



Spinal Manipulations





The Similarities and Disparities Between
Osteopaths, Chiropractors and Physical Therapists
Around the World

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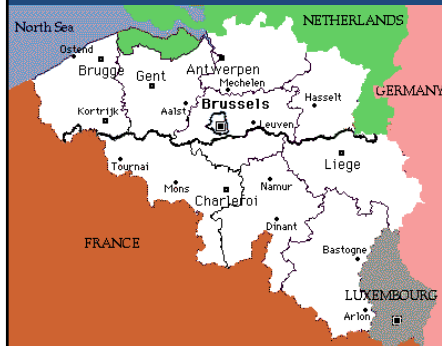
My origins?

Belgium - Europe



The image contains two maps of Europe. The left map is a satellite-style map with a yellow dot indicating Belgium's location. The right map is a political map of Europe with Belgium highlighted in yellow and circled in red. The political map includes labels for various countries such as Norway, Sweden, Finland, Denmark, Germany, France, Italy, Spain, Portugal, Greece, Turkey, and others.

Lived in Brussels - Belgium



"The Great Market"

Belgium... the land of

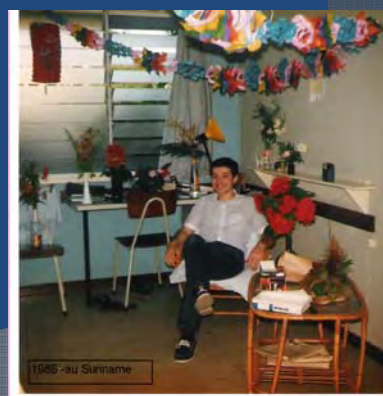


University Education:
Catholic University Of Louvain-la-Neuve
Physical Education
Physical Therapy



Job

- Worked as a physical therapist in Belgium, then in South America in a hospital in Paramaribo (Suriname)



Opportunities

- Opportunities following South America
 - Belgium: School of Osteopathy
 - USA: Graduate School



Job + Graduate School

- USA – Texas Tech University



History of spinal manipulation therapy

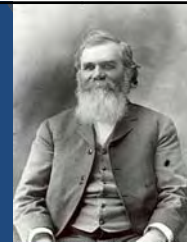
- Roots of spinal manipulation found in folk traditions of "bone setting"
- Documented use as far back as
 - Ancient Egyptians
 - Asian Cultures
 - Hippocrates
- Often associated with audible "popping" sound.
- Still practiced in the UK and is protected



Bonesetter. Wikipedia Encyclopedia.
<http://en.wikipedia.org/wiki/Bone-setting>;
 Accessed 07/25/08

Chiropractic: its history

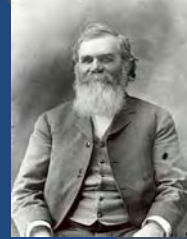
- from Greek
 - chiro- χειρο- "hand-" + praktikós πρακτικός "concerned with action"
- **Daniel D Palmer**,
 - founder of chiropractic (1897)
- 1895: in Davenport, Iowa, **Daniel Palmer**, a canadian immigrant who worked as a grocer manipulated the cervical vertebra of Henry Lillard and reported **relief of the patient's deafness**.



Livingston MCP: Spinal manipulation in medical practice: A century of ignorance. *Med J Aust* 2:552–555, 1963.

Brownson RJ, Zollinger WK, Madeira T, Fell D: Sudden sensorineural hearing loss following manipulation of the cervical spine. *Laryngoscope* 96:166–170. 1986.

Chiropractic: definition



- Chiropractic treatment emphasizes manual therapy including spinal manipulation and other joint and soft tissue manipulation, and includes exercises and health and lifestyle counseling.
- Traditionally, it assumes that a vertebral **subluxation** or spinal joint dysfunction can interfere with the body's function and its innate ability to heal itself.

Livingston MCP: Spinal manipulation in medical practice: A century of ignorance. *Med J Aust* 2:552–555, 1963.

Brownson RJ, Zollinger WK, Madeira T, Fell D: Sudden sensorineural hearing loss following manipulation of the cervical spine. *Laryngoscope* 96:166–170. 1986.

Chiropractic schools in the World

- USA: 18
- UK: 3
- Canada: 2
- Australia: 2
- Japan: 2
- Brazil: 2
- South Africa: 2
- Sweden: 1
- Mexico: 1
- New Zealand: 1
- Denmark: 1
- France: 1

Chiropractors in Europe

- Over 70 years of presence
 - France: rebouteux
 - Germany: knochen-einrichter
 - Spain: algebrista
 - Denmark: kloge folk
 - Britain: bonesetters

Chiropractic Education

- Highly variable
- In the US: doctorate degree – 4-year program
- Other countries: Bachelor and Masters of Sciences

World Health Organization (2005). "WHO guidelines on basic training and safety in chiropractic" (PDF). Retrieved on 2008-03-03.

