

# **CURRICULUM VITAE**

## **Edward F. Owens, Jr., MS, DC**

### **EDUCATION**

|       |      |  |                                 |
|-------|------|--|---------------------------------|
| BS    | 1979 | Georgia Institute of Technology, Atlanta, GA | Engineering Science & Mechanics |
| MSESM | 1981 | Georgia Institute of Technology, Atlanta, GA | Engineering Science & Mechanics |
| DC    | 1986 | Life Chiropractic College, Marietta, GA      | Chiropractic                    |

### **PROFESSIONAL EXPERIENCE**

#### Positions and Employment:

|         |  |
|---------|--|
| 1979-81 | Graduate Research Assistant, ESM Department, Georgia Tech, Atlanta, GA   |
| 1982-86 | Instructor, Research Dept. Life College, Marietta, GA  |
| 1986-87 | Interim Research Director, Life College, Marietta, GA  |
| 1987-98 | Private Practice, Decatur, Georgia   |
| 1987-91 | Assistant Professor of Research, Life College  |
| 1994-98 | Research Staff, Life College   |
| 1995-98 | Editor, Chiropractic Research Journal  |
| 1998-03 | Director of Research, Sherman College of Straight Chiropractic   |
| 2004-08 | Associate Professor of Research, Palmer Center for Chiropractic Research   |
| 2008-11 | Director, Office of Data Management, Wolfe-Harris Center for Clinical Studies,<br>Associate Professor, Northwestern Health Sciences University |
| 2011-   | Director of Research, TriMax Direct  |
| 2013-   | Adjunct Faculty, Life University   |

#### Honors

Awarded \$1000 Paper prize at 2015 ACC/RAC Conference  
Awarded \$1000 Paper prize at 2011 ACC/RAC Conference  
Awarded 1<sup>st</sup> prize for Clinical Research at 2007 ACC/RAC Conference  
Peer Reviewer: J Manipulative & Physiological Therapeutics, J Canadian Chiropractic Assoc, Association of Chiropractic Colleges.  
Editorial Review Boards: J of Chiropr Medicine, J Canadian Chiropr Assoc  
Appointed to College of the Upper Cervical Spine by the Academy of Upper Cervical Chiropractic Organizations, 2000  
Invited speaker at RAC-VII, New Orleans, LA, March, 2002  
Invited speaker at RAC-VI, Kansas City, MO, IL July, 2001  
Invited speaker at RAC-V, Chicago, IL July, 2000  
Invited speaker at RAC IV, Chicago, IL July, 1999.  
Participant in a federally funded project entitled, "A National Workshop to Develop the Chiropractic Research Agenda III" Alexandria, VA, 1996-1998.  
Invited Speaker: "Line Drawing Analyses of Static Cervical X-ray Used in Chiropractic." Consortium for Chiropractic Research, CORE Conference, Monterey CA, 1991.  
Invited Speaker: "Digitized X-ray Analysis." Invited Lecture Series, Palmer College of Chiropractic, Dec. 6, 1988.  
Awarded Best Theoretical/Technique Paper at Logan/CRC Conf., 1982.  
Georgia Tech Scholarship for Graduate Studies, 1979.  
Louis M. Fitten Scholarship, Georgia Institute of Technology, 1975.

### **PROFESSIONAL LICENSURE AND CERTIFICATION**

1987                      Georgia Chiropractic License # 2654

### **SOCIETY MEMBERSHIP**

American Society of Biomechanics since 2007

## SCHOLARSHIP and RESEARCH

### Books & Book Chapters

Chen HY-L and **Owens EF**, Smooth Muscle Rheology: In search of a Specimen. in *Frontiers in Biomechanics*, ed. by G.W. Schmid-Schonbein, SL-Y Woo and B.W. Zweifach, Springer-Verlag, 1986.

Hoiriis KT, Pflieger B, McDuffie FC, Alattar M, **Owens EF**, Brown S. Design of a randomized clinical trial using chiropractic versus medical care and results from chiropractic trials. In Ehrlich GE, Khaltaev NG (editors) *Low back pain initiative. Department of Noncommunicable Disease Management, World Health Organization*, 1999; pg57-73.

