindley EM, Bond A, Razavi-Shearer D, Noshchenko A, Henry SE, Burger EL, Cain CMJ, **Patel VV**. Vitamin D Deficiency in Spine Surgery Patients. 34th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* and *Orthopaedic World Congress*. Hyderabad, India, October 17-19 2013.
80. Lindley EM, Razavi-Shearer D, **Patel VV**, Henry SE, McBeth Z, Burger EL, Cain CMJ, Finn MA. Medical marijuana use characteristics in patients with chronic spine pain disorders. 28th Annual Meeting of the *North American Spine Society (NASS)*. New Orleans, Louisiana, October 9-12 2013.
81. Lindley EM, Kleck CJ, **Patel VV**. Clinical and Functional Outcomes with Postoperative Adjunctive use of Pulsed Electromagnetic Field Stimulation in Cervical Fusion. Inagrual Summer Spine Meeting of the *North American Spine Society (NASS)*. Naples, Florida, July 31-August 3 2013.
82. Finn MA, Razavi-Shearer D, Henry SE, **Patel VV**, Burger EL, Cain CMJ, Lindley EM. Medical Marijuana use characteristics in the spinal surgery patient. 6th Annual meeting of the *Lumbar Spine Research Society (LSRS)*. Chicago, Illinois, April 11-12 2013.
83. Chatham L, **Patel VV**, Carpenter D: "Subject-specific Differences in Strain Levels in the Lumbar Spine Following Interbody Fusion" ORS 2013 Annual Meeting in San Antonio, Texas, January 26-29, 2013
84. Farmer R, Paietta R, Ferguson V, **Patel VV**, Burger-Van Der walt EL: "Histological Characterization of the Cartilaginous Endplate in the Human Spine" ORS 2013 Annual Meeting in San Antonio, Texas, January 26-29, 2013
85. Lindley EM, McBeth ZL, Henry SE, Burger EL, Cain CMJ, **Patel VV**. Retrograde ejaculation following anterior lumbar spine surgery. 33rd annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* & 17th annual meeting of the *Pan Arab Orthopaedic Association (PAOA) Orthopaedic World Conference*. Dubai, United Arab Emirates, November 28-30 2012.
86. Burger EL, **Patel VV**, Noshchenko A. Modeling of vertebral strength topography by quantitative computed tomography (CT) imaging. 33rd annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)* & 17th annual meeting of the *Pan Arab Orthopaedic Association (PAOA) Orthopaedic World Conference*. Dubai, United Arab Emirates, November 28-30 2012.
87. Lindley EM, McBeth ZL, Henry SE, Burger EL, Cain CMJ, **Patel VV**. Retrograde ejaculation following anterior lumbar spine surgery. 27th Annual Meeting of the *North American Spine Society (NASS)*. Dallas, Texas, October 24-27 2012.

88. Chatham L, **Patel VV**, Carpenter D: “Effects of Age-related Cortical Thinning and Trabecular Bone Loss on the Strain Distribution in the Lumbar Spine Following Interbody Fusion” American Society of Bone and Mineral Research Annual Meeting, Oct 12-15, 2012, Abstract #SU0054
89. Farmer RP, Paietta RC, Ferguson VL, Burger E, **Patel VV**. Histological characterization of the cartilaginous endplate in the infant spine. 19th *International Meeting on Advanced Spine Techniques (IMAST)*. Istanbul, Turkey, Toronto, Canada, July 18-21, 2012.
90. Cain CM, Lafleur M, Rao M, Hollenbeck J, Rullkoetter PJ. Pre-operative anatomical FEA templating for patient selection and optimizing range of motion in TDR. 19th *International Meeting on Advanced Spine Techniques (IMAST)*. Istanbul, Turkey, Toronto Canada, July 18-21, 2012.
