chirosacademy

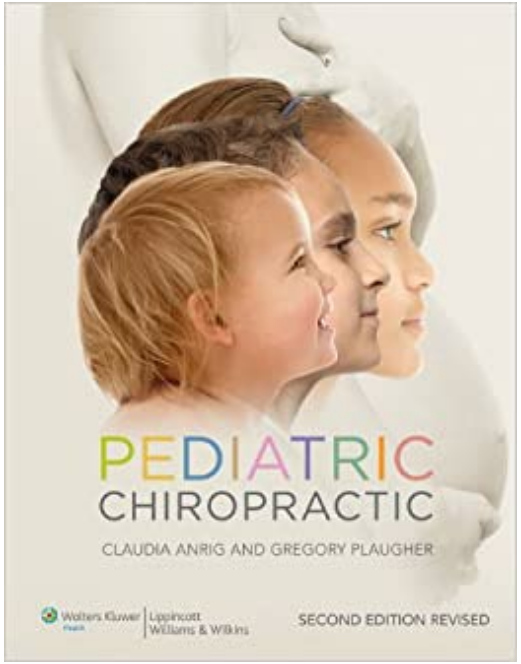
CLINICAL SCIENCE LEVEL 2

8 – Clincial Indicators of Vertebral Subluxations

Content

- Brief recap of what the contemporary view on the subluxation is.
- Introduce inter-examiner reliability.
- Introduce clinical indicators of vertebral subluxation.
- The reliability of each of these clinical indicators.
- How valid are our clinical indicators of vertebral subluxations?
- What does this research mean for us practicing chiropractors..
- How to communicate this information.
- Take-home summary messages.

Book References
to Support Power Points



Haavik H. (2022) The Contemporary Understanding of the Chiropractic Subluxation. Chapter 4 In: Anrig CA, Plaugher G, eds. Pediatric chiropractic: Wolters Kluwer/Lippincott Williams & Wilkins Health.