### Journal Articles

1. Schram SB, Hosek RS, **Owens EF**, Computerized paraspinal skin surface temperature scanning: a technical report. *J Manipulative Physiol Ther* 5(3):117-22, 1982.
2. **Owens EF**, Schram SB, Hosek RS, A critique of applications of the Euler equation to the human spine. *J Manipulative Physiol Ther* 6(2):67-70, 1983.
3. **Owens EF**, An objective measurement of muscle tone. *Chiropr Res J* 1(2):34-46, 1988.
4. **Owens EF**, Structure Location errors in an Upper Cervical X-ray Analysis. *Chiropractic Research Journal*.1(1):13-20, 1988.
5. Williams SE, Penn PF, **Owens EF**, Hosek RS, Burneskis RD, Bloomingdale SA, Hoiriis KT, Rhodes CL. A progress report of chiropractic efficacy in the treatment of low back pain, headaches and related pe-ripheral conditions: a blind study. *Chiropr Res J* 1(3):11-21, 1989.
6. **Owens EF**, Hoiriis KT. Cervical Curvature Assessment using a Digitized Radiographic Analysis. *Chiropr Res J* 1(4):47-62, 1990.
7. **Owens EF**, Line Drawing Analyses of Static Cervical X-ray Used in Chiropractic. *J Manipulative Physiol Ther* 15(7), pg 442-9, 1992.
8. Leach RA, **Owens EF**, Geisen JM. Correlates of Myoelectric Asymmetry detected in Low Back Pain Patients Using Hand-Held Post-Style Surface Electromyography. *J Manipulative Physiol Ther* 16(3) 140-149, 1993.
9. **Owens EF**, Hosek RS. The Flexion /Relaxation Phenomenon Detected in the cervical spine using surface EMG at static end-range of motion. *Chiropr Res J*, 3(1) 13-18, 1994
10. **Owens EF**, Hoiriis KT. [Letter] To the Editor. *SPINE*. 1996 NOV. 21(22). pp 2698-701.
11. **Owens EF** [Letter] A new technique of tissue stiffness (compliance) assessment: Its reliability, accuracy and comparison with an existing method. *J Manipulative Physiol Ther* 19(5). pp 357, 1996.
12. Rochester RP, **Owens EF**. Patient Placement Error in Rotation and its effect on the upper cervical measuring system. *Chiropr Res J* 3(2), pp 40-53, 1996.
13. **Owens EF**. The Contributions of Dr. John D. Grostic to the Scientific Development of Subluxation Based Chiropractic Principles. *Chiropr Res J* 3(2) pp 6-12, 1996.
14. **Owens EF**. The Annual Biomechanics Conference on the Spine: A Review of Basic Chiropractic Research at the University of Colorado from 1969-1985. *Chiropr Res J* 3(3) pp 34-51, 1996.
15. Eriksen K, **Owens EF**. Upper cervical post X-ray reduction and its relationship to symptomatic improvement and spinal stability. *Chiropr Res J* 4(1):10-17, 1997.
16. Hoiriis KT, **Owens EF**, Pflieger B. Changes in general health status during upper cervical chiropractic care: A practice based research project. *Chiropr Res J* 4(1):18-26, 1997.
17. Hoiriis KT, Pflieger B, McDuffie FC, Alattar M, **Owens EF**. Design and implementation of a randomized controlled clinical trial of chiropractic care versus drug therapy for sub-acute low back pain. *Chiropr Res J* 4(2):50-63, 1997.
18. **Owens EF**, Hoiriis KT, Burd D. Changes in general health status during upper cervical chiropractic care: PBR progress report. *Chiropr Res J* 5(1):9-16, 1998.
19. Hoiriis KT, Burd D, **Owens EF**. Changes in general health status during upper cervical chiropractic care: A practice-based research project update. *Chiropr Res J* 1999; 6(2):65-70.
20. **Owens EF**. Vertebral Subluxation-Centered Straight Chiropractic Research. *Chiropr Res J*, 1999

- 6(1);12-13.
21. **Owens EF**. Directions for Chiropractic Research in the 21st Century. *Today's Chiropractic* 1999; 28(6):94-99.
  22. **Owens EF**; Koch, David; Moore, Leroy. Hypothesis Formulation for Scientific Investigation of Vertebral Subluxation. *J Vertebral Subluxation Res.* 1999; 3(3):98-103.
  23. **Owens EF**, Stein T. Computer-aided analysis of paraspinal thermographic patterns: A technical report. *Chiropr Res J* 2000; 7(2):65-69.
  24. **Owens EF**. Theoretical Constructs of Vertebral Subluxation as Applied by Chiropractic Practitioners and Researchers. *Topics in Clinical Chiropractic* 2000; 7(1):74-79.
  25. **Owens EF**, Pennachio VA. Operational Definitions of Vertebral Subluxation: A Case Study. *Topics in Clinical Chiropractic* 2001; 8(1):40-48.
  26. **Owens EF**. Chiropractic subluxation assessment: What the research tells us. *J American Chiropr Assoc* 2002; September: 20-24.
  27. **Owens EF**. Chiropractic subluxation assessment: What the research tells us. *J Canadian Chiropr Assoc* 2002; December 46(4): 215-220.
  28. Knutson GA, **Owens EF**. Active and passive characteristics of muscle tone and their relationship to models of subluxation/joint dysfunction - Part I. *J Canadian Chiropr Assoc* 2003; 47(3):168-179.
  29. Knutson GA, **Owens EF**. Active and passive characteristics of muscle tone and their relationship to models of subluxation/joint dysfunction - Part II. *J Canadian Chiropr Assoc* 2003; 47(4):269-283.
  30. Knutson GA, **Owens EF**. Leg length alignment asymmetry in a non-clinical population and its correlation to a decrease in general health as measured by the SF-12: a pilot study. *J Vertebral Subluxation Res* 2004; Nov 1: 1-5.
  31. Hart J, **Owens EF**. Stability of paraspinal thermal patterns during acclimation. *J Manipulative Physiol Ther* 2004; 27(2) :109-117.
  32. **Owens EF**, Hart J, Donofrio JJ, Haralambous J, Mierzejewski E. Paraspinal skin temperature patterns: An inter- and intraexaminer reliability study. *J Manipulative Physiol Ther* 2004; 27(3) :155-159.
  33. Knutson GA, **Owens EF**. Erector spinae and quadratus lumborum muscle endurance tests and supine leg-length alignment asymmetry: An observational study. *J Manipulative Physiol Ther* 2005; 28:575-581.
  34. **Owens EF**, Henderson CNR, Gudavalli MR, Pickar JG. Head repositioning errors in normal student volunteers: a possible tool to assess the neck's neuromuscular system. *Chiropr Osteopat.* 2006 Mar 6;14(1):5.
  35. Goldenberg LR, **Owens EF**, Pickar JG. Recruitment of research volunteers: methods, interest and incentives. *J Chiropr Education*; 2007; 21(1):28-31.
  36. **Owens EF**, DeVocht JW, Wilder DG, Gudavalli MR, Meeker WC. The reliability of a posterior-to-anterior spinal stiffness measuring system in a population of patients with low back pain. *J Manipulative Physiol Ther.* 2007 Feb;30(2):116-23.
  37. Rowell RM, Lawrence DJ, **Owens EF**. Process development for ethical recruitment of patients into simultaneous clinical studies in a chiropractic research clinic. *J Manipulative Physiol Ther*; 2007; 30(4):295-300.
  38. **Owens EF Jr**, DeVocht JW, Gudavalli MR, Wilder DG, Meeker WC. Comparison of posteroanterior spinal stiffness measures to clinical and demographic findings at baseline in patients enrolled in a clinical study of spinal manipulation for low back pain. *J Manipulative Physiol Ther.* 2007 Sep;30(7):493-500.
  39. Kuhta P, **Owens EF Jr**. The effect of lateral cranial translation on the appearance of the Atlanta-Occipital joint. *J Vertebral Subluxation Res* 2008 April 30.
  40. Radpasand M, **Owens E**. Combined multimodal therapies for chronic tennis elbow: pilot study to test protocols for a randomized clinical trial. *J Manipulative Physiol Ther.* 2009 Sep;32(7):571-85.
  41. Schulz CA, Hondras MA, Evans RL, Gudavalli MR, Long CR, **Owens EF**, Wilder DG, Bronfort G. Chiropractic and self-care for back-related leg pain: design of a randomized clinical trial. *Chiropr Man Therap.* 2011 Mar 22;19:8.
  42. Bronfort G, Maiers MJ, Evans RL, Schulz CA, Bracha Y, Svendsen KH, Grimm RH Jr, **Owens EF Jr**, Garvey TA, Transfeldt EE. Supervised exercise, spinal manipulation, and home exercise for chronic low back pain: a randomized clinical trial. *Spine J.* 2011 Jul;11(7):585-98. Epub 2011 May 31.

