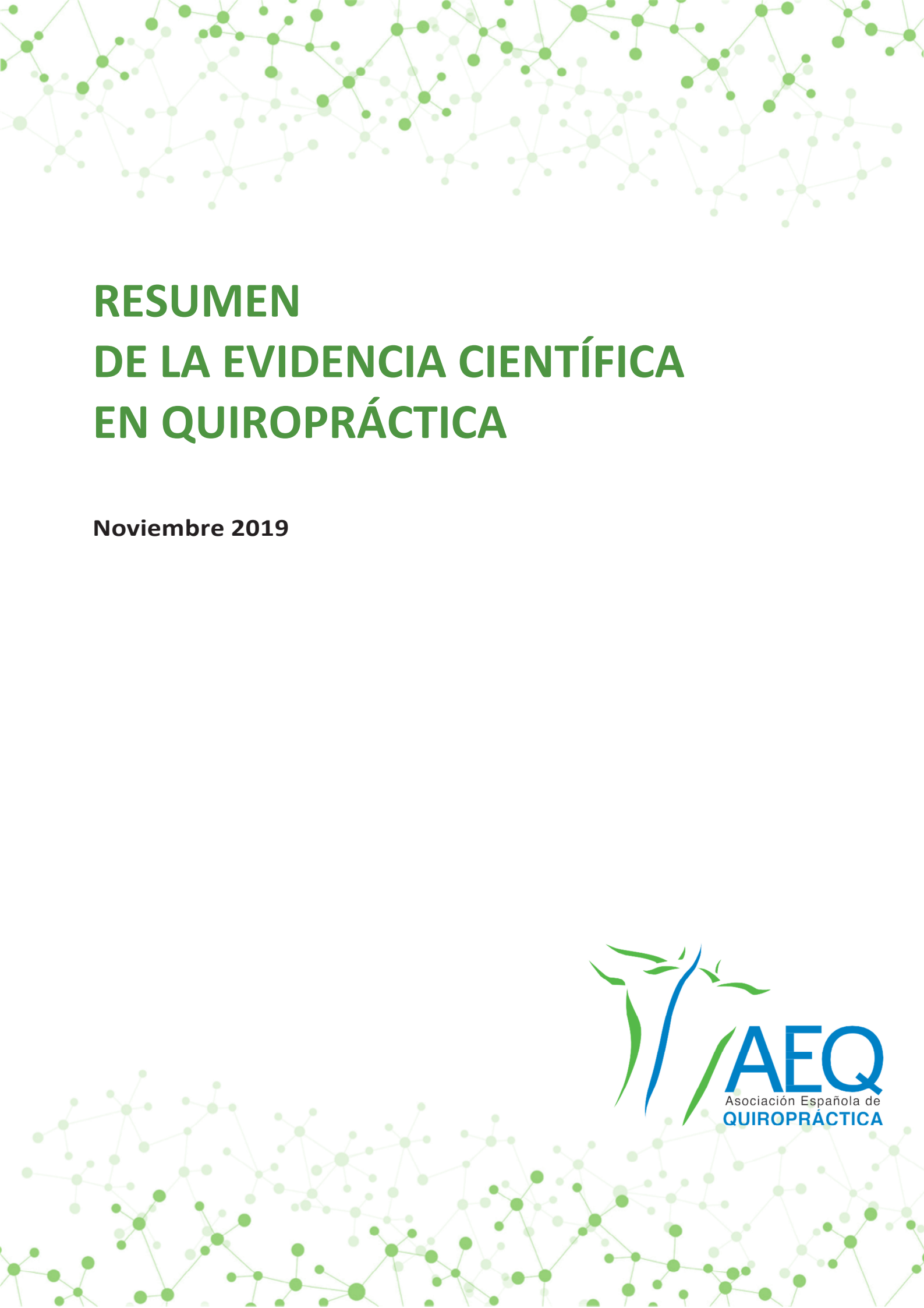




RESUMEN DE LA EVIDENCIA CIENTÍFICA EN QUIROPRÁCTICA

Noviembre 2019



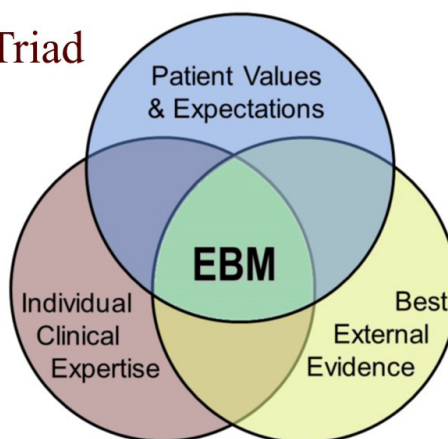
RESUMEN DE LA EVIDENCIA CIENTÍFICA EN QUIROPRÁCTICA

Este dossier es una breve recopilación de publicaciones científicas, para la cual se han seleccionado exclusivamente publicaciones del más alto nivel de calidad de evidencia científica publicadas en revistas de alto impacto en los últimos 15 años. Para una selección más extensa de títulos, remitimos a la última sección de esta publicación (*Bibliografía complementaria* pág.69).

La Organización Mundial de la Salud (OMS) define la Quiropráctica como la Profesión Sanitaria “que se ocupa del diagnóstico, el tratamiento y la prevención de los trastornos del sistema neuromusculoesquelético y de los efectos de dichos trastornos sobre la salud en general”¹. La mayoría de países del entorno de España, tanto en la UE como fuera de ella también reconocen que la Quiropráctica es una profesión sanitaria. Tenemos ejemplos cercanos como Francia², Portugal³ o Italia⁴, pero también Bélgica⁵, Alemania⁶, Reino Unido⁷ y todos los países Nórdicos, en la mayoría incorporada a los servicios ofrecidos por la sanidad pública^{8,9,10,11,12}.

Como toda profesión sanitaria, la Quiropráctica ha desarrollado un cuerpo de conocimientos propio, centrado en el estudio de la columna vertebral, sus trastornos, el efecto de los mismos sobre el sistema nervioso, y su abordaje. La intención de este dossier es el de recopilar y resumir el cuerpo de conocimientos en los siguientes artículos científicos. Como describe la OMS, la Quiropráctica “concede una particular importancia a las técnicas manuales, como la manipulación o el ajuste de las articulaciones”¹. Por este motivo, los estudios seleccionados se centran en la intervención más utilizada por los Quiroprácticos, a pesar de no ser la única. Como bien se define en esta investigación reciente, en la práctica clínica se emplean a menudo intervenciones como la educación al paciente¹³, con amplia evidencia a su favor (a menudo muy superior a intervenciones farmacológicas) para el abordaje de trastornos del aparato locomotor incluyendo los de la columna vertebral¹⁴.

The EBM Triad



Armstrong, E.C. (2003) Harnessing new technologies while preserving basic values. Fam Sys & Health, (21)4, 351-355.

Según la definición revisada por Sackett y colaboradores, la Medicina Basada en la Evidencia supone la integración de la mejor evidencia disponible con la experiencia clínica y los valores y expectativas de los pacientes¹⁵.

Los artículos que se presentan, publicados todos en revistas indexadas, revistas médicas de alto impacto en el sector (JAMA, Spine, The Spine Journal, The European Spine Journal, revisiones Cochrane), son en su mayoría revisiones sistemáticas y/o metaanálisis, por tanto del **más alto nivel de calidad de evidencia publicada en los últimos años**. El único artículo no indexado es un informe elaborado por Mercer Health & Benefits, rama de la consultoría en recursos humanos más grande del mundo¹⁶ y publicado por la prestigiosa Universidad de Harvard. A lo largo del documento se especifican el nivel de evidencia y el grado de recomendación de cada estudio, según la clasificación establecida por Sackett.¹⁷

Otro de los pilares a tener en cuenta son los valores y expectativas de los pacientes, a lo que a menudo se refiere como “preferencias del paciente”. Por este motivo, hemos incluido dos apartados específicos a recopilar evidencia disponible sobre por un lado el coste y relación coste-eficacia de los servicios proporcionados por Quiroprácticos, y por otro, los niveles de satisfacción asociados a la atención recibida.

Por último, la pericia de los profesionales, depende en gran parte de la formación recibida. En las directrices elaboradas por la OMS, se establece que la seguridad y calidad de los servicios prestados depende directamente de la calidad de la formación. Según las mismas, un Quiropráctico es un profesional con una formación universitaria mínima de 4.800 horas¹. Los países que reconocen el carácter sanitario de la profesión también determinan los criterios mínimos formativos, que son en todo el mundo de carácter universitario de segundo ciclo. Esto en Europa implica una formación de Grado y Máster, en países como Canadá o EE.UU. Bachelor y Doctor en Quiropráctica, mientras que en otros como México es de Licenciado en Quiropráctica. Según la normativa de educación superior en cada país, la duración de los estudios oscila entre 5 y 7 años, en Europa equivalente a 300 puntos ECTS, como se detalla específicamente en la normativa francesa del 2018, por citar un ejemplo reciente¹⁸.

No se citan en este dossier, pero cabe mencionar que paneles compuestos por expertos en muchas otras disciplinas recomiendan la atención Quiropráctica mediante guías de práctica clínica basadas en la evidencia. Muchas de estas vienen dictadas por los Colegios de Médicos, como en Canadá¹⁹ o EE.UU.²⁰, mientras que otras son elaboradas por la Comisión Europea²¹ o sus países miembros como es el ejemplo de Bélgica²², Reino Unido²³, Dinamarca²⁴ o por sociedades científicas²⁵. Una muy reciente serie de estudios sobre lumbalgia del prestigioso The Lancet²⁶ confirma estas recomendaciones. En general las recomendaciones apoyan el abordaje Quiropráctico para trastornos de la columna vertebral. Precisamente, son los problemas de columna y en particular la lumbalgia, la primera causa de discapacidad a nivel global, según los datos extraídos del enorme esfuerzo realizado en el estudio de “Carga mundial de morbilidad 2016”²⁷, y el quiropráctico, unos de los profesionales mejor preparados para afrontar esta carga, según modelos basados en la evidencia propuestos desde EE.UU.²⁸

Referencias

1. OMS (2005). Directrices sobre formación básica e inocuidad en quiropráctica. Ginebra, Organización Mundial de la Salud. Disponible online en: <http://apps.who.int/medicinedocs/documents/s14104s/s14104s.pdf>.
2. WLoi n° 2002-303, du 4 mars 2002 relative aux droits des malades et à la qualité du système de santé- Article 75. Journal Officiel de la République Française, 15 avril 2011 au 29 novembre 2015. Disponible online en: <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000227015>.
3. Lei n. ° 71, de 2 de setembro 2013, Regulamenta a Lei nº 45/2003, de 22 de agosto, relativamente ao exercício profissional das atividades de aplicação de terapêuticas não convencionais. Diário da República, 2 de setembro de 2013, pp. 5439 a 5439. Disponible online en: <http://www.imt.pt/BO/uploadDOCS/Lei/lei712013.pdf>.
4. Legge n° 244 Articolo 2 comma 355, 24 dicembre 2007, "Disposizioni per la formazione del bilancio annuale e pluriennale dello Stato (legge finanziaria 2008)" pubblicata nella Gazzetta Ufficiale n. 300 del 28 dicembre 2007 - Supplemento ordinario n. 285, pp. 140. Disponible online en: <http://www.parlamento.it/parlam/leggi/07244l.pdf>.
5. Loi du 29 avril 1999 relative aux pratiques non conventionnelles dans les domaines de l'art médical, de l'art pharmaceutique, de la kinésithérapie, de l'art infirmier et des professions. médicales. Moniteur Belge, 24 June 1999, 169. Belgium. Disponible online en: http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1999042968&table_name=loi.
6. Heilpraktikergesetz in der im Bundesgesetzblatt Teil III, Gliederungsnummer 2122-2, veröffentlichten bereinigten Fassung, das zuletzt durch Artikel 17e des Gesetzes vom 23. Dezember 2016 (BGBl. I S. 3191) geändert worden ist. Disponible online en: <https://www.gesetze-im-internet.de/heilprg/BJNR002510939.html>.
7. The Chiropractors Act 1994. London: HMSO, 1994. Disponible online en: <http://www.legislation.gov.uk/ukpga/1994/17/pdfs/ukpga19940017en.pdf>.
8. LBK nr. 877, af 04 august 2011, Kapitel 12 Kiropraktorer, Lov om autorisation af sundhedspersoner og om sundhedsfaglig virksomhed. Sundheds- og Ældreministeriets. Disponible online en: <https://www.retsinformation.dk/Forms/R0710.aspx?id=121913#Kap12>.
9. Act of 2 July 1999 No. 64 relating to health personnel etc (the health personnel Act), Ot.prp. nr. 13 (1998-99). Disponible online en: <https://www.regjeringen.no/no/dokumenter/act-of-2-july-1999-no-64-relating-to-hea/id107079/>.
10. Motion till riksdagen 1989/90:Ub530-537, Stockholm den 22 januari 1990. Disponible online en: https://www.riksdagen.se/sv/dokument-lagar/dokument/motion/kiropraktorutbildningen_GD02Ub530.
11. Laki terveysalan ammattilaisista (559/1994) 2 §: n 1 momentin 2 kohta. Disponible online en: <http://finlex.fi/fi/laki/ajantasa/1994/19940564>.
12. Íslensk lög 1. janúar 2018. Útgáfa 148a. Lög um heilbrigðisstarfsmenn, 2012 nr. 34 15. Maí. Disponible online en: <http://www.althingi.is/lagas/nuna/2012034.html>.
13. Beliveau PJH, Wong JJ, Sutton DA, Simon NB, Bussi  res AE, Mior SA and French SD. The chiropractic profession: a scoping review of utilization rates, reasons for seeking care, patient profiles, and care provided. Chiropr Man Therap. 2017 Nov;22:25:35.
14. Babatunde OO, Jordan JL, Van der Windt DA, Hill JC, Foster NE, Protheroe J. Effective treatment options for musculoskeletal pain in primary care: a systematic overview of current evidence. PLoS One. 2017;12(6):e0178621.
15. Sackett DL, Richardson WS, Rosenberg W, and Hayne RB. Evidence-based medicine: how to practice and teach EBM. London: Churchill-Livingstone, 2000.
16. Dawson J, (2004). Acquisition by Mercer to give new energy to high-flying Synhrgy. Houston Business Journal. Disponible online en: <https://www.bizjournals.com/houston/stories/2004/01/19/story8.html>.
17. Ball C, Sackett D, Phillips B, Haynes B, Straus S. Levels of evidence and grades of recommendations. In: EBM (Web site of the Oxford Centre for Evidence-Based Medicine). Disponible en: www.cebm.net/levels_of_evidence.asp
18. JORF no0037, du 14 f  vrier 2018, Minist  re Des Solidarit  s Et De La Sant  . Relatif    la formation en chiropraxie, 13 f  vrier 2018. Disponible online en: http://solidarites-sante.gouv.fr/fichiers/bo/2018/18-02/ste_20180002_0000_0099.pdf.
19. Busse JW, Craigie S, Juurlink DN, Buckley DN, Wang L, Couban RJ, et al. Guideline for opioid therapy and chronic noncancer pain. CMAJ 2017; 189(18):E659  6.
20. Qaseem A, MD, PhD, MHA; Wilt TJ, MD, MPH; McLean RM, MD; Forciea MA, MD. Clinical Guidelines Committee of the American College of Physicians. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. Ann Intern Med. 2017 Apr 4;166(7):514-530.
21. M. Aebi, COST Action B13: European Guidelines for the Management of Low Back Pain, European Spine Journal. 2006. Vol. 15, Suppl. 2 La original pone ON LINE.
22. Wambeke PV, Desomer A, Aillet L, Berquin A, Dumoulin C, Depreitere B, Dewachter J, Dolphens M, Forget P, Fraselle V, et al. (2017) Belgian Health Care Knowledge Centre (KCE) Report. 287.
23. National Institute for Health and Care Excellence (NICE). Low back pain and sciatica in over 16s: assessment and Management (NG59). November 2016.
24. Stockkendahl et al. (2017) Stockkendahl MJ, Kjaer P, Hartvigsen J, Kongsted A, Aaboe J, Andersen M, Andersen M  , Fournier G, H  jgaard B, Jensen MB. National clinical guidelines for non-surgical treatment of patients with recent onset low back pain or lumbar radiculopathy. European Spine Journal. 2017;27:60  75.
25. North American Spine Society Diagnosis and Treatment of Low-Back Pain Evidence-Based Guideline 2016- Currently Under Development Guideline. Inclusion/Exclusion Criteria Clinical Question List. NASS Diagnosis and Treatment of Low-Back Pain Guideline  Clinical Question Protocol.
26. Foster, N et al. Prevention and treatment of low back pain: evidence, challenges, and promising directions. The Lancet. Published Online .2018 Mar 21. Disponible en: <http://www.thelancet.com/series/low-back-pain>.
27. Vos, T et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990  2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet, Volume 390, Issue 10100,1211    1259.
28. Murphy DR, Justice BD, Paskowski IC, Perle SM, Schneider MJ. The establishment of a primary spine care practitioner and its benefits to health care reform in the United States. Chiropr Man Therap. 2011 Jul 21;19(1):17.

MECANISMOS DE ACCIÓN Y EFECTOS BIOLÓGICOS SUBYACENTES A LAS TÉCNICAS DE MANIPULACIÓN QUIROPRÁCTICAS

- Valenzuela PL, Pancorbo S, Lucia A, Germain F. Spinal Manipulative Therapy Effects in Autonomic Regulation and Exercise Performance in Recreational Healthy Athletes: A Randomized Controlled Trial. *Spine*. 2018 Oct.
- Baarbé JK, Yelder P, Haavik H, Holmes MW, Murphy BA. Subclinical recurrent neck pain and its treatment impacts motor training-induced plasticity of the cerebellum and motor cortex. *PloS one*. 2018 Feb 28;13(2):e0193413.
- López-Herradón A, Fujikawa R, Gómez-Marín M, Stedile-Lovatel JP, Mulero F, Ardura JA, Ruiz P, Muñoz I, Esbrit P, Mahillo-Fernández I, Ortega-de Mues A. Impact of Chiropractic Manipulation on Bone and Skeletal Muscle of Ovariectomized Rats. *Calcified Tissue International*. 2017 Nov 1; 101(5):519-29.
- Randoll C, Gagnon-Normandin V, Tessier J, Bois S, Rustamov N, O'Shaughnessy J, Descarreaux M, Piché M. The mechanism of back pain relief by spinal manipulation relies on decreased temporal summation of pain. *Neuroscience*. 2017 May 4;349:220-8.
- Sampath KK, Mani R, Cotter J, Gisselman AS, Tumilty S. Changes in biochemical markers following spinal manipulation-a systematic review and meta-analysis. *Musculoskeletal Science and Practice*. 2017 Apr 5.
- Coronado RA, Gay CW, Bialosky JE, Carnaby GD, Bishop MD, George SZ. Changes in pain sensitivity following spinal manipulation: a systematic review and meta-analysis. *Journal of Electromyography and Kinesiology*. 2012 Oct 31;22(5):752-67.
- Herzog W. The biomechanics of spinal manipulation. *Journal of bodywork and movement therapies*. 2010 Jul 31;14(3):280-6.
- Pickar JG. Neurophysiological effects of spinal manipulation. *The Spine Journal*. 2002 Oct 31; 2(5):357-71.

EFICACIA Y EFECTIVIDAD DE LAS TÉCNICAS DE MANIPULACIÓN QUIROPRÁCTICA

- Rubinstein SM, De Zoete A, Van Middelkoop M, Assendelft WJ, De Boer MR, Van Tulder MW. Benefits and harms of spinal manipulative therapy for the treatment of chronic low back pain: systematic review and meta-analysis of randomised controlled trials. *bmj*. 2019 Mar 13;364:l689.
- Paige NM, Miake-Lye IM, Booth MS, Beroes JM, Mardian AS, Dougherty P, Branson R, Tang B, Morton SC, Shekelle PG. Association of spinal manipulative therapy with clinical benefit and harm for acute low back pain: systematic review and meta-analysis. *Jama*. 2017 Apr 11;317(14):1451-60.

- Gross A, Langevin P, Burnie SJ, Bédard-Brochu MS, Empey B, Dugas E, Faber-Dobrescu M, Andres C, Graham N, Goldsmith CH, Brønfort G. Manipulation and mobilisation for neck pain contrasted against an inactive control or another active treatment. The Cochrane Library. 2015 Jan 1.
- 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*. 2013 Apr 15; 38(8):627
- von Heymann WJ, Schloemer P, Timm J, Muehlbauer B. Spinal high-velocity low amplitude manipulation in acute nonspecific low back pain: a double-blinded randomized controlled trial in comparison with diclofenac and placebo. *Spine*. 2013 Apr 1;38(7):540-8.
- Senna MK, Machaly SA. Does maintained spinal manipulation therapy for chronic nonspecific low back pain result in better long-term outcome? *Spine*. 2011 Aug 15;36(18):1427-37.
- Bronfort G, Haas M, Evans R, Leininger B, Triano J. Effectiveness of manual therapies: the UK evidence report. *Chiropractic & osteopathy*. 2010 Dec;18(1):3.
- Bishop PB, Quon JA, Fisher CG, Dvorak MF. The Chiropractic Hospital-based Interventions Research Outcomes (CHIRO) study: a randomized controlled trial on the effectiveness of clinical practice guidelines in the medical and chiropractic management of patients with acute mechanical low back pain. *The Spine Journal*. 2010 Dec 1;10(12):1055-64.
- Walker BF, French SD, Grant W, Green S. Combined chiropractic interventions for low-back pain. The Cochrane Library. 2010 Jan 1.