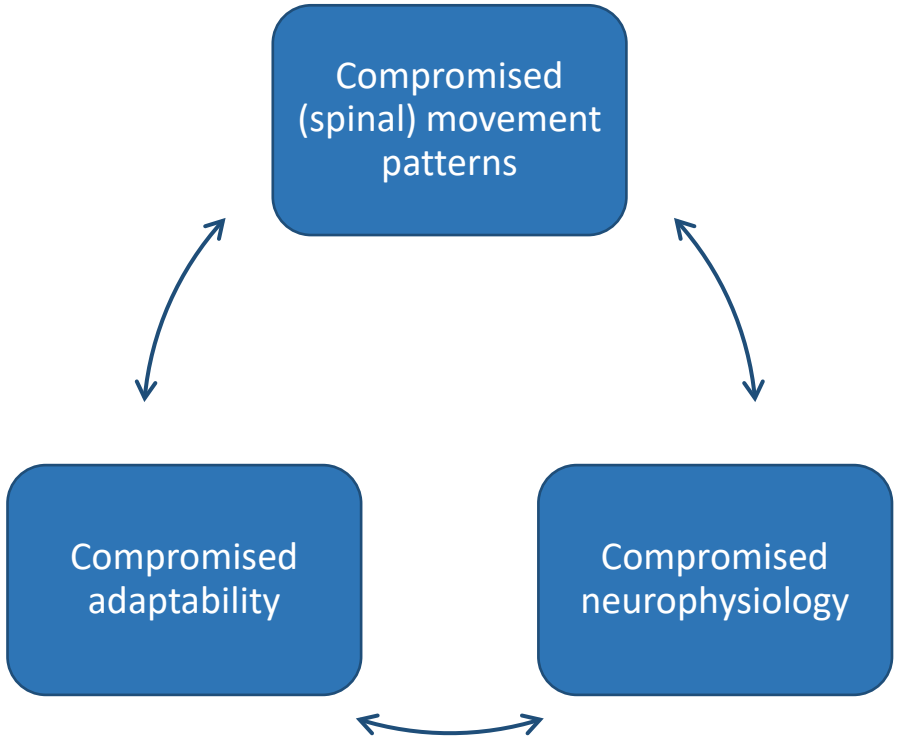
HAAVIK RESEARCH

The Contemporary Understanding of the Vertebral Subluxation

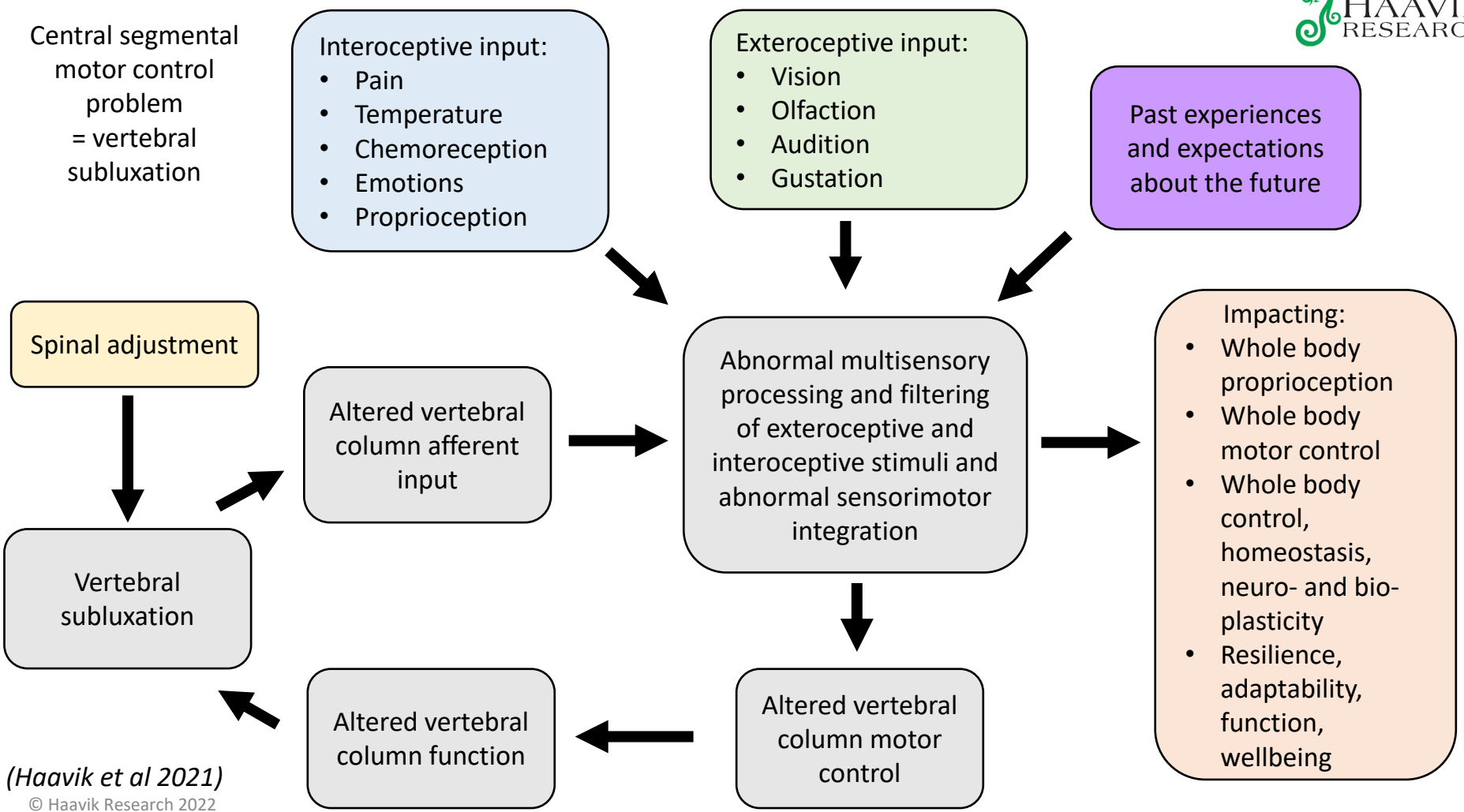
"We currently define a chiropractic subluxation as a self-perpetuating, central segmental motor control problem that involves a joint, such as a vertebral motion segment, that is not moving appropriately, resulting in ongoing maladaptive neural plastic changes that interfere with the central nervous system's ability to self-regulate, self-organize, adapt, repair, and heal."