43. Wilder DG, Vining RD, Pohlman KA, Meeker WC, Xia T, DeVocht, JW, Gudavalli MR, Long CR, **Owens EF**, Goertz CM. Effect of spinal manipulation on sensorimotor functions in back pain patients: protocol for a randomized clinical trial. *Trials*. 2011 Jun 28;12:161.
44. **Owens EF**, Gudavalli MR, Wilder DG. Paraspinal Muscle Function Assessed With the Flexion–Relaxation Ratio at Baseline in a Population of Patients With Back-Related Leg Pain. *J Manip Physiol Ther* 2011 Nov 34(9): 594-601.
45. Goertz CM, Long CR, Hondras MA, Petri R, Delgado R, Lawrence DJ, **Owens EF**, Meeker WC. Adding chiropractic manipulative therapy to standard medical care for patients with acute low back pain: results of a pragmatic randomized comparative effectiveness study. *Spine (Phila Pa 1976)*. 2013 Apr 15;38(8):627-34.
46. DeVocht JW, **Owens EF**, Gudavalli MR, Strazewski J, Bhogal R, Xia T. Force-time profile differences in the delivery of simulated toggle-recoil spinal manipulation by students, instructors, and field doctors of chiropractic. *J Manipulative Physiol Ther*. 2013 Jul-Aug;36(6):342-8.
47. Xia T, Long CR, Gudavalli MR, Wilder DG, Vining RD, Rowell RM, Reed WR, DeVocht JW, Goertz CM, **Owens EF**, Meeker WC. Similar Effects of Thrust and Non-Thrust Spinal Manipulation Found in Adults With Subacute and Chronic Low Back Pain - A Controlled Trial with Adaptive Allocation. *Spine (Phila Pa 1976)*. 2016 Jun;41(12):E702-9.
48. Goertz CM, Xia T, Long CR, Vining RD, Pohlman KA, DeVocht JW, Gudavalli MR, **Owens EF Jr**, Meeker WC, Wilder DG. Effects of spinal manipulation on sensorimotor function in low back pain patients - A randomised Controlled trial. *Man Ther*. 2016 Feb;21:183-90.
49. Minicozzi SJ, Russell BS, Ray KJ, Struebing AY, **Owens EF Jr**. Low Back Pain Response to Pelvic Tilt Position: An Observational Study of Chiropractic Patients. *J Chiropr Med*. 2016 Mar;15(1):27-34.
50. **Owens EF Jr**, Hosek RS, Sullivan SG, Russell BS, Mullin LE, Dever LL. Establishing force and speed training targets for lumbar spine high-velocity, low-amplitude chiropractic adjustments. *J Chiropr Educ*. 2016 Mar;30(1):7-13.
51. **Owens EF**, Hosek RS, Mullin L, Dever L, Sullivan S, Russell B. Thrust magnitudes, rates and 3-dimensional directions delivered in simulated lumbar spine HVLA adjustments. *J Manipulative Physiol Ther*. 2017 (accepted for publication 3/16/2017).
52. **Owens EF Jr**, Russell BS, Hosek RS, Sullivan SG, Dever LL, Mullin LE. Changes in adjustment force, speed and direction factors in chiropractic students after 10 weeks undergoing standard technique training. *The Journal of Chiropractic Education* (in review).