Chiropractors in Europe

- Switzerland
 - Part of insurance law
- Greece
 - Unrecognized, uncovered, but not illegal

Osteopathy: its history

- **Andrew Taylor Still,**
 - founder of Osteopathy (1892) in Kirksville, Missouri
 - In Medical school in Kansas City, lost 4 children due to spinal meningitis and pneumonia. Disgusted with traditional medicine. Did not finish medical school.
 - medical practice relying on a system of manipulation and spinal reflexes that he devised to treat all types of conditions
 - named his new school of medicine "osteopathy," reasoning that "the bone, osteon, was the starting point from which [he] was to ascertain the cause of pathological conditions."



Livingston MCP: Spinal manipulation in medical practice: A century of ignorance. *Med J Aust* 2:552–555, 1963.

Osteopathic schools in the World

- USA: 28
- Canada: 2
- UK: 8
- More in European and Asian countries (China has approached the AOA to train family physicians)

Osteopathic Education

- Variable
- In the US & Canada:
 - doctorate degree – 4-year program
- Practice as MD's
- Other countries: Bachelor and Masters of Sciences
- Can be osteopathy on his own, or physical therapists and MD's



<http://en.wikipedia.org/wiki/Osteopathy>

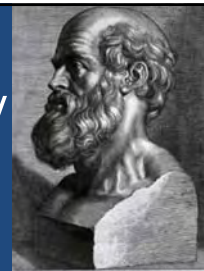
What about
 Physical Therapy
 Physiotherapy
 Fysiotherapy
 Kinésithérapie
 Masso-kinésithérapie



same meanings

Physical Therapy: its history

- 400 B.C. Hippocrates and Hector used water therapy, traction, movement as therapeutic approaches.
- 1894: as a profession in Great Britain with 4 nurses
- 1940s mainly exercise, massage, and traction.
- 1950s Manipulative procedures to the spine and extremity joints began to be practiced



Physical Therapy schools in the World

- USA: 200
- Education
 - USA: doctorate level (3-3 or 4-2)
 - Other countries highly variable:
 - Some European countries: university degree and others not

Contentious history of spinal manipulation



- 1895: **Daniel Palmer**, manipulated the cervical vertebra of Henry Lillard and reported **relief of the patient's deafness**.
- 1986: Brownson et al. described the **development of sudden deafness in two patients who underwent manipulation of the cervical spine by osteopathic physicians**.

Livingston MCP: Spinal manipulation in medical practice: A century of ignorance. *Med J Aust* 2:552–555, 1963.

Brownson RJ, Zollinger WK, Madeira T, Fell D: Sudden sensorineural hearing loss following manipulation of the cervical spine. *Laryngoscope* 96:166–170. 1986.

Manipulation – Physical Therapy

- Guide to Physical Therapist Practice
 - **Mobilization/manipulation:** A manual therapy technique comprising a continuum of skilled passive movements to the joints and/or related soft tissue that are applied at varying speeds and amplitudes, including a small-amplitude/ high- velocity therapeutic movement.
 - **Thrust manipulation** as “high velocity, low amplitude therapeutic movements within or at end range of motion.”

Manipulation Education Manual For Physical Therapist Professional Degree Programs
- Manipulation Education Committee: APTA Manipulation Task Force, 2004

Manipulation – Chiropractic

- **Spinal Manipulation:** Passive manual maneuver during which a three-joint complex is taken past the normal physiological range of movement without exceeding the anatomical boundary limit; its defining factor is a *dynamic thrust, a sudden force that causes an audible release and attempts to increase a joint's range of motion.*

Winkler K, Hegetschweiler-Goertz C, Jackson PS et al. (2003). Spinal manipulation policy statement. American Chiropractic Association.
http://www.acatoday.org/pdf/spinal_manipulation_policy.pdf Accessed on 2008-07-08

Manipulation – Osteopathic

- **Manipulation**: the therapeutic application of manual pressure or force. In osteopathy, the manipulation itself is only **part of a philosophy of care**; it is regarded as an adjunct to other medical care. An emphasis on the importance of the musculoskeletal system in health and disease is a strong feature of the education of an osteopathic physician.

Osteopathic Medicine in the United States -

http://en.wikipedia.org/wiki/Osteopathic_medicine_in_the_United_States ; Accessed on 2008-07-08

Andersson GB, Lucente T, Davis AM, Kappler RE, Lipton JA, Leurgans S. A comparison of osteopathic spinal manipulation with standard care for patients with low back pain. *N Engl J Med.* 1999;341(19):1426-31

Manipulation - Osteopathic



Thoracic

Manipulation – Chiropractic



Thoracic

Manipulation – Physical Therapy

Thoracic Spine

Intervertebral Joints T4-T10

Posteroanterior Thrust

Grade V Manipulation



Thoracic

Manipulation – Osteopathy



Lumbar

Manipulation – Chiropractic



Lumbar

Manipulation – Physical Therapy - Maitland

Lumbar Spine;
*Intervertebral Joints
T10-S1 (Rotation)*
- As a Mobilisation



Lumbar

So what is the difference?



Homola S. Chiropractic: history and overview of theories and methods. *Clin Orthop Relat Res.* 2006 Mar;444:236-42.

Cyriax J. *Textbook of Orthopaedic Medicine: Treatment by Manipulation, Massage, and Injection.* Vol 2, 11th Ed, London, Bailliere Tindall; 1984.

So what is the difference?