(The Rubicon Group, 2017; Haavik et al 2021)

The Contemporary Understanding of the Vertebral Subluxation

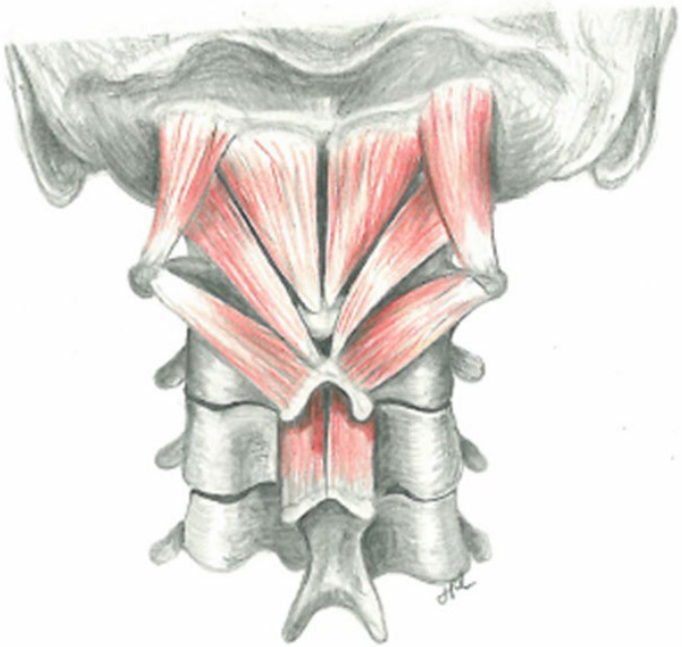


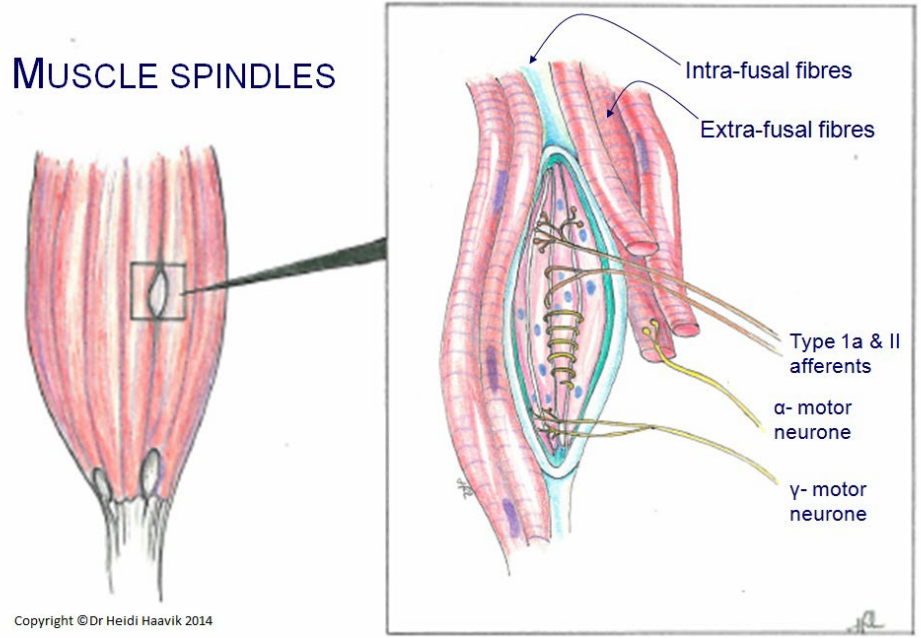
(The Rubicon Group, 2017; Haavik et al 2021)