## Platform Presentations

### *Invited Presentations*

1. **Owens EF**. "Digitized X-ray Analysis." Invited Lecture Series, Palmer College of Chiropractic, Dec. 6, 1988.
2. **Owens EF**. "Line Drawing Analyses of Static Cervical X-ray Used in Chiropractic." Consortium for Chiropractic Research, CORE Conference, Monterey CA, 1991.
3. **Owens EF**, Koch D, Moore L. "A Vertebral Subluxation Hypothesis Tree." RAC IV, Chicago, IL July, 1999.
4. **Owens EF**. "Research in the Office Environment." Sherman College Lyceum, Spartanburg, SC May 29, 2000.
5. **Owens EF**. "Modeling Chiropractic Concepts: Health – Subluxation – Adjustment." RAC-V, Chicago, IL July, 2000.
6. **Owens EF**, Irwin R. "Developing a Subluxation-Centered Practice-Based Research Network." Sherman College Lyceum, Spartanburg, SC May 29, 2001.
7. **Owens EF**. "Technology Assessment: Defining Appropriate Outcomes." RAC-VI, Kansas City, MO, IL July, 2001.
8. **Owens EF**. "State of the Art: Diagnostic Assessment." RAC-VII, New Orleans, LA, March, 2002.
9. **Owens EF**. "Vertebral Subluxation Research: Philosophical Roots to Modern Development." Palmer College Lyceum, Davenport, IA August 2002.
10. **Owens EF**. "Research and Philosophy of Science." Palmer Institute for Professional Advancement, Iowa Communications Network, Feb 2005.

11. **Owens EF**. "Projects underway at the Palmer Center for Chiropractic Research." NUCCA Spring Conference, Chicago, IL May 2005.
12. **Owens EF**, Lawrence DJ, Triano JJ. Research in Action. Palmer College Continuing Education program, 2007. Davenport, IA, April 14-15.

### **Workshops**

Owens E, Hawk C, Sullivan S, Alcantara J, Hosek R. Practice-based research: a pressing need for the chiropractic profession. ACC/RAC Conference 2014. Orlando, FL. March 20-22.

### **Contributed Presentations**

1. **Owens EF**, Schram SB, Hosek RS, Application of the Euler buckling theory to the human spine, 13th Biomech of the Spine Conf., San Francisco, CA, Nov., 1982.
2. **Owens EF**, Schram SB, Hosek RS, Computerized thermal scanning system, Proc Logan/CRC Conf on manipulation, diagnosis and therapy, St. Louis, MO, July, 1982.
3. Schram SB, Hosek RS, **Owens EF**, Variations of skin surface temperature with chiropractic adjustments, 13th Biomech of the Spine Conf., San Francisco, CA, Dec., 1982.
4. **Owens EF**, Hosek RS, Spinal buckling loads and curvature, 2nd Annual Advances in Conservative Health Care Conference, Lombard, IL, Oct., 1983.
5. **Owens EF**, A Potential energy model of the lumbar spine, 14th Biomech of the Spine Conf., San Lorenzo, CA, Nov., 1983.
6. Nathan G, Hosek RS, **Owens EF**, Schram SB, Effect of gravity inversion on the lumbar spine, 14th Biomech of the Spine Conf., San Lorenzo, CA, Nov., 1983.
7. Hosek RS, **Owens EF**, Elmore G, Non-invasive monitoring of neuro-muscular changes, 14th Biomech of the Spine Conf., San Lorenzo, CA, Nov., 1983.
8. **Owens EF**, Elmore G, Hosek RS, Relationship of gravity weight line and functional short leg, 3rd Adv in Conserv Hlth Conf, Pasadena, TX, Nov., 1984.
9. **Owens EF**, Williams SE, Hosek RS, A Computer-Aided Gravity Weight Line Analysis device, 15th Biomech of the Spine Conf., Seoul, Korea, Oct., 1984.
10. Hosek RS and **Owens EF**, A Triple Blind Study of the Effects of Specific Upper Cervical Adjusting, 3rd Adv in Conserv Hlth Care Conf, Pasadena, TX, Nov., 1984.
11. Williams SE, **Owens EF**, Hosek RS, The Sid Williams Research Instrument, 15th Biomech of the Spine Conf., Seoul, Korea, Oct., 1984.
12. Williams SE, **Owens EF**, Hosek RS, The role of Stylus Force Factors in Instrument Adjusting, 15th Biomech of the Spine Conf., Seoul, Korea, Oct., 1984.
13. Hosek RS, **Owens EF**. A Real-Time EEG Monitoring System. 4th Annual Conservative Health Science Research Conference, Sunnyvale, California, 1985.
14. **Owens EF** and Hosek RS, In Vivo Measurement of Muscle Tone. 4th Adv in Conservative Health Conf., Sunnyvale, Calif. 1985.
15. **Owens EF** and Hosek RS, Thrust Magnitudes and Rates in Upper Cervical Adjustment. 16th Biomech of the Spine Conf., Boulder, Colorado, 1985.
16. **Owens EF** and Hosek RS, In Vivo Measurement of Muscle Tone: A Progress Report. 5th Adv in Conservative Health Conf., Davenport, Iowa, 1986.
17. **Owens EF**. A Database for Analysis of Clinical Research Findings. 6th Adv in Conservative Health Conf., Old Brookfield, N.Y., Oct. 1987.
18. **Owens EF**. A Computerized Data Base for Analysis of Chiropractic Clinical Research Findings. Fourth Annual Upper Cervical Conference. Marietta, GA. Dec. 1987.
19. **Owens EF** and Grostic JD, Computer Aided Analysis of Upper Cervical Radiographs. 6th Adv in Conservative Health Conf., Old Brookfield, N.Y., Oct. 1987.
20. **Owens EF**, Computerized Analysis of Cervical Curvature. Fifth Annual Upper Cervical Conference. Marietta, GA. Nov. 1988.
21. **Owens EF**, Hoiriis KT, Assessment of Cervical Curvature using a digitized analysis of lateral cervical radiographs. Proceedings of the Scientific Symposium on Spinal Biomechanics. Tampa, FL, March 1990.