- Goals of treatment – **Osteopathy**
 - Osteopathic physicians are trained to place emphasis on the achievement of normal body mechanics as central to **maintaining good health**.
 - Manipulative treatment is taught as an adjunctive measure to other biomedical interventions for a number of disorders and diseases.

Osteopathic Medicine in the United States.

http://en.wikipedia.org/wiki/Osteopathic_medicine_in_the_United_States; Accessed 07/20/2008

Osteopathy. http://en.wikipedia.org/wiki/Osteopathy#cite_note-31 ; Accessed 11/29/2008
Johnson SM, Kurtz ME. Diminished use of osteopathic manipulative treatment and its

So what is the difference?

- Goals of treatment – **Physical Therapy**
 - Physical therapists use joint manipulation/mobilization to **relieve and prevent physical disability**.
 - Physical therapists base their manipulative treatment on **loss of mobility and pain**.
 - Physical therapists will discontinue use of manipulation when mobility is restored and symptoms are resolved

Homola S. Chiropractic: history and overview of theories and methods. *Clin Orthop Relat Res.* 2006 Mar;444:236-42.

So what is the difference?

- Goals of treatment – **Chiropractic**
 - use adjustment/manipulation over the spine to restore and maintain health.
 - may focus on correcting and preventing vertebral “**subluxations**”.
 - A chiropractor who follows the subluxation theory may continue manipulating the spine of an asymptomatic patient for **preventive** maintenance purposes.
 - Some chiropractic patients have preventive maintenance spinal adjustments to correct what they believe is a constant cause of disease in their spine. James Cyriax, MD referred to such fear as chiropractogenic neurosis.

Alcantara J, Plaughter G, Araghi HJ. Chiropractic care of a pediatric patient with myasthenia gravis. *J Manipulative Physiol Ther.* 2003 Jul-Aug;26(6):390-4.

Homola S. Chiropractic: history and overview of theories and methods. *Clin Orthop Relat Res.* 2006 Mar;444:236-42.

Cyriax J. *Textbook of Orthopaedic Medicine: Treatment by Manipulation, Massage, and Injection.* Vol 2, 11th Ed. London, Bailliere Tindall; 1984.

“Pop” – Placebo & Nocebo Effects

- Perfectly normal joints can be made to “pop”.
- Adjusting or popping a normal spine to correct “subluxations” can have nocebo and placebo effects.
 - The **placebo** effect is evident by patients who feel better because they believe that a vertebra has been realigned when manipulation pops the spine.
 - The **nocebo** effect is shown by patients who believe that vertebrae are constantly slipping in and out of place, producing fear in the patients that they will become ill if subluxations are not corrected or prevented by regular adjustments.

Homola S. Placebos, nocebos, and chiropractic adjustments. *Skeptical Inquirer.* 2003;27:35–38.

Mobilization or Manipulation? Which is more strenuous?



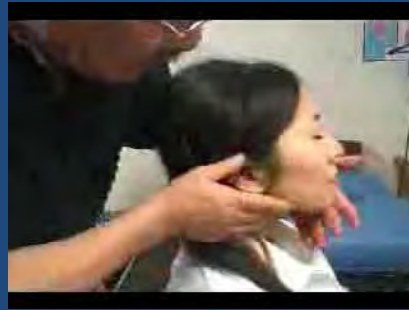
Maitland Rotation mobilization

Mobilization or Manipulation? Which is more strenuous?



Rotation Manipulation HVLA C4-5 –
Physical therapy osteopathic

Mobilization or Manipulation? Which is more strenuous?



Cervical Manipulation HVLA - seated
Chiropractic

Mobilization or Manipulation? Which is more strenuous?



Cervical Manipulation HVLA - supine
Chiropractic

Mobilization or Manipulation? Which is more strenuous?

- **Cervical Mobilizations (Snodgrass, 2007)**
 - grade I: 21.8 N; SD, 15.0
 - grade II: 34.9 N; SD, 20.9
 - grade III: 58.2 N; SD, 27.5
 - grade IV: 61.0 N; SD, 29.9
- **Lumbar Mob (Threlkeld, 1992)**
 - grade I: 52.16 (36.11)
 - grade II: 119.23 (50.96)
 - grade III: 179.31 (63.34)
 - grade IV: 242.25 (69.17)
- **Thoracic Mob (Cook, 2002)**
 - Grade I: 91.1 - 205.8 (range)
 - Grade IV: 231.8 - 499.8 (range)
- **Spinal manipulations**
 - Forces are smaller for spinal manipulations of the cervical spine compared to the thoracic spine and sacroiliac joint.
 - **Cervical:** mean peak force = 117.7 N (+/- 15.6 N)
 - **Thoracic:** average peak force = 238.2 N
- The inconsistency in manual force application during PA spinal mobilization in existing studies suggests that further studies are needed to improve the clinical standardization of manual force application. Future research on mobilization should include forces applied to the cervical and thoracic spines

Snodgrass SJ, Rivett DA, Robertson VJ. Manual forces applied during cervical mobilization. J Manipulative Physiol Ther. 2007 Jan;30(1):17-25.

Herzog W, Conway PJ, Kawchuk GN, Zhang Y, Hasler EM. Forces exerted during spinal manipulative therapy. Spine. 1993 Jul;18(9):1206-12.

