

Private and Confidential

CURRICULUM VITAE

Dr Raymond Hayek, BSc (Hons: 1 UNSW), Masters of Chiropract. (Macq.), PhD (Macq.), C.HedMang., FICC., FACC.

Qualifications:

1. 1999 PhD Titled: "Central projection of afferents innervating upper thoracic spinal joints".
2. 1997 Certificate in Higher Education Management (Center in Higher Education and Professional Development) Macquarie University.
3. 1992 Master of Chiropractic, Macquarie University.
4. 1991 BSc (Hons: 1) in Anatomy and Pharmacology, University of New South Wales with 1st Class Honours.

Recognitions

1. 2007- Short listed & highly commended on an Invention Disclosure for Spinal Cord Injury, Invention Disclosure Prize Macquarie University.
2. 2006- Vice President of & Chair Research Committee, Australian Spinal Research Foundation (3-year term).
3. 2006- Foundation Fellow (Research), Australian College of Chiropractors (FACC).
4. 2005- Winner of the 2005 Innovation and Commercialization Award Macquarie University, Jointly with Dr Peter Bull for a joint venture with Macquarie on Telemedicine and Teleradiology.
5. 2004- Fellow of the International College of Chiropractic (FICC).
6. 2003- Recipient of the Rotary Club's 'Four Way' test award for community services in Western Sydney.
7. 2001- Acknowledged as one of the top performing researchers in Macquarie University's annual report of 2001.
8. 2001- Recognized by the New York Academy of Science
9. 1999- Adjunct Research Fellow, Palmer Center for Chiropractic Research, Palmer University, USA.
10. 1998- Chiropractic Excellence Award. Chiropractic Association of Australia.
11. 1996- Honorary Research Fellow. School of Biological Sciences, Macquarie University, Sydney Australia.
12. 1992- Macquarie University Centre for Chiropractic "Student of the Year" award for academic achievements in the Master of Chiropractic Program.
13. 1991- University Prize, The Winifred Dickes Rost for outstanding merit in Anatomy & Research (Honours Year).

Membership of Societies and Associations:

1. Australian Neuroscience Society, 1990-
2. International Society for Neurochemistry, 1990-93
3. Australian Spinal Research Foundation Limited, 1991-
4. Chiropractors Association of Australian, 1992-
5. International Association for the Study of Pain, 1995-
6. Australasian College of Chiropractic and Osteopathy, 1996-99
7. International Society for Chiropractic Neuroscience, 1999-
8. Fellow, The New York Academy of Science, 1999-

Career Details & Positions Held:

1. 1985- 87 Undergraduate studying for BSc, University of New South Wales.
2. 1989- 90 School of Anatomy University of NSW Scholarship for Honours program under A/Professor PME Waite.
3. 1991-92 Postgraduate studies in The Centre for Chiropractic, Macquarie University.
4. 1990-91 Lecturer/Tutor in Gross Anatomy for Podiatry at Sydney TAFE.
5. 1990-93 Tutor in the Faculty of Medicine, School of Anatomy, University of NSW.
6. 1993-94 Lecturer/Tutor at Centre for Chiropractic, Dept. of Biomechanics, Macquarie University.
7. 1993- Clinic Supervisor, for Clinic Department, Centre for Chiropractic, Macquarie University.
8. 1993-7 Head, Research Department, Centre for Chiropractic Macquarie University.
9. 1993- Full time lecturer, Centre for Chiropractic, Macquarie University.
10. 1996-8 Honorary Research Fellow, School of Biological Sciences, Macquarie University.
11. 1997- PostGraduate Certificate in Higher Education Management, Centre for Higher Education, MQ University.
12. 1999 Adjunct Research Fellow, Palmer Center for Chiropractic Research, Palmer College of Chiropractic, Davenport Iowa, USA.
13. 2000-01 Assistant Head, Department of Chiropractic, Macquarie University.
14. 2001-02 Assistant Head, Department of Health and Chiropractic, Macquarie University
15. 2002-05 Director Centre for Chiropractic, Macquarie University.
16. 2002-05. Foundation Chair, Consortium of Chiropractic Institutions Australasia (CCI-A).

Private and Confidential

17. 2005- Chairman Board of Directors, Image Connections Australasian Pty Ltd.
18. 2006- Foundation Director, Centre for Spinal and Medical Research, Access MU, Macquarie University.

Teaching Experience: Course Coordinator and Head Lecturer:

1. 1st year Master of Chiropractic, Neurology course (BIOL 837) Macquarie, 1993-9
2. 1st year Master of Chiropractic, Research Methods (BIOL 832) Macquarie, 1993-7
3. 2nd year Master of Chiropractic, Research Project Coordinator and Supervisor (Biol 850) Macquarie, 1993-7
4. 1st year Master of Chiropractic, Clinical Epidemiology course (CHIR 832) Macquarie, 1998-
5. 2nd year Master of Chiropractic, Communication Skills course (BIOL 825) Macquarie, 1998-
6. 2nd year Master of Chiropractic, Professional Studies, Ethics and Jurisprudence course (CHIR 853) Macquarie, 1999-05
7. 1st year Master of Chiropractic, Neurological Diagnosis course (CHIR 866) Macquarie, 2000-

Lecturer, Demonstrator and Tutor at various times in:

1. 1st and 2nd year Medical students for Anatomy (Histology), University of New South Wales (UNSW), 1990-93
2. 1st year Medical students for Anatomy (Gross), UNSW, 1990-93
3. 2nd year Science students for Anatomy (Gross), UNSW, 1991-93
4. 2nd year Science students for Anatomy (Mammalian Embryology), UNSW, 1991-93
5. 2nd year Science students for Anatomy (Histology), UNSW, 1991-92
6. 1st year Podiatry students for Anatomy (Gross), TAFE, 1991-92
7. 2nd year Master of Chiropractic students for Chiropractic skills, (Terminal Point Technique), Macquarie, 1993-94
8. 2nd year Master of Chiropractic students' internship Clinic Supervisor. Macquarie, 1993-98
9. 1st year Master of Chiropractic students in Neurology Macquarie, 1993-
10. 1st year Master of Chiropractic students in Research Methods Macquarie, 1993-8
11. 1st year Master of Chiropractic students, contribute to, Spinal Biomechanics and Radiology, Macquarie, 1997-2002
12. 1st year Master of Chiropractic students in Clinical Epidemiology Macquarie, 1998-
13. 2nd year Master of Chiropractic students in Communication Skills Macquarie, 1998-
14. 2nd year Master of Chiropractic students in Clinic Workshop Macquarie, 1998-2002
15. 1st year Bachelor of Chiropractic Sciences in Histology Macquarie, 2005-

Research Supervisor:

Small research projects for the Master of Chiropractic Students, 1994-2005.

1. Development of Cervical Chiropractic Mannequin.
2. Median Nerve Conduction Alterations as a Result of Cervical Chiropractic Adjustments.
3. Clinic Parameters of the Chiropractic Subluxation in the Neck.
4. Surface Electromyography in Temporalis, Tensor Fascia Latae and Sternocleidomastoid muscles with Sacro-Occipital Technique, Pelvic Blocking. A Pilot Study.
5. The Effects of Focus-Film Distance (FFD) Variation on Measurement Reliability and Testicular Radiation Dose during Lumbar Spine Radiography.
6. Spirometric measurements of asthmatic patients with chiropractic care.
7. Central projections of spinal afferents of the thoracic spine in the rat.
8. Sympathetic connectivity within the local spinal circuitry utilising Dil in the rat.
9. Electromyographic Alterations of Para-spinal Muscles as a Result of Changing Mattress Hardness.
10. Inter & Intra-examiner Reliability in the use of Flexicurve to assess the Lumbar Curve.
11. Does Lumbar motion palpation correlate with X-ray findings?
12. Cervical spine ROM alterations with racing car drivers.
13. Inter and Intra examiner reliability of X-ray spinography for the cervical spine.
14. Relationship between genu varus angle and femorotibial bone length deficit.
15. Neurotrauma and brain injuries.
16. Sensory innervation of spinal structures.
17. Spinal pain mechanisms.
18. Effects of the vertebral subluxation on the nervous system.
19. Dura Mata: Anatomical Relationships and sensory innervation.
20. The notion of re-afferentation following chronic subluxation.

Honours student supervisor by research, School of Biological Sciences.

1. 1996 Sensory innervation of para-spinal articular tissues in the thoracic spine (Ms Susan Habjan): Completed.

Post Graduate Research Certificate.

1. 2004-05. Reviewing higher educational training competencies for clinical training. Leon Cohen. Completed

Masters student Supervisor

1. 2003-2006 The role of traction during the delivery of an HVLA chiropractic adjustment. (Ms Lucy Mcnaught., DC., DO).
2. 2005- Functional restoration of Spinal cord injury utilizing electrical stimulation. (Samar Hamid., MBBS)
3. 2006- Developing Clinical training competencies for Hypnotherapy. (Leon Cowen)
4. 2004- The role of the endocrine system and thoracic spinal disorders (Norm Hasham., MChiropract.)
5. 2006- Effects of long segment fixation in the upper thoracic spine on Cardiovascular function (Bin Yi., MBBS)

PhD student co-supervisor

1. 1998 Spinal cord regeneration after full cord transection in the rat. (*in collaboration with Prof. P Waite, Head, Neural Trauma Unit, School of Anatomy, UNSW*). (Dr Jike Lu., MBBS, MSC). Completed
2. 2003 Establishing a national data base on morbidity and natural medicine in Australia (Mavourneen Casey). (*in collaboration with the Centre for Epidemiology and Biostatics Australia*). New Castle University. Completed.

PhD student Supervisor

1. 2001/2 The relationship between pelvic pain, dysmenorrhoea, endometrioses and low back pain (Mavourneen Casey).
2. 2002- Convergence patterns of afferents from upper thoracic spine and pericardial structures. Using DiI, DiO and DiA neuronal markers (Kevin Ivins DC).
3. 2006- Chiropractic treatment for Asthma (Sue Ellen Mackelvey DC). Submitting.
4. 2006- Radiological Interpretation with spinography, a new approach. (John Dalhunny DC). Submitting.