22. **Owens EF**, Leach RA. Changes in Cervical Curvature Determined Radiographically Following Chiropractic Adjustment. Presented at ICSM Conference, Washington DC, May, 1990.
23. **Owens EF**, Validity of an Upper Cervical Spine X-ray Analysis System: Accuracy of Listings with respect to 3-Dimensional Rotations. Seventh Annual Upper Cervical Spine Conference. Marietta, GA Dec. 1990.
24. Leach RA, **Owens EF**. Thoraco-Lumbar Asymmetry Detected in Low Back Pain Patients with Hand Held Post-Style Surface Electromyography. Presented at ICSM Conference, Washington DC, May, 1991.
25. **Owens EF**, Hosek RS. Validity of an X-ray Marking System: Accuracy of Lateral Tilt Measure and Influence of Rotation. Eighth Annual Upper Cervical Spine Conference. Marietta, GA Dec. 1991.
26. Leach RA, Trusty J, Lay M, Owens E, Beck R. Myoelectric and Clinical Predictors of Low Back Pain in Consecutive Cases of Lumbar Trauma. Proceedings of Int'l Conf on Spinal Manip. pp 92-4, May, 1992
27. **Owens EF**, Hosek RS, Hoiriis KT. Validity of an X-ray Marking System: Effect of Tube tilt on Laterality. Ninth Annual Upper Cervical Spine Conference. Marietta, GA Dec. 1992.
28. **Owens EF**, Hosek RS. The Flexion /Relaxation Phenomenon Detected in the cervical spine using surface EMG at static end-range of motion. Proceedings 1994 ICSM Conference, Palm Springs, CA.
29. **Owens EF**, Hether F, Schindler J. Equilibration times for digitized thermographic Evaluation. Eleventh Annual Upper Cervical Spine Conference. Marietta, GA Nov. 1994.
30. **Owens EF**, Rochester R. Using Simulated Radiographic images to test the accuracy of an upper cervical X-ray analysis system. Eleventh Annual Upper Cervical Spine Conference. Marietta, GA Nov. 1994.
31. **Owens EF**, Hoiriis, KT, Pflieger B. Surface EMG used to assess low back pain: repeatability of baseline measures. In Conference Proceedings of the Chiropractic Centennial Foundation, Washington, DC, July 6-8, 1995.
32. Smith CG, **Owens EF**. High-resolution three-dimensional graphical modeling of the cervical spine. In Conference Proceedings of the Chiropractic Centennial Foundation, Washington, DC, July 6-8, 1995.
33. **Owens EF**. Cervical Spine Animations. In Conference Proceedings 12th Annual Upper Cervical Spine Conference. Marietta, GA 1995
34. **Owens EF**. Equilibration times for digitized thermographic evaluation. In Conference Proceedings of the Chiropractic Centennial Foundation, Washington, DC, July 6-8, 1995.
35. **Owens EF**. Using simulated radiographic images to test the accuracy of an upper cervical x-ray analysis system. In Conference Proceedings of the Chiropractic Centennial Foundation, Washington, DC, July 6-8, 1995.
36. Brown SH, Hinson R, **Owens EF**. Comparison of radiographic Analysis and Clinical outcome of two upper cervical specific techniques. 15th Annual Upper Cervical Spine Conference. Marietta, GA Nov 1998.
37. **Owens EF**. Current research projects at Sherman College of Straight Chiropractic. 15th Annual Upper Cervical Spine Conference. Marietta, GA, Nov 1998.
38. Hoiriis KT, Burd D, **Owens EF**. Changes in General Health Status during Upper Cervical Chiropractic Care. Proceedings World Federation of Chiropractic, 5th Biennial Congress, Auckland, NZ, May 17-22, 1999.
39. **Owens EF**, Donofrio JD, Guest T. Vertebral Subluxation Assessment in Clinical Research. Proceedings World Federation of Chiropractic, 5th Biennial Congress, Auckland, NZ, May 17-22, 1999.
40. **Owens EF**, Hoiriis KT. The relationship between chronicity of complaints and changes in general health in a practice-based study. ACC 2000 Educational Conference, March 15-18, San Antonio, TX
41. **Owens EF**. Thermographic pattern analysis using objective numeric methods. ACC 2000 Educational Conference, March 15-18, San Antonio, TX
42. **Owens EF**. Philosophically driven scientific investigation of vertebral subluxation. Proceedings Lisbon 2000 - ICA/FACTS conference. November 17-18, Lisbon, Portugal.
43. McAulay BM, Lemberger D, **Owens EF**. Success in chiropractic practice: a practitioner-based content analysis. Proceedings Lisbon 2000 - ICA/FACTS conference. November 17-18, Lisbon, Portugal.
44. McAulay, B, **Owens EF**, Moore L, Hartley A. Clinical curriculum validation at a chiropractic college: a participant observation case study of an alternating bifocal model of work team effectiveness. ACC 2000 Educational Conference, March 15-18, San Antonio, TX

