

## Role of Chiropractic in Management of Pain

Natasha Kim, DC, DABCO, LAc  
 Rehabilitation Institute of Chicago  
 Spine and Sports Rehabilitation Center  
 nkim@ric.org

## Outline

- Understand Chiropractic medicine and it's role in management of pain
- Indications, Contraindications
- Efficacy
- Safety
- Predictors for favorable outcome with SMT
- Frequency, Duration

## Chiropractic

- "Health care approach that focuses on the relationship between the body's structure-mainly the spine-and functioning."\*
- 2007 National Health Interview Survey\*\*
  - 38% of Americans (4 out of 10) use CAM (Complementary and Alternative Medicine) within last year
  - Greater than 18 million adults within past 12 months (i.e., 8.6% adults) received Chiropractic or Osteopathic manipulation

\*National Center for Complementary and Alternative Medicine.  
 \*\*Barnes PM et al., 2008

## Approach to Patient Care

- Functional reactivation of the patient
  - Reassure patient
  - Relieve pain - to allow for reactivation
  - Reactivate - Introduce/maintain normal activity, exercise, patient education activity modification
    - Restore function
  - Self management

Liebenson C, 2007

## Guidelines

- NICE guidelines management of LBP\*
  - Non-specific LBP >6weeks and <12 months
  - Encourage staying active, exercise
  - Choice of manual therapy (manipulation/mobilization/massage) or exercise or acupuncture
- European Guidelines for Chronic LBP\*\*
  - Short course spinal manipulative therapy (SMT)
- Working Backs Scotland Guidelines\*\*\*
  - Stay active
  - Simple pain relief
  - If necessary, get advice

\*National Institute for Health and Clinical Excellence, 2009  
 \*\* Airaksinen O et al, 2006  
 \*\*\*Scotland's Working Backs Partnership, 2000

## Guidelines from American College of Physicians and American Pain Society (LBP):

- Stay active, self – care options
- Patient who do not improve with self care
  - Acute- SMT
  - Subacute, chronic-SMT, yoga, cognitive-behavioral therapy, progressive relaxation, exercise, acupuncture, massage, interdisciplinary rehab\*

\*Chou R et al, 2007

## Approach to Patient Care: Guidelines

- Bone and Joint Decade 2000-2010 Task Force (Neck Pain Task Force), 2008
  - Grade I: neck pain with no signs of major pathology, little or no interference with daily activities
  - Grade II: neck pain with no signs of major pathology, interference with daily activities
  - Grade III: neck pain with neurologic signs of nerve compression
  - Grade IV: neck pain with signs of major pathology

\*Guzman J et al, 2008

## Proposed Benefits of Manipulative Therapy

- Improved joint range of motion\*
- Relaxation of hypertonic muscles
- Decreased pain\*

\*Triano JJ et al, 1997  
 Kirkaldy-Willis et al, 1999

- Theories\*:

- Release of entrapped synovial folds or plica
- Relaxation of hypertonic muscle by sudden stretch
- Disruption of articular or periarticular adhesions
- Inhibition of central sensitization by increasing neurochemical pain inhibitors

\*Shekelle P, 1994

## Manipulative Therapy

- Biomechanical Theory\*:

- Intersegmental spinal buckling
- Potential stressors include:
  - Prolonged posture/static load (sit, flexion)
  - Sudden spinal load (jarring event spine)
  - Vibrational load to spine
- External load exceeds local tissue threshold, resulting in aberrant mechanics

\*Triano JJ, 2001

- Symptoms depend on structure affected: facet, ligament, nerve, muscle, disk

- SMT:

- 'Unbuckling' of motion segments that have undergone disproportionate displacement
- Reduces internal mechanical stressors, restore normal biomechanics, reduce symptoms

\*Triano JJ, 2001

## Manipulative Therapy

- Types of manipulation procedures

- Physician induced:

- Mobilization
- HVLA (High velocity, low amplitude)
- Unloaded spinal motion
  - Eg. Motorized table

- Physician guided:

- Muscle activation techniques

Triano JJ, 2001;  
Kim N, Triano JJ, 2006

## Indications

- Back/neck pain with and without radiating symptoms
- Symptom produced with palpation, provocation testing
- Joint, myofascial restriction
- Changes in tissue tone

## Relative Contraindications

- May require modification of manipulative technique utilized:
  - Acute disk herniation
  - Osteopenia
  - Patient on anti-coagulant medication
  - Bleeding disorder
  - Hypermobility
  - Psychologic overlay