Publications:

a) Book Chapters

1. 2005. Neurological Diagnosis: Diagnosis made simple: 2nd ed. In Diagnosis made simple edited by: R Bierman. ISBN: 1 86408 805 2.
2. 2002. Neurological Diagnosis: Diagnosis made simple: Ed: R Bierman. ISBN: 1 86408 805 2.
3. 2000. Subluxation: The Neurological Components. In: Chiropractic Secrets. Seth Gardner and John B Mosby. Jr. eds., Hanley & Belfus, Inc. Co-author with Professor Charles NR Henderson. ISBN: 1 56053 318 8
4. 1999. Cerebrovascular accidents from Spinal Manipulative treatment. LAAMS Publication. ISBN: 1 86474 125 2

b) Invited Papers

5. 1999 *Hayek R*. Unique Features of the Thoracic Spine: Implications for Chiropractic Management. Topics in Clinical Chiropractic (TICC). Vol: 6. No: 3: 69-79.
6. 2004 *Hayek R*. Can the Science and Philosophy of Chiropractic Cohabit? Chiropractic Journal of Australia
7. 2006 *Hayek R*. Spinal Research an Update, Australian Chiropractor, December.

c) Peer Reviewed Papers and Scientific presentations.

8. 1991. The Effects of Airborne Aluminium in the Rabbit Olfactory Pathway. Proc. Aust. Neuroscience Soc. Vol. 24, No. 2. pp 27.
9. 1993. Intramuscular activity of the rotatorae muscles in response to movement and spinal manipulative therapy; A pilot study. Australian Physiological Soc: Vol. 24, No. 2 pp 182p
10. 1994. Does Abnormal Motion Palpation Correlate with Abnormal Coupled Motion Specifically at L4/5? Chiropractors Association of Australia, October.
11. 1995. The Effects of Focus-Film Distance Variation on Measurement Reliability and Testicular Radiation Dose During Lumbar Spine Radiography. Chiropractors Association of Australia, October.
12. 1995. A Cervical Mannequin Procedure for Chiropractic Skills Development. Chiropractors Association of Australia, October.
13. 1995. Central Projections of Afferents Innervating Thoracic Joints. Chiropractors Association of Australia, October.
14. 1995. Central terminals of Afferents in the Neck. Proc. Aust. Neuroscience Soc. Vol. 28, No. 2. pp 53-4.
15. 1995 *Hayek R*, Austin S and Pollard H. An Electromyographic Study of the Intramuscular Effects of the Chiropractic Adjustment: A Pilot Study. Journal of Chiropractors & Osteopaths Musculoskeletal Interest Group, Comsig Review. Vol. 4, No. 1, March. pp 3-10.
16. 1995 Anderson R., *Hayek R*. & Fogarty M. Leg Length Inequality and Side of Pain in Low Back Pain Patients. A Pilot Study. Journal of Chiropractors & Osteopaths Musculoskeletal Interest Group, Comsig Review. Vol. 4, No. 2, August. pp 33-7.
17. 1995. Gregory P and *Hayek R*. Does Abnormal Motion Palpation Correlate with Abnormal Coupled Motion Specifically at L4/5? Chiropractors Journal of Australia, Vol. 25. No 2. pp 73-5.
18. 1996 *Hayek R*, Young T & Philipson S. A cervical mannequin procedure for chiropractic skill development.