91. Noshchenko, A; Burger, EL; Cain, CM; Lindley, EM; Patel, **VV**. Two Year Bone Morphogenetic Protein Clinical Effects after Lumbar Fusion in Degenerative Disc Disease. 19th *International Meeting on Advanced Spine Techniques (IMAST)*. Istanbul, Turkey, Toronto, Canada, July 18-21, 2012.
92. Noshchenko A, Burger EL, **Patel VV**. Clinical Outcomes of Lumbar Arthrodeses in Patients with Spondylosis. 125th *Annual Meeting of the American Orthopaedic Association (AOA)*. Washington, DC, June 27-30, 2012.
93. Lindley EM, Zimkowski M, **Patel VV**, Rentschler M. Pain sensitivity testing using a novel computer-controlled pressure algometer that simultaneously records sympathetic nervous system responses to pain stimuli. Annual Meeting of the *American Pain Society (APS)*. Honolulu, Hawaii, May 16-19, 2012.
94. Cain C, Rao M, Rullkoetter P. Pre-op templating for TDR alignment: Is it clinically relevant? 12th Annual Meeting of *The International Society for the Advancement of Spine Surgery (ISASS)*. Barcelona, Spain, March 20-23, 2012.
95. Noschenko A, Burger EL, Cain CMJ, Lindley EM, **Patel VV**; Two Year Bone Morphogenetic Protein Clinical Effects After Lumbar Fusion in Degenerative Disc Disease. 12th Annual Meeting of *The International Society for the Advancement of Spine Surgery (ISASS)*. Barcelona, Spain March 20-23, 2012.
96. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. Annual Meeting of *The American Academy of Orthopaedic Surgeons (AAOS)*. San Diego, California, February 15-19, 2011.
97. Burger EL, **Patel VV**, Noshchenko A. Two Year Bone Morphogenetic Protein (BMP) Clinical effects after lumbar fusion in degenerative disc disease. Annual Meeting of *The American Academy of Orthopaedic Surgeons (AAOS)*. San Francisco, California, February 7-11, 2012.
98. Rao M, Cain CMJ, Rullkoetter, PJ. The influence of prodisc-I positioning on mechanics of the lumbar spine. Annual meeting of the *Orthopaedic Research Society (ORS)*. February 4-7, 2012.
99. Leahy P, McGilvray K, Sherman J, Traynelis V, Nottmeier E, Singh V, Murrell B, **Patel VV**, Puttlitz C: “Analysis of Anterior Cervical Discectomy and Fusion Kinematics when Supplemented with Facet Screw Instrumentation” Annual Meeting of the *Orthopaedic Research Society (ORS)*. 2012 Annual Meeting in San Francisco, California, February 4-7, 2012

100. Patil S, Lindley EM, Burger EL, **Patel VV**. O-arm and stealth system navigation for pedicle screw placement in thoracolumbar spine surgery. Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Prague, Czech Republic, September 6-9, 2011.
101. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. 124th Annual Meeting of The *American Orthopaedic Association (AOA)*. Boston, Massachusetts, June 22-25, 2011.
102. Patil S, Lindley EM, Burger EL, **Patel VV**. O-arm and stealth system navigation for pedicle screw placement in thoracolumbar spine surgery. 11th Annual Meeting of The *International Society for the Advancement of Spine Surgery (ISASS)*. Las Vegas, Nevada, April 26 - 29, 2011.
103. Golembeski S, Lindley EM, Sophacles A, Burger EL, **Patel VV**. Dynamic translating versus variable angle plates in anterior cervical discectomy and fusion. 11th Annual Meeting of The *International Society for the Advancement of Spine Surgery (ISASS)*. Las Vegas, Nevada, April 26 - 29, 2011.
104. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. Annual Meeting of The *American Academy of Orthopaedic Surgeons (AAOS)*. San Diego, California, February 15-19, 2011.