\* DeFranca, 2007

## Absolute Contraindications

- Neoplasm
- Severe osteoporosis
- Bone Infection
- Inflammatory arthritis
- Acute fracture/dislocation
- Instability of spine
- Progressive neurologic deficits
- Vascular compromise
  - Eg. Vertebral artery compromise
  - Aneurysm
- Cauda equina
- Visceral referred pain

## Efficacy Spinal Manipulative Therapy (SMT) Low Back Pain

- Acute low back pain\*: Superior to placebo and sham
- SMT –acute and chronic LBP (moderate evidence)
  - Acute: short term pain relief compared to mobilization, physical modality
  - Chronic
    - SMT similar NSAID, short and long term pain relief
    - SMT/mobilization superior to PT, long term
    - SMT/mobilization superior to physical modalities and medical care, short term

\*Assendelft W et al, 2003  
 \*\* Bronfort G et al, 2004

## European Guidelines Chronic LBP

- Chronic non-specific LBP
  - Strong evidence: SMT and GP care similar
  - Moderate evidence:
    - SMT superior to sham improving short term pain and function
    - No less and no more effective than PT/exercise
    - No less and no more effective than back school
- Recommendation:
  - Consider short course SMT/mobilization as treatment option for chronic LBP

\* Airaksinen O et al, 2006

## Efficacy SMT for Chronic LBP

- Strong evidence
  - Similar to medical care + exercise instruction
- Moderate evidence
  - SMT + strengthening similar to NSAIDS plus strengthening
  - Flexion-distraction mobilization better than exercise
  - High dose SMT better than low dose in short term
  - Superior to standard medical care
  - Similar to PT short and long term

\* Bronfort et al 2008

## Efficacy SMT for Chronic LBP Con't

- Limited evidence
  - Better than PT and home exercise
  - Better than chemonucleolysis for herniated nucleus pulposus (HNP)
  - Inferior to exercise for HNP post op
  - Superior to hospital outpatient care for pain/disability
  - Superior to medications and acupuncture

\* Bronfort et al, 2008

## SMT & Exercise

- Niemisto L et al, 2003 (chronic LBP)
  - Compared SMT/exercise/physician group to physician consultation alone
  - Greater reduction pain, disability for combined group at 5 months, 1 year follow-up
- UK BEAM trial – greatest improvement noted in combined group vs SMT or exercise only
- Childs JD et al, 2004- significant improvement in disability SMT & exercise group vs exercise only

## Efficacy SMT Neck Pain

- Cochrane Database Review\*
- Multi-modal care including mobilization and/or manipulation with exercise
- No difference between mobilization/manipulation when performed alone or compared with other modalities
- Neck pain with radicular symptoms – uncertain

\*Gross AR et al, 2004

## Efficacy SMT Neck Pain

- Acute neck pain: inconclusive
- Chronic neck pain:
  - Moderate evidence
    - SMT/mobilization improvement physical function superior to GP management, and physical therapy, short term
    - SMT at most similar pain reduction to high technology rehab exercise, short and long term
- Mix acute and chronic neck pain:
  - Moderate evidence
    - SMT similar to mobilization (short and long term)
  - Mobilization
    - superior to PT (short, long term)
    - superior to medical care (short term)

\*Bronfort G et al, 2004

- Bone and Joint Decade 2000-2010 Task Force on Neck Pain and its Associated Disorders (Neck Pain Task Force)

- Grade I and II neck pain without trauma\*: exercises, mobilization, manipulation, analgesics, acupuncture, low level laser
  - Short term relief

- Grade I:
  - Reassure, self-care, remain active and avoid immobilization neck
  - Short course of treatment as noted above

\*Guzman J et al, 2008

- Thoracic manipulation

- Acute mechanical neck pain
- RCT, 45 subjects
- 2 groups: thoracic SMT and control group (no SMT)
- Both groups received : 6 sessions TENS, superficial thermotherapy, soft tissue massage

- Reduction in neck pain and improved cervical range of motion in subjects receiving thoracic SMT

\* Gonzalez-Iglesias et al, 2009

## Safety

- Side effects/Complications
  - Most common-minor local muscle, joint discomfort
  - Usually resolves 24-48 hrs
  - Cochrane Database review (mechanical neck pain)\*:
    - Benign, transient local spine pain, HA, dizziness, ear symptoms, radicular pain, distal paresthesia