Kawchuk GN, Herzog W, Hasler EM. Forces generated during spinal manipulative therapy of the cervical spine: a pilot study. J Manipulative Physiol Ther. 1992 Jun;15(5):275-8.

ROM Testing or Manipulation? Which is more strenuous?

- Symons et al., 2002
- Cadaveric study
- Cervical Manipulations resulted in
 - average strain of 6.2% +/- 1.3% to the distal (C0-C1) loop of the VA and a 2.1% +/- 0.4% strain to the proximal (C6) loop.
- These values were similar to or lower than the strains recorded during diagnostic and range of motion testing.

Symons BP, Leonard T, Herzog W. Internal forces sustained by the vertebral artery during spinal manipulative therapy. J Manipulative Physiol Ther. 2002 Oct;25(8):504-10.

Questions

- Where is the evidence about the effectiveness of spinal manipulations?
- Are they safe?

Mobilizations vs Manipulations

What works best?

- Cervical spine
 - Osteopaths – Spain - RCT
 - “Single cervical HVLA manipulation C3-4-5 was more effective in reducing neck pain at rest and in increasing active cervical range of motion than a control mobilization procedure in subjects suffering from mechanical neck pain.”



Martínez-Segura R, Fernández-de-las-Peñas C, Ruiz-Sáez M, López-Jiménez C, Rodríguez-Blanco C. Immediate effects on neck pain and active range of motion after a single cervical high-velocity low-amplitude manipulation in subjects presenting with mechanical neck pain: a randomized controlled trial. *J Manipulative Physiol Ther.* 2006 Sep;29(7):511-7.

Mobilizations vs Manipulations

- **Cervical Spine – Cochrane review**
- Mobilization and/or manipulation when used with exercise are beneficial for persistent mechanical neck disorders with or without headache.
- Done alone, manipulation and/or mobilization are not beneficial
- Effectiveness is equal

Gross AR, Hoving JL, Haines TA, Goldsmith CH, Kay T, Aker P, Bronfort G; Cervical Overview Group. A Cochrane review of manipulation and mobilization for mechanical neck disorders. *Spine*. 2004 Jul 15;29(14):1541-8.

Hurwitz EL, Morgenstern H, Harber P, Kominski GF, Yu F, Adams AH. A randomized trial of chiropractic manipulation and mobilization for patients with neck pain: clinical outcomes from the UCLA neck-pain study. *Am J Public Health*. 2002;92(10):1634-41.

Cervical Manipulations – Are they safe?

- Serious adverse events
 - **Manipulations**
 - 6/100,000 → 5/1,000,000
 - 1/ 100,000 persons

Michaeli A. Reported occurrence and nature of complications following manipulative physiotherapy in South Africa. *Aust Physiother* 1993;39:309–15.

Haldeman S, Carey P, Townsend M, et al. Arterial dissections following cervical manipulation: the chiropractic experience. *CMAJ* 2001;165:905–6..

Rothwell D, Bondy S, Williams J. Chiropractic manipulation and stroke: a population-based case-control study. *Stroke* 2001;32:1054–60.

Thiel HW, Bolton JE, Docherty S, Portlock JC. Safety of chiropractic manipulation of the cervical spine: a prospective national survey. *Spine*. 2007;32(21):2375-8.

Cervical Manipulations - Risks

- Serious adverse events
 - NSAIDS
 - bleeding or perforation: 4/1,000
 - Death: 4/10,000
 - Problems with this line of argument:
 1. Efficacy of NSAIDs is undoubted but that of spinal manipulation is not
 2. Adverse effects of NSAIDs are subject to post-marketing surveillance while those of spinal manipulation are not.
 3. Other therapeutic options (e.g. exercise therapy) have not been associated with significant risks.



Dabbs V, Lauretti WJ. A risk assessment of cervical manipulation vs NSAIDs for the treatment of neck pain. JMPT 1995 18: 530-536.

Ernst E. Adverse effects of spinal manipulation: a systematic review. J R Soc Med. 2007 Jul;100(7):330-8.

Cervical Manipulations - Risks

- Frequency and Clinical Predictors of Adverse Reactions to Chiropractic Care in the UCLA Neck Pain Study
 - 336 patients
 - 30.4% adverse symptoms following chiropractic care
 - “Adverse reactions appear more likely to follow cervical spine manipulation than mobilization. Given the possible higher risk of adverse reactions and lack of demonstrated effectiveness of manipulation over mobilization, **chiropractors should consider a conservative approach for applying manipulation to their patients, especially those with severe neck pain.**”

Hurwitz EL, Morgenstern H, Vassilaki M, Chiang LM. Frequency and clinical predictors of adverse reactions to chiropractic care in the UCLA neck pain study. Spine. 2005 Jul 1;30(13):1477-84.



Cervical Manipulations - Risks

- Serious adverse events
 - **Alert from Portugal** after three cases of serious adverse events:
 - VBI stroke
 - neuropraxic injury
 - epidural hematoma
 - “The described serious adverse events promptly recommend the implementation of a risk alert system.”



Gouveia LO, Castanho P, Ferreira JJ, Guedes MM, Falcão F, e Melo TP.
 Chiropractic manipulation: reasons for concern? Clin Neurol Neurosurg. 2007
 Dec;109(10):922-5.