CAPÍTULO 3

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COSTE-EFECTIVIDAD DEL TRATAMIENTO QUIROPRÁCTICO

- Hurwitz EL, Vassilaki M, Li D, Schneider MJ, Stevans JM, Phillips RB, Phelan SP, Lewis EA, Armstrong RC. Variations in Patterns of Utilization and Charges for the Care of Headache in North Carolina, 2000-2009: A Statewide Claims' Data Analysis. *Journal of Manipulative & Physiological Therapeutics*. 2016 May 1; 39(4):229-39.
- Hurwitz EL, Li D, Guillen J, Schneider MJ, Stevans JM, Phillips RB, Phelan SP, Lewis EA, Armstrong RC, Vassilaki M. Variations in patterns of utilization and charges for the care of neck pain in north carolina, 2000 to 2009: a statewide claims' data analysis. *Journal of Manipulative & Physiological Therapeutics*. 2016 May 1;39(4):240-51.
- Blanchette MA, Stochkendahl MJ, Borges Da Silva R, Boruff J, Harrison P, Bussi res A. Effectiveness and Economic Evaluation of Chiropractic Care for the Treatment of Low Back Pain: A Systematic Review of Pragmatic Studies. *PLoS One*. 2016 Aug 3;11(8):e0160037.
- Peterson CK, Leemann S, Lechmann M, Pfirrmann CW, Hodler J, Humphreys BK. Symptomatic Magnetic Resonance Imaging–Confirmed Lumbar Disk Herniation Patients: A Comparative Effectiveness Prospective Observational Study of 2 Age-and Sex-Matched Cohorts Treated With Either High-Velocity, Low-Amplitude Spinal Manipulative Therapy or Imaging-Guided Lumbar Nerve Root Injections. *Journal of Manipulative & Physiological Therapeutics*. 2013 May 1;36(4):218-25.
- Liliedahl RL, Finch MD, Axene DV, Goertz CM. Cost of care for common back pain conditions initiated with chiropractic doctor vs medical doctor/doctor of osteopathy as first physician: experience of one Tennessee-based general health insurer. *Journal of Manipulative & Physiological Therapeutics*. 2010 Nov 1;33 (9):640-3.

- Choudhry, N, Milstein, A. Do chiropractic physician services for treatment of low-back and neck pain improve the value of health benefit plans? An evidence-based assessment of incremental impact on population health and total health care spending. Harvard Medical School, Boston, Mercer Health and Benefits, San Francisco. 2009 Oct 12.

CAPÍTULO 4

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SATISFACCIÓN DE LOS USUARIOS DE QUIROPRÁCTICA

- MacPherson H, Newbronner E, Chamberlain R, Hopton A. Patients' experiences and expectations of chiropractic care: a national cross-sectional survey. *Chiropractic & manual therapies*. 2015 Dec; 23(1):3.
- Weeks WB, Goertz CM, Meeker WC, Marchiori DM. Public perceptions of doctors of chiropractic: results of a national survey and examination of variation according to respondents' likelihood to use chiropractic, experience with chiropractic, and chiropractic supply in local health care markets. *Journal of Manipulative & Physiological Therapeutics*. 2015 Oct 1;38(8):533-44
- Houweling TA, Braga AV, Hausheer T, Vogelsang M, Peterson C, Humphreys BK. First-contact care with a medical vs chiropractic provider after consultation with a Swiss telemedicine provider: comparison of outcomes, patient satisfaction, and health care costs in spinal, hip, and shoulder pain patients. *Journal of Manipulative & Physiological Therapeutics*. 2015 Sep 1;38(7):477-83.
- Weigel PA, Hockenberry JM, Wolinsky FD. Chiropractic use in the Medicare population: prevalence, patterns, and associations with 1-year changes in health and satisfaction with care. *Journal of Manipulative & Physiological Therapeutics*. 2014 Oct 1;37(8):542-51.
- Leininger BD, Evans R, Bronfort G. Exploring patient satisfaction: a secondary analysis of a randomized clinical trial of spinal manipulation, home exercise, and medication for acute and subacute neck pain. *Journal of Manipulative & Physiological Therapeutics*. 2014 Oct 1;37(8):593-601.
- Navrud IM, Feier CH. A survey of parent satisfaction with chiropractic care of the pediatric patient. *Reason*. 2014; 221(174):55-9.

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SEGURIDAD DEL EJERCICIO DE LA QUIROPRÁCTICA

- Moser N, Mior S, Noseworthy M, Côté P, Wells G, Behr M, Triano J. Effect of cervical manipulation on vertebral artery and cerebral haemodynamics in patients with chronic neck pain: a crossover randomised controlled trial. *BMJ open*. 2019 May 1;9(5):e025219.
- Church EW, Sieg EP, Zalatimo O, Hussain NS, Glantz M, Harbaugh RE. Systematic review and meta-analysis of chiropractic care and cervical artery dissection: no evidence for causation. *Cureus*. 2016 Feb;8(2).
- Kosloff TM, Elton D, Tao J, Bannister WM. Chiropractic care and the risk of vertebrobasilar stroke: results of a case-control study in US commercial and Medicare Advantage populations. *Chiropractic & manual therapies*. 2015 Dec;23(1):19.

- Hebert JJ, Stomski NJ, French SD, Rubinstein SM. Serious adverse events and spinal manipulative therapy of the low back region: a systematic review of cases. *Journal of Manipulative & Physiological Therapeutics*. 2015 Nov 1;38(9):677-91.
- Whedon JM, Mackenzie TA, Phillips RB, Lurie JD. Risk of traumatic injury associated with chiropractic spinal manipulation in Medicare Part B beneficiaries aged 66–99. *Spine*. 2015 Feb 15;40(4):264.
- Cassidy JD, Boyle E, Côté P, He Y, Hogg-Johnson S, Silver FL, Bondy SJ. Risk of vertebrobasilar stroke and chiropractic care: results of a population-based case-control and case-crossover study. *Journal of Manipulative & Physiological Therapeutics*. 2009 Feb 1; 32(2):S201-8.
- Thiel HW, Bolton JE, Docherty S, Portlock JC. Safety of chiropractic manipulation of the cervical spine: a prospective national survey. *Spine*. 2007 Oct 1; 32(21):2375-8.
- Rubinstein SM, Leboeuf-Yde C, Knol DL, de Koekkoek TE, Pfeifle CE, van Tulder MW. The benefits outweigh the risks for patients undergoing chiropractic care for neck pain: a prospective, multicenter, cohort study. *Journal of Manipulative & Physiological Therapeutics*. 2007 Jul 1; 30(6):408-18.
- Oliphant D. Safety of spinal manipulation in the treatment of lumbar disk herniations: a systematic review and risk assessment. *Journal of Manipulative & Physiological Therapeutics*. 2004 Mar 1; 27(3):197-210.

CONCLUSIONES

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GLOSARIO DE ABREVIATURAS

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CAPÍTULO 1

MECANISMOS DE ACCIÓN Y EFECTOS BIOLÓGICOS SUBYACENTES A LAS TÉCNICAS DE MANIPULACIÓN QUIROPRÁCTICA

Este capítulo tiene como objetivo presentar un resumen de la evidencia científica existente sobre los mecanismos a través de los cuales los ajustes (técnicas de manipulación) quiroprácticos actúan sobre el organismo.

Debido a la existencia de diferentes efectos clínicos observados tras la realización de los ajustes vertebrales y la complejidad de los mismos, podemos pensar en diferentes mecanismos involucrados en la producción de dichos efectos. Por este motivo, se ha realizado una selección de artículos centrados por un lado en el estudio de diferentes mecanismos involucrados, biomecánicos y fisiológicos (incluidos los neurológicos) y, por otro, en los efectos asociados tales como la inhibición del dolor, observados tanto en modelos animales como en humanos.

Podemos apreciar una creciente producción científica que apoya cómo los efectos de los ajustes vertebrales se basan en alteraciones biomecánicas o fisiológicas (incluidas las neurológicas). Aún así, futuros estudios podrán aportar más información sobre estos mecanismos y podrán ser comprendidos en mayor profundidad.

Spinal manipulative therapy effects in autonomic regulation and exercise performance in recreational healthy athletes: a randomized controlled trial

Valenzuela PL, Pancorbo S, Lucia A, Germain F.

Spine. 2018 Oct

ABSTRACT

Study design: Randomized, double blind, parallel groups, sham-controlled trial.

Objective: To analyse the acute effects of spinal manipulative therapy (SMT) on performance and autonomic modulation.²

Summary of Background Data: The use of SMT is progressively spreading from the clinical to the sporting context owing to its purported ergogenic effects. However, its effects remain unclear.²

Methods: 37 male recreational athletes (aged 37 ± 9 years) who had never received SMT were assigned to a sham (n=19) or actual SMT group (n=18). Study endpoints included autonomic modulation (heart rate variability), handgrip strength, jumping ability and cycling performance (8-minute time trial [TT]). Differences in custom effects between interventions were determined using magnitude-based inferences.²

Results: A significant and very likely lower value of a marker of sympathetic modulation, the stress score, was observed in response to actual compared to sham SMT ($p=0.007$; effect size [ES]=-0.97). A trend towards a significant and likely lower sympathetic:parasympathetic ratio ($p=0.055$; ES=-0.96) and a likely higher natural logarithm of the root-mean-square differences of successive heartbeat intervals ([LnRMSSD], $p=0.12$; ES=0.36) was also found with actual SMT. Moreover, a significantly lower mean power output was observed during the TT with actual compared with sham SMT ($p=0.035$; ES=-0.28). Non-significant ($p>0.05$) and unclear or likely trivial differences ($ES<0.2$) were found for the rest of endpoints, including handgrip strength, heart rate during the TT, and jump loss thereafter.²

Conclusion: A single pre-exercise SMT session induced an acute shift towards parasympathetic dominance and slightly impaired performance in recreational healthy athletes.

RESUMEN DEL TEXTO

Este ensayo clínico controlado y aleatorizado de doble ciego tiene como objetivo analizar los efectos que provoca la terapia de manipulación vertebral (SM) sobre el sistema nervioso autónomo y el rendimiento de triatletas. Se midieron variables de modulación autónoma (variabilidad de la frecuencia cardíaca), el rendimiento en bicicleta estática y una tarea de salto,

así como la fuerza manual de los participantes antes y después de una única sesión de SM o terapia placebo, según el grupo al que fueran asignados. Se observó un **aumento de la actividad parasimpática** sobre la simpática tras la SM en los atletas que recibieron el tratamiento en comparación con el grupo control. No se vieron diferencias significativas en cuanto a la fuerza de empuñadura ni en la tarea de salto y se observó un menor rendimiento en la bicicleta estática en el grupo SM en comparación con el grupo control, hallazgo que se relaciona con una influencia hacia la **dominancia de la rama parasimpática provocada por la SM**.

Nivel de evidencia: 1B

Grado de recomendación: A

Subclinical recurrent neck pain and its treatment impacts motor training-induced plasticity of the cerebellum and motor cortex

Baarbé JK, Yields P, Haavik H, Holmes MW, Murphy BA.

PloS one. 2018 Feb 28;13(2):e0193413.

ABSTRACT

The cerebellum processes pain inputs and is important for motor learning. Yet, how the cerebellum interacts with the motor cortex in individuals with recurrent pain is not clear. Functional connectivity between the cerebellum and motor cortex can be measured by a twin coil transcranial magnetic stimulation technique in which stimulation is applied to the cerebellum prior to stimulation over the motor cortex, which inhibits motor evoked potentials (MEPs) produced by motor cortex stimulation alone, called cerebellar inhibition (CBI). Healthy individuals without pain have been shown to demonstrate reduced CBI following motor acquisition. We hypothesized that CBI would not reduce to the same extent in those with mild- recurrent neck pain following the same motor acquisition task. We further hypothesized that a common treatment for neck pain (spinal manipulation) would restore reduced CBI following motor acquisition. Motor acquisition involved typing an eight-letter sequence of the letters Z,P,D,F with the right index finger. Twenty-seven neck pain participants received spinal manipulation (14 participants, 18–27 years) or sham control (13 participants, 19–24 years). Twelve healthy controls (20–27 years) also participated. Participants had CBI measured; they completed manipulation or sham control followed by motor acquisition; and then had CBI re-measured. Following motor acquisition, neck pain sham controls remained inhibited ($58 \pm 33\%$ of test MEP) vs. healthy controls who disinhibited ($98 \pm 49\%$ of test MEP, $P < 0.001$), while the spinal manipulation group facilitated ($146 \pm 95\%$ of test MEP, $P < 0.001$). Greater inhibition in neck pain sham vs. healthy control groups suggests that neck pain may change cerebellar-motor cortex interaction. The change to facilitation suggests that spinal manipulation may reverse inhibitory effects of neck pain.

RESUMEN DEL TEXTO

En este **ensayo clínico controlado y aleatorizado** se estudia el efecto que tiene el dolor cervical crónico y la manipulación cervical sobre la **activación del cerebelo** mediante la aplicación de estimulación transcraneal magnética. El cerebelo está involucrado en el proceso de aprendizaje motor y es responsable de la modulación del circuito motor, además, tiene un papel clave en el procesamiento de información sensorial relacionada con el movimiento. Se observó una disminución de potenciales motores evocados (inhibición) mayor en pacientes con dolor cervical crónico que en los pacientes sanos, confirmando la hipótesis de que el dolor cervical produce una alteración en el procesamiento cerebeloso de la información sensorial. Además, se observó que esta **inhibición cerebelosa se revertía en los sujetos que recibieron manipulación cervical y no en los pacientes que recibieron el procedimiento placebo**.

Nivel de evidencia: 1B

Grado de recomendación: A

Impact of Chiropractic Manipulation on Bone and Skeletal Muscle of Ovariectomized Rats

López-Herradón A, Fujikawa R, Gómez-Marín M, Stedile-Lovatel JP, Mulero F, Ardura JA, Ruiz P, Muñoz I, Esbrit P, Mahillo-Fernández I, Ortega-de Mues A.

Calcified Tissue International. 2017 Nov 1; 101(5):519-29.

ABSTRACT

Evidence suggests that chiropractic manipulation might exert positive effects in osteoporotic patients. The aim of this study was to evaluate the effects of chiropractic manipulation on bone structure and skeletal muscle in rats with bone loss caused by ovariectomy (OVX). The 6-month old Sprague-Dawley rats at 10 weeks following OVX or sham operation (Sh) did not suffer chiropractic manipulation (NM group) or were submitted to true chiropractic manipulation using the chiropractic adjusting instrument Activator V® three times/week for 6 weeks as follows: Force 1 setting was applied onto the tibial tubercle of the rat right hind limb (TM group), whereas the corresponding left hind limb received a false manipulation (FM group) consisting of ActivatorV® firing in the air and slightly touching the tibial tubercle. Bone mineral density (BMD) and bone mineral content (BMC) were determined in long bones and L3–L4 vertebrae in all rats. Femora and tibia were analyzed by ICT. Mechano growth factor (MGF) was detected in long bones and soleus, quadriceps and tibial muscles by immunohistochemistry and Western blot. The decrease of BMD and BMC as well as trabecular bone impairment in the long bones of OVX rats vs Sh controls was partially reversed in the TM group versus FM or NM rats. This bone improvement by chiropractic manipulation was associated with an increased

MGF expression in the quadriceps and the anterior tibial muscle in OVX rats. These findings support the notion that chiropractic manipulation can ameliorate osteoporotic bone at least partly by targeting skeletal muscle.

Keywords: Chiropractic manipulation; Mechano growth factor (MGF); Osteoporotic bone; Skeletal muscle.

RESUMEN DEL TEXTO

*En este **estudio preclínico** se evaluó el efecto de los ajustes quiroprácticos realizados con el instrumento Activator V® sobre la estructura ósea y músculos esqueléticos de ratas con osteoporosis inducida mediante ovariectomía. Tras la intervención se observó un **aumento de la densidad mineral ósea, del contenido mineral óseo y del factor de crecimiento mecánico** en las ratas que recibieron los ajustes, lo que sugiere que los **ajustes quiroprácticos podrían mejorar parcialmente la pérdida ósea en huesos con osteoporosis**.*

Nivel de evidencia: 1B

Grado de recomendación: A

The mechanism of back pain relief by spinal manipulation relies on decreased temporal summation of pain

Randoll C, Gagnon-Normandin V, Tessier J, Bois S, Rustamov N, O'Shaughnessy J, Descarreaux M, Piché M.

Neuroscience. 2017 May 4; 349:220-8.

ABSTRACT

The aim of the present study was to determine whether thoracic spinal manipulation (SM) decreases temporal summation of back pain. The study comprised 2 controlled experiments including 16 and 15 healthy participants, respectively. Each study included 6 sessions during which painful or non-painful electrical stimulations were delivered in three conditions: 1) control 2) light mechanical stimulus (MS) or 3) SM. Electrical stimulation was applied on the thoracic spine (T4), in the area where SM and MS were performed. In Experiment 1, electrical stimulation consisted in a single 1-ms pulse while a single or repeated train of ten 1-ms pulses was used in Experiment 2. SM involved articular cavitation while MS was a calibrated force of 25 N applied manually for 2 seconds. For the single pulse, changes in pain or tactile sensation in the SM or MS sessions compared with the CTL session were not significantly different (all p 's > 0.05). In contrast, temporal summation of pain was decreased in the SM session compared with the CTL session for both the single and repeated train (p 's < 0.05). Changes were not significant for the MS sessions (all p 's > 0.05) and no effect was observed for the tactile sensation (all p 's $>$

0.1). These results indicate that SM produces specific inhibitory effects on temporal summation of back pain, consistent with the involvement of a spinal antinociceptive mechanism in clinical pain relief by SM. This provides the first mechanistic evidence of back pain relief by spinal manipulation.

RESUMEN DEL TEXTO

*El objetivo de este **ensayo clínico controlado** es determinar los efectos hipoalgésicos específicos de la manipulación vertebral (SM) de alta velocidad y baja amplitud realizada en la columna dorsal. Este estudio demuestra que el **efecto de la SM en la producción de hipoalgesia** se debe a una disminución en la sumación temporal del dolor, **disminuyendo**, a su vez, la sobreactivación de las neuronas del asta dorsal de la médula que dan lugar a **mecanismos de sensibilización central**. Será interesante conocer los efectos de la SM a largo plazo.*

Nivel de evidencia: 1B

Grado de recomendación: A

Changes in biochemical markers following spinal manipulation - a systematic review and meta-analysis

Sampath KK, Mani R, Cotter J, Gisselman AS, Tumilty S.

Musculoskeletal Science and Practice. 2017 Apr 5.

ABSTRACT

The aim of this meta-analysis was to determine the effectiveness of spinal manipulation in influencing various biochemical markers in healthy and or symptomatic population.

Electronic databases (n=10) were searched (from inception till September 2016) and eight trials (325 participants) that met the inclusion criteria were included in the meta-analysis. Two authors independently extracted and assessed the risk of bias in included studies. Standardised mean differences for outcome measures were used to calculate effect sizes. The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) tool was used for assessing the quality of the body of evidence for each outcome of interest.

There was moderate quality evidence that spinal manipulation influenced biochemical markers. There was moderate quality evidence of significant difference that spinal manipulation is better (SMD -0.46, 95% CI - 0.93 to 0) than control in eliciting changes in cortisol levels immediately after intervention. There was also a low quality evidence that spinal manipulation is better than control at post-intervention in increasing substance-P (SMD -0.48, 95% CI -0.87 to -0.1), neurotensin (SMD -1.8, 95% CI -2.56 to -1.04) and oxytocin levels (SMD -2.61, 95% CI -3.5 to -1.72). However, low quality evidence indicated that spinal manipulation did not influence epinephrine

(SMD 0.1,95%CI- 0.56to0.75) or nor-epinephrine levels (SMD - 0.06,95%CI-0.71to0.6).

The current review found that spinal manipulation can increase substance-p, neurotensin, oxytocin and interleukin levels and may influence cortisol levels post-intervention. However, future trials targeting symptomatic populations are required to understand the clinical importance of such changes.

Keywords: Spinal manipulation; Pain markers; Inflammation; Hormones.

RESUMEN DEL TEXTO

*En este metaanálisis se observó un **nivel de evidencia moderada** que demuestra que la **manipulación vertebral (SM)** es mejor que el control en provocar cambios en diferentes **marcadores bioquímicos** del organismo. Los resultados más destacados fueron un aumento en la concentración de sustancia P, neurotensina, oxitocina e interleukinas, además de cambios en la concentración de cortisol tras la SM. Debido a que estos marcadores bioquímicos modulan el dolor y/o la inflamación, se considera que la SM es **una estrategia sólida para el manejo de afecciones que cursan con dolor y/o inflamación**.*

Nivel de evidencia: 1A

Grado de recomendación: A

Changes in pain sensitivity following spinal manipulation: a systematic review and meta-analysis

Coronado RA, Gay CW, Bialosky JE, Carnaby GD, Bishop MD, George SZ.

Journal of Electromyography and Kinesiology. 2012 Oct 31;22(5):752-67.