(Haavik et al 2021)

The Contemporary Understanding of the Vertebral Subluxation





(Haavik et al 2021)

HAAVIK RESEARCH

ACUTE PERIOD

SUBACUTE/EARLY CRONIC PERIOD

CHRONIC PERIOD

Injury happens

MINUTES

DAYS

3-6 months

12 months +

Increased corticospinal drive to Multifidus

Localised Multifidus atrophy due to neural inhibition

Multifidus muscle fibrosis

Fatty infiltration

Slow-to-fast twitch fibre type change

Hypomobility
DJD around joint

Multifidus atrophy

TIME

(Haavik et al 2021)

The Contemporary Understanding of the Vertebral Subluxation

- What causes vertebral subluxations?
  - Stress (traumatic experiences that elicit the fight and flight response)
  - Trauma (physical injury to the spine)
  - Local Inflammation

- What is known to occur over several months to the small deep paraspinal muscles following injury, stress, or local inflammation:
  - Atrophy
  - Fatty infiltration
  - Fibrotic
  - Change of fibre type
  - Hypomobility
  - DJD around joint

(Haavik et al 2021)

What is Inter-examiner Reliability?

Can two different chiropractors find the same vertebral subluxations every time?

Vertebral subluxation assessment generally involves evaluating the maladaptive consequences that occur over time with vertebral join dysfunction.

P – Pain

A – Asymmetry

R – Range of motion

T – Tissue temperature/texture/tone

S – Special tests

Introduction to Clinical Indicators of Vertebral Subluxations

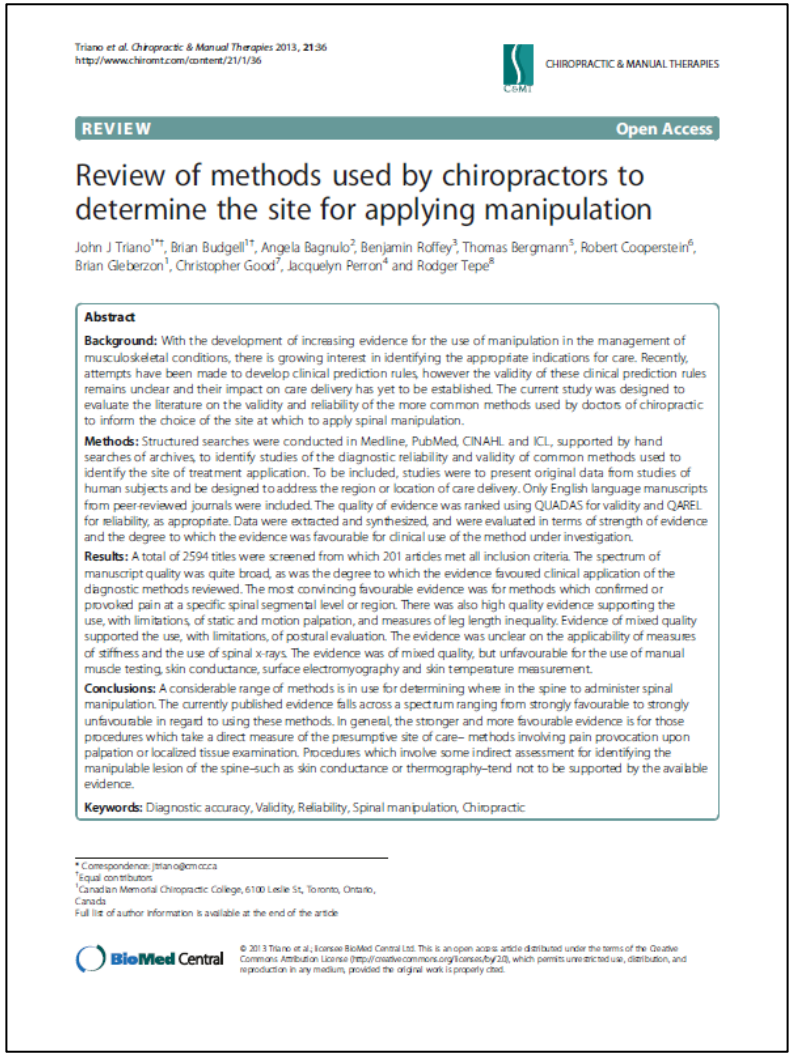
- Pain provocation,
- Palpatory stiffness
- Motion Palpation
- Leg length Inequality
- Manual muscle testing
- Instrumentation (x-ray, thermography and surface EMG in particular)
- Multi-test approach