Cervical Manipulations – Serious Injuries

- Arterial Dissection 20%
- Brain-Stem Injury 18%
- Cerebral/Cerebellar Injury 10%
- Spinal cord Injury 9%

Di Fabio R. Manipulation of the Cervical Spine: Risks and Benefits, *Physical Therapy*, 1999, 79(1);50-65

Cervical Manipulations Risks and Physical Therapists

- Physical Therapists involved in less than 2% of injuries due to cervical manipulation
- The risks to damage the vertebral artery can be avoided by using mobilization
- *Manipulation benefits do not outweigh their risks*

Di Fabio R. Manipulation of the Cervical Spine: Risks and Benefits, *Physical Therapy*, 1999, 79(1);50-65

Cervical Manipulation: Who is Responsible for deaths?

- Di Fabio (1999): no death attributed to Cervical Manipulations by Physical Therapists

Di Fabio R. Manipulation of the Cervical Spine: Risks and Benefits, *Physical Therapy*, 1999, 79(1);50-65

Cervical Manipulation: Who is responsible for death?



- Ernst (2002): 1995 – 2001 (Ernst, MD, PhD - UK)
- 42 cases reported in literature found
- 1 death attributed to forced rotational manipulation of a 3-months old baby girl by a physical therapist

27	3-month-old baby girl	Physiotherapist — forced active rotation and retraction of head	Bleeding into adventitia of both vertebral arteries causing ischaemia of caudal brainstem with subarachnoid haemorrhage	MRI	Death
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Jacobi G, Riepert T, Kieslich M, Bohl J. [Fatal outcome during physiotherapy (Vojta's method) in a 3-month old infant. Case report and comments on manual therapy in children] *Klin Padiatr.* 2001 Mar-Apr;213(2):76-85.

Ernst E. Manipulation of the cervical spine: a systematic review of case reports of serious adverse events, 1995-2001. *Med J Aust.* 2002 Apr 15;176(8):376-80.

Cervical Manipulation: who is Responsible for death?

- Ernst (2007): 2001 – 2006
- 200 cases
- no death attributed to manipulation by physical therapists

Ernst E. Adverse effects of spinal manipulation: a systematic review. *J R Soc Med.* 2007 Jul;100(7):330-8.

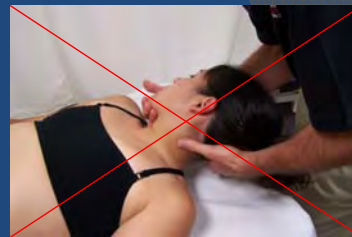
Type of Cervical Manipulation Associated with Injuries

- Any Rotation 23%
- Tilt 2%
- Traction 1%

Di Fabio R. Manipulation of the Cervical Spine: Risks and Benefits, *Physical Therapy*, 1999, 79(1);50-65

Cervical Manipulations - Risks

- Mechanical deformation of suboccipital vertebral artery associated with cervical spine rotation as a possible cause of compromised blood flow to the hindbrain and VBI
- **“Avoid full-range or sustained cervical spine rotation in clinical practice.”**



Mitchell J. Is mechanical deformation of the suboccipital vertebral artery during cervical spine rotation responsible for vertebrobasilar insufficiency? *Physiother Res Int*. 2008 Mar;13(1):53-66.

Saxler G, Schopphoff E, Quitmann H, Quint U. Spinal manipulative therapy and cervical artery dissections *HNO*. 2005 Jun;53(6):563-7.

Cervical Manipulations - Risks

- Most dangerous manipulations
- C1-2 Rotation



Nadgir RN, Loevner LA, Ahmed T, Chalela J, Slawek K, Imbesi S. Simultaneous bilateral internal carotid and vertebral artery dissection following chiropractic manipulation: case report and review of the literature. *Neuroradiol* 2003; 45:311 -4

Saxler G, Schopphoff E, Quitmann H, Quint U. Spinal manipulative therapy and cervical artery dissections *HNO*. 2005 Jun;53(6):563-7.

Cervical Manipulations - Risks

- How to avoid being at end ROM with HVLA manipulations?
 - In order that the joint is not moved past its painless or 'normal' range of movement in any one plane, the joint is positioned in a **combination of mid-range positions**.
 - HVLA thrust applied at end ROM of combination of plane movements but not at end of available range for each of the movements if they were to be applied in isolation
 - The use of these 'combined' movements produces the 'lock' position commonly referred to in osteopathic literature (Hartman 1985).

Nyberg R 1993 Manipulation: Definition, Types, Application. In: Basmajian JV, Nyberg R (Eds) *Rational Manual Therapies*, Williams and Wilkins: Baltimore pp. 21-47

Hartman LS 1985 *Handbook of Osteopathic Technique*, 2nd ed. Unwin Hyman: London

McCarthy CJ. Spinal manipulative thrust technique using combined movement theory. *Man Ther*. 2001 Nov;6(4):197-204.