ABSTRACT

Spinal manipulation (SMT) is commonly used for treating individuals experiencing musculoskeletal pain. The mechanisms of SMT remain unclear; however, pain sensitivity testing may provide insight into these mechanisms. The purpose of this systematic review is to examine the literature on the hypoalgesic effects of SMT on pain sensitivity measures and to quantify these effects using meta-analysis. We performed a systematic search of articles using CINAHL, MEDLINE, PsycINFO, and SPORTDiscus from each databases' inception until May 2011. We examined methodological quality of each study and generated pooled effect size estimates using meta-analysis software. Of 997 articles identified, 20 met inclusion criteria for this review. Pain sensitivity testing used in these studies included chemical, electrical, mechanical, and thermal stimuli applied to various anatomical locations. Meta-analysis was appropriate for studies examining the immediate effect of SMT on mechanical pressure pain threshold (PPT). SMT demonstrated a favorable effect over other interventions on increasing PPT. Subgroup analysis showed a significant effect of SMT on

increasing PPT at the remote sites of stimulus application supporting a potential central nervous system mechanism. Future studies of SMT related hypoalgesia should include multiple experimental stimuli and test at multiple anatomical sites.

Keywords: Manual therapy; Spinal manipulation; Pain; Experimental pain.

RESUMEN DEL TEXTO

*Esta **revisión sistemática y metaanálisis** concluye que la manipulación vertebral (SM) resulta **efectiva en la inducción de hipoalgesia**, provocando un aumento del umbral del dolor y/o disminución en la sumación temporal del dolor, tanto en pacientes sanos como sintomáticos. Se concluye que la **SM es efectiva en la modulación del dolor a través de mecanismos neurológicos tanto periféricos como centrales**. Hay que tener en cuenta que estos resultados solo fueron evaluados a corto plazo, por lo que se recomienda más investigación sobre los efectos a largo plazo.*

Nivel de evidencia: 1A

Grado de recomendación: A

The biomechanics of spinal manipulation

Herzog W.

Journal of bodywork and movement therapies. 2010 Jul 31;14(3):280-6.

ABSTRACT

Biomechanics is the science that deals with the external and internal forces acting on biological systems and the effects produced by these forces. Here, we describe the forces exerted by chiropractors on patients during high-speed, low-amplitude manipulations of the spine and the physiological responses produced by the treatments. The external forces were found to vary greatly among clinicians and locations of treatment on the spine. Spinal manipulative treatments produced reflex responses far from the treatment site, caused movements of vertebral bodies in the “para-physiological” zone, and were associated with cavitation of facet joints. Stresses and strains on the vertebral artery during chiropractic spinal manipulation of the neck were always much smaller than those produced during passive range of motion testing and diagnostic procedures.

Keywords: Spinal biomechanics; Chiropractic; Manipulative therapy; Vertebral artery; Stroke; Internal forces

RESUMEN DEL TEXTO

*En esta **revisión**, cuyo objetivo es conocer los mecanismos fisiológicos de la manipulación vertebral quiropráctica de alta velocidad y baja amplitud (HVLA), se observó que la **magnitud de la fuerza***

aplicada durante el tratamiento HVLA no es tan importante como la velocidad y dirección del impulso; que existe un movimiento significativo de la vértebra sobre la que se aplica la fuerza en relación con los segmentos adyacentes, dando lugar a una respuesta refleja de la musculatura paraespinal, que puede afectar a otros grupos musculares más extensos. Por último, se comprobó que durante las manipulaciones HVLA, las arterias vertebrales con sometidas a fuerzas muy inferiores a las que se generan durante las maniobras diagnósticas.

Nivel de evidencia: 1A

Grado de recomendación: A

Neurophysiological effects of spinal manipulation

Pickar JG.

The Spine Journal. 2002 Oct 31;2(5):357-71.

ABSTRACT

Background context: Despite clinical evidence for the benefits of spinal manipulation and the apparent wide usage of it, the biological mechanisms underlying the effects of spinal manipulation are not known. Although this does not negate the clinical effects of spinal manipulation, it hinders acceptance by the wider scientific and healthcare communities and hinders rational strategies for improving the delivery of spinal manipulation.

Purpose: The purpose of this review article is to examine the neurophysiological basis for the effects of spinal manipulation.

Study design: A review article discussing primarily basic science literature and clinically oriented basic science studies.

Methods: This review article draws primarily from the peer-reviewed literature available on Medline. Several textbook publications and reports are referenced. A theoretical model is presented describing the relationships between spinal manipulation, segmental biomechanics, the nervous system and end-organ physiology. Experimental data for these relationships are presented.

Results: Biomechanical changes caused by spinal manipulation are thought to have physiological consequences by means of their effects on the inflow of sensory information to the central nervous system. Muscle spindle afferents and Golgi tendon organ afferents are stimulated by spinal manipulation. Smaller-diameter sensory nerve fibers are likely activated, although this has not been demonstrated directly. Mechanical and chemical changes in the intervertebral foramen caused by a herniated intervertebral disc can affect the dorsal roots and dorsal root ganglia, but it is not known if spinal manipulation directly affects these changes. Individuals with herniated lumbar discs have shown clinical improvement in response to spinal manipulation. The phenomenon of central facilitation is known to increase the receptive field of central neurons, enabling either subthreshold or innocuous stimuli access to central pain pathways. Numerous studies show that

spinal manipulation increases pain tolerance or its threshold. One mechanism underlying the effects of spinal manipulation may, therefore, be the manipulation's ability to alter central sensory processing by removing subthreshold mechanical or chemical stimuli from paraspinal tissues. Spinal manipulation is also thought to affect reflex neural outputs to both muscle and visceral organs.

Substantial evidence demonstrates that spinal manipulation evokes paraspinal muscle reflexes and alters motoneuron excitability. The effects of spinal manipulation on these somatosomatic reflexes may be quite complex, producing excitatory and inhibitory effects. Whereas substantial information also shows that sensory input, especially noxious input, from paraspinal tissues can reflexively elicit sympathetic nerve activity, knowledge about spinal manipulation's effects on these reflexes and on end-organ function is more limited.

Conclusions: A theoretical framework exists from which hypotheses about the neurophysiological effects of spinal manipulation can be developed. An experimental body of evidence exists indicating that spinal manipulation impacts primary afferent neurons from paraspinal tissues, the motor control system and pain processing. Experimental work in this area is warranted and should be encouraged to help better understand mechanisms underlying the therapeutic scope of spinal manipulation.

Keywords: Spinal manipulation; Neurophysiology; Manual therapy; Manual medicine; Chiropractic; Osteopathy

RESUMEN DEL TEXTO

*El objetivo de esta **revisión** de estudios de ciencias básicas es describir los cambios neurofisiológicos producidos por la **manipulación vertebral (SM)**, principalmente la de **alta velocidad y baja amplitud (HVLA)** aplicada mediante **palanca corta y llevada a cabo por quiroprácticos en más del 90% de los casos**. Se pudieron apreciar diferentes mecanismos mediante los que la SM produce cambios fisiológicos en el organismo, confirmando que la SM **modifica las aferencias propioceptivas, desencadena reflejos tanto somatosomáticos como somatoviscerales**, así como cambios subsecuentes a **nivel central relacionados con procesos de modulación del dolor**.*

Nivel de evidencia: 1A

Grado de recomendación: A

CAPÍTULO 2

EFICACIA Y EFECTIVIDAD DE LAS TÉCNICAS DE MANIPULACIÓN QUIROPRÁCTICA

Los estudios más recientes y las guías de práctica clínica basadas en la evidencia de muchos países de nuestro entorno, sitúan a la profesión quiropráctica y en particular al tratamiento basado en la manipulación vertebral realizada por quiroprácticos (Spinal Manipulation Treatment) como uno de los abordajes más eficaces y efectivos de estos trastornos musculoesqueléticos.

Si bien podría afirmarse que sus efectos son igual de beneficiosos que otras prácticas, incluida las empleadas por la medicina convencional, los mejores efectos clínicos sobre los pacientes se obtienen mediante la combinación de tratamientos en base a la práctica basada en la evidencia dentro de la que se contempla la Quiropráctica.

A continuación se muestran algunos de los estudios más relevantes que apoyan la eficacia del tratamiento quiropráctico.

Benefits and harms of spinal manipulative therapy for the treatment of chronic low back pain: systematic review and meta-analysis of randomised controlled trials

Rubinstein SM, De Zoete A, Van Middelkoop M, Assendelft WJ, De Boer MR, Van Tulder MW.

BMJ. 2019 Mar 13;364:l689.

ABSTRACT

Objective: To assess the benefits and harms of spinal manipulative therapy (SMT) for the treatment of chronic low back pain.

Design: Systematic review and meta-analysis of randomised controlled trials.

Data sources: Medline, PubMed, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), CINAHL, Physiotherapy Evidence Database (PEDro), Index to Chiropractic Literature, and trial registries up to 4 May 2018, including reference lists of eligible trials and related reviews.

Eligibility criteria for selecting studies: Randomised controlled trials examining the effect of spinal manipulation or mobilisation in adults (≥ 18 years) with chronic low back pain with or without referred pain. Studies that exclusively examined sciatica were excluded, as was grey literature. No restrictions were applied to language or setting.

Review methods: Two reviewers independently selected studies, extracted data, and assessed risk of bias and quality of the evidence. The effect of SMT was compared with recommended therapies, non-recommended therapies, sham (placebo) SMT, and SMT as an adjuvant therapy. Main outcomes were pain and back specific functional status, examined as mean differences

and standardised mean differences (SMD), respectively. Outcomes were examined at 1, 6, and 12 months. Quality of evidence was assessed using GRADE. A random effects model was used and statistical heterogeneity explored.

Results: 47 randomised controlled trials including a total of 9211 participants were identified, who were on average middle aged (35-60 years). Most trials compared SMT with recommended therapies. Moderate quality evidence suggested that SMT has similar effects to other recommended therapies for short term pain relief (mean difference -3.17 , 95% confidence interval -7.85 to 1.51) and a small, clinically better improvement in function (SMD -0.25 , 95% confidence interval -0.41 to -0.09). High quality evidence suggested that compared with non-recommended therapies SMT results in small, not clinically better effects for short term pain relief (mean difference -7.48 , -11.50 to -3.47) and small to moderate clinically

better improvement in function (SMD -0.41, -0.67 to -0.15). In general, these results were similar for the intermediate and long term outcomes as were the effects of SMT as an adjuvant therapy. Evidence for sham SMT was low to very low quality; therefore these effects should be considered uncertain. Statistical heterogeneity could not be explained. About half of the studies examined adverse and serious adverse events, but in most of these it was unclear how and whether these events were registered systematically. Most of the observed adverse events were musculoskeletal related, transient in nature, and of mild to moderate severity. One study with a low risk of selection bias and powered to examine risk (n=183) found no increased risk of an adverse event (relative risk 1.24, 95% confidence interval 0.85 to 1.81) or duration of the event (1.13, 0.59 to 2.18) compared with sham SMT. In one study, the Data Safety Monitoring Board judged one serious adverse event to be possibly related to SMT.

Conclusion: SMT produces similar effects to recommended therapies for chronic low back pain, whereas SMT seems to be better than non-recommended interventions for improvement in function in the short term. Clinicians should inform their patients of the potential risks of adverse events associated with SMT.

RESUMEN DEL TEXTO

*Esta revisión sistemática y metaanálisis evalúa la **efectividad de la terapia de manipulación vertebral en el alivio del dolor lumbar crónico y la mejora de la función de la espalda** en comparación con los tratamientos habituales. Consta de 47 ensayos controlados aleatorizados con un total de 9211 pacientes de edades comprendidas entre los 25 y 60 años de edad, con dolor lumbar de más de 3 meses de duración. La conclusión de esta revisión indica que la SMT produce efectos similares a los tratamientos recomendados para el dolor lumbar crónico. Además produce **mejores efectos clínicos en la mejora de la función de la espalda** a corto plazo en comparación con los tratamientos no recomendados, el tratamiento simulado o cuando se agrega como un tratamiento adyuvante.*

Nivel de evidencia: 1A

Grado de recomendación: A

Association of spinal manipulative therapy with clinical benefit and harm for acute low back pain: systematic review and meta-analysis

Paige NM, Miake-Lye IM, Booth MS, Beroes JM, Mardian AS, Dougherty P, Branson R, Tang B, Morton SC, Shekelle PG.

JAMA. 2017 Apr 11; 317(14):1451-60.

ABSTRACT

Importance: Acute low back pain is common and spinal manipulative therapy (SMT) is a treatment option. Randomized clinical trials (RCTs) and meta-analyses have reported different conclusions about the effectiveness of SMT.

Objective: To systematically review studies of the effectiveness and harms of SMT for acute (6 weeks) low back pain.

Data sources: Search of MEDLINE, Cochrane Database of Systematic Reviews, EMBASE, and Current Nursing and Allied Health Literature from January 1, 2011, through February 6, 2017, as well as identified systematic reviews and RCTs, for RCTs of adults with low back pain treated in ambulatory settings with SMT compared with sham or alternative treatments, and that measured pain or function outcomes for up to 6 weeks. Observational studies were included to assess harms.

Data extraction and synthesis: Data extraction was done in duplicate. Study quality was assessed using the Cochrane Back and Neck (CBN) Risk of Bias tool. This tool has 11 items in the following domains: randomization, concealment, baseline differences, blinding (patient), blinding (care provider [care provider is a specific quality metric used by the CBN Risk of Bias tool]), blinding (outcome), co-interventions, compliance, dropouts, timing, and intention to treat. Prior research has shown the CBN Risk of Bias tool identifies studies at an increased risk of bias using a threshold of 5 or 6 as a summary score. The evidence was assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) criteria.

Main outcomes and measures: Pain (measured by either the 100-mm visual analog scale, 11-point numeric rating scale, or other numeric pain scale), function (measured by the 24-point Roland Morris Disability Questionnaire or Oswestry Disability Index [range, 0-100]), or any harms measured within 6 weeks.

Findings: Of 26 eligible RCTs identified, 15 RCTs (1711 patients) provided moderate-quality evidence that SMT has a statistically significant association with improvements in pain (pooled mean improvement in the 100-mm visual analog pain scale, -9.95 [95% CI, -15.6 to -4.3]). Twelve

RCTs (1381 patients) produced moderate-quality evidence that SMT has a statistically significant association with improvements in function (pooled mean effect size, -0.39 [95% CI, -0.71 to -0.07]). Heterogeneity was not explained by type of clinician performing SMT, type of manipulation, study quality, or whether SMT was given alone or as part of a package of therapies. No RCT reported any serious adverse event. Minor transient adverse events such as increased pain, muscle stiffness, and headache were reported 50% to 67% of the time in large case series of patients treated with SMT.

Conclusions and relevance: Among patients with acute low back pain, spinal manipulative therapy was associated with modest improvements in pain and function at up to 6 weeks, with transient minor musculoskeletal harms. However, heterogeneity in study results was large.

RESUMEN DEL TEXTO

*Esta revisión bibliográfica publicada en la **revista de la Asociación Médica Americana** (Journal of the American Medical Association, JAMA), evalúa la eficacia de la terapia de manipulación vertebral (SM) para el tratamiento de **dolor lumbar agudo**. Incluye 26 ensayos aleatorizados y controlados de calidad de evidencia moderada en los que se observa una **mejora significativa de la funcionalidad y/o del nivel de dolor a corto plazo** tras la aplicación de la SM. Además, se observaron que los efectos secundarios a la SM eran de carácter menor y transitorios.*

Nivel de evidencia: 1A

Grado de recomendación: A

Manipulation and mobilisation for neck pain contrasted against an inactive control or another active treatment

Gross A, Langevin P, Burnie SJ, Bédard-Brochu MS, Empey B, Dugas E, Faber-Dobrescu M, Andres C, Graham N, Goldsmith CH, Brønfort G.

The Cochrane Library. 2015 Jan 1.

ABSTRACT

Background: Manipulation and mobilisation are commonly used to treat neck pain. This is an update of a Cochrane review first published in 2003, and previously updated in 2010.

Objectives: To assess the effects of manipulation or mobilisation alone compared with those of an inactive control or another active treatment on pain, function, disability, patient satisfaction, quality of life and global perceived effect in adults experiencing neck pain with or without radicular symptoms and cervicogenic headache (CGH) at immediate- to long-term follow-up. When appropriate, to assess the influence of treatment characteristics (i.e. technique, dosage), methodological quality, symptom duration and subtypes of neck disorder on treatment outcomes.

Search methods: Review authors searched the following computerised databases to November 2014 to identify additional studies: the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). We also searched ClinicalTrials.gov, checked references, searched citations and contacted study authors to find relevant studies. We updated this search in June 2015, but these results have not yet been incorporated.

Selection criteria: Randomised controlled trials (RCTs) undertaken to assess whether manipulation or mobilisation improves clinical outcomes for adults with acute/subacute/chronic neckpain.

Data collection and analysis: Two review authors independently selected studies, abstracted data, assessed risk of bias and applied Grades of Recommendation, Assessment, Development and Evaluation (GRADE) methods (very low, low, moderate, high quality). We calculated pooled risk ratios (RRs) and standardised mean differences (SMDs).

Main results: We included 51 trials (2920 participants, 18 trials of manipulation/mobilisation versus control; 34 trials of manipulation/mobilisation versus another treatment, 1 trial had two comparisons).

Cervical manipulation versus inactive control: For subacute and chronic neck pain, a single manipulation (three trials, no meta- analysis, 154 participants, ranged from very low to low quality) relieved pain at immediate- but not short-term follow-up.

Cervical manipulation versus another active treatment: For acute and chronic neck pain, multiple sessions of cervical manipulation (two trials, 446 participants, ranged from moderate to high quality) produced similar changes in pain, function, quality of life (QoL), global perceived effect (GPE) and patient satisfaction when compared with multiple sessions of cervical mobilisation at immediate-, short- and intermediate-term follow-up. For acute and subacute neck pain, multiple sessions of cervical manipulation were more effective than certain medications in improving pain and function at immediate- (one trial, 182 participants, moderate quality) and long-term follow-up (one trial, 181 participants, moderate quality). These findings are consistent for function at intermediate-term follow-up (one trial, 182 participants, moderate quality). For chronic CGH, multiple sessions of cervical manipulation (two trials, 125 participants, low quality) may be more effective than massage in improving pain and function at short/intermediate-term follow-up. Multiple sessions of cervical manipulation (one trial, 65 participants, very low quality) may be favoured over transcutaneous electrical nerve stimulation (TENS) for pain reduction at short-term follow-up. For acute neck pain, multiple sessions of cervical manipulation (one trial, 20 participants, very low quality) may be more effective than thoracic manipulation improving pain and function at short/intermediate-term follow-up.

Thoracic manipulation versus inactive control: Three trials (150 participants) using a single session were assessed at immediate-, short- and intermediate-term follow-up. At short-term follow-up, manipulation improved pain in participants with acute and subacute neck pain (five trials, 346 participants, moderate quality, pooled SMD -1.26, 95% confidence interval (CI) -1.86 to -0.66) and improved function (four trials, 258 participants, moderate quality, pooled SMD

-1.40, 95% CI -2.24 to -0.55) in participants with acute and chronic neck pain. A funnel plot of these data suggests publication bias. These findings were consistent at intermediate follow-up for pain/function/quality of life (one trial, 111 participants, low quality).

Thoracic manipulation versus another active treatment: No studies provided sufficient data for statistical analyses. A single session of thoracic manipulation (one trial, 100 participants, moderate quality) was comparable with thoracic mobilisation for pain relief at immediate-term follow-up for chronic neck pain.

Mobilisation versus inactive control: Mobilisation as a stand-alone intervention (two trials, 57 participants, ranged from very low to low quality) may not reduce pain more than an inactive control.

Mobilisation versus another active treatment: For acute and subacute neck pain, anterior-posterior mobilisation (one trial, 95 participants, very low quality) may favour pain reduction over rotatory or transverse mobilisations at immediate-term follow-up. For chronic CGH with temporomandibular joint (TMJ) dysfunction, multiple sessions of TMJ manual therapy (one trial, 38 participants, very low quality) may be more effective than cervical mobilisation in improving pain/function at immediate- and intermediate-term follow-up. For subacute and chronic neck pain, cervical mobilisation alone (four trials, 165 participants, ranged from low to very low quality) may not be different from ultrasound, TENS, acupuncture and massage in improving pain, function, QoL and participant satisfaction at immediate- and intermediate-term follow-up. Additionally, combining laser with manipulation may be superior to using manipulation or laser alone (one trial, 56 participants, very low quality).

Authors' conclusions: Although support can be found for use of thoracic manipulation versus control for neck pain, function and QoL, results for cervical manipulation and mobilisation versus control are few and diverse. Publication bias cannot be ruled out. Research designed to protect against various biases is needed. Findings suggest that manipulation and mobilisation present similar results for every outcome at immediate/short/intermediate-term follow-up. Multiple cervical manipulation sessions may provide better pain relief and functional improvement than certain medications at immediate/intermediate/ long-term follow-up. Since the risk of rare but serious adverse events for manipulation exists, further high-quality research focusing on mobilisation and comparing mobilisation or manipulation versus other treatment options is needed to guide clinicians in their optimal treatment choices.

RESUMEN DEL TEXTO

*Esta **revisión sistemática** analizó 51 estudios sobre el efecto de la manipulación y movilización vertebral en la intensidad del dolor, funcionalidad, satisfacción y calidad de vida percibidos en adultos con dolor cervical. Los resultados sugieren que la **manipulación dorsal parece ser la intervención más efectiva**, y que la manipulación y movilización cervicales resultan **más efectivas que el tratamiento farmacológico***

*para el dolor cervical agudo y subagudo, manteniendo los efectos a largo plazo. También fueron **más efectivas que masaje o la electroestimulación** mediante TENS reduciendo el dolor a corto plazo en la cefalea cervicogénica.*

Nivel de evidencia: 1A

Grado de recomendación: A

Adding chiropractic manipulative therapy to standard medical care for patients with acute low back pain: results of a pragmatic randomized comparative effectiveness study

Goertz CM, Long CR, Hondras MA, Petri R, Delgado R, Lawrence DJ, Owens EF, Meeker WC.