105. Ayturk U; Schuldt D; **Patel VV**; Puttlitz C: "Orthotropic Continuum Model Development for Healthy and Degenerated Annulus Fibrosus Based on a Biaxial Testing Protocol": Annual Meeting of the *Orthopaedic Research Society (ORS)*. 2011 Annual Meeting in Long Beach, California, January 13-16, 2011
106. Ayturk U; **Patel VV**; Puttlitz C:" Finite Element Modeling of Degeneration-Related Biomechanical Changes of the Lumbar Spine": *Orthopaedic Research Society (ORS)*. Annual Meeting in Long Beach, California, January 13-16, 2011
107. Noshchenko A, Burger EL, **Patel VV**. Correlation of vertebral strength topography with 3-dimensional computed tomography structure. 25th Annual Meeting of the *North American Spine Society (NASS)*. Orlando, Florida, October 5-9, 2010.
108. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. 25th Annual Meeting of the *North American Spine Society (NASS)*. Orlando, Florida, October 5-9, 2010.
109. Lindley EM, Sherman BP, Ohnmeiss D, Zigler J, Kasow DB, Janssen ME, Burger EL, **Patel VV**. The positive predictive value of provocative discography in artificial disc replacement. 25th Annual Meeting of the *North American Spine Society (NASS)*. Orlando, Florida, October 5-9, 2010.
110. Lindley, EM, McCullough M, Brown C, Burger EL, **Patel VV**. Complications associated with axial lumbar interbody fusion. 25th Annual Meeting of the *North American Spine Society (NASS)*. Orlando, Florida, October 5-9, 2010.
111. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. 7th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Gothenburg, Sweden, August 31-September 3, 2010.

112. Lindley EM, McCullough M, Brown C; Burger EL; **Patel VV**. Complications associated with axial lumbar interbody fusion. 7th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Gothenburg, Sweden, August 31 – September 3, 2010.
113. Lindley EM, Robinson ES, Gonzalez P, Estes S, Cooley R, Burger EL, **Patel VV**. Piriformis syndrome versus radiculopathy following lumbar artificial disc replacement. 7th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Gothenburg, Sweden, August 31 – September 3, 2010.
114. Noshchenko A, Burger EL, **Patel VV**. Correlation of vertebral strength topography with 3-dimensional computed tomography structure. 7th Annual Meeting of the *International Society of Orthopaedic Surgery and Traumatology (SICOT)*. Gothenburg, Sweden, August 31 – September 3, 2010.
115. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. 12th Meeting of the *Combinded Orthopaedic Associations (COMOC)*. Glasgow, Scotland, September 12-17, 2010.
116. Lindley EM, McCullough M, Brown C; Burger EL; **Patel VV**. Complications associated with axial lumbar interbody fusion. 17th *International Meeting on Advanced Spine Techniques (IMAST)*. Toronto, Canada, July 21-24, 2010.
117. Lindley EM, Robinson ES, Gonzalez P, Estes S, Cooley R, Burger EL, **Patel VV**. Piriformis syndrome versus radiculopathy following lumbar artificial disc replacement. 17th *International Meeting on Advanced Spine Techniques (IMAST)*. Toronto, Canada, July 21-24, 2010.
118. Lindley EM, Sherman BP, Ohnmeiss D, Zigler J, Kasow DB, Jansses, ME, Burger EL, **Patel VV**. The positive predictive value of provocative discography in artificial disc replacement. 17th *International Meeting on Advanced Spine Techniques (IMAST)*. Toronto, Canada, July 21-24, 2010.
119. Noshchenko A, Burger EL, **Patel VV**. Correlation of vertebral strength topography with 3-dimensional computed tomography structure. 17th *International Meeting on Advanced Spine Techniques (IMAST)*. Toronto, Canada, July 21-24, 2010.
120. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. 17th *International Meeting on Advanced Spine Techniques (IMAST)*. Toronto, Canada, July 21-24, 2010. ****Winner of the Whitecloud Award for Best Basic Science Paper****
121. Lindley EM, McCullough M, Brown C; Burger EL; **Patel VV**. Complications associated with axial lumbar interbody fusion. *American College of Spine Surgery Annual Meeting (ACSS)*. Newport Beach, CA, June 10-12, 2010.