Private and Confidential

- Chiropractors Journal of Australia, Vol. 26. No 1. pp 26-7.
19. 1996 Dilger R, Egan I, Zeiderman R, Castell J, Dean D & Hayek R. The effect of focus-film distance (FFD) variation on measurement reliability and testicular radiation dose during lumbar spine radiography. Chiropractors Journal of Australia, Vol. 26. No 1. pp 24-5.
 20. 1996 Hayek R, Young T & Philipson S. Can students learn Chiropractic skills using a cervical mannequin procedure? Foundation for Chiropractic Education and Research publication. Arlington, VA: pp 113-116.
 21. 1996 Hayek R, Bassett JR and Habjan S. Central projection of afferents innervating T2/3 thoracic joint and para-articular tissues. Foundation for Chiropractic Education and Research publication. Arlington, VA: pp 10-13.
 22. 1996. Hayek R, Chacos M, Fenwick M & Parkes J. Central projection of afferents innervating thoracic joints. Chiropractors Journal of Australia, Vol. 26. No 1. pp 25-6.
 23. 1996. Central projections of afferents innervating left T2-T3 thoracic zygapophyseal joints and para-articular tissues. International Conference on Spinal Manipulation, Foundation for Chiropractic and Education, Bournemouth, England.
 24. 1996. Can students learn chiropractic spinal skills using a cervical mannequin? International Conference on Spinal Manipulation, Foundation for Chiropractic and Education, Bournemouth, England.
 25. 1997 Dilger R, Eagan I & Hayek R. Effects of Focus Film Distance (FFD) Variation on Entrance Testicular Dose in Lumbar-pelvic Radiography. "Journal of Australasian Chiropractic & Osteopathy". Vol. 6. No 1. pp 13-19.
 26. 1997 Hayek R. Chiropractic treatment of asthmatics. J. of Asthma Welfarer. Vol:12 No:2 pp:21-3.
 27. 1997. Asthma and Chiropractic. National Asthma Foundation. Sydney Australia.
 28. 1997. What role does Chiropractic offer in the treatment of Asthmatic Patients? Asthma Foundation. Proceedings of the Asthma Foundation National Conference. Pp 37-9.
 29. 1998. Chiropractic Treatment, Asthma and Stress: DASS Profile of Asthmatics. Proc. of the Intern. Conf. On Spinal Manipulation. FCER. Pp 16-8.
 30. 1998. Pain stimulation and processing from thoracic spinal joints. Proc. of the Intern. Conf. On Spinal Manipulation. FCER. Pp 196-97.
 31. 1998. Asthma and chiropractic. An Australian Trial. Proc. of the Intern. Conf. On Spinal Manipulation. FCER. Pp 72-4.
 32. 1998. Para-spinal Muscle Electromyography changes with varying Mattress Hardness. Proc. of the Intern. Conf. On Spinal Manipulation. FCER. Pp 80-1.
 33. 1998. Chiropractic Treatment, Asthma and Stress: DASS profile of an asthmatic. International Conference on Spinal Manipulation, FCER, Vancouver BC, Canada.
 34. 1998. Asthma and Chiropractic. An Australian Trial. International Conference on Spinal Manipulation, FCER, Vancouver BC, Canada.
 35. 1998. Para-spinal muscle electromyography changes with varying mattress hardness. International Conference on Spinal Manipulation, FCER, Vancouver BC, Canada.
 36. 1998. Pain stimulation and processing from thoracic spinal joints. International Conference on Spinal Manipulation, FCER, Vancouver BC, Canada.
 37. 1998 Young T, Hayek R & Philipson S. Can students learn Chiropractic skills using a cervical mannequin procedure? Journal of Manipulative and Physical Therapy. Vol 21 No 4 : 241-46.
 38. 1998 Gregory P. Hayek R. & Mann-Hayek A. The Correlation of Motion Palpation with Abnormal Lumbar Motion Coupling from X-rays in Low Back Pain Patients, at L4/5. J. of the Chiro. & Osteo. College of Australia. Vol: 7. No: 1. Pp 15-20.
 39. 1998 Hayek R. The need and opportunity for basic research into Chiropractic. J. of the Chiro. & Osteo. College of Australia. Vol: 7. No: 3. 4-9.
 40. 1999. The c-fos expression from the zygapophyseal joint capsule, as a result of 2% formalin stimulation. Australian Neuroscience Society, Australia.
 41. 1999. Pain expression from zygapophyseal joint capsule, as a result of 2% formalin stimulation. World Federation of Chiropractic Conference, New Zealand.
 42. 1999. The incorporation of the Thrust in Motion Cervical Manikin into a teaching strategy for chiropractic technique. World Federation of Chiropractic Conference, New Zealand.
 43. 1999. The efficacy of the Cervical Thrust in Motion Manikin as a teaching tool for various Chiropractic adjustment procedures. World Federation of Chiropractic Conference, New Zealand.
 44. 1999. Asthma and Chiropractic. An Australian Multicentre approach. World Federation of Chiropractic Conference, New Zealand.
 45. 1999. Patterns of Spinal Dysfunction in Asthmatics and Non-asthmatics. World Federation of Chiropractic Conference, New Zealand.
 46. 1999. Asthma and chiropractic. A Multi-centre clinical trial. World Federation of Chiropractic Conference, New Zealand.
 47. 1999. Is there a role for free circulating cortisol hormone as a measure of chiropractic efficacy? World Federation of

Private and Confidential

- Chiropractic Conference, New Zealand.
48. 1999. The effects of mattress firmness on para-spinal Muscle Electromyography. World Federation of Chiropractic Conference, New Zealand.
 49. 1999. The Effects of Spondylolisthesis on the Lumbar Spine. World Federation of Chiropractic Conference, New Zealand.
 50. 1999. Neuroscience Methodologies for Chiropractic Research. Research Agenda Conference, Sponsored by the US Government on Alternative Health Care. Chicago, July.
 51. 2000. An organised approach for practice based research into chiropractic. Gonstead Clinical Studies Society. Sydney.
 52. 2000. Pain stimulation from upper thoracic facet joints. International Conference on Spinal Manipulation (ICSM) September, USA.
 53. 2000. Asthma and Chiropractic: A Multisite Clinical Trial. International Conference on Spinal Manipulation (ICSM) September, USA.
 54. 2000 Bull P and Hayek R. The Effects of Spondylolisthesis on the Lumbar Spine. To: Chiropractic Journal of Australia. Vol. 30: pp 5-12.
 55. 2001 Lu J., Aswell K., Hayek R., Waite P. Fluroruby technique for detecting spinal cord regeneration. Brain Research. Oct 5;915(1):118-23.
 56. 2001 Hayek R., et al A Multisite Trial: Chiropractic and Asthma with Physiological Markers. Journal of the American Chiropractic Association JACA: 38(2):46-8.
 57. 2001. The somatovisceral effects of chiropractic treatment on the hypothalamo adrenal axis and immunity of the respiratory system in asthmatics. Accepted for Platform presentation. World Federation of Chiropractic (May, Paris).
 58. 2001. c-fos expression from thoracic facet joint stimulation. Platform presentation. World Federation of Chiropractic (May, Paris).
 59. 2001. Convergence patterns of sensory afferent neurons from the pericardium and upper thoracic facet joints in the rat. Platform presentation. World Federation of Chiropractic (May, Paris).
 60. 2002. Cortisol changes secondary to Chiropractic treatment in Asthma sufferers. International Conference on Spinal Manipulation, Toronto Canada, October.
 61. 2002. Pain arising from facet joints, implication for therapeutic interventions. International Conference on Spinal Manipulation, Toronto Canada, October.
 62. 2002. Convergence pattern of sensory afferents from the upper thoracic facet joints and the pericardium. International Conference on Spinal Manipulation, Toronto Canada, October.
 63. 2002. The Chiropractic Integrated Skills Acquisition Programme (ISAP). WFC-Brazil October.
 64. 2003. Sensory innervation of the upper thoracic spine. Inaugural Scientific symposium: The Adelaide Centre for Spinal Research. September.
 65. 2005. Leboeuf-Yde C, Pedersen EN, Bryner P, Cosman D, Hayek R, Meeker W, Shaik J, Tanno H, Terrazas O, Tucker J, Walsh M. Non-musculoskeletal responses to chiropractic intervention: A multinational survey. Journal of Manipulative and Physiological Therapeutics (JMPT). Jun;28(5):294-302;
 66. 2005. Traction and the Chiropractic Adjustment. Poster: World Federation of Chiropractic Scientific conference, Darling Harbor June.
 67. 2005. Hayek R, Immunological Responses of Asthma Sufferers to Chiropractic Care. World Federation of Chiropractic Scientific conference, Darling Harbor June.
 68. 2006. Hayek R., Ali S., Holland R., McKelvey SE., Beirman R. The Endocrine Response to Chiropractic Management of Asthma sufferers. Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
 69. 2006. Hayek R., Bull P., Eaton S., Vemulpad S. The effects of the “Spinal Support Bedding System” on recumbent postures, using Computer Radiography and Pressure mapping analysis. Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
 70. 2006. Dulhunty J., Kraemer K., Salameh J., Hayek R. Exploring follower loading of the spine as an ideal mechanical model in relation to chiropractic therapeutic intervention. Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
 71. 2006. Hayek R., Bassett J. Joint Sensory Innervation: Implications for the Chiropractic Management of the Spine. Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
 72. 2006. Dalhunty J., Hayek R. Reconciling Aspects of Chiropractic Philosophy with the Increasing Demand for Evidence Based Practice. . Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
 73. 2006. Ivins K., Hayek R. Convergence Pattern of Sensory Afferents from T1 – T4 Facet Joint and the cardiovascular structures in an animal model using DiI and DiO Neuronal Tracers. Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
 74. 2006. Hamid S., Hayek R., Connolly R. Effects of Electrical Stimulation on Axonal Regeneration After Spinal Cord