\*Gross A et al, 2004

## Safety

- Severe complication - rare
  - Cauda equina or worsening HNP
    - < 1 / 1 000 000\*\*\*
    - 1 event per 3.72 million SMT\*\*\*\*
  - Cerebrovascular incident
    - Range from 1 in 400 000-500 000 to 1 in 3.85 million cervical SMT\*
    - Unpredictable in nature

\*Halderman S et al, 2002  
 \*\*\*Chou R et al, 2007  
 \*\*\*\*Oliphant D 2004

## Predictors of Favorable Outcome with SMT – Low Back Pain

- Clinical Prediction Rule\*
  - Segmental dysfunction/pain lumbar spine (at least 1 hypomobile segment)
  - LBP less than **16 days**
  - No radiating symptoms distal to knee
  - At least one hip with greater than 35 deg internal rotation
  - Low fear-avoidance beliefs score (<19)
- Most favorable response in those experiencing immediate improvement following first visit \*\*

\*Childs JD et al, 2004  
 \*\* Axen I et al, 2002

## Predictors of Favorable Outcome with SMT

### Neck Pain

- Thiel HW et al, 2008
  - Neck pain
  - Shoulder, arm pain
  - Reduced neck, shoulder, arm movement, stiffness
  - Headache
  - Upper, mid back pain
  - Number of presenting symptoms

## Predictors of Favorable Outcome with SMT

- Neck Pain

- Number of days with neck pain in preceding year
  - Predictive of all 3 outcome measures (neck pain, neck disability, perceived recovery)

- Working status
- Level of education
- Intermittent neck pain
- Tiredness
- Expected effectiveness
- General health
- Morning pain

} Predictive of 2 of 3 outcome measures

Rubinstein SM et al, 2008

## Clinical Prediction Rule\*

- Neck pain patients who may likely benefit from thoracic SMT

- Symptoms < 30 days
- No symptoms distal to shoulder
- Looking up doesn't aggravate symptoms
- FABQPA score <12
- Decreased upper thoracic spine kyphosis
- Cervical extension ROM <30 degrees
- If 3 of 6 variables present: probability of success increase from 54% to 86%
- If 4 of 6 variables present: probability of success 93%

\*Cleland JA et al, 2007

## Treatment Course

- Duration and frequency of SMT
  - Severity of condition
  - Goals: immediate and long term functional goals
- Low back with/without leg pain
  - Average 8 sessions for maximal improvement\*
  - Literature varies- eg. Haas et al, 2004

\*Triano JJ, 2003

## Summary

- Understand the role of Chiropractic medicine in management of pain
  - Goal- reactivate the patient, restore function
  - Indications, Contraindications
  - Efficacy
  - Safety
  - Predictors of favorable outcome with SMT
  - Frequency, duration

## References

- Airaksinen O et al. Chapter 4 European guidelines for the management of chronic nonspecific low back pain. *Eur Spine J* 2006 15 (Suppl. 2): S192-S300.
- Assendelft WJ et al. Spinal Manipulative Therapy for Low Back Pain. A Metaanalysis of Effectiveness Relative to Other Therapies. *Ann Intern Med* 2003;138:871-881.
- Axen I et al. Can Patient Reactions to the First Chiropractic Treatment Predict early Favorable Treatment Outcome in Persistent Low Back Pain? *J Man & Manipul Ther* 2002;25:450-454.
- Barnes PM et al. Complementary and Alternative Medicine Use among Adults and Children: United States, 2007. National Health Statistics Reports;12: 2008.
- Bronfort G et al. Efficacy of Spinal Manipulative Therapy for Low Back and Neck Pain: A Systematic Review and best Evidence Synthesis. *Spine J* 2004;4:335-356.
- Cassidy JD et al. Risk of Vertebrobasilar Stroke and Chiropractic Care: Results of a Population-Based Case-Control and Case-Crossover Study. *Spine* 2008 33:5176-5183.
- Cherkin DC et al. A Review of the Evidence for the Effectiveness, Safety, and Cost of acupuncture, Massage Therapy, and Spinal Manipulation for Back Pain. *Ann Intern Med* 2003;138:871-881.