HAAVIK RESEARCH

Inter-examiner Reliability & Validity

Triano, et al. 2013

- Review of methods used by chiropractors to determine the site for applying manipulation.
- Validity and reliability.



Triano et al. Chiropractic & Manual Therapies 2013, 21:36
http://www.chiromt.com/content/21/1/36

CHIROPRACTIC & MANUAL THERAPIES

REVIEW Open Access

Review of methods used by chiropractors to determine the site for applying manipulation

John J Triano[1*†], Brian Budgell[1†], Angela Bagnulo[2], Benjamin Roffey[3], Thomas Bergmann[5], Robert Cooperstein[6], Brian Gleberzon[1], Christopher Good[7], Jacquelyn Perron[4] and Rodger Tepe[8]

Abstract

Background: With the development of increasing evidence for the use of manipulation in the management of musculoskeletal conditions, there is growing interest in identifying the appropriate indications for care. Recently, attempts have been made to develop clinical prediction rules, however the validity of these clinical prediction rules remains unclear and their impact on care delivery has yet to be established. The current study was designed to evaluate the literature on the validity and reliability of the more common methods used by doctors of chiropractic to inform the choice of the site at which to apply spinal manipulation.

Methods: Structured searches were conducted in Medline, PubMed, CINAHL and ICL, supported by hand searches of archives, to identify studies of the diagnostic reliability and validity of common methods used to identify the site of treatment application. To be included, studies were to present original data from studies of human subjects and be designed to address the region or location of care delivery. Only English language manuscripts from peer-reviewed journals were included. The quality of evidence was ranked using QUADAS for validity and QAREL for reliability, as appropriate. Data were extracted and synthesized, and were evaluated in terms of strength of evidence and the degree to which the evidence was favourable for clinical use of the method under investigation.

Results: A total of 2594 titles were screened from which 201 articles met all inclusion criteria. The spectrum of manuscript quality was quite broad, as was the degree to which the evidence favoured clinical application of the diagnostic methods reviewed. The most convincing favourable evidence was for methods which confirmed or provoked pain at a specific spinal segmental level or region. There was also high quality evidence supporting the use, with limitations, of static and motion palpation, and measures of leg length inequality. Evidence of mixed quality supported the use, with limitations, of postural evaluation. The evidence was unclear on the applicability of measures of stiffness and the use of spinal x-rays. The evidence was of mixed quality, but unfavourable for the use of manual muscle testing, skin conductance, surface electromyography and skin tempeature measurement.

Conclusions: A considerable range of methods is in use for determining where in the spine to administer spinal manipulation. The currently published evidence falls across a spectrum ranging from strongly favourable to strongly unfavourable in regard to using these methods. In general, the stronger and more favourable evidence is for those procedures which take a direct measure of the presumptive site of care– methods involving pain provocation upon palpation or localized tissue examination. Procedures which involve some indirect assessment for identifying the manipulable lesion of the spine–such as skin conductance or thermography–tend not to be supported by the available evidence.