Private and Confidential

- Injury in an Animal Model. Foundation for Chiropractic Education (FCER) & Research Scientific Meeting October.
75. 2007. L Cowen., D Saltmarch., R Hayek., How soon will hypnosis be *routinely* included in health curricula? ANZAME., In Press.
 76. 2007. L Cowen., D Saltmarch., R Hayek., Hypnotherapy: An Adjunct to Complementary Therapies. Australian Traditional Medicine Society. – In Press.
 77. 2007. Invited paper. Spinal cord injury and rehabilitation. The Adelaide Centre for Spinal Research. August.
 78. 2007. *Hayek R., et al.* Circulating free unbound cortisol levels in Asthmatic and Immune consequences. In Press press.
 79. 2007. *Hayek R., et al.* Endocrine responses to Chiropractic following treatment of asthma sufferers: In Press.
 80. 2007. *Hayek R., et al.* Health status improvements due to chiropractic co-management of Asthma sufferers. JMPT submitted
 81. 2007. *Hayek R., et al.* Chiropractic techniques and their efficacy in co-managing asthma sufferers. A dose response analysis. In Press
 82. 2007. Ali S and *Hayek R.* The role of cortisol and IgA in the pathophysiology of asthma. In Press
 83. 2007. *Hayek R., et al.* The validity of self reported health benefits of asthma sufferers using health status questionnaires. In Press
 84. 2007. McKelvey SE. *Hayek R., Ali S.* Fingerprints of an Asthmatic spine. COA Accepted
 85. 2007. Hamid S., Hayek R. Role of Electrical Stimulation in Spinal Cord Injury- An overview. European Spine Journal. In Press.

Private and Confidential

Grants Awarded:

1. 2007. Benchmarking Competencies for Introducing and managing Mental Health Disorders in Chiropractic Curricula: Direct Commission for the Council on Chiropractic Education Australasia & The Department of Health and Ageing. **\$138,131.**
2. 2007. Health outcomes survey following the purchase of a new mattress. Collaborative Partnership Grant: AHBeard. **\$9,040.**
3. 2007. Impact of FlexGel mattress design on spine posture. Collaborative Partnership Grant with AHBeard. **\$68,879.**
4. 2005. PGRF. Spinal cord injury model, jointly with S Hamid, Masters Student. **\$4,000.**
5. 2004. Developing a Urinary analysis kit for immune responses following chiropractic care. A 3-year collaboration with Dr L Blackwell, Massey University New Zealand. ASRF. **\$75,000**
6. 2003- The dynamic effects of the “Spinal Support Bedding System” on recumbent postures. Macquarie University External Collaborative Research Grants. **\$ 28, 000.**
7. 2002- A multination survey into type O disorders. World Federation of Chiropractic. Canada, **\$5,000 US**
8. 2001. A Multi-site study of Chiropractic and Asthma. Foundation for Chiropractic Education and Research. USA, **\$532,850.**
9. 2000/2001 Precursor messenger RNA concentration within neurons in response to pain stimulation. Australian Spinal Research Foundation. (ASRF) **\$56,000.**
10. 2000 A double labelling fluorescence procedure looking at the pattern of sensory convergence into the thoracic spine. **MURG \$ 7,700.**
11. 1999/2000 Pain stimulation and mechanisms from thoracic facet joints and para-articular tissues. Australian Spinal research Foundation. (ASRF) **\$ 23,500.**
12. 1999 Macquarie University Travel Grant. **\$ 4,800.**
13. 1999 Central projections from Lumbar facet joints. Palmer Center for Chiropractic Research, Research Council, USA. **\$ 12,500.**
14. 1998 Asthma and Chiropractic. Macquarie University Research Grant (MURG). **\$ 6,600.**
15. 1998 Noxious stimulation from thoracic facet joints. Macquarie University Research Grant (MURG). **\$ 5,000.**
16. 1997 Release from Teaching Grant, Centre for Higher Education & Professional Development, Macquarie University. **\$ 3,500.**
17. 1997 Spirometric Alterations in Asthmatic Patients with Chiropractic Care. Australian Spinal Research Foundation. (ASRF) **\$ 1,800.**
18. 1997 Median Nerve Conduction Alterations as a Result of Cervical Adjustments in-Patients with Upper Limb Radiculopathies. Australian Spinal Research Foundation. (ASRF). **\$ 2,000.**
19. 1996 Clinic Parameters of the Chiropractic Subluxation in the Neck. (ASRF) **\$ 1,800.**
20. 1995 Release From Teaching Grant, Centre for Higher Education & Professional Development, Macquarie University. **\$ 3,500.**
21. 1994 Central Projections of Afferents from the Back. (MURG), Macquarie University, Seeding Grant. **\$ 4,000.**
22. 1994/5 Electromyographic Alterations in Para-spinal Muscles as a Result of Changing Mattress Hardness. A Pilot Study Co-Investigator. (ASRF) **\$ 15,000.**
23. 1994/5 Central Projections of Afferents from the Neck Collaborative Study with Dr Phillip Bolton at The Discipline of Human Physiology, Newcastle University. (ASRF) **\$ 43,002.**
24. 1994 Central projection of Afferents Innervating Thoracic Zygapophyseal Joints. (ASRF) **\$ 18,346.80.**
25. 1994 Fellowship of the Australian Spinal Research Foundation. **\$ 15,000.**
26. 1993 Electromyography Activity of Para-spinal Muscles. Australian Spinal Research Foundation (ASRF) **\$ 1,200.**
27. 1991 Airborne Aluminium and Alzheimer's disease. Winterhaulter Australia. **\$ 2,000.**

Total = \$1,088,149

Invited Lectures:

1. 1990. Airborne Aluminium and its role in Alzheimer's Disease, School of Anatomy, University of New South Wales, November.
2. 1993. Functional and Clinical Anatomy of the Spine. Postgraduate Medical Sports Course, School of Physiology and Pharmacology, University of New South Wales, June.
3. 1994. Gross Anatomy of the Lower Limb, International Tae Kwon Do Federation, New South Wales, September.
4. 1994. The role of Chiropractic in The Health Care Delivery System. University of Technology, Podiatry School, July.
5. 1995. Modern Chiropractic, Rotary Club of Castle Hill, On behalf of the Chiropractors Association of Australia. February.
6. 1995. Functional Anatomy and Injury Prevention of the Lower Limb, International Tae Kwon Do Federation, New South Wales, March.
7. 1995. "Chiropractic" The art, science and philosophy. Northern Clinical School, Royal North Shore Hospital, St Leonards, August.
8. 1995. Australian Spinal Research Foundation, on para-spinal electromyography during sleep, at the Australian Bedding and Research Consortium, July.
9. 1996. Fundamentals of Basic Research, Foundation for Chiropractic Education and Research Bournemouth, England.
10. 1997. Thoracic lung volume alterations with Chiropractic care in Asthmatic sufferers. School of Medicine, Sydney University, September.
11. 1997. Personal Research Portfolio, School of Biological Sciences, Macquarie University, September.
12. 1997. Para-spinal electromyography during sleep for the Australian Spinal Research Foundation, at the Australian Bedding and Research Consortium, July.
13. 1997. Central Projection of afferents from the thoracic spine, The Journal Club, Macquarie University, September.
14. 1998. Key Note speaker on spinal cord injuries for the Mensa society's annual general dinner, March.
15. 1999. The use of the TMC Manikin in training Chiropractic Students. Technique Department, Palmer College of Chiropractic, 5 March.
16. 1999. **Plenary session** for a lectures series on Spinal Pain Mechanism and the Vertebral Subluxation. Palmer Center for Chiropractic Research, Palmer College of Chiropractic, 9 March.
17. 1999. **Plenary session** for a lectures series on The Science And Philosophy of Chiropractic. Chiropractic Association of Australia, 20 February.
18. 1999. **Plenary session** for a lectures series on Neurological implications of soft tissue injuries. Australasian College of Chiropractic and Osteopathy. October, Victoria.
19. 1999. Report on Spinal Research Activities at Macquarie University, Annual Conference, and Department of Chiropractic Macquarie University.
20. 2000. Conservative Management of Back Pain. Lions Club of Penrith NSW Australia.
21. 2001. Spinal Manipulation for spinal disorders. School of Physiotherapy, Sydney University.
22. 2004. New technologies in Medical Imaging. Chiropractors Association of Australia. AGM March.
23. 2005. Chiropractic Treatment and Asthma, Thoracic Spine, Anatomy and best practice. Plenary Session: World Federation of Chiropractic Scientific conference, Darling Harbor June.
24. 2005. Pain mechanisms of arthritis. Arthritis Foundation of Australia: Bone and Joint Decade lecture. November, Conference centre Darling Harbor June.
25. 2006. Ethics and Ethical Research Training of the future University Graduate scheduled for September 2006. Cancun Mexico Sept.
26. 2007. Convergence pattern of sensory afferents from the upper thoracic spine and pericardial structures. Centre for Spinal Research. Adelaide University and Adelaide Hospital. August.