Spine. 2013 Apr 15;38(8):627-34.

ABSTRACT

Study Design: Randomized controlled trial.

Objective: To assess changes in pain levels and physical functioning in response to standard medical care (SMC) versus SMC plus chiropractic manipulative therapy (CMT) for the treatment of low back pain (LBP) among 18 to 35-year-old active-duty military personnel.

Summary of Background Data: LBP is common, costly, and a significant cause of long-term sick leave and work loss. Many different interventions are available, but there exists no consensus on the best approach. One intervention often used is manipulative therapy. Current evidence from randomized controlled trials demonstrates that manipulative therapy may be as effective as other conservative treatments of LBP, but its appropriate role in the healthcare delivery system has not been established.

Methods: Prospective, 2-arm randomized controlled trial pilot study comparing SMC plus CMT with only SMC. The primary outcome measures were changes in back-related pain on the numerical rating scale and physical functioning at 4 weeks on the Roland-Morris Disability Questionnaire and back pain functional scale (BPFS).

Results: Mean Roland-Morris Disability Questionnaire scores decreased in both groups during the course of the study, but adjusted mean scores were significantly better in the SMC plus CMT group than in the SMC group at both week 2 ($P < 0.001$) and week 4 ($P = 0.004$). Mean numerical rating scale pain scores were also significantly better in the group that received CMT. Adjusted mean back pain functional scale scores were significantly higher (improved) in

the SMC plus CMT group than in the SMC group at both week 2 ($P < 0.001$) and week 4 ($P = 0.004$).

Conclusion: The results of this trial suggest that CMT in conjunction with SMC offers a significant advantage for decreasing pain and improving physical functioning when compared with only standard care, for men and women between 18 and 35 years of age with acute LBP.

Key words: Low back pain, chiropractic manipulation, military medicine, physical functioning.

RESUMEN DEL TEXTO

*La **adición de terapia manipulativa quiropráctica** (manipulación de alta velocidad y baja amplitud) a la atención médica habitual (medicamentos y asesoramiento general de atención domiciliaria) supone un beneficio estadísticamente y clínicamente **significativo** en cuanto a **reducción de dolor y aumento de la funcionalidad física** en pacientes de entre 18 y 35 años de edad con **dolor lumbar agudo** (< 4 semanas) con o sin radiculopatía.*

Nivel de evidencia: 1B

Grado de recomendación: A

Spinal high-velocity low amplitude manipulation in acute nonspecific low back pain: a double-blinded randomized controlled trial in comparison with diclofenac and placebo

von Heymann WJ, Schloemer P, Timm J, Muehlbauer B.

Spine. 2013 Apr 1;38(7):540-8.

ABSTRACT

Study Design: A randomized, double-blinded, placebo-controlled, parallel trial with 3 arms.

Objective: To investigate in acute nonspecific low back pain (LBP) the effectiveness of spinal high-velocity low-amplitude (HVLA) manipulation compared with the nonsteroidal anti-inflammatory drug diclofenac and with placebo.

Summary of Background Data: LBP is an important economical factor in all industrialized countries. Few studies have evaluated the effectiveness of spinal manipulation in comparison to nonsteroidal anti-inflammatory drugs or placebo regarding satisfaction and function of the patient, off-work time, and rescue medication.

Methods: A total of 101 patients with acute LBP (for <48 hr) were recruited from 5 outpatient practices, exclusion criteria were numerous and strict. The subjects were randomized to 3 groups:

(1) spinal manipulation and placebo-diclofenac; (2) sham manipulation and diclofenac; (3) sham manipulation and placebo-diclofenac. Outcomes registered by a second and blinded investigator included self-rated physical disability, function (SF-12), off-work time, and rescue medication between baseline and 12 weeks after randomization.

Results: Thirty-seven subjects received spinal manipulation, 38 diclofenac, and 25 no active treatment. The placebo group with a high number of dropouts for unsustainable pain was closed praecox. Comparing the 2 active arms with the placebo group the intervention groups were significantly superior to the control group. Ninety subjects were analyzed in the collective intention to treat. Comparing the 2 intervention groups, the manipulation group was significantly better than the diclofenac group (Mann-Whitney test: $P = 0.0134$). No adverse effects or harm was registered.

Conclusion: In a subgroup of patients with acute nonspecific LBP, spinal manipulation was significantly better than nonsteroidal anti-inflammatory drug diclofenac and clinically superior to placebo.

Key words: Acute nonspecific low back pain, spinal HVLA manipulation, randomized controlled trial, diclofenac, placebo-controlled.

RESUMEN DEL TEXTO

*En este estudio se investigó la efectividad en el dolor lumbar agudo inespecífico de la **manipulación vertebral de alta velocidad y baja amplitud (HVLA)** en comparación con el medicamento antiinflamatorio no esteroideo diclofenaco y con el placebo. Los resultados obtenidos en el estudio con 101 pacientes de ambos sexos entre 18 y 55 años de edad fueron altamente significativos. Los **sujetos del grupo de HVLA** mostraron una **reducción más rápida y cuantitativamente más clara en cuanto a calidad de vida, discapacidad y dolor** que los de los otros grupos. La evaluación final mostró que la manipulación es **significativamente mejor que los antiinflamatorios no esteroideos y clínicamente superior al placebo**. Se concluye que puede recomendarse para el tratamiento del dolor lumbar agudo inespecífico.*

Nivel de evidencia: 1B

Grado de recomendación: A

Does maintained spinal manipulation therapy for chronic nonspecific low back pain result in better long-term outcome?

Senna MK, Machaly SA.

Spine. 2011 Aug 15;36(18):1427-37.

ABSTRACT

Study Design: A prospective single blinded placebo controlled study was conducted.

Objective: To assess the effectiveness of spinal manipulation therapy (SMT) for the management of chronic nonspecific low back pain (LBP) and to determine the effectiveness of maintenance SMT in long-term reduction of pain and disability levels associated with chronic low back conditions after an initial phase of treatments.

Summary of Background Data: SMT is a common treatment option for LBP. Numerous clinical trials have attempted to evaluate its effectiveness for different subgroups of acute and chronic LBP but the efficacy of maintenance SMT in chronic nonspecific LBP has not been studied.

Methods: Sixty patients, with chronic, nonspecific LBP lasting at least 6 months, were randomized to receive either (1) 12 treatments of sham SMT over a 1-month period, (2) 12 treatments, consisting of SMT over a 1-month period, but no treatments for the subsequent 9 months, or (3) 12 treatments over a 1-month period, along with “maintenance spinal manipulation” every 2 weeks for the following 9 months. To determine any difference among therapies, we measured pain and disability scores, generic health status, and back-specific patient satisfaction at baseline and at 1-, 4-, 7-, and 10-month intervals.

Results: Patients in second and third groups experienced significantly lower pain and disability scores than first group at the end of 1-month period ($P = 0.0027$ and 0.0029 , respectively). However, only the third group that was given spinal manipulations (SM) during the follow-up period showed more improvement in pain and disability scores at the 10-month evaluation. In the nonmaintained SMT group, however, the mean pain and disability scores returned back near to their pretreatment level.

Conclusion: SMT is effective for the treatment of chronic nonspecific LBP. To obtain long-term benefit, this study suggests maintenance SM after the initial intensive manipulative therapy.

Key words: chronic nonspecific low back pain, effectiveness of maintenance of spinal manipulation, long-term benefit of manipulative therapy, maintained spinal Manipulation.

RESUMEN DEL TEXTO

*El estudio confirma los informes previos en cuanto a dolor lumbar crónico inespecífico en pacientes de entre 20 y 60 años de edad. Demuestra que **la terapia de manipulación vertebral es una modalidad efectiva en el dolor lumbar crónico inespecífico**, especialmente a corto plazo. Esta terapia, además presenta una eficacia estadísticamente significativa y clínicamente importante a largo plazo en cuanto a los niveles de discapacidad.*

Nivel de evidencia: 1B

Grado de recomendación: A

Effectiveness of manual therapies: the UK evidence report

Bronfort G, Haas M, Evans R, Leininger B, Triano J.

Chiropractic & osteopathy. 2010 Dec;18(1):3.

ABSTRACT

Background: The purpose of this report is to provide a succinct but comprehensive summary of the scientific evidence regarding the effectiveness of manual treatment for the management of a variety of musculoskeletal and non-musculoskeletal conditions.

Methods: The conclusions are based on the results of systematic reviews of randomized clinical trials (RCTs), widely accepted and primarily UK and United States evidence-based clinical guidelines, plus the results of all RCTs not yet included in the first three categories. The strength/quality of the evidence regarding effectiveness was based on an adapted version of the grading system developed by the US Preventive Services Task Force and a study risk of bias assessment tool for the recent RCTs.

Results: By September 2009, 26 categories of conditions were located containing RCT evidence for the use of manual therapy: 13 musculoskeletal conditions, four types of chronic headache and nine non-musculoskeletal conditions. We identified 49 recent relevant systematic reviews and 16 evidence-based clinical guidelines plus an additional 46 RCTs not yet included in systematic reviews and guidelines. Additionally, brief references are made to other effective non-pharmacological, non-invasive physical treatments.

Conclusions: Spinal manipulation/mobilization is effective in adults for: acute, subacute, and chronic low back pain; migraine and cervicogenic headache; cervicogenic dizziness; manipulation/mobilization is effective for several extremity joint conditions; and thoracic manipulation/mobilization is effective for acute/subacute neck pain. The evidence is inconclusive for cervical manipulation/mobilization alone for neck pain of any duration, and for manipulation/mobilization for mid back pain, sciatica, tension-type headache, coccydynia, temporomandibular joint disorders, fibromyalgia, premenstrual syndrome, and pneumonia in older adults. Spinal manipulation is not effective for asthma and dysmenorrhea when compared to sham manipulation, or for Stage 1 hypertension when added to an antihypertensive diet. In children, the evidence is inconclusive regarding the effectiveness for otitis media and enuresis, and it is not effective for infantile colic and asthma when compared to sham manipulation. Massage is effective in adults for chronic low back pain and chronic neck pain. The evidence is inconclusive for knee osteoarthritis, fibromyalgia, myofascial pain syndrome, migraine headache, and premenstrual syndrome. In children, the evidence is inconclusive for asthma and infantile colic.

Key words: Manual Therapy, Spinal Manipulation, Adhesive Capsulitis, Plantar Fasciitis, Lateral Epicondylitis.

RESUMEN DEL TEXTO

*Esta **revisión sistemática**, aunque enfocada en las “terapias manuales”, fue **llevada a cabo por cuatro investigadores quiroprácticos** con el objetivo de evaluar la eficacia de estas intervenciones, incluyendo la manipulación vertebral, para una gran variedad de trastornos musculoesqueléticos y no-musculoesqueléticos. Se incluyen 49 revisiones sistemáticas, 16 guías clínicas basadas en la evidencia y 46 ensayos clínicos aleatorizados y controlados, clasificados por nivel de evidencia. Se concluyó que la **manipulación vertebral es efectiva en adultos para el tratamiento de dolor lumbar de cualquier duración, migraña, cefalea cervicogénica, mareo cervicogénico, dolor cervical agudo y subagudo, y varios trastornos de las extremidades.***

Nivel de evidencia: 1A

Grado de recomendación: A

The Chiropractic Hospital-based Interventions Research Outcomes (CHIRO) study: a randomized controlled trial on the effectiveness of clinical practice guidelines in the medical and chiropractic management of patients with acute mechanical low back pain

Bishop PB, Quon JA, Fisher CG, Dvorak MF.

The Spine Journal. 2010 Dec 1;10(12):1055-64.

ABSTRACT

Background context: Evidence-based clinical practice guidelines (CPGs) for the management of patients with acute mechanical low back pain (AM-LBP) have been defined on an international scale. Multicenter clinical trials have demonstrated that most AM-LBP patients do not receive CPG-based treatments. To date, the value of implementing full and exclusively CPG-based treatment remains unclear.

Purpose: To determine if full CPGs-based study care (SC) results in greater improvement in functional outcomes than family physician-directed usual care (UC) in the treatment of AM-LBP.

Study design/setting: A two-arm, parallel design, prospective, randomized controlled clinical trial using blinded outcome assessment. Treatment was administered in a hospital-based spine program outpatient clinic.

Patient sample: Inclusion criteria included patients aged 19 to 59 years with Quebec Task Force Categories 1 and 2 AM-LBP of 2 to 4 weeks' duration. Exclusion criteria included "red flag" conditions and comorbidities contraindicating chiropractic spinal manipulative therapy (CSMT).

Outcome measures: Primary outcome: improvement from baseline in Roland-Morris Disability Questionnaire (RDQ) scores at 16 weeks. Secondary outcomes: improvements in RDQ scores at 8 and 24 weeks; and in Short Form-36 (SF-36) bodily pain (BP) and physical functioning (PF) scale scores at 8, 16, and 24 weeks.

Methods: Patients were assessed by a spine physician, then randomized to SC (reassurance and avoidance of passive treatments, acetaminophen, 4 weeks of lumbar CSMT, and return to work within 8 weeks), or family physician-directed UC, the components of which were recorded.

Results: Ninety-two patients were recruited, with 36 SC and 35 UC patients completing all follow-up visits. Baseline prognostic variables were evenly distributed between groups. The primary outcome, the unadjusted mean improvement in RDQ scores, was significantly greater in the SC group than in the UC group ($p = .003$). Regarding unadjusted mean changes in secondary outcomes, improvements in RDQ scores were also greater in the SC group at other time points, particularly at 24 weeks ($p = .004$). Similarly, improvements in SF-36 PF scores favored the SC group at all time points; however, these differences were not statistically significant. Improvements in SF-36 BP scores were similar between groups. In repeated-measures analyses, global adjusted mean improvement was significantly greater in the SC group in terms of RDQ ($p = .0002$), nearly significantly greater in terms of SF-36 PF ($p = .08$), but similar between groups in terms of SF-36 BP ($p = .27$).

Conclusions: This is the first reported randomized controlled trial comparing full CPG-based treatment, including spinal manipulative therapy administered by chiropractors, to family physician-directed UC in the treatment of patients with AM-LBP. Compared to family physician-directed UC, full CPG-based treatment including CSMT is associated with significantly greater improvement in condition-specific functioning.

RESUMEN DEL TEXTO

El tratamiento completo basado en guías de práctica clínica, incluyendo la terapia de manipulación vertebral administrada por quiroprácticos, en comparación con el tratamiento habitual de atención primaria, se asocia a una mejoría significativa en el funcionamiento específico de pacientes que sufren dolor lumbar mecánico agudo. A su vez, dicho tratamiento mostró mayores tasas de recuperación total, dando como resultado una menor necesidad de atención continuada y por tanto generando menores costes.

Nivel de evidencia: 1B

Grado de recomendación: A

Combined chiropractic interventions for low-back pain

Walker BF, French SD, Grant W, Green S.

The Cochrane Library. 2010 Jan 1.

ABSTRACT

Background: Chiropractors commonly use a combination of interventions to treat people with low-back pain (LBP).

Objectives: To determine the effects of combined chiropractic interventions (that is, a combination of therapies, other than spinal manipulation alone) on pain, disability, back-related function, overall improvement, and patient satisfaction in adults with LBP, aged 18 and older.

Search methods: We searched: The Cochrane Back Review Group Trials Register (May 2009), CENTRAL (The Cochrane Library 2009, Issue 2), and MEDLINE (from January 1966), EMBASE (from January 1980), CINAHL (from January 1982), MANTIS (from Inception) and the Index to Chiropractic Literature (from Inception) to May 2009. We also screened references of identified articles and contacted chiropractic researchers.

Selection criteria: All randomised trials comparing the use of combined chiropractic interventions (rather than spinal manipulation alone) with no treatment or other therapies.

Data collection and analysis: At least two review authors selected studies, assessed the risk of bias, and extracted the data using standardised forms. Both descriptive synthesis and meta-analyses were performed.

Main results: We included 12 studies involving 2887 participants with LBP. Three studies had low risk of bias. Included studies evaluated a range of chiropractic procedures in a variety of sub-populations of people with LBP. No trials were located of combined chiropractic interventions compared to no treatment. For acute and subacute LBP, chiropractic interventions improved short- and medium-term pain (SMD -0.25 (95% CI -0.46 to -0.04) and MD -0.89 (95%CI -1.60 to -0.18)) compared to other treatments, but there was no significant difference in long-term pain (MD -0.46 (95% CI -1.18 to 0.26)). Short-term improvement in disability was greater in the chiropractic group compared to other therapies (SMD -0.36 (95% CI -0.70 to -0.02)). However, the effect was small and all studies contributing to these results had high risk of bias. There was no difference in medium- and long-term disability. No difference was demonstrated for combined chiropractic interventions for chronic LBP and for studies that had a mixed population of LBP.

Authors' conclusions: Combined chiropractic interventions slightly improved pain and disability in the short-term and pain in the medium-term for acute and subacute LBP. However, there is currently no evidence that supports or refutes that these interventions provide a clinically meaningful

difference for pain or disability in people with LBP when compared to other interventions. Future research is very likely to change the estimate of effect and our confidence in the results.

RESUMEN DEL TEXTO

*Para esta **revisión** se incluyeron 12 ensayos clínicos aleatorizados, con un total de 2.887 participantes. Estos investigaron varias combinaciones de atención quiropráctica para dolor lumbar (LBP). Los resultados de la revisión indican que la **atención quiropráctica es igual de efectiva que otras intervenciones para el LBP**. Son necesarios más estudios para determinar qué tipo de intervención proporciona una ventaja clínicamente significativa sobre otros tratamientos para el dolor o la discapacidad en personas con LBP.*

Nivel de evidencia: 1A

Grado de recomendación: A

CAPÍTULO 3

COSTE-EFECTIVIDAD DEL TRATAMIENTO QUIROPRÁCTICO

Los trastornos de la columna vertebral representan el mayor problema de salud en la sociedad moderna y en la salud pública⁶, ya que entre un 60-80% de la población sufrirá problemas de espalda en alguna etapa de su vida. Constituye la mayor carga social y económica debido a la elevada cronicidad y discapacidad de larga duración asociada a los altos costes en la sanidad y a la pérdida de productividad.

El presente capítulo tiene como objetivo analizar si el tratamiento quiropráctico a través de ajustes quiroprácticos (SM, Spinal Manipulation) es un tipo de tratamiento adecuado para este tipo de trastornos musculoesqueléticos.

Para ello se ha realizado una selección de artículos centrados en la coste-efectividad del tratamiento quiropráctico en diversos ámbitos como son el dolor lumbar agudo, el dolor cervical y el dolor de cabeza.

Variations in Patterns of Utilization and Charges for the Care of Headache in North Carolina, 2000-2009: A Statewide Claims' Data Analysis

Hurwitz EL, Vassilaki M, Li D, Schneider MJ, Stevans JM, Phillips RB, Phelan SP, Lewis EA, Armstrong RC.

Journal of Manipulative & Physiological Therapeutics. 2016 May 1;39(4):229-39.

ABSTRACT

Objectives: The purpose of the study was to compare patterns of utilization and charges generated by medical doctors (MDs), doctors of chiropractic (DCs), and physical therapists (PTs) for the treatment of headache in North Carolina.

Methods: Retrospective analysis of claims data from the North Carolina State Health Plan for Teachers and State Employees from 2000 to 2009. Data were extracted from Blue Cross Blue Shield of North Carolina for the North Carolina State Health Plan using International Classification of Diseases, Ninth Revision, diagnostic codes for headache. The claims were separated by individual provider type, combination of provider types, and referral patterns.

Results: The majority of patients and claims were in the MD-only or MD plus referral patterns. Chiropractic patterns represented less than 10% of patients. Care patterns with single-provider types and no referrals incurred the least charges on average for headache. When care did not include referral providers or services, MD with DC care was generally less expensive than MD care with PT. However, when combined with referral care, MD care with PT was generally less expensive. Compared with MD-only care, risk-adjusted charges (available 2006-2009) for patients in the middle risk quintile were significantly less for DC-only care.

Conclusions: Utilization and expenditures for headache treatment increased from 2000 to 2009 across all provider groups. MD care represented the majority of total allowed charges in this study. MD care and DC care, alone or in combination, were overall the least expensive patterns of headache care. Risk-adjusted charges were significantly less for DC-only care. (J Manipulative Physiol Ther 2016;39:229-239)

Key Indexing Terms: Headache; Chiropractic; Medical Care; Health Services; Utilization; Healthcare Costs

RESUMEN DEL TEXTO

El dolor de cabeza es el síntoma neurológico más prevalente, el que tiene más incidencia y uno de los que presenta mayor impacto en la salud, suponiendo uno de los principales gastos directos e indirectos de la sociedad. Este estudio se trata de un análisis retrospectivo realizado entre 2000

y 2009 en Carolina del Norte (EEUU) a través del North Carolina State Health Plan (NCSHP) para evaluar la utilización y el coste-efectividad entre los diferentes tipos de tratamiento existentes para pacientes con dolor de cabeza. Se estudian 910,778 casos y se establece que **el uso sólo de tratamiento quiropráctico es el menos costoso** de todos.