45. **Owens EF.** X-ray analysis accuracy testing using computer simulated radiographs: An interactive research presentation. Vertebral Subluxation Research Conference, December 7-8, 2002, Hayward, CA.
46. Potocki E, **Owens EF** Precision of palpatory location of skeletal landmarks in three dimensions. 11<sup>th</sup> Annual Vertebral Subluxation Research Conference. Sherman College of Straight Chiropractic, Spartanburg, SC , October 11-12, 2003.
47. Ashton A, Park JP, **Owens EF.** The application of surface electromyography for subluxation detection. 11<sup>th</sup> Annual Vertebral Subluxation Research Conference. Sherman College of Straight Chiropractic, Spartanburg, SC , October 11-12, 2003.
48. **Owens EF,** DeVocht J. Gudavalli R, Wilder DG. Intra- and Interexaminer Reliability of a New Hand-Held Device for Measuring Lumbar Posteroanterior Stiffness. ACC 2005 Educational Conference, March 17-19. Las Vegas, NV.
49. **Owens EF,** DeVocht J. Gudavalli R, Wilder DG, Meeker W. The reliability of posterior-to-anterior stiffness measures in a population of patients with low back pain. 2005 World Congress of Chiropractic, FCER/WFC. Sydney, Australia.
50. **Owens EF,** Henderson CNR, Gudavalli MR, Pickar JG. Head repositioning errors in normal student volunteers: A possible tool to assess the neuromuscular system of the neck. ACC/RAC Conference 2006. Washington, DC. March 16-18.
51. **Owens EF,** Nafziger RE, Percuoco RE, Mullin P. Using technology to engage faculty in developing assessment outcomes. ACC/RAC Conference 2006. Washington, DC. March 16-18.
52. Wilder DG, Xia T, Gudavalli MR, **Owens EF.** Response to sudden loads by patients with back pain. 1st American Conference on Human Vibration 2006, Morgantown WV, June 5-7
53. **Owens EF.** Sensory deficits seen in neck and back pain patients: possible evidence of neurological interference. FCER: The Conference on Chiropractic Research. Chicago, IL. September 15-17, 2006.
54. **Owens EF,** DeVocht JW, Gudavalli MR, Wilder DG, Meeker WC. Baseline spinal stiffness characteristics of patients enrolled in a clinical study of spinal manipulation for low back pain. ACC/RAC Conference 2007. Phoenix AZ. March 15-17.
55. DeVocht JW, **Owens EF,** Gudavalli MR, Wilder DG, DiDuro JO, Meeker WC. Relationship of paraspinal surface EMG levels to perceived muscle tightness of low back pain patients in a clinical study. ACC/RAC Conference 2007. Phoenix AZ. March 15-17.
56. Rowell RM, **Owens EF,** Lawrence DJ. The challenges of ethical recruitment of patients into simultaneous clinical studies in a chiropractic research clinic. ACC/RAC Conference 2007. Phoenix AZ. March 15-17.
57. **Owens EF,** Xia T, Wilder DG, Gudavalli MR, Meeker WC. Postural stability at baseline in patients recruited for two studies of the effects of spinal manipulation on subacute and chronic back pain. International Conference on Chiropractic Research, WFC 9th Biennial Congress 2007, Vilamoura, Portugal, May 17-19.
58. **Owens EF,** Xia T, Wilder DG, Gudavalli, MR, Meeker, WC. Postural stability in patients with subacute and chronic low back pain: changes seen with repeat testing and foam challenge. IASTED International Conference on Biomechanics, Honolulu, HI, Aug 20-22, 2007.
59. DeVocht JW, **Owens EF,** Gudavalli MR, Bhogal R, Strazewski J. Characterization of force/time profiles of toggle recoil practice thrusts on a speeder board. ACC/RAC Conference 2008. Washington, DC, March 13-15.
60. Lee YJ, Gudavalli MR, **Owens EF.** Biomechanics of Gonstead cervical chair thrust on a mannequin. ACC/RAC Conference 2009. Las Vegas, NV March 12-14. Proceedings in J Chiropr Education 2010; 23(1):79.
61. Radpasand M, **Owens EF,** Pickar J, Juehring D. Combined multimodal therapies for chronic tennis elbow: a feasibility study. ACC/RAC Conference 2009. Las Vegas, NV March 12-14. Proceedings in J Chiropr Education 2009; 23(1):88.
62. Evans R, **Owens EF.** Evaluation of evidence-informed practice attitudes, skills and behaviors. ACC/RAC Conference 2010. Las Vegas, NV March 18-20. Proceedings in J Chiropr Education 2010; 24(1):92.
63. **Owens EF,** Gudavalli MR, Wilder DG. Paraspinal Muscle Function Assessed With the Flexion–Relaxation Ratio at Baseline in a Population of Patients With Back-Related Leg Pain. ACC/RAC Conference 2011. Las Vegas, NV March 17-20. Proceedings in J Chiropr Education 2010; 25(1):93.

64. Meeker W, Wilder DG, Goertz C, DeVocht J, **Owens EF**, Rowell R, Hondras MA, Gudavalli MR. Patient Characteristics Associated with Improvement of Subacute and Chronic Low Back Pain Treated with HVLA or LVVA Spinal Manipulation. 11th Biennial Congress of the World Federation of Chiropractic, Rio de Janeiro, April 6-9, 2011.
65. Goertz C, Wilder DG, Long C, Vining R, DeVocht J, Pohlman K, **Owens E**, Gudavalli MR. Toward standardizing the delivery of spinal manipulation for patients with low back pain. 11th Biennial Congress of the World Federation of Chiropractic, Rio de Janeiro, April 6-9, 2011.
66. Wilder DG, Xia T, Long CR, Vining RD, Pohlman KA, DeVocht JW, Gudavalli MR, **Owens Jr. EF**, Meeker WC, Goertz CM: Time to peak muscle response due to unexpected flexion force observed in a clinical trial of spinal manipulation. Podium presentation at the 5th International Conference on Whole Body Vibration Injuries, Amsterdam, The Netherlands, 5-7 June 2013.
67. Feeley K, **Owens E**. Inter and Intra Reliability of Heel Tension Scale. 11<sup>th</sup> Annual International Research & Philosophy Symposium. Spartanburg, SC Oct 18-19, 2014.
68. **Owens EF**, Hosek RS, Sullivan S, Russell B, Mullin L, Dever L. Developing training targets for lumbar spine high-velocity, low-amplitude adjustments in a chiropractic program. ACC/RAC Conference 2015. Las Vegas, NV March 19-21. Proceedings in J Chiropr Education 2015; 29(1):83.
69. **Owens EF**, Hosek RS, Mullin L, Dever L, Sullivan S, Russell B. Changes in adjustment force, speed, and direction factors in chiropractic students after 10 weeks undergoing standard technique training. . ACC/RAC Conference 2016. Orlando, FL, NV March 17-19. Proceedings in J Chiropr Education 2016; 30(1):52-68.
70. **Owens EF**, Hosek RS. A physical model of lumbar spine fixation for use in palpation and adjustment training. WFC/ACC Education Conference. Montreal, Quebec, Canada. October 19-22, 2016.
71. **Owens EF**, Hosek RS, Russell B. Using technology to measure adjustment vectors as well as force and speed. WFC/ACC Education Conference. Montreal, Quebec, Canada. October 19-22, 2016.