Professional Seminar Presentations and Chair.

1. 1995. Research Activities as supported by The Australian Spinal Research Foundation, Dynamic Growth Workshop, Sydney, Australia.
2. 1996. **Chair**, Research Forum, "Fundamentals of Basic Research and its Clinical Implications", International Conference on Spinal Manipulation, Foundation for Chiropractic and Education, Bournemouth, England.
3. 1996. Research Profile, Research Department, Centre for Chiropractic, for National Conference, Chiropractor Association Of Australia, September, Perth.
4. 1996. Clinical implications and the neurological processing of pain, for National Conference, Chiropractor Association Of Australia, September, Perth.
5. 1997. What role does Chiropractic offer in the treatment of Asthmatic Patients? Asthma Foundation. School of Medicine, Sydney University, September.
6. 1997. Pain processing within the dorsal horn, The Journal Club, August, Macquarie University.
7. 1997. Central projection of afferents from thoracic joints T1 to T4 and their role in pain perception. College of

Private and Confidential

Chiropractic and Osteopathy Conference-The Back Pain Challenge-An Evidence Based Approach to Spinal Pain. August Victoria.

8. 1997. Clinical Record Keeping and Medico-legal report writing, for the Chiropractors Association of Australia NSW Branch.
9. 1997. Medico-legal reporting and the Chiropractic expert witness. Risk Management seminar. Harpers and Associates. Sydney Australia.
10. 1998. Asthma and Chiropractic. Centre for Chiropractic Home coming, May.
11. 1998. Electromyography and bedding research, Centre for Chiropractic Home coming, May.
12. 1998. Spinal Adjustive Skills utilising the Thrust in Motion Manikin, Centre for Chiropractic Home coming, May.
13. 1998. Electromyography of para-spinal muscles from different mattress firmness. The Australian Bedding and Research Consortium. October.
27. 1999. **Key Note Speaker.** Pain processing from thoracic spinal joints. Palmer Center for Chiropractic Research Basic Sciences Colloquium, Palmer College of Chiropractic, 12 March.
28. 1999. **Key Note Speaker.** Central projection of afferents from thoracic facet joints. Palmer Center for Chiropractic Research Basic Sciences Colloquium, Palmer College of Chiropractic, 12 March.
29. 1999. **Key Note Speaker.** Neuroplasticity and Spinal Cord Injuries. Palmer Center for Chiropractic Research Basic Sciences Colloquium, Palmer College of Chiropractic, 12 March.
30. 1999. Spinal Cord Injuries. LAAMS, 20 April.
31. 1999. Undertaking Chiropractic research without losing sight of our heritage. Chiropractic Association of Australia. 20 February.
32. 1999. Chiropractic research, as sponsored by the Australian Spinal Research Foundation. Dynamic Growth. March.
33. 2001. Gonstead clinical studies Society. The role of research outcomes. July.
34. 2002. Low back pain mechanism and treatment protocols. Kjelberg society Brisbane, July.
35. 2002. Pain arising from thoracic facet joints. International Conference on Spinal Manipulation (ICSM) Toronto Canada, October.
36. 2002. Convergence pattern of afferents innervating upper thoracic facet joints and the pericardium, using DiI and DiO. International Conference on Spinal Manipulation (ICSM) Toronto Canada, October.
37. 2002. Asthma and Chiropractic, a neuroendocrine phenomenon. International Conference on Spinal Manipulation (ICSM) Toronto Canada, October.
38. 2003. **Moderator** for the Basic Science presentations segment in the Research Agenda Conference (RACVIII). New Orleans, March.
39. 2003. Asthma and Chiropractic. Invited Seminar, Chiropractic Association of Australia NSW, 16 February.
40. 2003. **Key Note Speaker** at the World Federation of Chiropractic Student Congress. Quebec Canada, October.
41. 2003. **Key Note Speaker.** Asthma and Chiropractic. Toyo Chiropractic Association in Japan, October 25.
42. 2003. **Key Note Speaker.** Neurological impact of Ageing. Kjelberg Chiropractic Society. Brisbane.
43. 2004. **Key Note Speaker.** Immunological outcomes of Chiropractic care in a population of Asthma sufferers. Quebec Chiropractic Association. September.
44. 2007. **Key Note Speaker.** Practical Neurology. Tamworth Chiropractic Group. Tamworth. August.