- Childs JD et al. A Clinical Prediction Rule to Identify Patients with Low Back Pain Most Likely to Benefit From Spinal Manipulation: A Validation Study. *Ann Intern Med* 2004;141:920-928.
- Chou R et al. Diagnosis and treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society *Ann Int Med* 2007;147:478-491.
- Chou R et al. Nonpharmacological Therapies for Acute and Chronic Low Back Pain. *Ann Int Med* 2007;147:492-504.
- Cleland JA et al. 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;87:9-23.
- Cleland JA et al. Immediate effects of thoracic manipulation in patients with neck pain: A randomized clinical trial. *Manual Therapy* 10 (2005) 127-135.
- Cleland JA et al. Short Term Effects of Thrust Versus Nonthrust Mobilization/Manipulation Directed at the thoracic Spine in Patient with Neck Pain: A Randomized Clinical Trial. *Phys Ther* 2007;87:431-440.
- DeFranca G. Chapter 21-Manipulation Techniques for Key Joints. Rehabilitation of the Spine-A Practitioner's Manual. 2<sup>nd</sup> edition. Liebenson C (ed). Lippincott Williams & Wilkins, 2007.

- Gonzalez-Iglesias J et al. Inclusion of thoracic spine thrust manipulation into an electro-therapy/thermal program for the management of patients with acute mechanical neck pain: a randomized clinical trial. *Man Ther* 2009 Jun;14(3):306-13. Epub 2008 Aug 8.
- Giles LGF et al. A Randomized Clinical Trial Comparing Medication, acupuncture, and Spinal Manipulation. *Spine* 2003;28:1490-1503.
- Gouveia et al. Safety of Chiropractic Interventions *Spine* 2009;34:E405-E413
- Gross A et al. A Cochrane Review of Manipulation and Mobilization for Mechanical Neck Disorders. *Spine* 2004;29:1541-1548.
- Guzman J et al. Clinical Practice Implication of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and It's Associated Disorders; From Concepts and Findings to Recommendations. *Spine* 2008;33:S199-S213.
- Haas M et al: Cost-Effectiveness of Medical and Chiropractic Care for Acute and Chronic Low Back Pain. *J Man Manipul Ther* 2005;28:555-563.
- Haas M et al: Dose-response for Chiropractic Care of Chronic Low Back Pain. *Spine J* 2004 4:574-583.
- Hurwitz E et al. Treatment of Neck Pain: Noninvasive Interventions: Results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and it's Associated Disorders. *Spine* 2008;33:S123-S125.

- Kim N et al. Chapter 14-Manipulative Therapy. Orthopaedic Knowledge Update Spine. 3<sup>rd</sup> Edition. Spivak J et al (eds). American Academy of Orthopaedic Surgeons, 2006.
- Kirkaldy-Willis, W. Managing Low Back Pain. 4<sup>th</sup> ed. Elsevier Health Sciences, 1999.
- Morris C. Low Back Syndromes: Integrated Clinical Management. McGraw-Hill, 2006.
- National Center for Complementary and Alternative Medicine. Chiropractic: An Introduction. Available from: <http://nccam.nih.gov/health/chiropractic>.
- National Institute for Health and Excellence, May 2009. Available from: <http://www.nice.org.uk>
- Niemisto L etl al: a Randomized trial of Combined Manipulation, Stabilizing Exercise, and Physician consultaiton Compared to Physician Consultation Alone for Chronic Low Back Pain. *Spine* 2003;28:2185-2191.
- Oliphant D. Safety of Spinal Manipulation in the Treatment of Lumbar Disk Herniations: A Systematic Review and Risk Assessment. *J Man Manip Ther* 2004;27(3):197-210.

- Rubinstein SM et al. Predictors of a Favorable Outcome in Patients Treated by Chiropractors for Neck Pain. *Spine* 2008;33:1451-1458.
- Scotland's Working Backs Partnership 2000. Working Backs Scotland, [www.workingbacksscotland.scot.nhs.uk](http://www.workingbacksscotland.scot.nhs.uk)
- Thiel HW et al. Predictors for Immediate and Global Responses to Chiropractic Manipulation of the Cervical Spine. *J Manipulative Physiol Ther* 2008;31:172-183.
- Triano JJ. Biomechanics of Spinal Manipulative Therapy. *Spine J* 2001; 1(2):121-130.
- Triano JJ. Chapter 11-Manipulation. The Low Back Pain Handbook, 2<sup>nd</sup> Edition. Cole A, Herring S. (eds). Hanley & Belfus, Inc., 2003.
- Triano JJ et al. Use of Chiropractic Manipulation in Lumbar Rehabilitation. *J Rehabil Res Dev*. 1997 Oct;34(4):394-404.
- 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*. 2004;329:1377-1381.