Nivel de evidencia: 2B

Grado de recomendación: B

Variations in patterns of utilization and charges for the care of neck pain in North Carolina, 2000 to 2009: a statewide claims' data analysis

Hurwitz EL, Li D, Guillen J, Schneider MJ, Stevans JM, Phillips RB, Phelan SP, Lewis EA, Armstrong RC, Vassilaki M.

Journal of Manipulative & Physiological Therapeutics. 2016 May 1; 39(4):240-51.

ABSTRACT

Objectives: The purpose of the study was to compare utilization and charges generated by medical doctors (MD), doctors of chiropractic (DC) and physical therapists (PT) by provider patterns of care for the treatment of neck pain in North Carolina.

Methods: This was an analysis of neck-pain-related closed claim data from the North Carolina State Health Plan for Teachers and State Employees (NCSHP) from 2000 to 2009. Data were extracted from Blue Cross Blue Shield of North Carolina for the NCSHP using ICD-9 diagnostic codes for uncomplicated neck pain (UNP) and complicated neck pain (CNP).

Results: Care patterns with single-provider types and no referrals incurred the least average charges for both UNP and CNP. When care did not include referral providers or services, for either UNP or CNP, MD care with PT was generally less expensive than MD care with DC care. However, when care involved referral providers or services, MD and PT care was on average more expensive than MD and DC care for either UNP or CNP. Risk-adjusted charges for patients in the middle quintile of risk (available 2006-2009) were lower for chiropractic patients with or without medical care or referral care to other providers.

Conclusions: Chiropractic care alone or DC with MD care incurred appreciably fewer charges for UNP or CNP compared to MD care with or without PT care, when care included referral providers or services. This finding was reversed when care did not include referral providers or services. Risk-adjusted charges for UNP and CNP patients were lower for DC care patterns.

Key Indexing Terms: Neck Pain; Chiropractic; Medical Care; Health Services; Utilization; Healthcare Costs

RESUMEN DEL TEXTO

*El **dolor cervical** es una patología musculoesquelética situada en el cuarto lugar en el ranking de enfermedades que afectan a los años de vida por discapacidad (Years Lived in Disability) según el Global Burden of Disease, siendo un problema mundial de salud pública, y suponiendo un gran impacto en la salud del paciente. Se trata de un estudio de análisis retrospectivo realizado entre 2000 y 2009 en Carolina del Norte (EEUU) a través del North Carolina State Health Plan para evaluar la utilización y coste-efectividad entre los diferentes tipos de tratamiento existentes para pacientes con dolor cervical. Los resultados establecen que en el tratamiento de dolor cervical inespecífico el uso **sólo de tratamiento quiropráctico es entre un 41-80% menos costoso que el uso sólo de tratamiento médico**; mientras que en el tratamiento de dolor cervical específico el **tratamiento quiropráctico supone una disminución del coste total entre un 54-84%**.*

Nivel de evidencia: 2B

Grado de recomendación: B

Effectiveness and Economic Evaluation of Chiropractic Care for the Treatment of Low Back Pain: A Systematic Review of Pragmatic Studies

Blanchette MA, Stochkendahl MJ, Borges Da Silva R, Boruff J, Harrison P, Bussi res A.

PLoS One. 2016 Aug 3; 11(8): e0160037.

ABSTRACT

Background Context: Low back pain (LBP) is one of the leading causes of disability worldwide and among the most common reasons for seeking primary sector care. Chiropractors, physical therapists and general practitioners are among those providers that treat LBP patients, but there is only limited evidence regarding the effectiveness and economic evaluation of care offered by these provider groups.

Purpose: To estimate the clinical effectiveness and to systematically review the literature of full economic evaluation of chiropractic care compared to other commonly used care approaches among adult patients with non-specific LBP.

Study Design: Systematic reviews of interventions and economic evaluations.

Methods: A comprehensive search strategy was conducted to identify 1) pragmatic randomized controlled trials (RCTs) and/or 2) full economic evaluations of chiropractic care for low back pain compared to standard care delivered by other healthcare providers. Studies published between 1990 and 4th June 2015 were considered. Primary outcomes included pain, functional status and global improvement. Study selection, critical quality appraisal and data extraction were conducted by two

independent reviewers. Data from RCTs with low risk of bias were included in a meta-analysis to determine effect estimates. Cost estimates of full economic evaluations were converted to 2015 USD and results summarized using Slavin's qualitative best-evidence synthesis.

Results: Six RCTs and three full economic evaluations were scientifically admissible. Five RCTs with low risk of bias compared chiropractic care to exercise therapy (n = 1), physical therapy (n = 3) and medical care (n = 1). Overall, we found similar effects for chiropractic care and the other types of care and no reports of serious adverse events. Three low to high quality full economic evaluations studies (one cost-effectiveness, one cost-minimization and one cost-benefit) compared chiropractic to medical care. Given the divergent conclusions (favours chiropractic, favours medical care, equivalent options), mixed-evidence was found for economic evaluations of chiropractic care compared to medical care.

Conclusion: Moderate evidence suggests that chiropractic care for LBP appears to be equally effective as physical therapy. Limited evidence suggests the same conclusion when chiropractic care is compared to exercise therapy and medical care although no firm conclusion can be reached at this time. No serious adverse events were reported for any type of care. Our review was also unable to clarify whether chiropractic or medical care is more cost-effective. Given the limited available evidence, the decision to seek or to refer patients for chiropractic care should be based on patient preference and values. Future studies are likely to have an important impact on our estimates as these were based on only a few admissible studies.

RESUMEN DEL TEXTO

*El dolor lumbar es uno de los grandes problemas de salud pública y una de las principales causas de discapacidad global, y por tanto de consultas de atención primaria. Esta **revisión sistemática** evalúa la efectividad y el impacto económico de los servicios profesionales prestados por quiroprácticos, fisioterapeutas y médicos de atención primaria. La conclusión de esta revisión es que existe **evidencia moderada** que sugiere que la **atención quiropráctica para dolor lumbar es igual de efectiva que la fisioterapéutica**. No queda claro si existe diferencia con respecto al tratamiento médico ni con respecto al coste-efectividad. Los autores concluyen que la **decisión final debería basarse en las preferencias y valores del paciente**.*

Nivel de evidencia: 1A

Grado de recomendación: A

Symptomatic Magnetic Resonance Imaging–Confirmed Lumbar Disk Herniation Patients: A Comparative Effectiveness Prospective Observational Study of 2 Age-and Sex-Matched Cohorts Treated With Either High-Velocity, Low-Amplitude Spinal Manipulative Therapy or Imaging-Guided Lumbar Nerve Root Injections

Peterson CK, Leemann S, Lechmann M, Pfirrmann CW, Hodler J, Humphreys BK.

Journal of Manipulative & Physiological Therapeutics. 2013 May 1; 36(4):218-25.

ABSTRACT

Objectives: The purpose of this study was to compare self-reported pain and “improvement” of patients with symptomatic, magnetic resonance imaging–confirmed, lumbar disk herniations treated with either high-velocity, low amplitude spinal manipulative therapy (SMT) or nerve root injections (NRI).

Methods: This prospective cohort comparative effectiveness study included 102 age- and sex-matched patients treated with either NRI or SMT. Numerical rating scale (NRS) pain data were collected before treatment. One month after treatment, current NRS pain levels and overall improvement assessed using the Patient Global Impression of Change scale were recorded. The proportion of patients, “improved” or “worse,” was calculated for each treatment. Comparison of pretreatment and 1-month NRS scores used the paired t test. Numerical rating scale and NRS change scores for the 2 groups were compared using the unpaired t test. The groups were also compared for “improvement” using the χ^2 test. Odds ratios with 95% confidence intervals were calculated. Average direct procedure costs for each treatment were calculated.

Results: No significant differences for self-reported pain or improvement were found between the 2 groups. “Improvement” was reported in 76.5% of SMT patients and in 62.7% of the NRI group. Both groups reported significantly reduced NRS scores at 1 month ($P = .0001$). Average cost for treatment with SMT was Swiss Francs 533.77 (US \$558.75) and Swiss Francs 697 (US \$729.61) for NRI.

Conclusions: Most SMT and NRI patients with radicular low back pain and magnetic resonance imaging–confirmed disk herniation matching symptomatic presentation reported significant and clinically relevant reduction in self-reported pain level and increased global perception of

improvement. There were no significant differences in outcomes between NRI and SMT. When considering direct procedure costs, the average cost of SMT was slightly less expensive. (J Manipulative Physiol Ther 2013; 36:218-225)

Key Indexing Terms: Chiropractic; Spinal Manipulation; Disc Herniation; Epidural Injections; Lumbar Spine

RESUMEN DEL TEXTO

*El dolor lumbar es uno de los grandes problemas de salud público de las sociedades actuales, siendo el dolor lumbar causado por una hernia discal uno de los que presenta mayor prevalencia entre los 30 y 50 años. Este estudio de 102 casos realizado en Suiza para comparar la eficacia y coste de dos de los tratamientos conservadores utilizados en pacientes con **dolor lumbar que sufren de hernias discales lumbares sintomáticas**. Las conclusiones del estudio son que en estos pacientes, el tratamiento conservador a través de terapia de manipulación vertebral (SM) o de infiltración de la raíz nerviosa (NRI) es muy efectivo en el periodo de un mes. En el caso de la SM, el **76.5% de los pacientes tras un mes de tratamiento se sentían “mejor” o “mucho mejor”** mientras que el 62.7% lo hacía tras recibir el tratamiento con NRI, siendo la **SM un 26% más económica**.*

Nivel de evidencia: 2B

Grado de recomendación: B

Cost of care for common back pain conditions initiated with chiropractic doctor vs medical doctor/doctor of osteopathy as first physician: experience of one Tennessee-based general health insurer

Liliedahl RL, Finch MD, Axene DV, Goertz CM.

Journal of Manipulative & Physiological Therapeutics. 2010 Nov 1;33(9):640-3.

ABSTRACT

Objective: The primary aim of this study was to determine if there are differences in the cost of low back pain care when a patient is able to choose a course of treatment with a medical doctor (MD) versus a doctor of chiropractic (DC), given that his/her insurance provides equal access to both provider types.

Methods: A retrospective claims analysis was performed on Blue Cross Blue Shield of Tennessee's intermediate and large group fully insured population between October 1, 2004

and September 30, 2006. The insured study population had open access to MDs and DCs through self-referral without any limit to the number of visits or differences in copays to these 2 provider types. Our analysis was based on episodes of care for low back pain. An episode was defined as all reimbursed care delivered between the first and the last encounter with a health care provider for low back pain. A 60 day window without an encounter was treated as a new episode. We compared paid claims and risk adjusted costs between episodes of care initiated with an MD with those initiated with a DC.

Results: Paid costs for episodes of care initiated with a DC were almost 40% less than episodes initiated with an MD. Even after risk adjusting each patient's costs, we found that episodes of care initiated with a DC were 20% less expensive than episodes initiated with an MD.

Conclusions: Beneficiaries in our sampling frame had lower overall episode costs for treatment of low back pain if they initiated care with a DC, when compared to those who initiated care with an MD. (J Manipulative Physiol Ther 2010;33:640-643)

Key Indexing Terms: Chiropractic; Medicine; Costs and Cost Analysis

RESUMEN DEL TEXTO

*El dolor lumbar supone actualmente un grave problema de salud pública con una alta prevalencia y un alto coste para la sociedad. El objetivo del estudio es determinar las diferencias existentes en cuanto al coste-efectividad del tratamiento médico y quiropráctico en pacientes con dolor lumbar en una población en las que se les permite decidir a qué profesional visitar ya que su seguro le incluye todas las visitas necesarias. El estudio se lleva a cabo en Tennessee (EEUU) con 85,402 casos. Este estudio concluye que el **tratamiento quiropráctica para el dolor lumbar (LBP) supone un ahorro del 19.45% con respecto al tratamiento médico**, traduciéndose en valores numéricos en un **ahorro de 2.3 millones de dólares**.*

Nivel de evidencia: 2B

Grado de recomendación: B

Do Chiropractic Physician Services for Treatment of Low Back and Neck Pain Improve the Value of Health Benefit Plans? An evidence-based assessment of incremental impact on population health and total health care spending

Choudhry N, Milstein A.

Harvard Medical School, Boston. Mercer Health and Benefits, San Francisco; 2009 Oct 12.

ABSTRACT

Low back and neck pain are extremely common conditions that consume large amounts of health care resources. Chiropractic care, including spinal manipulation and mobilization, are used by almost half of US patients with persistent back-pain seeking out this modality of treatment. Does the availability of chiropractic care improve the value of health benefit plans?

The peer-reviewed scientific literature evaluating the effectiveness of US chiropractic treatment for patients with back and neck pain suggests that these treatments are at least as effective as other widely used treatments. However, US cost-effectiveness studies have methodological limitations.

High quality randomized cost-effectiveness studies have to date only been performed in the EU. To model the EU study findings for US populations, we applied US insurer-payable unit price data from a large database of employer-sponsored health plans. Our findings rest on the assumption that the *relative differences* in the cost-effectiveness of low back and neck pain treatment with and without chiropractic services are similar in the US and the EU.

The results of our analysis are as follows:

- Effectiveness: Chiropractic care is *more effective* than other modalities for treating low back and neck pain.
- Total cost of care per year: For low back pain, chiropractic physician care *increases* total annual per patient spending by \$75 compared to medical physician care. For neck pain, chiropractic physician care *reduces* total annual per patient spending by \$302 compared to medical physician care.
- Cost-effectiveness: When considering effectiveness and cost together, chiropractic physician care for low back and neck pain is *highly cost-effective*, represents a good value in comparison to medical physician care and to widely accepted

cost-effectiveness thresholds. Because we were unable to incorporate savings in drug spending commonly associated with US chiropractic care, our estimate of its comparative cost-effectiveness is likely to be understated.

Our findings in combination with existing US studies published in peer-reviewed scientific journals suggest that chiropractic care for the treatment of low back and neck pain is likely to achieve equal or better health outcomes at a cost that compares very favorably to most therapies that are routinely covered in US health benefit plans. As a result, the addition of chiropractic coverage for the treatment of low back and neck pain at prices typically payable in US employer-sponsored health benefit plans will likely increase value-for-dollar by improving clinical outcomes and either reducing total spending (neck pain) or increasing total spending (low back pain) by a smaller percentage than clinical outcomes improve.

RESUMEN DEL TEXTO

Este estudio realizado por investigadores médicos de **Harvard y Marcer Heath** and Benefits analiza el **impacto sanitario y económico del tratamiento quiropráctico** en el sistema sanitario de los EE.UU. Las conclusiones del análisis indican que la **quiropráctica es más efectiva que otras modalidades a la hora de abordar dolor lumbar y cervical**. Posteriormente, se evalúa el gasto medio por paciente basándose en **estudios realizados en Europa**, concluyendo que el gasto anual derivado del tratamiento quiropráctico aumenta en 75 dólares al compararlo con el tratamiento médico para pacientes con dolor lumbar, pero disminuye en 302 dólares en el caso del tratamiento de dolor cervical. Al tener en cuenta conjuntamente el efectividad y coste-eficacia del tratamiento quiropráctico, se observa que es **igual o más efectivo que el tratamiento médico tradicional, a un coste menor** (dolor cervical) **o ligeramente superior** (dolor lumbar). Hay que tener en cuenta que en este estudio no se han valorado el ahorro en gastos por tratamiento farmacológico derivado del uso de servicios quiroprácticos, por lo que se estima que el coste-efectividad real del tratamiento quiropráctico sea aún mayor del que se muestra en este estudio.

Nivel de evidencia: 1A

Grado de recomendación: A

CAPÍTULO 4

SATISFACCIÓN DE LOS USUARIOS DE QUIROPRÁCTICA

Como hemos mencionado en nuestra introducción, uno de los tres pilares de la Medicina Basada en la Evidencia es el de los valores y expectativas de los pacientes. Así, las creencias y preferencias de los pacientes cobran un importante valor en la toma de decisiones en el ámbito de la salud. Esto ocurre no solo en cuanto a la toma de decisiones individuales, sino también en la creación de guías de práctica clínica basadas en la evidencia, incluso a la hora de dictar cambios políticos o legislativos.

A continuación presentamos una serie de estudios que analizan las preferencias de pacientes y el nivel de satisfacción asociado a la atención quiropráctica.

Patients' experiences and expectations of chiropractic care: a national cross-sectional survey

MacPherson H, Newbronner E, Chamberlain R, Hopton A.

Chiropractic & manual therapies. 2015 Dec;23(1):3.

ABSTRACT

Background: Not enough is understood about patients' views of chiropractic care. The aims of this research were to explore patients' experiences and expectations, their perceptions of benefits and risks, and the implications for chiropractors' continuing fitness to practise.

Methods: Survey questions were formulated from existing literature, published guidance on good practice from the General Chiropractic Council, and from 28 telephone interviews and a small focus group with chiropractic patients using a semi-structured topic guide. In its final form, the survey elicited patients' ratings on expectations regarding 33 aspects of care. In a national cross-sectional survey, a number of sampling methods were required as a consequence of the low practitioner response rate.

Results: In total, 544 completed questionnaires were received from chiropractic patients, a lower response rate than expected (8%). The two main benefits that patients reported regarding their chiropractic care were reduced pain (92%) and increased mobility (80%). Of respondents, 20% reported unexpected or unpleasant reactions to their treatment, most commonly tiredness or fatigue (32%), and extra pain (36%). In most cases they expressed low levels of concern about these reactions. Patients' expectations were met for most aspects of care. The four aspects of practice where expectations were least well met comprised: having more information on the cost of the treatment plan at the first consultation (80%); the chiropractor contacting the patient's general practitioner if necessary (62%); having a discussion about a referral to another healthcare practitioner (62%); and providing a method for confidential feedback (66%).

Conclusions: Overall, patients reported a high level of satisfaction with the benefits of their chiropractic care, although there is a likelihood of bias towards patients with a positive experience of chiropractic. There were no serious adverse reactions; however, patients reported concern about pain, tingling and numbness in the limbs after chiropractic. In general, patients' expectations were being well met.

Keywords: Chiropractic, Patients' expectations, Patients' experiences, Risk, Benefit, Fitness to practice

RESUMEN DEL TEXTO

*Este estudio se basa en el análisis de **cuestionarios** realizados a pacientes que recibieron atención por parte de quiroprácticos en el **Reino Unido**. Sobre un total de 544 cuestionarios respondidos por **pacientes de quiropráctica**, el **92% reportaron reducción del dolor**, el **80% mejoría de movilidad**, y por ello un **alto grado de satisfacción** con el tratamiento, y **ningún paciente declaró haber sufrido efectos adversos graves** de ningún tipo.*

Nivel de evidencia: 2B

Grado de recomendación: B

Public perceptions of doctors of chiropractic: results of a national survey and examination of variation according to respondents' likelihood to use chiropractic, experience with chiropractic, and chiropractic supply in local health care markets

Weeks WB, Goertz CM, Meeker WC, Marchiori DM.

Journal of Manipulative & Physiological Therapeutics. 2015 Oct 1;38(8):533-44.

ABSTRACT

Objectives: The purpose of this study was to determine whether general perceptions of doctors of chiropractic (DCs) varied according to likeliness to use chiropractic care, whether particular demographic characteristics were associated with chiropractic care use, and whether perception of DCs varied according to the per-capita supply of DCs in local health care markets. **Methods:** We performed a secondary analysis of results from a 26-item nationally representative survey of 5422 members of The Gallup Panel that was conducted in the spring of 2015 (response rate, 29%) that sought to elicit the perceptions and use of DCs by US adults. We compared survey responses across: (1) respondents who had different likelihoods to use DCs for treatment of neck or back pain and (2) respondents who had different experiences using DCs. We linked respondents' zip codes to hospital referral regions for which we had the per-capita supply of DCs. Using the χ^2 test, we examined relationships between likeliness to use a DC, experience using a DC, respondent demographic variables, perceptions of DCs, and the per-capita supply of DCs in the local health care market.

Results: Most (61.4%) respondents believed that chiropractic care was effective at treating neck and back pain, 52.6% thought DCs were trustworthy, and 24.2% thought chiropractic care was dangerous; however, as respondents' likelihood to use a DC increased, perceptions of effectiveness

and trustworthiness increased, and perceptions of danger decreased. Of all 5422 survey respondents, 744 or 13.7% indicated that they had seen a DC within the last 12 months. As one moved from distant to more recent experience using a DC, respondents were more likely to be female, married, white, and employed; those who had a distant history of using a DC were older and more likely to be retired than the other groups. A higher per-capita supply of DCs was associated with higher utilization rates and showed a more favorable regard for DCs.

Conclusions: US adults often use chiropractic care, generally regard DCs favorably, and largely perceive that chiropractic care is safe. Where there is a higher per-capita supply of DCs in the local health care market, utilization and positive perceptions of chiropractic are higher.

Key Indexing Terms: Chiropractic; Health Services Research

RESUMEN DEL TEXTO

*Este estudio analizó la **percepción del público** general con respecto a la profesión quiropráctica en Estados Unidos. Sobre un total de **5422** cuestionarios respondidos en el ámbito nacional, el **61,4%** consideraron la quiropráctica beneficiosa para el dolor de espalda y cuello, y el **52,6%** la quiropráctica como tratamiento fiable y seguro.*

Nivel de evidencia: 2B

Grado de recomendación: B

First-contact care with a medical vs chiropractic provider after consultation with a Swiss telemedicine provider: comparison of outcomes, patient satisfaction, and health care costs in spinal, hip, and shoulder pain patients

Houweling TA, Braga AV, Hausheer T, Vogelsang M, Peterson C, Humphreys BK.