C1-2 Combined Rotation Manipulation



Chin hold technique



Cradle hold technique

Risk Factors and Neck Movements Causing Vertebrbasilar Artery Dissection

- 367 cases of Vertebral Artery Dissection
 - 57% males & 43% females
 - mean age of 39.3 years
 - 160 of spontaneous onset
 - 115 cases of onset after manipulation
 - 58 cases associated to trivial trauma
 - 37 cases of major trauma

Haldeman S. Kohlbeck F. McGregor M. Risk factors and Precipitating Neck Movements Causing Vertebrbasilar Artery Dissection After Cervical Trauma and Spinal Manipulation. *Spine*, 1999, 24(8);785-794



Risk Factors and Neck Movements Causing Vertebrobasilar Artery Dissection

- Conclusion: no precipitating event found

Haldeman S, Kohlbeck F, McGregor M. Risk factors and Precipitating Neck Movements Causing Vertebrobasilar Artery Dissection After Cervical Trauma and Spinal Manipulation. *Spine*, 1999, 24(8);785-794

Haneline MT, Lewkovich GN. An analysis of the etiology of cervical artery dissection: 1994-2003. *JMPT*. 2005; 28:617-622

Risk Factors of Cerebrovascular Accident Associated with Cervical Spine Manipulation

- Haldeman (2002): CVA's due to cervical manipulations are unpredictable
- VBI testing unable to screen these patients at risk
- Any thrust technique should be preceded by informed consent and explanation to the patient that CVA symptoms are unpredictable, inherent, rare complication of cervical manipulation

Haldeman S, Kohlbeck F, McGregor M. Unpredictability of Cerebrovascular Ischemia Associated with Cervical Spine Manipulation Therapy. A Review of 64 Cases After Cervical Spine Manipulation. *Spine*, 2002, 27(1);49-55

Screening Guidelines - Cervical Manual Therapy

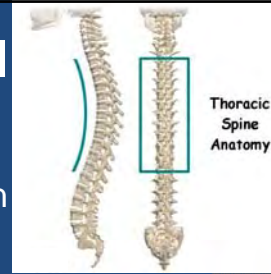
1. Inform the patient
2. Screen – rule out red flags
3. Document screening of the following via questionnaire:
 1. Dizziness
 2. Lightheadedness
 3. Nystagmus
 4. Impaired sensation to the face
 5. Blurred vision
4. Sustained Rotation for the above sx's
5. No thrust manipulation in the first session (because VBI symptoms are often delayed)
6. Monitor patient during all interventions and after all interventions

Mobilizations vs Manipulations Summary - Cervical

- Evidence suggest **no superiority of cervical manipulation over mobilization**
- Careful screening
- Know the contra-indications
- Consent
- No end ROM rotation
- More research to find if subgroup of patients with neck pain could benefit from cervical manipulations

What about Thoracic Spinal Manipulations?

- Thoracic Manipulations for Neck Pain



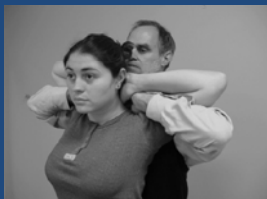
Browder DA, Erhard RE, Piva SR. Intermittent cervical traction and thoracic manipulation for management of mild cervical compressive myelopathy attributed to cervical herniated disc: a case series. *J Orthop Sports Phys Ther.* 2004;34(11):701-12.

Fernández-de-las-Peñas C, Palomeque-del-Cerro L, Rodríguez-Blanco C, Gómez-Conesa A, Miangolarra-Page JC. Changes in neck pain and active range of motion after a single thoracic spine manipulation in subjects presenting with mechanical neck pain: a case series. *J Manipulative Physiol Ther.* 2007 May;30(4):312-20.

Cleland JA, Childs JD, Fritz JM, Whitman JM, Eberhart SL. Development of a clinical prediction rule for guiding treatment of a subgroup of patients with neck pain: use of thoracic spine manipulation, exercise, and patient education. *Phys Ther.* 2007;87(1):9-23

Cleland JA, Glynn P, Whitman JM, Eberhart SL, MacDonald C, Childs JD. Short-term effects of thrust versus nonthrust mobilization/manipulation directed at the thoracic spine in patients with neck pain: a randomized clinical trial. *Phys Ther.* 2007 Apr;87(4):431-40.

- Thoracic Manipulations for Neck Pain –
The **American Physical Therapists Leading**



- Helpful as an adjunct treatment to
 - cervical traction (Browder)

Browder DA, Erhard RE, Piva SR. Intermittent cervical traction and thoracic manipulation for management of mild cervical compressive myelopathy attributed to cervical herniated disc: a case series. *J Orthop Sports Phys Ther.* 2004;34(11):701-12.

Thoracic Manipulations for Neck Pain

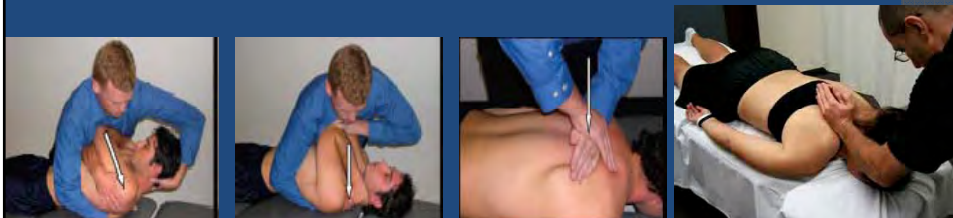
- Thoracic spine manipulation results in immediate analgesic effects in patients with mechanical neck pain.