Other Output:

1. 2001. *Hayek R.* Neurological Diagnosis course notes. Centre for Chiropractic. Department of Health and Chiropractic. Macquarie University
2. 1998. *Hayek R.* Research Report. Centre for Chiropractic. Macquarie University. ISBN 1 86408 489 8.
3. 1998. *Hayek R.* Lecture Notes, Neurology, Master of Chiropractic Course. Centre for Chiropractic, Macquarie University Publication. (Continually updated)
4. 1998. *Hayek R.* Lecture Notes, Clinical Epidemiology, Master of Chiropractic Course. Centre for Chiropractic, Macquarie University Publication.
5. 1996. *Hayek R.* Lecture Notes, Research Methodology, Master of Chiropractic Course. Centre for Chiropractic, Macquarie University Publication.
6. 1994. *Hayek R, Bonello R and Pollard H.* Research Methodology, Lecture Notes, Master of Chiropractic Sports Course. Centre for Chiropractic, Macquarie University Publication.

Community Outreach activities

Television

1. Channel 7: Seven National News. Back to School and Back Packs. 1998
2. Channel 7: Chiropractic and Low Back Pain. Today Tonight (Current Affairs, National Program). 1998
3. Channel 7: Chiropractic and Paediatrics. Today Tonight (Current Affairs, National Program). 1998
4. Channel 7: Back Pain and Mattress Firmness. Today Tonight (Current Affairs, National Program). 1998
5. Channel 10: Home Office Ergonomics. Bright Ideas (National Program). 1998

Private and Confidential

6. Channel 7: Seven National News. Current Spinal Research at Macquarie University. 1999
7. Channel 9: Good Medicine, Choosing the right mattress. 2000
8. Channel 7: How to choose a mattress. Today Tonight (Current Affairs, National Program). 2001
9. Channel 10: Bright Ideas on Bedding. 2001.
10. Channel 7: Today Tonight. How to choose the right bed support system. 2003.
11. Channel 9: Morning with Kerry Anne. How to choose the right bed support system. 2004
12. Channel 9 (Melbourne): Bedding Research and Spinal Health. 2005-7

Radio

13. ABC Radio Perth. Chiropractic and Asthma. 1998
14. ABC Radio Canberra. Chiropractic and Asthma. 1998
15. ABC Radio Sydney. Chiropractic Clinical Trial for Asthmatics. 1998
16. 2SER Radio Sydney. Chiropractic and Asthma. 1997
17. 2GB Radio Sydney. Chiropractic and Asthma. 1997
18. ABC Radio Sydney. Research into Chiropractic. 1999
19. 2SER Radio Sydney. Chiropractic and Asthma. 2000
20. ABC Radio National. Chiropractic and Asthma. 2000
21. 2CR Radio National. Chiropractic and Asthma. 2000
22. Australia National. Chiropractic and Asthma. 2000
23. Australia National. Follow up on Chiropractic and Asthma. 2001
24. ABC National. Chiropractic and Asthma. 2003
25. ABC National. Chiropractic and Asthma. February 2004
26. 2SER FM Asthma and Chiropractic July-2004
27. 2GB Radio Sydney. Posture and back pain January-2006

Print Media

28. Northern District Herald. Chiropractic and Asthma. 1999
29. Sydney Morning Herald. Chiropractic Clinical Trial for Asthmatics. 1999
30. Northern District Herald. Chiropractic and Asthma. 2000
31. Asthma News, Asthma Soc. of Australia. 2000
32. Asthma and Chiropractic. Sydney Morning Herald. 2001
33. Asthma and Chiropractic. Northern District Herald. 2002
34. Asthma and Chiropractic care. Good Medicine Magazine. 2002
35. Asthma ad Chiropractic. FCER web page 2002
36. The Australian Higher Education Supplement on Chiropractic Education, Sept. 2005
37. Selecting the best mattress. Good Medicine Magazine. July 2007

Community and Professional Services

38. 1994- Medico-legal services for the Chiropractic Profession. (*Provided advise on over 45 cases to date*)
39. 1997- Promotional advice and information preparation for the Chiropractic Association of Australia. 1997-
40. 1994-6, Honorary Governor on the Board of the Australian Spinal Research Foundation.
41. 1994-9, Research Information Officer, Australian Spinal Research Foundation.
42. 1994-7, Research committee, School of Biological Sciences, Macquarie University,
43. 1994-7, Internal Human Ethics Committee, School of Biological Sciences, Macquarie University.
44. 1995-, Peer reviewer for the "Journal of Chiropractors & Osteopaths musculoskeletal Interest Group", COMSIG.
45. 1996-03, Peer reviewer for the "Journal of Australasian Chiropractic & Osteopathy".
46. 1996-, Associate Governor on the Board of the Australian Spinal Research Foundation.
47. 1996-, Higher Education Advisor to the New South Wales Vocational Education & Training Accreditation Board.
48. 2001-3, Divisional Management Advisory Committee, Division of Environmental and Life Sciences, Macquarie University.
49. 2003- Advisory Board Committee. Centre for Chiropractic, Department of Health and Chiropractic.
50. 2002- Foundation Member & councillor on the Council for Chiropractic Education Australasia,
51. 2003- Nominated to the serve on Macquarie University Academic Senate for 3 years representing the Division of Environmental and Life Sciences (ELS).
52. 2003- Nominated as the University's Senate representative to the committee on Intellectual Property and Innovation Committee.
53. 2005- Governor of the Australian Spinal Research Foundation.
54. 2004-06 Chair, Consortium of Chiropractic Institutions Australasia (CCI-A).
55. 2005-06 Chair, Podiatry program Induction working party for ELS.

56. 2007- Member of Macquarie University's Innovation Awards Committee on Innovation in Research.