Journal of Manipulative & Physiological Therapeutics. 2015 Sep 1;38(7):477-83.

ABSTRACT

Objective: The purpose of this study was to identify differences in outcomes, patient satisfaction, and related health care costs in spinal, hip, and shoulder pain patients who initiated care with medical doctors (MDs) vs those who initiated care with doctors of chiropractic (DCs) in Switzerland.

Methods: A retrospective double cohort design was used. A self-administered questionnaire was completed by first- contact care spinal, hip, and shoulder pain patients who, 4 months previously, contacted a Swiss telemedicine provider regarding advice about their complaint. Related health

care costs were determined in a subsample of patients by reviewing the claims database of a Swiss insurance provider.

Results: The study sample included 403 patients who had seen MDs and 316 patients who had seen DCs as initial health care providers for their complaint. Differences in patient sociodemographic characteristics were found in terms of age, pain location, and mode of onset. Patients initially consulting MDs had significantly less reduction in their numerical pain rating score (difference of 0.32) and were significantly less likely to be satisfied with the care received (odds ratio = 1.79) and the outcome of care (odds ratio = 1.52). No significant differences were found for Patient's Global Impression of Change ratings. Mean costs per patient over 4 months were significantly lower in patients initially consulting DCs (difference of CHF 368; US \$368).

Conclusion: Spinal, hip, and shoulder pain patients had clinically similar pain relief, greater satisfaction levels, and lower overall cost if they initiated care with DCs, when compared with those who initiated care with MDs.

Key Indexing Terms: Clinical Audit; Patient Outcome Assessment; Health Care Costs, Treatment Outcome; Physicians; Chiropractic

RESUMEN DEL TEXTO

*En este estudio **comparativo entre tratamiento médico y quiropráctico** para **dolor de cadera y de hombro**, los pacientes atendidos con **tratamiento médico** (n=403) mostraron **menor reducción de dolor** (diferencia de 0,32 en escala de dolor), y estuvieron **menos satisfechos con el tratamiento recibido** y con los resultados obtenidos que aquellos tratados con quiropráctica (n= 316). Así mismo, los pacientes atendidos con **quiropráctica mostraron una reducción en el gasto de tratamiento a los 4 meses** de hasta 368 dólares por persona.*

Nivel de evidencia: 2B

Grado de recomendación: B

Chiropractic use in the Medicare population: prevalence, patterns, and associations with 1-year changes in health and satisfaction with care

Weigel PA, Hockenberry JM, Wolinsky FD.

Journal of Manipulative & Physiological Therapeutics. 2014 Oct 1;37(8):542-51.

ABSTRACT

Objective: The purpose of this study was to examine how chiropractic care compares to medical treatments on 1-year changes in self-reported function, health, and satisfaction with care measures in a representative sample of Medicare beneficiaries. **Methods:** Logistic regression using generalized estimating equations is used to model the effect of chiropractic relative to medical care on decline in 5 functional measures and 2 measures of self-rated health among 12 170 person-year observations. The same method is used to estimate the comparative effect of chiropractic on 6 satisfaction with care measures. Two analytic approaches are used, the first assuming no selection bias and the second using propensity score analyses to adjust for selection effects in the outcome models.

Results: The unadjusted models show that chiropractic is significantly protective against 1-year decline in activities of daily living, lifting, stooping, walking, self-rated health, and worsening health after 1 year. Persons using chiropractic are more satisfied with their follow-up care and with the information provided to them. In addition to the protective effects of chiropractic in the unadjusted model, the propensity score results indicate a significant protective effect of chiropractic against decline in reaching.

Conclusion: This study provides evidence of a protective effect of chiropractic care against 1-year declines in functional and self-rated health among Medicare beneficiaries with spine conditions, and indications that chiropractic users have higher satisfaction with follow-up care and information provided about what is wrong with them.

Key Indexing Terms: Chiropractic; Medicare; Activities of Daily Living; Patient Satisfaction

RESUMEN DEL TEXTO

En este estudio, se analizaron 5 medidas funcionales, 2 medidas de autoevaluación de salud, y 6 medidas de satisfacción del paciente, en 12.170 personas a lo largo del primer año de tratamiento quiropráctico y fueron comparados con tratamiento médico. Los resultados muestran un elevado índice de satisfacción del paciente con el tratamiento quiropráctico, así como una mejoría en los parámetros funcionales y de autoevaluación de salud superior al tratamiento médico.

Nivel de evidencia: 1B

Grado de recomendación: A

Exploring patient satisfaction: a secondary analysis of a randomized clinical trial of spinal manipulation, home exercise, and medication for acute and subacute neck pain

Leininger BD, Evans R, Bronfort G.

Journal of Manipulative & Physiological Therapeutics. 2014 Oct 1;37(8):593-601.

ABSTRACT

Objective: The purpose of this study was to assess satisfaction with specific aspects of care for acute neck pain and explore the relationship between satisfaction with care, neck pain, and global satisfaction. **Methods:** This study was a secondary analysis of patient satisfaction from a randomized trial of spinal manipulation therapy (SMT) delivered by doctors of chiropractic, home exercise and advice (HEA) delivered by exercise therapists, and medication (MED) prescribed by a medical doctors for acute/subacute neck pain. Differences in satisfaction with specific aspects of care were analyzed using a linear mixed model. The relationship between specific aspects of care and (1) change in neck pain (primary outcome of the randomized trial) and (2) global satisfaction were assessed using Pearson's correlation and multiple linear regression.

Results: Individuals receiving SMT or HEA were more satisfied with the information and general care received than MED group participants. Spinal manipulation therapy and HEA groups reported similar satisfaction with information provided during treatment; however, the SMT group was more satisfied with general care. Satisfaction with general care ($r = -0.75$ to -0.77 ; $R^2 = 0.55-0.56$) had a stronger relationship with global satisfaction compared with satisfaction with information provided ($r = -0.65$ to 0.67 ; $R^2 = 0.39-0.46$). The relationship between satisfaction with care and neck pain was weak ($r = 0.17-0.38$; $R^2 = 0.08-0.21$).

Conclusions: Individuals with acute/subacute neck pain were more satisfied with specific aspects of care received during spinal manipulation therapy or home exercise interventions compared to receiving medication. The relationship between neck pain and satisfaction with care was weak.

Key Indexing Terms: Neck Pain; Patient Satisfaction; Musculoskeletal Manipulations; Exercise Therapy; Pharmaceutical Preparations; Clinical Trial; Chiropractic

RESUMEN DEL TEXTO

El estudio, secundario a un ensayo clínico aleatorizado sobre manipulación vertebral quiropráctica (Spinal Manipulation - SM), ejercicios en casa y medicación para dolor cervical agudo y subagudo, muestra un índice de satisfacción similar sobre la información recibida entre los grupos de SM y

*ejercicios en casa, pero un **índice de satisfacción general con el tratamiento más elevado para el grupo de SM** que los grupos de ejercicio en casa o medicación.*

Nivel de evidencia: 1B

Grado de recomendación: A

A survey of parent satisfaction with chiropractic care of the pediatric patient

Navrud IM, Feier CH.

Reason. 2014;221(174):55-9.

ABSTRACT

Introduction: Chiropractic is a common parental choice as a therapeutic intervention for numerous pediatric conditions. No studies investigating parent satisfaction with pediatric chiropractic care have been published to date.

Methods: All infants aged 0-36 weeks and presenting to a chiropractic teaching clinic on the south coast of England between January 2011 and October 2013 were eligible for inclusion. Parents completed questionnaires, which rated their own and their infant's characteristics prior to, and at the end of, a course of chiropractic care. Non-parametric tests were used to analyze before and after care scores.

Results: A total of 395 results were collected in this study. Satisfaction scores of 10/10 ("completely satisfied") were reported by 75.1% (n=295) of the parents. There was a significant improvement in parental distress (Median=5.0 before care, Median=2.0 after care, $Z=-13.7$, $p<.001$, $r=-.49$) and infants' sleep quality (Median=5.0 before care, Median=3.0 after care, $Z=-10.5$, $p<.001$, $r=-.38$). Satisfaction scores were found to have a small correlation with sleep quality ($r_s=-.21$) after care, as well as a moderate correlation with distress ($r_s=-.31$) and improvement scores ($r_s=.42$), $p<.01$.

Conclusion: The parents in this study appear to be satisfied with the care their infant received. However, the satisfaction scores and improvement scores are only moderately correlated, which indicates that there are other factors influencing the level of satisfaction.

Key Indexing Terms: pediatric, satisfaction, parent, chiropractic, complementary alternative medicine.

RESUMEN DEL TEXTO

*El estudio basado en **cuestionarios** realizados a padres y madres de 395 casos de niños entre 0 y 36 meses atendidos a lo largo de más de dos años en el **Reino Unido**, mostró una **alta satisfacción parental tras el tratamiento quiropráctico (75%)** un **significativo descenso de estrés parental**, así*

como una *mejora en la calidad del sueño*.

Nivel de evidencia: 1B

Grado de recomendación: A

CAPÍTULO 5

SEGURIDAD DEL EJERCICIO DE LA QUIROPRÁCTICA

La Organización Mundial de la Salud (OMS) alienta y apoya a los países en todo lo que concierne al uso apropiado de prácticas, productos y medicamentos eficaces e inocuos en sus servicios nacionales de salud. En vista de la situación en la que se encuentran países como España, existen la necesidad de formular directrices sobre la formación y ejercicio inocuos de la quiropráctica, que además incluyan evidencias sobre las contraindicaciones de tal servicio asistencial. Con estos objetivos, la OMS publicó en 2005 sus “Directrices sobre formación básica e inocuidad en Quiropráctica”. Este documento esboza los requisitos formativos mínimos y necesarios para proteger a los pacientes.

Las conclusiones de esta revisión de artículos científicos son muy claras: aunque el ajuste quiropráctico puede tener efectos adversos, igual que ocurre en cualquier actividad humana, estos son en general muy leves y transitorios por lo que se puede concluir que el ejercicio de la quiropráctica es seguro, siempre y cuando se garanticen unos criterios de formación mínimos. A continuación presentamos evidencias de muy alta calidad que apoyan esta noción de que el ejercicio de la profesión es extremadamente seguro, en países en los que la misma está bien establecida. Este tema a menudo se presenta como controvertido solo si se contemplan estudios publicados de baja calidad, alto nivel de sesgo y de naturaleza anecdótica, que en general son utilizados en países en los que la actividad no está debidamente regulada con el intento claro de desprestigiar la profesión.

Effect of cervical manipulation on vertebral artery and cerebral haemodynamics in patients with chronic neck pain: a crossover randomised controlled trial

Moser N, Mior S, Noseworthy M, Côté P, Wells G, Behr M, Triano J.

BMJ open. 2019 May 1;9(5):e025219.

ABSTRACT

Setting: The Imaging Research Centre at St. Joseph's Hospital in Hamilton, Ontario, Canada.

Participants: Twenty patients were included. The mean age was 32 years (SD ± 12.5), mean neck pain duration was 5.3 years (SD ± 5.7) and mean neck disability index score was 13/50 (SD ± 6.4).

Methods: Following baseline measurement of cerebrovascular haemodynamics, we randomised participants to: (1) maximal neck rotation followed by cervical manipulation or (2) cervical manipulation followed by maximal neck rotation. The primary outcome, vertebral arteries and cerebral haemodynamics, was measured after each intervention and was obtained by measuring three-dimensional T1-weighted high-resolution anatomical images, arterial spin labelling and phase-contrast flow encoded MRI. Our secondary outcome was functional connectivity within the default mode network measured with resting state functional MRI.

Results: Compared with neutral neck position, we found a significant change in contralateral blood flow following maximal neck rotation. There was also a significant change in contralateral vertebral artery blood velocity following maximal neck rotation and cervical manipulation. We found no significant changes within the cerebral haemodynamics following cervical manipulation or maximal neck rotation. However, we observed significant increases in functional connectivity in the posterior cerebrum and cerebellum (resting state MRI) after manipulation and maximum rotation.

Conclusions: Our results are in accordance with previous work, which has shown a decrease in blood flow and velocity in the contralateral vertebral artery with head rotation. This may explain why we also observed a decrease in blood velocity with manipulation because it involves neck rotation. Our work is the first to show that cervical manipulation does not result in brain perfusion changes compared with a neutral neck position or maximal neck rotation. The changes observed were found to not be clinically meaningful and suggests that cervical manipulation may not increase the risk of cerebrovascular events through a haemodynamic mechanism.

RESUMEN DEL TEXTO

El objetivo de este estudio es determinar si la manipulación espinal se asocia a cambios en las arterias vertebrales y en la hemodinámica cerebral. Para ello, tras medir los valores basales de la hemodinámica con RMN, se estudiaron 20 pacientes con dolor cervical de larga evolución y con índices de discapacidad cervical. Se realizaron mediciones de las arterias vertebrales y de la hemodinámica cerebral en un grupo de pacientes en los que se realizaba manipulación cervical tras rotación cervical máxima y en otro grupo en los que tras la rotación máxima se realizaba la

manipulación cervical. En los resultados *se encontró un cambio significativo del flujo y la velocidad de la sangre en la arteria contralateral a la rotación máxima y en la manipulación cervical*. Sin embargo estos cambios *no se correlacionaban con cambios en la hemodinámica cerebral*. Estos hallazgos, que ya eran conocidos, explican la ya observada disminución del flujo sanguíneo en la manipulación cervical. Sin embargo esta disminución del flujo no se asocian a cambios en la perfusión del cerebro en comparación con la posición neutra del cuello. Los autores concluyen que *este estudio sugiere que la manipulación cervical no tiene porqué incrementar el riesgo de eventos cardiovasculares a través de mecanismos hemodinámicos*.

Nivel de evidencia: 1A

Grado de recomendación: B

Systematic Review and Meta-analysis of Chiropractic Care and Cervical Artery Dissection: No Evidence for Causation

Church EW, Sieg EP, Zalatimo O, Hussain NS, Glantz M, Harbaugh RE

Cureus. 2016 Feb;8(2).

ABSTRACT

Background: Case reports and case control studies have suggested an association between chiropractic neck manipulation and cervical artery dissection (CAD), but a causal relationship has not been established. We evaluated the evidence related to this topic by performing a systematic review and meta-analysis of published data on chiropractic manipulation and CAD.

Methods: Search terms were entered into standard search engines in a systematic fashion. The articles were reviewed by study authors, graded independently for class of evidence, and combined in a meta-analysis. The total body of evidence was evaluated according to GRADE criteria.

Results: Our search yielded 253 articles. We identified two class II and four class III studies. There were no discrepancies among article ratings (i.e., kappa=1). The meta-analysis revealed a small association between chiropractic care and dissection (OR 1.74, 95% CI 1.26-2.41). The quality of the body of evidence according to GRADE criteria was “very low.”

Conclusions: The quality of the published literature on the relationship between chiropractic manipulation and CAD is very low. Our analysis shows a small association between chiropractic neck manipulation and cervical artery dissection. This relationship may be explained by the high risk of bias and confounding in the available studies, and in particular by the known association of neck pain with CAD and with chiropractic manipulation. There is no convincing evidence to support a causal link between chiropractic manipulation and CAD. Belief in a causal link may have significant negative consequences such as numerous episodes of litigation.

RESUMEN DEL TEXTO

*Se realiza una **revisión sistemática de la literatura y metaanálisis de datos** de 253 artículos, para evaluar la asociación causal entre la manipulación quiropráctica cervical y la disección de la arteria cervical. El metaanálisis reveló una asociación pequeña entre ambas, aunque la calidad de los estudios publicados es muy baja. Los autores concluyen que esta asociación puede explicarse por **sesgos y confusión en los estudios disponibles**, y que **no existen por tanto evidencias que apoyen la relación causal entre la manipulación quiropráctica y la disección de la arteria cervical.***

Nivel de evidencia: 3A

Grado de recomendación: B

Chiropractic care and the risk of vertebrobasilar stroke: results of a case– control study in U.S. commercial and Medicare Advantage populations

Kosloff TM, Elton D, Tao J, Bannister WM.

Chiropractic & manual therapies. 2015 Dec;23(1):19.

ABSTRACT

Background: There is controversy surrounding the risk of manipulation, which is often used by chiropractors, with respect to its association with vertebrobasilar artery system (VBA) stroke. The objective of this study was to compare the associations between chiropractic care and VBA stroke with recent primary care physician (PCP) care and VBA stroke.

Methods: The study design was a case–control study of commercially insured and Medicare Advantage (MA) health plan members in the U.S. population between January 1, 2011 and December 31, 2013. Administrative data were used to identify exposures to chiropractic and PCP care. Separate analyses using conditional logistic regression were conducted for the commercially insured and the MA populations. The analysis of the commercial population was further stratified by age (<45 years; ≥45 years). Odds ratios were calculated to measure associations for different hazard periods. A secondary descriptive analysis was conducted to determine the relevance of using chiropractic visits as a proxy for exposure to manipulative treatment.

Results: There were a total of 1,829 VBA stroke cases (1,159 – commercial; 670 – MA). The findings showed no significant association between chiropractic visits and VBA stroke for either population or for samples stratified by age. In both commercial and MA populations, there was a significant association between PCP visits and VBA stroke incidence regardless of length of hazard period. The results were similar for age-stratified samples. The findings of the secondary analysis showed that chiropractic visits did not report the inclusion of manipulation in almost one third of stroke cases in the commercial population and in only 1 of 2 cases of the MA cohort.

Conclusions: We found no significant association between exposure to chiropractic care and the risk of VBA stroke. We conclude that manipulation is an unlikely cause of VBA stroke. The positive association between PCP visits and VBA stroke is most likely due to patient decisions to seek care for the symptoms (headache and neck pain) of arterial dissection. We further conclude that using chiropractic visits as a measure of exposure to manipulation may result in unreliable estimates of the strength of association with the occurrence of VBA stroke.

Keywords: Chiropractic, Primary care, Cervical manipulation, Vertebrobasilar stroke, Adverse events

RESUMEN DEL TEXTO

*El objetivo de este estudio fue comparar la asociación entre el tratamiento quiropráctico y médico de atención primaria (MAP), y la ocurrencia de infartos del territorio de la arteria vertebral (AVB). Para ello se realizó un estudio de casos y controles entre miembros del plan de salud Medicare Advantage en población de EEUU entre enero de 2011 y diciembre de 2013. Se identificaron un total de 1829 infartos de AVB y los hallazgos **no mostraron asociación significativa entre visitas al quiropráctico e infarto de la AVB** para ninguna de las poblaciones o por muestras estratificadas por edad. En todas las poblaciones de pacientes, **sí hubo una asociación significativa entre las visitas al MAP e infarto de AVB**. Los autores concluyen que es **improbable que la manipulación cervical sea causa de infarto de AVB**. La asociación positiva entre las visitas al médico de atención primaria y el infarto AVB puede ser debida a la decisión de los pacientes de buscar atención para los síntomas (cefalea y dolor de cuello) de la disección arterial.*

Nivel de evidencia: 3B

Grado de recomendación: B

Serious adverse events and spinal manipulative therapy of the low back region: a systematic review of cases

Hebert JJ, Stomski NJ, French SD, Rubinstein SM.

Journal of Manipulative & Physiological Therapeutics. 2015 Nov 1;38(9):677-91.

ABSTRACT

Objective: The purpose of this study was to systematically search the literature for studies reporting serious adverse events following lumbopelvic spinal manipulative therapy (SMT) and to describe the case details.

Methods: A systematic search was conducted in PubMed including MEDLINE, EMBASE, CINAHL and The Cochrane Library up to January 12, 2012, by an experienced reference librarian. Study

selection was performed by 2 independent reviewers using predefined criteria. We included cases involving individuals 18 years or older who experienced a serious adverse event following SMT applied to the lumbar spine or pelvis by any type of provider (eg, chiropractic, medical, physical therapy, osteopathic, layperson). A serious adverse event was defined as an untoward occurrence that results in death or is life threatening, requires hospital admission, or results in significant or permanent disability. We included studies published in English, German, Dutch, and Swedish.

Results: A total of 2046 studies were screened, and 41 studies reporting on 77 cases were included. Important case details were frequently unreported, such as descriptions of SMT technique, the pre-SMT presentation of the patient, the specific details of the adverse event, time from SMT to the adverse event, factors contributing to the adverse event, and clinical outcome. Adverse events consisted of cauda equina syndrome (29 cases, 38% of total); lumbar disk herniation (23 cases, 30%); fracture (7 cases, 9%); hematoma or hemorrhagic cyst (6 cases, 8%); or other serious adverse events (12 cases, 16%) such as neurologic or vascular compromise, soft tissue trauma, muscle abscess formation, disrupted fracture healing, and esophageal rupture.

Conclusions: This systematic review describes case details from published articles that describe serious adverse events that have been reported to occur following SMT of the lumbopelvic region. The anecdotal nature of these cases does not allow for causal inferences between SMT and the events identified in this review. Recommendations regarding future case reporting and research aimed at furthering the understanding of the safety profile of SMT are discussed.