Cleland JA, Childs JD, McRae M, Palmer JA, Stowell T. Immediate effects of thoracic manipulation in patients with neck pain: a randomized clinical trial. *Man Ther.* 2005 May;10(2):127-35.

Thoracic Manipulations for Neck Pain

- Thrust vs non-thrust
- **Thrust mobilization/manipulation better short-term reductions in pain and disability** than does thoracic nonthrust mobilization/manipulation in people with neck pain.



Cleland JA, Glynn P, Whitman JM, Eberhart SL, MacDonald C, Childs JD. Short-term effects of thrust versus nonthrust mobilization/manipulation directed at the thoracic spine in patients with neck pain: a randomized clinical trial. *Phys Ther.* 2007 Apr;87(4):431-40.

Thoracic Manipulations for Neck Pain

- 78 patients with neck pain
- No association between the number of “pops” and improvement of pain, function and mobility of the cervical spine.

Cleland JA, Flynn TW, Childs JD, Eberhart S. The Audible Pop from Thoracic Spine Thrust Manipulation and Its Relation to Short-Term Outcomes in Patients with Neck Pain. *Journal of Manual and Manipulative Therapy*. 2007; 15(3):143-154

Spinal Manipulation for Thoracic Pain

- This pilot study suggests that spinal manipulative therapy for mechanical thoracic pain has greater benefits than placebo treatment.
- Weakness: small sample size

Schiller L. Effectiveness of spinal manipulative therapy in the treatment of mechanical thoracic spine pain: a pilot randomized clinical trial. *J Manipulative Physiol Ther*. 2001 Jul-Aug;24(6):394-401.

Thoracic Manipulation for non-thoracic symptoms

- Cervicogenic headache (RCT)
- Upper Extremity CRPS (case study)
 - Joint manipulation of T3 & T4 segments
- T4 syndrome (case study)

Nilsson N, Christensen HW, Hartvigsen J. The effect of spinal manipulation in the treatment of cervicogenic headache. *J Manipulative Physiol Ther.* 1997;20(5):326-30.

Menck JY, Requejo SM, Kulig K. Thoracic spine dysfunction in upper extremity complex regional pain syndrome type I. *J Orthop Sports Phys Ther.* 2000 Jul;30(7):401-9.

Conroy JL, Schneiders AG. The T4 syndrome. *Man Ther.* 2005 Nov;10(4):292-6.

Complications of thoracic spine manipulations

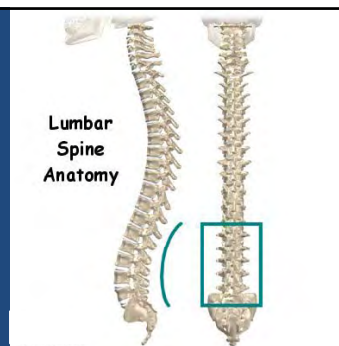
- Thoracic epidural hematoma
- Esophageal rupture
- Thoracic disk herniation
- Esophageal rupture
- Pathological fracture

Ruelle A, Datti R, Pisani R. Thoracic epidural hematoma after spinal manipulation therapy. *J Spinal Disord.* 1999 Dec;12(6):534-6.

Lanska DJ, Lanska MJ, Fenstermaker R, Selman W, Mapstone T. Thoracic disk herniation associated with chiropractic spinal manipulation. *Arch Neurol.* 1987 Oct;44(10):996-7.

Austin RT. Pathological vertebral fractures after spinal manipulation. *Br Med J (Clin Res Ed).* 1985 Oct 19;291(6502):1114-5.

What about Lumbar Spinal Manipulations?



- There is no evidence that spinal manipulative therapy is superior to other standard treatments for patients with acute or chronic low back pain.

Assendelft WJ, Morton SC, Yu EI, Suttorp MJ, Shekelle PG. Spinal manipulative therapy for low back pain. A meta-analysis of effectiveness relative to other therapies. *Ann Intern Med.* 2003 Jun 3;138(11):871-81

Lumbar spine manipulation: does it work?

- RCT comparing medication, acupuncture and spinal manipulation
- In patients with chronic spinal pain, manipulation, if not contraindicated, results in greater short-term improvement than acupuncture or medication.
- The data do not strongly support the use of only manipulation, only acupuncture, or only NSAIDS for the treatment of chronic spinal pain.

Giles LG, Muller R. Chronic spinal pain: a randomized clinical trial comparing medication, acupuncture, and spinal manipulation. *Spine.* 2003 Jul 15;28(14):1490-502; discussion 1502-3.

What about Lumbar Spinal Manipulations?

- Manual therapy significantly reduces low back pain.
- The level of pain reduction is greater than expected from placebo effects alone and persists for at least three months

Licciardone JC, Brimhall AK, King LN. Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials. *BMC Musculoskelet Disord.* 2005 Aug 4;6:43.

What about Lumbar Spinal Manipulations?