Keywords: Diagnostic accuracy, Validity, Reliability, Spinal manipulation, Chiropractic

* Correspondence: jtriano@cmcc.ca
† Equal contributors
[1] Canadian Memorial Chiropractic College, 6100 Leslie St., Toronto, Ontario, Canada
Full list of author information is available at the end of the article

Inter-examiner Reliability

Pain provocation

- You can tell if someone is sore by poking a sore part!
- **Favourable inter-examiner reliability.**

"Based on this research, we can conclude that both decreased movement at the level of the chiropractic subluxation, and/or repeated microtrauma due to faulty vertebral motor control, could both cause increased local inflammation around the area of chiropractic subluxation, that would be tender to the touch, which is a highly reliable clinical indicator of the presence of a subluxation."

(Triano et al 2013: Haavik 2022)

Inter-examiner Reliability

Palpatory stiffness

- Passive Joint Play (feeling for segmental stiffness).
- OK reliability if the stiff joint is also tender to touch (but this then falls under pain provocation, not stiffness).
- When not considering pain, reliability is not so convincing.

(Triano et al 2013)

Inter-examiner Reliability

Motion Palpation

- Very popular subluxation finding technique.
- Old studies found poor reliability - although Robert Cooperstein et al argues that some design flaws can account for the poor results in many trials.
- ICC – intraclass correlation coefficient.
- Using a better approach has shown **good inter-examiner reliability**!

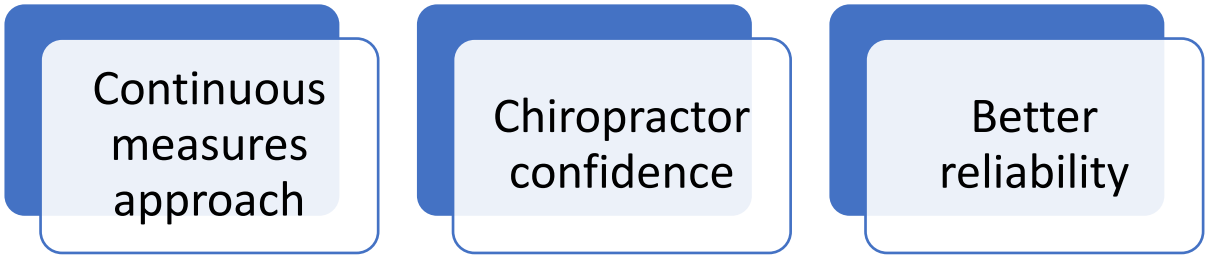
(Triano et al 2013; Cooperstein, 2013; Cooperstein et al, 2010; Cooperstein & Young, 2016a; 2016b; Holt et al 2018a)

Problems With These Past Studies About Reliability of Motion Palpation

- Forcing yes or no answer
- Which segment are you on
- Intraclass correlation coefficient assumption (equal chance of VS at every level)

(Triano et al 2013; Cooperstein, 2013; Cooperstein et al, 2010; Cooperstein & Young, 2016a; 2016b; Holt et al 2018)

A New and Better Scientific Approach



(Holt et al 2018; Cooperstein, 2013; Cooperstein et al, 2010; Cooperstein & Young, 2016a; 2016b)

Inter-examiner Reliability

Leg Length Inequality

- Reliability depends on method of leg length test but is overall favourable.
- **Derifield leg check has 'substantial' inter-examiner reliability.**
- **Activator technique has good reliability**, however only for the basic leg check approach – other common tests were not looked at.

(Triano et al 2013; Holt et al 2009; Nguyen et al 1999)

Inter-examiner Reliability

Manual Muscle Testing

- "Break test" – Applied Kinesiology.
- Mixed results for reliability.
- Not too sure about using it to identify a subluxation.