Key Indexing Terms: Risk; Manipulation, Spinal; Lumbosacral Region; Intervertebral Disc Displacement; Cauda Equina Syndrome; Injury

RESUMEN DEL TEXTO

*Este estudio es una **revisión sistemática** de la literatura de estudios que informen de eventos adversos serios después de terapia de manipulación vertebral (SM) y describen los casos en detalle. La búsqueda sistemática incluyó **publicaciones en las grandes bases de datos hasta enero del 2012**. Se incluyeron casos que afectaban a individuos de 18 años o mayores que hubieran experimentado un evento adverso serio después de la terapia de manipulación vertebral de la columna lumbar o pelvis, realizada por cualquier tipo de practicante (quiropático, médico, fisioterapeuta, osteópata o persona sin formación). Se revisaron un total de 2046 estudios y 41 estudios de 77 casos se incluyeron también. Entre los efectos adversos se incluyeron: síndrome de la cola de caballo, hernia de disco lumbar, fracturas, hematomas o quistes hemorrágicos (6 casos, 8%) u otros eventos adversos serios. La conclusión del estudio es que la **naturaleza anecdótica de estos casos no permite inferencias causales** entre manipulación vertebral y los eventos identificados en esta revisión.*

Nivel de evidencia: 3A

Grado de recomendación: B

Risk of Traumatic Injury Associated with Chiropractic Spinal Manipulation in Medicare Part B Beneficiaries Aged 66–99

Whedon JM, Mackenzie TA, Phillips RB, Lurie JD.

Spine. 2015 Feb 15;40(4):264.

ABSTRACT

Study Design: Retrospective cohort study.

Objective: In older adults with a neuromusculoskeletal complaint, to evaluate risk of injury to the head, neck or trunk following an office visit for chiropractic spinal manipulation, as compared to office visit for evaluation by primary care physician.

Summary of Background Data: The risk of physical injury due to spinal manipulation has not been rigorously evaluated for older adults, a population particularly vulnerable to traumatic injury in general.

Methods: We analyzed Medicare administrative data on Medicare B beneficiaries aged 66–99 with an office visit in 2007 for a neuromusculoskeletal complaint. Using a Cox proportional hazards model, we evaluated for adjusted risk of injury within 7 days, comparing two cohorts: those treated by chiropractic spinal manipulation vs. those evaluated by a primary care physician. We used direct adjusted survival curves to estimate the cumulative probability of injury. In the chiropractic cohort only, we used logistic regression to evaluate the effect of specific chronic conditions on likelihood of injury.

Results: The adjusted risk of injury in the chiropractic cohort was lower as compared to the primary care cohort (hazard ratio 0.24; 95% CI 0.23–0.25). The cumulative probability of injury in the chiropractic cohort was 40 injury incidents per 100,000 subjects, as compared to 153 incidents per 100,000 subjects in the primary care cohort. Among subjects who saw a chiropractic physician, the likelihood of injury was increased in those with a chronic coagulation defect, inflammatory spondylopathy, osteoporosis, aortic aneurysm and dissection, or long-term use of anticoagulant therapy.

Conclusions: Among Medicare beneficiaries aged 66–99 with an office visit risk for a neuromusculoskeletal problem, risk of injury to the head, neck or trunk within 7 days was 76% lower among subjects with a chiropractic office visit as compared to those who saw a primary care physician.

RESUMEN DEL TEXTO

*En este estudio retrospectivo de cohortes diseñado para evaluar el riesgo general de daño físico asociado a la manipulación vertebral quiropráctica en pacientes mayores con problemas musculoesqueléticos, se analiza datos administrativos de usuarios de Medicare con edades comprendidas entre 66 y 99 años recogidos en el año 2007. Se compararon dos cohortes: los tratados por quiroprácticos y los por médicos de atención primaria. En los resultados se vio que el **riesgo ajustado de** daño en el cohorte de usuarios de **quiropráctica fue más bajo en comparación con el cohorte de atención primaria**. La probabilidad acumulativa de daño en la cohorte quiropráctica fue de 40 incidentes por 100.000 sujetos, mientras que en los sujetos atendidos por el médico de atención primaria fue de 153 por 100.000 pacientes.*

Nivel de evidencia: 2B

Grado de recomendación: B

Risk of vertebrobasilar stroke and chiropractic care: results of a population- based case-control and case-crossover study

Cassidy JD, Boyle E, Côté P, He Y, Hogg-Johnson S, Silver FL, Bondy SJ.

Journal of Manipulative & Physiological Therapeutics. 2009 Feb 1;32(2):S201-8

ABSTRACT

Study Design: Population-based, case-control and case-crossover study.

Objective: To investigate associations between chiropractic visits and vertebrobasilar artery (VBA) stroke and to contrast this with primary care physician (PCP) visits and VBA stroke.

Summary of Background Data: Chiropractic care is popular for neck pain and headache, but may increase the risk for VBA dissection and stroke. Neck pain and headache are common symptoms of VBA dissection, which commonly precedes VBA stroke.

Methods: Cases included eligible incident VBA strokes admitted to Ontario hospitals from April 1, 1993 to March 31, 2002. Four controls were age and gender matched to each case. Case and control exposures to chiropractors and PCPs were determined from health billing records in the year before the stroke date. In the case-crossover analysis, cases acted as their own controls.

Results: There were 818 VBA strokes hospitalized in a population of more than 100 million person-years. In those aged 45 years, cases were about three times more likely to see a chiropractor or a PCP before their stroke than controls. Results were similar in the case control and case crossover analyses. There was no increased association between chiropractic visits and VBA stroke in those

older than 45 years. Positive associations were found between PCP visits and VBA stroke in all age groups. Practitioner visits billed for headache and neck complaints were highly associated with subsequent VBA stroke.

Conclusion: VBA stroke is a very rare event in the population. The increased risks of VBA stroke associated with chiropractic and PCP visits is likely due to patients with headache and neck pain from VBA dissection seeking care before their stroke. We found no evidence of excess risk of VBA stroke associated chiropractic care compared to primary care.

RESUMEN DEL TEXTO

*Para investigar la posible asociación entre visitas al quiropráctico y infarto en el territorio de la arteria vertebrobasilar (AVB), y contrastarlo con la asociación entre visitas al médico de atención primaria (MAP) y el infarto de la AVB se realizó un estudio de casos y control, y estudio cruzado poblacional. En el estudio se incluyeron casos de infartos del territorio de la AVB ingresados en los hospitales de Ontario en un periodo de 9 años. Se identificaron 818 casos de este tipo de infarto hospitalizados en una población de más de **100 millones de personas/año**. Entre los pacientes con menos de 45 años, había 3 veces más probabilidades de haber visitado tanto a un quiropráctico como a un MAP antes del infarto que los controles. Los resultados fueron similares en los casos-control que en el estudio cruzado poblacional. No se encontró asociación aumentada entre visitas al quiropráctico y infarto de la AVB en los mayores de 45 años, pero sí una asociación positiva entre las visitas al MAP y el infarto de la AVB en todos los grupos de edad. La conclusión del estudio es que el infarto de la AVB es un evento muy raro en la población, y que el aumento de riesgo de infarto de la AVB asociado a visitas quiroprácticos y MAP es debido probablemente a que los pacientes con dolor de cabeza y de cuello, síntomas de la disección de la AVB, buscan ayuda por estos problemas antes del infarto. **No se encuentran evidencia de mayor riesgo de infarto de la AVB asociado a cuidado quiropráctico comparado con los pacientes que visitaron a médicos de atención primaria.***

Nivel de evidencia: 3B

Grado de recomendación: B

Safety of chiropractic manipulation of the cervical spine: a prospective national survey

Thiel HW, Bolton JE, Docherty S, Portlock JC.

Spine. 2007 Oct 1;32(21):2375-8.

ABSTRACT

Study Design: Prospective national survey.

Objective: To estimate the risk of serious and relatively minor adverse events following chiropractic manipulation of the cervical spine by a sample of U.K. chiropractors.

Summary of Background Data: The risk of a serious adverse event following chiropractic manipulation of the cervical spine is largely unknown. Estimates range from 1 in 200,000 to 1 in several million cervical spine manipulations.

Methods: We studied treatment outcomes obtained from 19,722 patients. Manipulation was defined as the application of a high-velocity/low-amplitude or mechanically assisted thrust to the cervical spine. Serious adverse events, defined as "referred to hospital A&E and/or severe onset/worsening of symptoms immediately after treatment and/or resulted in persistent or significant disability/incapacity," and minor adverse events reported by patients as a worsening of presenting symptoms or onset of new symptoms, were recorded immediately, and up to 7 days, after treatment.

Results: Data were obtained from 28,807 treatment consultations and 50,276 cervical spine manipulations. There were no reports of serious adverse events. This translates to an estimated risk of a serious adverse event of, at worst 1 per 10,000 treatment consultations immediately after cervical spine manipulation, 2 per 10,000 treatment consultations up to 7 days after treatment and 6 per 100,000 cervical spine manipulations. Minor side effects with a possible neurologic involvement were more common. The highest risk immediately after treatment was fainting/dizziness/light-headedness in, at worst 16 per 1000 treatment consultations. Up to 7 days after treatment, these risks were headache in, at worst 4 per 100, numbness/tingling in upper limbs in, at worst 15 per 1000 and fainting/dizziness/light-headedness in, at worst 13 per 1000 treatment consultations.

RESUMEN DEL TEXTO

Este estudio es una encuesta nacional prospectiva realizada para estimar los riesgos de eventos adversos tras manipulación quiropráctica de la columna cervical. Se estudian los resultados del tratamiento de 19.722 pacientes. Se reunieron datos de 28.807 consultas y de 50.276 manipulaciones cervicales. No hubo ningún informe de eventos adversos graves. La conclusión del estudio es

que, aunque los efectos adversos leves fueron relativamente frecuentes tras la manipulación cervical, el riesgo de un evento adverso serio inmediatamente o hasta 7 días después del tratamiento fue bajo o muy bajo.

Nivel de evidencia: 2B

Grado de recomendación: B

The benefits outweigh the risks for patients undergoing chiropractic care for neck pain: a prospective, multicenter, cohort study

Rubinstein SM, Leboeuf-Yde C, Knol DL, de Koekkoek TE, Pfeifle CE, van Tulder MW.

Journal of Manipulative & Physiological Therapeutics. 2007 Jul 1;30(6):408-18.

ABSTRACT

Objective: This study describes both positive clinical outcomes and adverse events in patients treated for neck pain by a chiropractor. **Methods:** This study was a prospective, multicenter, observational cohort study. Patients with neck pain of any duration who fulfilled the inclusion criteria were recruited in a practice-based study. Data were collected on the patients and from the chiropractors at baseline, the first 3 visits, and at 3 and 12 months. Clinical outcome measures included (1) neck pain in the 24 hours preceding the visit, (2) neck disability, (3) treatment satisfaction, (4) global assessment, and (5) adverse events. Recovery was defined as bcompletely improvedQ or bmuch betterQ using the global assessment scale. An adverse event was defined as either a new related complaint or a worsening of the presenting or existing complaint by N30% based upon an 11-point numerical rating scale.

Results: In all, 79 chiropractors participated, recruiting 529 subjects, representing 4891 treatment consultations. Follow-up was possible for 90% and 92%, respectively, at 3 and 12 months. Most patients had chronic, recurrent complaints; mild to moderate disability of the neck; and a mild amount of pain at baseline; and two thirds had sought previous care for the presenting complaint in the preceding 6 months. Adverse events following any of the first 3 treatments were reported by 56%, and 13% of the study population reported these events to be severe in intensity. The most common adverse events affected the musculoskeletal system or were pain related, whereas symptoms such as tiredness, dizziness, nausea, or ringing in the ears were uncommon (b8%). Only 5 subjects (1%) reported to be much worse at 12 months. No serious adverse events were recorded during the study period. Of the patients who returned for a fourth visit, approximately half reported to be recovered, whereas approximately two thirds of the cohort were recovered at 3 and 12 months.

Conclusion: Adverse events may be common, but are rarely severe in intensity. Most of the patients report recovery, particularly in the long term. Therefore, the benefits of chiropractic care for neck pain seem to outweigh the potential risks. (J Manipulative Physiol Ther 2007;30:408Q418)

Key Indexing Terms: Neck pain; Chiropractic; Manipulation, Spinal; Adverse effects; Cervical vertebrae

RESUMEN DEL TEXTO

*Este es un estudio de cohortes, observacional prospectivo y multicéntrico, en el que se describen tanto los resultados clínicos positivos y los eventos adversos en pacientes tratados por un quiropráctico por dolor de cuello. En total participaron 79 quiroprácticos y se reclutaron 529 pacientes que representaron 4891 tratamientos. Sólo cinco sujetos (1%) declararon estar mucho peor a los 12 meses y **no se registró ningún evento adverso grave** durante el periodo del estudio. El estudio concluye que aunque los eventos adversos pueden ser frecuentes inicialmente, son raramente graves en intensidad. Además, la mayoría de los pacientes declararon estar recuperados, en particular, a largo plazo. Por tanto, **los beneficios del cuidado quiropráctico para el dolor de cuello superan los riesgos potenciales.***

Nivel de evidencia: 2B

Grado de recomendación: B

Safety of spinal manipulation in the treatment of lumbar disk herniations: a systematic review and risk assessment

Oliphant D.

Journal of Manipulative & Physiological Therapeutics. 2004 Mar 1;27(3):197-210.

ABSTRACT

Objective: To provide a qualitative systematic review of the risk of spinal manipulation in the treatment of lumbar disk herniations (LDH) and to estimate the risk of spinal manipulation causing a severe adverse reaction in a patient presenting with LDH.

Data Sources: Relevant case reports, review articles, surveys, and investigations regarding treatment of lumbar disk herniations with spinal manipulation and adverse effects and associated risks were found with a search of the literature.

Data Synthesis: Prospective/retrospective studies and review papers were graded according to quality, and results and conclusions were tabulated. From the data published, an estimate of the risk of spinal manipulation causing a clinically worsened disk herniation or cauda equina syndrome

(CES) in patients presenting with LDH was calculated. This was compared with estimates of the safety of nonsteroidal anti-inflammatory drugs (NSAIDs) and surgery in the treatment of LDH.

Results: An estimate of the risk of spinal manipulation causing a clinically worsened disk herniation or CES in a patient presenting with LDH is calculated from published data to be less than 1 in 3.7 million. Conclusion: The apparent safety of spinal manipulation, especially when compared with other accepted treatments for LDH, should stimulate its increased use in the conservative treatment plan of LDH.

RESUMEN DEL TEXTO

*Este estudio es una **revisión sistemática cualitativa** de la literatura sobre el riesgo de reacciones adversas tras manipulación vertebral en el tratamiento de las hernias de disco lumbares. La estimación del **riesgo de que la manipulación vertebral cause un empeoramiento clínico** de una hernia de disco lumbar calculada con los datos publicados es de menos de **1 en 3,7 millones**. En conclusión la **manipulación vertebral es segura, especialmente cuando se compara con otros tratamientos aceptados para la hernia de disco lumbar**, lo cual debería estimular su uso en el plan de tratamiento conservador de la hernia de disco lumbar.*

Nivel de evidencia: 1A

Grado de recomendación: A

CONCLUSIONES

Esta recopilación de estudios científicos nos proporciona amplia evidencia de suficiente calidad para poder extraer las siguientes conclusiones:

1. Los mecanismos de acción de la manipulación vertebral de alta velocidad y baja amplitud empleada por quiroprácticos han sido claramente identificados.
2. Este tipo de manipulación modifica las aferencias propioceptivas, desencadena reflejos somatosomáticos y somatoviscerales, y modula la respuesta de dolor, inhibiéndola, tanto a nivel periférico como central.
3. La manipulación vertebral tiene la capacidad de alterar positivamente marcadores bioquímicos relacionados con la inflamación, aumentar la densidad mineral ósea y activar el cerebelo.
4. Según revisiones de Cochrane y la revista de la Asociación Médica Americana, la Quiropráctica es una opción por lo menos igual de efectiva que las habituales para el manejo de dolor lumbar agudo y crónico, mejorando la funcionalidad y calidad de vida de los pacientes.
5. Según las revisiones de Cochrane, la Quiropráctica es más efectiva que otras opciones habituales para el dolor cervical agudo y subagudo.
6. Según la revisión sistemática de Bronfort, la Quiropráctica es efectiva para el tratamiento de dolor lumbar de cualquier duración, migraña, cefalea cervicogénica, mareo cervicogénico, dolor cervical agudo y subagudo, y varios trastornos de las extremidades.
7. El abordaje quiropráctico es una de las opciones más económicas y coste-efectivas para el manejo de hernias de disco lumbares, dolor lumbar, cervical y de cabeza.
8. Los pacientes de Quiropráctica, incluyendo pediátricos, muestran un alto grado de satisfacción con la atención recibida, informan de mejoría importante en parámetros funcionales y consideran la Quiropráctica segura.
9. Los servicios quiroprácticos están asociados únicamente a efectos adversos de carácter leve y siempre transitorios, pudiéndose considerar como una opción muy segura.
10. Las revisiones sistemáticas, metanálisis y estudios epidemiológicos a gran escala concluyen todos que no existen evidencias que apoyen la relación causal entre la manipulación quiropráctica y lesiones de la arteria vertebral.
11. La manipulación quiropráctica de la columna lumbar es segura en pacientes con hernia de disco, especialmente cuando se compara con otros tratamientos.

GLOSARIO DE ABREVIATURAS

AVB: Arteria Vertebrobasilar.

HVLA: Alta Velocidad y Baja Amplitud / High Velocity and Low Amplitude.

LBP: Dolor Lumbar / Low Back Pain.

MAP: Médico de Atención Primaria.

NRI: Infiltración de la Raíz Nerviosa / Nerve Root Injections.

SM: Manipulación Vertebral / Spinal Manipulation.

BIBLIOGRAFÍA COMPLEMENTARIA

USO Y REGULACIÓN DE LA PROFESIÓN QUIROPRÁCTICA

- Beliveau PJ, Wong JJ, Sutton DA, Simon NB, Bussi res AE, Mior SA, French SD. The chiropractic profession: a scoping review of utilization rates, reasons for seeking care, patient profiles, and care provided. *Chiropractic & manual therapies*. 2017 Dec;25(1):35.
- Brown RA. Spinal Health: The Backbone of Chiropractic's Identity. *Journal of chiropractic humanities*. 2016 Dec 1;23(1):22-8.
- Hawk C, Schneider MJ, Vallone S, Hewitt EG. Best practices for chiropractic care of children: a consensus update. *Journal of manipulative and physiological therapeutics*. 2016 Mar 1;39(3):158-68.
- Murphy DR, Hurwitz EL. Application of a diagnosis-based clinical decision guide in patients with neck pain. *Chiropractic & manual therapies*. 2011 Dec;19(1):19.
- Murphy DR, Justice BD, Paskowski IC, Perle SM, Schneider MJ. The establishment of a primary spine care practitioner and its benefits to health care reform in the United States. *Chiropractic & manual therapies*. 2011 Dec;19(1):17.
- Nelson CF, Lawrence DJ, Triano JJ, Bronfort G, Perle SM, Metz RD, Hegetschweiler K, LaBrot T. Chiropractic as spine care: a model for the profession. *Chiropractic & osteopathy*. 2005 Dec;13(1):9.
- World Health Organization. WHO guidelines on basic training and safety in chiropractic.

GU AS DE PR CTICA CL NICA BASADA EN LA EVIDENCIA

- Almeida M, Saragiotto B, Richards B, Maher CG. Primary care management of non-specific low back pain: key messages from recent clinical guidelines. *Medical Journal of Australia*. 2018 Apr;208(6):272-5.
- Foster NE, Anema JR, Cherkin D, Chou R, Cohen SP, Gross DP, Ferreira PH, Fritz JM, Koes BW, Peul W, Turner JA. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *The Lancet*. 2018 Mar 21.
- Stochkendahl MJ, Kjaer P, Hartvigsen J, Kongsted A, Aaboe J, Andersen M, Andersen M , Fournier G, H jgaard B, Jensen MB, Jensen LD. National Clinical Guidelines for non-surgical treatment of patients with recent onset low back pain or lumbar radiculopathy. *European Spine Journal*. 2018 Jan 1:1-6.
- Van Wambeke P, Desomer A, Aillet L, Berquin A, Dumoulin C, Depreitere B, Dewachter J, Dolphens M, Forget P, Frassel V, Hans G. Low back pain and radicular pain: assessment and management. *KCE Report*. 2017;287.