122. Lindley EM, Robinson ES, Gonzalez P, Estes S, Cooley R, Burger EL, **Patel VV**. Piriformis syndrome versus radiculopathy following lumbar artificial disc replacement. *American College of Spine Surgery Annual Meeting (ACSS)*. Newport Beach, CA, June 10-12, 2010.
123. Lindley EM, Sherman BP, Ohnmeiss D, Zigler J, Kasow DB, Jansses, ME, Burger EL, **Patel VV**. The positive predictive value of provocative discography in artificial disc replacement. *American College of Spine Surgery Annual Meeting (ACSS)*. Newport Beach, CA, June 10-12, 2010

124. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. *American College of Spine Surgery Annual Meeting (ACSS)*. Newport Beach, CA, June 10-12, 2010.
125. Noshchenko A, Burger EL, **Patel VV**. Correlation of vertebral strength topography with 3-dimensional computed tomography structure. *American College of Spine Surgery Annual Meeting (ACSS)*. Newport Beach, CA June 10-12, 2010.
126. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. Facet joint biomechanics at the treated and adjacent levels after total disc replacement. 10th Annual Meeting of the *Spine Arthroplasty Society (SAS)*. New Orleans, LA, April 27-30, 2010.
127. Lindley EM, McCullough M, Brown C; Burger EL; **Patel VV**. Complications Associated with Axial Lumbar Interbody Fusion. 10th Annual Meeting of the *Spine Arthroplasty Society (SAS)*. New Orleans, LA, April 27-30, 2010.
128. Lindley EM, Sherman BP, Ohnmeiss D; Zigler J; Kasow DB; Janssen ME; **Patel VV**. “The Positive Predictive Value of Provocative Discography in Artificial Disc Replacement.” 10th Annual Meeting of the *Spine Arthroplasty Society(SAS)*. New Orleans, LA, April 27-30, 2010.
129. McCullough M, Lindley EM, Brown C; Burger EL; **Patel VV**. “Complications Associated with Axial Lumbar Interbody Fusion”. 10th Annual Meeting of the *Spine Arthroplasty Society (SAS)*. New Orleans, LA, April 27-30, 2010.
130. Botolin S, Puttlitz C, Petrella A, Baldini T, Burger E, Abjornson C, **Patel VV**. “Facet joint biomechanics at the treated and adjacent levels after total disc replacement.” 26th Annual Meeting of the *American Association of Neurological Surgeons/Congress of Neurological Surgeons: Disorders of the Spine and Peripheral Nerves*. Orlando, FL, February 17-20, 2010.
131. Robinson ES, Gonzalez P, Lindley EM, Estes S, Cooley R, Burger EL, **Patel VV**. “Piriformis Syndrome versus Radiculopathy Following Lumbar Artificial Disc Replacement”. 26th Annual Meeting of the *American Association of Neurological Surgeons/Congress of Neurological Surgeons: Disorders of the Spine and Peripheral Nerves*. Orlando, FL, February 17-20, 2010.
132. Lindley EM; Sherman BP; Ohnmeiss D; Zigler J; Kasow DB; Janssen ME; **Patel VV**. “The Positive Predictive Value of Provocative Discography in Artificial Disc Replacement”. 26th Annual Meeting of the *American Association of Neurological Surgeons/Congress of Neurological Surgeons: Disorders of the Spine and Peripheral Nerves*. Orlando, FL, February 17-20, 2010.
133. McCullough M; Lindley EM; Brown C; Burger EL; **Patel VV**. “Complications Associated with Axial Lumbar Interbody Fusion”. 26th Annual Meeting of the *American Association of Neurological Surgeons/Congress of Neurological Surgeons: Disorders of the Spine and Peripheral Nerves*. Orlando, FL, February 17-20, 2010.
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A handwritten signature in black ink, appearing to read "Vikas V. Patel". The signature is fluid and cursive, with a large, sweeping underline that extends across the width of the text.

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