#### Poster Presentations

1. Brown S, Hinson R, **Owens EF**. Comparison of radiographic analysis and clinical outcome for two upper cervical specific techniques. ACC 2000 Educational Conference, March 15-18, San Antonio, TX
2. **Owens EF**, Hoiriis KT. Filling in the Gaps: An Interactive Research Project Poster at ACC/RAC. ACC 2005 Educational Conference, March 17-19, Las Vegas, NV.
3. Kuhta P, **Owens EF**. Effect of lateral head translation on the appearance of the atlanto-occipital joint. ACC/RAC Conference 2007. Phoenix AZ. March 15-17.
4. Wilder DG, Xia T, Gudavalli MR, **Owens EF**. Response to sudden loads by patients with back pain. International Society for the Study of the Lumbar Spine 2007 Conference. Hong Kong, China, June 10 – 14.
5. **Owens EF**, Wilder DG, Gudavalli MR, DeVocht, Meeker WC. Spinal stiffness measures do not change with chiropractic manipulation, even with clinical improvement. North American Congress on Biomechanics 2008. Ann Arbor, MI, Aug 5-9.
6. Gudavalli MR, Owens E, Vining R, Wilder D, Pohlman K, Satyanarayana P, Goertz C. Standardization of treatment loads for trials of spinal manipulation. North American Research Conference on Complementary and Integrative Medicine. Minneapolis, MN. May 12-15, 2009.
7. Hondras M, Delgado R, Long C, Petri R, Anderson K, Lawrence D, **Owens E**, Meeker W, Goertz C. A randomized controlled trial of chiropractic manipulative therapy and standard care for active duty soldiers with acute low back pain: MilCAM feasibility study. North American Research Conference on Complementary and Integrative Medicine. Minneapolis, MN. May 12-15, 2009.
8. Koo TK, Zheng YP, Nalli AN, **Owens EF**. Feasibility of using the tissue ultrasound palpations system (TUPS) to measure elasticity of segmental lumbar multifidus. ACC/RAC Conference 2008. Las Vegas, NV March 18-20. Proceedings in J Chiropr Education 2010; 24(1):133.
9. Bronfort G, Maiers MJ, Schulz C, Evans RL, Bracha Y, Svendsen KH, Grimm R, **Owens EF**, Garvey T, Transfeldt E. Clinical meaningfulness of between group differences observed in a trial of supervised exercise, spinal manipulation and home exercise for chronic low back pain. The Society for Back Pain Research – Odense, Denmark June 10 & 11, 2010.
10. **Owens EF**, Hosek RS, Bronfort G. An adaptive software solution to manage participant recruitment,



- screening and tracking for clinical trials. The Society for Back Pain Research – Odense, Denmark June 10 & 11, 2010.
11. Radpasand M, **Owens E**. Combined multimodal therapies for chronic tennis elbow: pilot study to test protocols for a randomized clinical trial. 21st Annual meeting of the American Academy of Pain Management: Integrative Pain Management for Optimal Patient Care. Las Vegas, NV, Sep 20-21, 2010.
  12. Hosek RS, **Owens EF**, Sullivan S, Esposito J. The feasibility of using electronic health records as a data source for practice-based research: an exercise in interprofessional collaboration. ACC/RAC Conference 2015. Las Vegas, NV March 19-21. Proceedings in J Chiropr Education 2015; 29(1):97.
  13. **Owens EF**, Hosek RS, Mullin L, Dever L, Sullivan S, Russell B. Thrust magnitudes, rates and 3-dimensional directions delivered in simulated lumbar spine HVLA adjustments. WFC 13<sup>th</sup> Biennial Congress – ECU Annual Convention. Athens, Greece May 13-16, 2015.
  14. Sullivan S, **Owens EF**, Hosek RS, Paolucci L. Review of the literature and comparison of two practice-based research network recruitment techniques: onsite event recruitment and affiliation recruitment. WFC 13<sup>th</sup> Biennial Congress – ECU Annual Convention. Athens, Greece May 13-16, 2015.
  15. Hosek RS, **Owens EF**, Plasker E, Sullivan S. A practice-based pilot study of patient's attitudes about long-term care and longevity. ACC/RAC Conference 2016. Orlando, FL March 17-19. Proceedings in J Chiropr Education 2016; 30(1):69-80.
  16. **Owens EF**, Esposito J, Hosek RS, Sullivan S. How well do diagnosis codes from claims databases represent health issues of chiropractic patients? ACC/RAC Conference 2016. Orlando, FL March 17-19. Proceedings in J Chiropr Education 2016; 30(1):69-80.
  17. Owens EF, Plasker E, Hosek RS, Sullivan S. The long-term effects of continuing chiropractic care: a feasibility study. ACC/RAC Conference 2016. Orlando, FL March 17-19. Proceedings in J Chiropr Education 2016; 30(1):69-80.
  18. Owens EF, Russell BS, Weiner M, Mullin LE, Dever L, Hosek, RS, Sullivan SGB. Amplitude and speed of Gonstead technique side-posture lumbopelvic adjustments in humans. ACC/RAC Conference 2017. Washington, DC March 15-18. Proceedings in J Chiropr Education 2017; 31(1):71.
  19. Owens EF, Esposito J, Hosek RS. Using private electronic health care databases when public ones do not exist. ACC/RAC Conference 2017. Washington, DC March 15-18. Proceedings in J Chiropr Education 2017; 31(1):71.