MECANISMOS DE ACCIÓN Y EFECTOS BIOLÓGICOS SUBYACENTES A LAS TÉCNICAS DE MANIPULACIÓN QUIROPRÁCTICAS

- Zheng W, Li X, Liu D, Li J, Yang S, Gao Z, Wang Z, Yokota H, Zhang P. Mechanical loading mitigates osteoarthritis symptoms by regulating endoplasmic reticulum stress and autophagy. *The FASEB Journal*. 2018 Nov 28:fj-201801851R.
- Bialosky JE, Beneciuk JM, Bishop MD, Coronado RA, Penza CW, Simon CB, George SZ. Unraveling the mechanisms of manual therapy: modeling an approach. *Journal of orthopaedic & sports physical therapy*. 2018 Jan;48(1):8-18.
- Reed WR, Cranston JT, Onifer SM, Little JW, Sozio RS. Decreased spontaneous activity and altered evoked nociceptive response of rat thalamic submedius neurons to lumbar vertebra thrust. *Experimental brain research*. 2017 Sep 1;235(9):2883-92.
- Ditchfield S, Yiou E, Delafontaine A, Hamaoui A. Short-Term Effects of Thoracic Spine Manipulation on the Biomechanical Organisation of Gait Initiation: A Randomized Pilot Study. *Frontiers in human neuroscience*. 2017 Jun 30;11:343.
- Zhang L, Yao CH. The Physiological Role of Tumor Necrosis Factor in Human Immunity and Its Potential Implications in Spinal Manipulative Therapy: A Narrative Literature Review. *Journal of chiropractic medicine*. 2016 Sep 1;15(3):190-6.
- Onifer SM, Reed WR, Sozio RS, Long CR. Antinociceptive effects of spinal manipulative therapy on nociceptive behavior of adult rats during the formalin test. *Evidence-Based Complementary and Alternative Medicine*. 2015;2015.
- Sampath KK, Mani R, Cotter JD, Tumilty S. Measureable changes in the neuro-endocrinal mechanism following spinal manipulation. *Medical hypotheses*. 2015 Dec 1;85(6):819-24.
- Zafereo JA, Deschenes BK. The Role of Spinal Manipulation in Modifying Central Sensitization. *Journal of Applied Biobehavioral Research*. 2015 Jun;20(2):84-99.
- Gay CW, Robinson ME, George SZ, Perlstein WM, Bishop MD. Immediate changes after manual therapy in resting-state functional connectivity as measured by functional magnetic resonance imaging in participants with induced low back pain. *Journal of manipulative and physiological therapeutics*. 2014 Nov 1;37(9):614-27.
- Molina-Ortega F, Lomas-Vega R, Hita-Contreras F, Manzano GP, Achalandabaso A, Ramos-Morcillo AJ, Martínez-Amat A. Immediate effects of spinal manipulation on nitric oxide, substance P and pain perception. *Manual therapy*. 2014 Oct 1;19(5):411-7.
- Kingston L, Claydon L, Tumilty S. The effects of spinal mobilizations on the sympathetic nervous system: a systematic review. *Manual therapy*. 2014 Aug 1;19(4):281-7.
- Reed WR, Pickar JG, Sozio RS, Long CR. Effect of spinal manipulation thrust magnitude on trunk mechanical activation thresholds of lateral thalamic neurons. *Journal of manipulative and physiological therapeutics*. 2014 Jun 1;37(5):277-86.
- Haavik H, Murphy B. The role of spinal manipulation in addressing disordered sensorimotor integration and altered motor control. *Journal of Electromyography and Kinesiology*. 2012 Oct 1;22(5):768-76.
- Pickar JG, Bolton PS. Spinal manipulative therapy and somatosensory activation. *Journal of electromyography and kinesiology*. 2012 Oct 1;22(5):785-94.

- Henderson CN. The basis for spinal manipulation: chiropractic perspective of indications and theory. *Journal of Electromyography and Kinesiology*. 2012 Oct 1;22(5):632-42.
- Dishman JD, Weber II KA, Corbin RL, Burke JR. Understanding inhibitory mechanisms of lumbar spinal manipulation using H-reflex and F-wave responses: A methodological approach. *Journal of neuroscience methods*. 2012 Sep 30;210(2):169-77.
- Padayachy K, Vawda GH, Shaik J, McCarthy PW. The immediate effect of low back manipulation on serum cortisol levels in adult males with mechanical low back pain. *Clinical Chiropractic*. 2010 Dec 1;13(4):246-52.
- Teodorczyk-Injeyan JA, McGregor M, Ruegg R, Injeyan HS. Interleukin 2-regulated in vitro antibody production following a single spinal manipulative treatment in normal subjects. *Chiropractic & osteopathy*. 2010 Dec;18(1):26.
- Kolberg C, Horst A, Kolberg A, Belló-Klein A, Partata WA. Effects of high-velocity, low-amplitude manipulation on catalase activity in men with neck pain. *Journal of manipulative and physiological therapeutics*. 2010 May 1;33(4):300-7.
- Bialosky JE, Bishop MD, Price DD, Robinson ME, George SZ. The mechanisms of manual therapy in the treatment of musculoskeletal pain: a comprehensive model. *Manual therapy*. 2009 Oct 1;14(5):531-8.
- Lystad RP, Pollard H. Functional neuroimaging: a brief overview and feasibility for use in chiropractic research. *The Journal of the Canadian Chiropractic Association*. 2009 Mar;53(1):59.
- Dishman JD, Greco DS, Burke JR. Motor-evoked potentials recorded from lumbar erector spinae muscles: a study of corticospinal excitability changes associated with spinal manipulation. *Journal of manipulative and physiological therapeutics*. 2008 May 1;31(4):258-70.
- Cramer G, Budgell B, Henderson C, Khalsa P, Pickar J. Basic science research related to chiropractic spinal adjusting: the state of the art and recommendations revisited. *Journal of manipulative and physiological therapeutics*. 2006 Nov 1;29(9):726-61.
- Pickar JG, Kang YM. Paraspinal muscle spindle responses to the duration of a spinal manipulation under force control. *Journal of manipulative and physiological therapeutics*. 2006 Jan 1;29(1):22-31.
- Ianuzzi A, Khalsa PS. Comparison of human lumbar facet joint capsule strains during simulated high-velocity, low-amplitude spinal manipulation versus physiological motions. *The Spine Journal*. 2005 May 1;5(3):277-90.
- Sung PS, Kang YM, Pickar JG. Effect of spinal manipulation duration on low threshold mechanoreceptors in lumbar paraspinal muscles: a preliminary report. *Spine*. 2005 Jan 1;30(1):115-22.
- Evans DW. Mechanisms and effects of spinal high-velocity, low-amplitude thrust manipulation: previous theories. *Journal of manipulative and physiological therapeutics*. 2002 May 1;25(4):251-62.
- Triano JJ. Biomechanics of spinal manipulative therapy. *The Spine Journal*. 2001 Mar 1;1(2):121-30.

EFICACIA Y EFECTIVIDAD DE LAS TÉCNICAS DE MANIPULACIÓN QUIROPRÁCTICA

- Traeger A et al. Effect of Intensive Patient Education vs Placebo Patient Education on Outcomes in Patients With Acute Low Back Pain A Randomized Clinical Trial. *JAMA Neurol*, 2018 Nov.
- Ailliet L, Rubinstein SM, Hoekstra T, Van Tulder MW, De Vet HCW. Long-term trajectories of patients with neck pain and low back pain presenting to chiropractic care: A latent class growth analysis. *Eur J Pain* 2018, 22: 103—113.
- Coulter ID, Crawford C, Hurwitz, EL, Vernon H, Khorsan R, Suttrop Booth M, Herman P. Manipulation and mobilization for treating chronic low back pain: a systematic review and meta-analysis. *The Spine Journal* 2018, 18: 866–879.
- Skelly A, Shou R et al. Noninvasive Non-pharmacological Treatment for Chronic Pain: A Systematic Review. *Comparative Effectiveness Review*, 2018 June, 209.
- Goertz CM, Long CR, Vining RD, Pohlman KA, Walter J, Coulter I. Effect of Usual Medical Care Plus Chiropractic Care vs Usual Medical Care Alone on Pain and Disability Among US Service Members With Low Back Pain. A Comparative Effectiveness Clinical Trial. *JAMA Network Open* 2018 May, 1-15.
- Haas M, Bronfort G, Evans R, Schulz C, Vavrek D, Takaki L, Hanson L, Leininger B, Neradilek MB. Dose-response and efficacy of spinal manipulation for care of cervicogenic headache: a dual-center randomized controlled trial. *The Spine Journal* (2018), <https://doi.org/10.1016/j.spinee.2018.02.01>.
- Babatunde O, Jordan JL, Van der Windt DA, Hill JC, Foster NE, Protheroe J. Effective treatment options for musculoskeletal pain in primary care: A systematic overview of current evidence. *PLOS ONE*, 2017 Jun, 22: 1-30.
- Chou R et al. Nonpharmacologic Therapies for Chronic Low Back Pain: A Review of the Evidence for an American Pain Society/American College of Physicians Clinical Practice Guideline. *Ann Intern Med* 2017, 2017 Apr 166 (7).
- Deyo R. The Role of Spinal Manipulation in the Treatment of Low Back Pain. *JAMA*, 2017 April 317 (14): 1418-1419.
- Qaseem A, Wilt T, McLean R, Force MA. Non-invasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med*, 2017 February.
- Holt KR, Haavik H, Chi Lun Lee A, Murphy B, Elley R. Effectiveness of Chiropractic Care to Improve Sensorimotor Function Associated With Falls Risk in Older People: A Randomized Controlled Trial. *JMPT*, 2016 May 39 (4): 267-278.
- Deyo R et al. Association Between Initial Opioid Prescribing Patterns and Subsequent Long-Term Use Among Opioid-Naïve Patients: A Statewide Retrospective Cohort Study. *J Gen Intern Med*, 2016.
- Mesa-Jiménez et al. Multimodal manual therapy vs pharmacological care for management of tension type headache: A meta-analysis of randomized trials. *Cephalgia*, 2015. DOI: 10.1177/0333102415576226.

- Haas M, Vavrek D, Peterson D, Polissar N, Neradilek M. Dose-response and efficacy of spinal manipulation for care of chronic low back pain: a randomized controlled trial. *The Spinal Journal*, 2014 July, 14 (7): 1106-1116.
- Kernel et al. An evidence-based clinical guideline for the diagnosis and treatment of lumbar disc herniation with radiculopathy. *JMPT* 2014 January,, 14 (1): 180-191.
- Salomón-Moreno J et al. Immediate changes in neck pain intensity and widespread pressure pain sensitivity in patients with bilateral chronic mechanical neck pain: a randomized controlled trial of thoracic thrust manipulation vs non-thrust mobilisation. *JMPT* 2014, 37 (5): 312-319.
- George J, Skaggs C, Nelson M, Gavard JA, Gros GA. A randomized controlled trial comparing a multimodal intervention and standard obstetrics care for low back and pelvic pain in pregnancy. *AM J Obstet Gynecol* 2013, 208 (295): 1-7.
- Johnson C, Rubinstein S et al. Chiropractic Care and Public Health: Answering Difficult Questions About Safety, Care Through the Lifespan, and Community Action. *JMPT* 2012 September, 35 (7): 493-514.
- Millan M, Leboeuf C, Budgell S and B, Amorim M-A. The effect of spinal manipulative therapy on experimentally induced pain: a systematic literature review. *Chiropractic & Manual Therapies* 2012, 20:26.
- Haldeman S et al. Advancements in the Management of Spine Disorders. *Best Practice & Research Clinical Rheumatology* 2012, 26: 263–280.
- Bronfort G et al. Spinal Manipulation, medication or home exercise with advice for acute and subacute neck pain. *Ann Intern* 2012, 156: 1-10.
- Chaibi A, Russell MB. Manual therapies for cervicogenic headache: a systematic review. *J Headache Pain* 2012, 13: 351-359.
- Walker B, French S, Grant W, Green S.A Cochrane review of Combined Chiropractic Interventions for Low-Back Pain. *Spine* 2011, 36 (3): 230-242.
- Chaibi A, Russell MB. Manual therapies for migraine: a systematic review. *J Headache Pain*, 2011, 12:127–133.
- Cifuentes M, Willetts J, Wasiak R. Health Maintenance Care in work-related low back pain and its association with disability recurrence. *JOEM* 2011 Apr, 53 (4): 396-404.
- Clark BC, Goss DA, Walkowski S, Hoffman RL, Ross A, Thomas JS. Neurophysiologic effects of spinal manipulation in patients with chronic low back pain. *BMC Musculoskeletal Disorders*, 2011,12:170.
- Dagenais S, Tricco AC, Haldeman S. Synthesis of recommendations for the assessment and management of low back pain from recent clinical practice guidelines. *The Spine Journal* 2010, 10: 514–529.
- Haldeman S et al. Findings From The Bone and Joint Decade 2000 to 2010 Task Force on Neck Pain and Its Associated Disorders. *JOEM*, 2010 April, 52 (4): 424-427.
- Haas et al. Dose response and efficacy of spinal manipulation for chronic cervicogenic headache: a pilot randomized controlled trial. *The Spine Journal* 2010, 10:117–128.
- Hurwitz EL et al. Results of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. *JMPT* 2009 February, 32 (2): 141-175.

- Johnson C. Comparative effectiveness research and the chiropractic profession. JMPT 2010 may, 33 (4): 243-250.
- Strunk R, Hawk C. Effects of chiropractic care on dizziness, neck pain, and balance: a single-group, pre-experimental, feasibility study. JCM 2009 December, 8 (4): 156-164.
- Van der Velde et al. Identifying the best treatment among common non surgical neck pain treatments. JMPT, 2009 February, 32 (2): 209-218.
- Bakris G, Dickholtz M, Meyer PM, Kravitz G, Avery E, Miller M, Brown J, Woodfield C, Bell B. Atlas vertebra realignment and achievement of arterial pressure goal in hypertensive patients: a pilot study. Journal of Human Hypertension (2007) 21,347–352.
- Chou R, Huffman LH. Non-pharmacologic Therapies for Acute and Chronic Low Back Pain: A Review of the Evidence for an American Pain Society/American College of Physicians Clinical Practice Guideline. Ann Inter Med 2007, 147: 492-504.
- Greene BR, Smith M, Allareddy V, Haa M. Referral patterns and attitudes of Primary Care Physicians towards chiropractors. BMC Complementary and Alternative Medicine 2006, 6.
- UK Beam Trial Team. United Kingdom back pain exercise and manipulation (UK BEAM) randomised trial: effectiveness of physical treatments for back pain in primary care. BMJ, doi:10.1136/bmj.38282.669225.AE (published 29 November 2004).
- Haas M, Group E, Kraemer DF. Dose-response for chiropractic care of chronic low back pain. The Spine Journal 2004, 4: 574–583.
- Hurwitz EL et al. A Randomized Trial of Medical Care With and Without Physical Therapy and Chiropractic Care With and Without Physical Modalities for Patients With Low Back Pain: 6-Month Follow-Up Outcomes From the UCLA Low Back Pain Study. Spine, 2002, 27 (20): 2193-2204.
- Rubinstein SM, van Middelkoop M, Assendelft WJ, de Boer MR, van Tulder MW. Spinal manipulative therapy for chronic low-back pain: an update of a Cochrane review. Spine, 2011 Jun 1;36(13):E825-46.
- Eklund A, Jensen I, Lohela-Karlsson M, Hagberg J, Leboeuf-Yde C, Kongsted A, et al. The Nordic Maintenance Care program: Effectiveness of chiropractic maintenance care versus symptom-guided treatment for recurrent and persistent low back pain—A pragmatic randomized controlled trial. PLoS ONE. 2018, 13(9): e0203029.
- Rist PM, Hernandez A, Bernstein C., Kowalski M, Osypiuk K, Vining R, et al. The Impact of Spinal Manipulation on Migraine Pain and Disability: A Systematic Review and Meta-Analysis. Headache: The Journal of Head and Face Pain. 2019, 59: 532-542.

COSTE-EFECTIVIDAD DEL TRATAMIENTO QUIROPRÁCTICO

- Mior S., Gamble B, Barnsley J, Côté P, Côté E. Changing primary care physician's management of LBP in model of intercollaborative care. Chirop Manual Ther 2013, 21:6.
- Gurden M, Morelli M, Sharp G, Baker K, Betts N, Bolton J. Evaluation of a general practitioner referral service for manual treatment of back and neck pain. Primary Health Care Research & Development 2012, 13: 204-210.

- Brown R. A health care system in transformation: making the case for chiropractic. *Chiropractic & Manual Therapies* 2012, 20: 37.
- Foster N, Hartvigsen J, Croft PR. Taking responsibility for the early assessment and treatment of patients with musculoskeletal pain: a review and critical analysis. *Arthritis Research & Therapy* 2012, 14: 205.
- Schofield DJ et al. The personal and national costs of early retirement because of spinal disorders: impacts on income, taxes, and government support payments. *Spine J.* 2012, 12:1111-1118.
- Michaleff ZA, Lina C-WC, Mahera CG, Van Tulder M.W. Spinal manipulation epidemiology: Systematic review of cost effectiveness studies. *J Electromyography Kinesiol* 2012, 22: 655-662.
- Daffner SD, Hymanson HJ, Wang JC. Cost and use of conservative management of lumbar disc herniation before surgical discectomy. *The Spine Journal.* 2010 Jun, 10 (6): 463-468.
- Haas M, Sharma R, Stano M. Cost-Effectiveness of Medical and Chiropractic Care for Acute and Chronic Low Back Pain. *Journal of Manipulative and Physiological Therapeutics.* 2005 Oct, 28 (8): 555-563.
- Legorreta AP, Metz D, Nelson CF, Ray S, Chernicoff HO, DiNubile NA. Comparative Analysis of Individuals With and Without Chiropractic Coverage. *Arch Intern Med.* 2004;164:1985-1992.
- Manga P, Angus D. Chiropractic a mean of reducing costs and attaining better health outcomes. Manga report 1998.
- Manga P, Angus ED, Papadopoulos C, Swan WR. The effectiveness and Cost-Effectiveness of Chiropractic management of low back-pain. Ontario Ministry of Health, 1993 Aug.

SEGURIDAD DEL EJERCICIO DE LA QUIROPRÁCTICA

- Hincapié CA, Tomlinson GA, Côté P, Rampersaud YR, Jadad AR, Cassidy JD. Chiropractic care and risk for acute lumbar disc herniation: a population-based self-controlled case series study. *European Spine Journal.* 2018 Jul 1;27(7):1526-37.
- Hincapié CA, Cassidy JD, Côté P, Rampersaud YR, Jadad AR, Tomlinson GA. Chiropractic spinal manipulation and the risk for acute lumbar disc herniation: a belief elicitation study. *European Spine Journal.* 2018 Jul 1;27(7):1517-25.
- Deyo RA, Hallvik SE, Hildebran C, Marino M, O'kane N, Carson J, Van Otterloo J, Wright DA, Millet LM, Wakeland W. Use of prescription opioids before and after an operation for chronic pain (lumbar fusion surgery). *Pain.* 2018 Jun 1;159(6):1147-54.
- Todd AJ, Carroll MT, Robinson A, Mitchell EK. Adverse events due to chiropractic and other manual therapies for infants and children: a review of the literature. *Journal of manipulative and physiological therapeutics.* 2015 Nov 1;38(9):699-712.
- Cassidy JD, Bronfort G, Hartvigsen J. Should we abandon cervical spine manipulation for mechanical neck pain? No. *BMJ: British Medical Journal (Online).* 2012;344.
- Hauser V, Zangger P, Winter Y, Oertel W, Kesselring J. Late sequelae of whiplash injury with dissection of cervical arteries. *European neurology.* 2010;64(4):214-8.

- Wenban AB. Inappropriate use of the title 'chiropractor' and term 'chiropractic manipulation' in the peer-reviewed biomedical literature. *Chiropractic & osteopathy*. 2006 Dec;14(1):16.

ESTUDIOS CUALITATIVOS, RENDIMIENTO Y CALIDAD DE VIDA

- Adams J, Peng W, Cramer H, Sundberg T, Moore C, Amorin-Woods L, Sibbritt D, Lauche R. The Prevalence, patterns, and predictors of chiropractic use among US adults. *Spine*. 2017 Dec 1;42(23):1810-6.
- Moore CS, Sibbritt DW, Adams J. A critical review of manual therapy use for headache disorders: prevalence, profiles, motivations, communication and self-reported effectiveness. *BMC neurology*. 2017 Dec;17(1):61.
- Goncalves G, Le Scanff C, Leboeuf-Yde C. Primary prevention in chiropractic practice: a systematic review. *Chiropractic & manual therapies*. 2017 Dec;25(1):9.
- Galindez-Ibarbengoetxea X, Setuain I, Andersen LL, Ramirez-Velez R, González-Izal M, Jauregi A, Izquierdo M. Effects of cervical high-velocity low-amplitude techniques on range of motion, strength performance, and cardiovascular outcomes: A review. *The Journal of Alternative and Complementary Medicine*. 2017 Sep 1;23(9):667-75.
- Fernandez M, Boyle E, Hartvigsen J, Ferreira ML, Refshauge KM, Maher CG, Christensen K, Hopper JL, Ferreira PH. Is this back pain killing me? All-cause and cardiovascular-specific mortality in older Danish twins with spinal pain. *European Journal of Pain*. 2017 May;21(5):938-48.
- Ndetan H, Hawk C, Sekhon VK, Chiusano M. The role of chiropractic care in the treatment of dizziness or balance disorders: analysis of National Health Interview Survey Data. *Journal of evidence-based complementary & alternative medicine*. 2016 Apr;21(2):138-42.
- Cohen SP. Epidemiology, diagnosis, and treatment of neck pain. In *Mayo Clinic Proceedings* 2015 Feb 1 (Vol. 90, No. 2, pp. 284-299). Elsevier.
- Miners AL. Chiropractic treatment and the enhancement of sport performance: a narrative literature review. *The Journal of the Canadian Chiropractic Association*. 2010 Dec;54(4):210.
- Stuber KJ, Smith DL. Chiropractic treatment of pregnancy-related low back pain: a systematic review of the evidence. *Journal of manipulative and physiological therapeutics*. 2008 Jul 1;31(6):447-54.
- Pollard H, Hoskins W, McHardy A, Bonello R, Garbutt P, Swain M, Dragasevic G, Pribicevic M, Vitiello A. Australian chiropractic sports medicine: half way there or living on a prayer?. *Chiropractic & osteopathy*. 2007 Dec;15(1):14.
- Assendelft WJ, Morton SC, Yu Emily I, Suttrop MJ, Shekelle PG. Tratamiento de manipulación espinal para el dolor lumbar. *La Biblioteca Cochrane Plus*. 2007(4).
- Hawk C, Khorsan R, Lisi AJ, Ferrance RJ, Evans MW. Chiropractic care for nonmusculoskeletal conditions: a systematic review with implications for whole systems research. *The Journal of Alternative and Complementary Medicine*. 2007 Jun 1;13(5):491-512.



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