- The efficacy of spinal manipulation for patients with acute or chronic low back pain has not been demonstrated with sound randomized clinical trials.
- There are indications that manipulation might be **effective in some subgroups of patients with low back pain.**

Koes BW, Assendelft WJ, van der Heijden GJ, Bouter LM. Spinal manipulation for low back pain. An updated systematic review of randomized clinical trials. *Spine.* 1996 Dec 15;21(24):2860-71; discussion 2872-3.

Who benefits from lumbar manipulative therapy?

- Manual therapy, particularly manipulation, can be an effective modality when used to treat patients who have low back pain.
- A preliminary "profile" of the patient with low back pain who would likely benefit from manual therapy included
 1. acute symptom onset with less than a 1-month duration of symptoms
 2. central or paravertebral pain distribution
 3. no previous exposure to spinal manipulation
 4. no pending litigation or workers' compensation.

Di Fabio RP. Efficacy of manual therapy. Phys Ther. 1992 Dec;72(12):853-64.

Who benefits from lumbar manipulative therapy?

- CPR (Flynn, 2002)
- Refined by Fritz (2005)
 - symptom duration < 16 days
 - no symptoms distal to the knee

were associated with a good outcome with spinal manipulation.



Flynn T, Fritz J, Whitman J, Wainner R, Magel J, Rendeiro D, Butler B, Garber M, Allison S. A clinical prediction rule for classifying patients with low back pain who demonstrate short-term improvement with spinal manipulation. Spine. 2002 Dec 15;27(24):2835-43.

Fritz JM, Childs JD, Flynn TW: Pragmatic application of a clinical prediction rule in primary care to identify patients with low back pain with a good prognosis following a brief spinal manipulation intervention. BMC Family Practice 2005. 6:29.

Lumbar spine manipulation: does it work for discogenic pain?

- Lisi et al. (2005): systematic review
- HVLA Manipulation for symptomatic lumbar disk disease: **more high-quality clinical trials** using valid and reliable diagnostic criteria and outcomes measures are needed.
- Oliphant (2004): it is safe

Oliphant D. Safety of spinal manipulation in the treatment of lumbar disk herniations: a systematic review and risk assessment. *J Manipulative Physiol Ther.* 2004 Mar-Apr;27(3):197-210.

Lisi AJ, Holmes EJ, Ammendolia C. High-velocity low-amplitude spinal manipulation for symptomatic lumbar disk disease: a systematic review of the literature. *J Manipulative Physiol Ther.* 2005 Jul-Aug;28(6):429-42.

Complications of manipulations of the lumbar spine

- cauda equina syndrome
- spinal epidural hematoma in patients undergoing anticoagulant therapy
- esophageal rupture
- disc herniation

Whedon JM, Quebada PB, Roberts DW, Radwan TA. Spinal epidural hematoma after spinal manipulative therapy in a patient undergoing anticoagulant therapy: a case report. *J Manipulative Physiol Ther.* 2006 Sep;29(7):582-5.

Haldeman S, Rubinstein SM. Cauda equina syndrome in patients undergoing manipulation of the lumbar spine. *Spine.* 1992 Dec;17(12):1469-73.

Sozio MS, Cave M. Boerhaave's syndrome following chiropractic manipulation. *Am Surg.* 2008 May;74(5):428-9.

Spinal Manipulations for non-spinal pain: the Evidence

- There is insufficient evidence to support the use of manual therapies for patients with asthma.

Hondras MA, Linde K, Jones AP. Manual therapy for asthma. Cochrane Database Syst Rev. 2005 Apr 18;(2):CD001002.

Spinal Manipulations for non-spinal pain: the Evidence

- Manipulations for
 - Fibromyalgia
 - carpal tunnel syndrome
 - infantile colic
 - otitis media
 - dysmenorrhea and chronic pelvic pain
- Only very few randomized clinical trials exist.
- The claim that this approach is effective for such conditions is not based on data from rigorous clinical trials.

Ernst E. Chiropractic manipulation for non-spinal pain--a systematic review. N Z Med J. 2003 Aug 8;116(1179):U539.

Proctor ML, Hing W, Johnson TC, Murphy PA. Spinal manipulation for primary and secondary dysmenorrhoea. Cochrane Database Syst Rev. 2004;(3):CD002119.

Spinal Manipulations in Infants and Children: No

- Serious injuries reported:
 1. subarachnoidal hemorrhage, paraplegia
 2. severe headache
 3. midback soreness
 4. delayed diagnosis: diabetes, neuroblastoma and/or inappropriate provision of spinal manipulation for serious medical conditions (ie, meningitis).
- Serious adverse events may be associated with pediatric spinal manipulations
- No rotation thrust manipulations before age 16

Vohra S, Johnston BC, Cramer K, Humphreys K. Adverse events associated with pediatric spinal manipulation: a systematic review. *Pediatrics*. 2007 Jan;119(1):e275-83.

Summary

- Chiropractors, osteopaths and physical therapists perform spinal manipulations in the same fashion.
- The goals of their treatment differ somewhat
- No superiority of cervical manipulations over mobilizations
- Thoracic HVLA may be better for the management of patients with neck pain
- Lumbar spine manipulations in selected subgroup of patients
- Mobilizations and/or manipulations should be used in conjunction with education & exercises
- Careful screening
- Informed Consent when performing spinal manipulations