## Research Support

### Completed Research Support

1-R18-HP-15124 (Bronfort) 09/01/2009 - 08/31/2012  
HRSA \$1,652,000  
Chiropractic and Exercise for Low Back Pain in Adolescents  
The primary aim of this project is to determine the relative clinical effectiveness of 3 months of chiropractic care and supervised exercise versus supervised exercise in 184 adolescents with sub-acute recurrent, or chronic LBP.  
Role: Co-Investigator, Data Management

1- R18-HP-15127 (Maiers) 09/01/2009 - 08/31/2012  
HRSA \$1,588,000  
Chiropractic and Exercise Management Of Spinal Dysfunction In Seniors  
The primary aim of this study is to compare the effectiveness of 9 months of chiropractic care and exercise with a) 3 months of the same intervention, and with b) 9 months of exercise alone, in 300 seniors with chronic spinal dysfunction.  
Role: Co-Investigator, Data Management and Biomechanics aims

1-R18-HP-07638 (Bronfort) 09/01/2006 - 08/31/2009  
HRSA \$384,723  
Chiropractic and Self-Care for Back-Related Leg Pain  
The goal is to compare the effectiveness of chiropractic care and self-care to self care in the treatment of patients with back-related leg pain.  
Role: Co-Investigator, Biomechanics aims

1-U19-AT004137-01 (Pickar) 07/01/2007 - 06/30/2011  
NIH/NCCAM \$766,514  
Developmental Center to Study Mechanisms and Effects of Chiropractic Manipulation  
The long range goal is to explore and understand the clinical role of spinal manipulation and the physiological and biomechanical mechanisms of spinal manipulation loads.  
Roles: Co-Leader for Project 3: Effect of manipulation on sensorimotor function in back pain patients.  
Co-Investigator for Project 2: Vertebral motions and ligament strains under simulated spinal manipulation

1-U19AT004663-01(Choate) 05/01/2008 – 04/30/2012  
NIH/NCCAM \$99,956  
Developmental Centers for Clinical and Translational Science in Chiropractic  
The central scientific theme is to evaluate non-rotary chiropractic spinal manipulation (SM) for cervical spine and related dysfunctions. This study includes 3 synergistic and novel projects in collaboration with the University of Iowa, Mt. Sinai Medical Center, Hines VA Hospital and Loyola University Stritch School of Medicine.  
Roles: Co-Investigator for Project 1: Upper cervical manipulation for patients with stage I hypertension  
Co-Investigator for Project 3: Cervical distraction sham development: Translating from basic to clinical studies

1-EA-0000055 (Petri) 07/01/2007 - 06/30/2008  
Samueli Institute for Information Biology \$200,263  
The Efficacy of Manual and Manipulative Therapy for Low Back Pain in Military Active Duty Personnel: A Feasibility Study  
The goal of this feasibility project is to explore the use of manipulative therapy in restoring peak performance in military personnel with low back pain in operational environments.  
Role: Co-Investigator

1-R25-AT003580-01A1 (Choate) 09/30/2007 - 09/22/2008  
NIH/NCCAM \$102,592  
Expanding EBM and Research across the Palmer College of Chiropractic  
The goals of this project are to review and revise the evidence-based medicine and research content for trainees in the DC program.

1-K30-AT000977-01A1 (Long) 09/15/2002 - 08/31/2008  
NIH/NCCAM \$280,420 (No-cost Extension)  
K30: Chiropractic Clinical Research Curriculum  
The goal is to develop and teach a master's program in clinical research to DCs.

5-U19-AT002006-03 (Choate) 09/22/2003 - 05/31/2008  
NIH/NCCAM \$815,243 (no-cost extension)  
Mechanisms and Effects of Chiropractic Manipulation  
The long range goal is to explore and understand the clinical role of spinal manipulation and the physiological and biomechanical mechanisms of spinal manipulation loads.  
Role: Co-Investigator, Biomechanics aims

R18-HP-01423-02-00 (PI: Meeker, DC, MPH) 09/01/2003 - 08/31/2007  
HRSA  
Elderly Back Pain: Comparing Chiropractic to Medical Care  
The goal is to compare the effectiveness of high-velocity low amplitude spinal adjustments, low-velocity variable amplitude spinal mobilization and standard medical care in the treatment of elderly patients with low back pain.  
Role: Biomechanics Core – data collection & reduction

U01-AT00170 (PI: Meeker) 09/30/1997 - 08/31/2005  
NIH/NCCAM  
Creating the Consortial Center for Chiropractic Research  
The purpose was to establish the Consortial Center for Chiropractic Research, which provided an infrastructure to examine the potential effectiveness and value of chiropractic health care. Project Name: Changes in Paraspinal Muscles Spindle Sensitivity  
The objective of this study is to acquire data that may provide a rationale for examining proprioceptive mechanisms in a patient population and determine if the mechanical history of cervical paraspinal muscles affects an individual's ability to reposition his/her head. As such, an investigation will be made on the effect of muscle history in the cervical vertebral column to determine if it impacts both cervical posture and inter-segmental motion.  
Role: Co-investigator