(Triano et al 2013; Conable & Rosner 2011; Rosner & Cuthbert 2012; Cuthbert & Goodheart 2007; Haas et al 2007; Rosner et al 2015)

Inter-examiner Reliability

Radiographic Imaging

- Not a lot of work has looked into x-ray analysis for identifying a subluxation.
- Gonstead system showed some good reliability results.

(Triano et al 2013)

Inter-examiner Reliability

Thermography and sEMG

- The jury is out… Reliability ranges from poor to excellent.

(Triano et al 2013)

Inter-examiner Reliability

Using Multiple Indicators

- Realistically, chiropractors use a range of techniques to identify subluxations so some studies reflected this.
- Reliable!

It can be stated with confidence that examiners using multiple subluxation indicators usually agreed on at least the motion segment containing the most positive vertebral subluxation test indicators, and very frequently on the exact same segment.

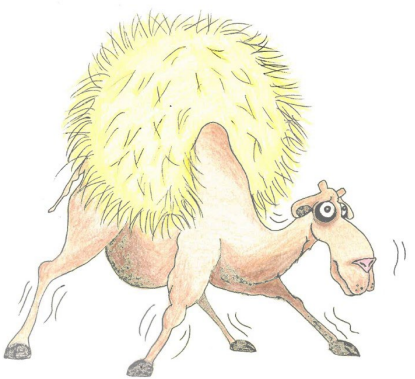
(Triano et al 2013; Holt 2018b)

What Does This Mean?

- Growing body of research shows that several different chiropractors can reliably identify vertebral subluxations, especially if they are using the following clinical indicators:
  - Pain provocation
  - Motion palpation (for stiffest joint)
  - Leg length inequality (although this does not specify where subluxation is)
  - Using a multi-test approach

- Next big question is how VALID are these tests?

How To Talk About This Research:



- Subluxations make it harder for the brain to accurately perceive (and therefore control) the spine, arms, and legs.
- This causes micro-traumas at the subluxated segments, that can become tender to touch.
- You (the chiropractor) can feel which segments don't move well, so can usually guess very accurately which spinal segments will be tender to touch.
- Subluxation will make it harder for the brain to evenly balance the legs, and this is not ideal when walking around, hence we check for leg length inequalities and also make sure they are even after adjusting them.
- Subluxations are by definition a central segmental motor control problem, meaning a change in messaging from the paraspinal muscles that makes it harder for the brain to perceive what is happening at that spinal segment, which makes it impossible for the brain to control the movement patter of that segment accurately or appropriately. This will inevitable cause microtraumas at that segment, which over time causes DJD and hypo-mobility (or stiffness).

Summary

- We currently define a chiropractic subluxation as a self-perpetuating, central segmental motor control problem that involves a joint, such as a vertebral motion segment, that is not moving appropriately, resulting in ongoing maladaptive neural plastic changes that interfere with the central nervous system's ability to self-regulate, self-organize, adapt, repair, and heal.

- That compromised spinal movement problem, compromises the brain's ability to accurately perceive what is going on inside them and around them, and this makes it hard for their brains to adapt appropriately.

- Interestingly, this does not just involve how the brain perceives and controls the spine, but also influences how the brain perceives and responds to internal signals and external signals, making it harder for the brain to appropriately control all body movements, normal bodily functions, resilience, adaptability, function, and wellbeing.

- That is why we always check the full spine for vertebral subluxations and adjust them where appropriate, independently of where the person may 'feel pain'.

- A subluxation can be caused due to vertebral injury, emotional or physiological stress and/or local inflammation.

Summary

A subluxation, once present, may start as a neurological problem, but can evolve over time, with changes to the tissues around the spine. E.g., small deep paraspinal muscles are known to become fibrotic, get fatty deposits, change fibre type, and atrophy over months and years after for example spinal injury. This joint will exhibit signs of degenerative joint disease and become hypomobile (stiff).

PARTS evaluation is a way to remember what the various clinical indicators are for locating vertebral subluxations:

P – Pain

A – Asymmetry

R – Range of motion

T – Tissue temperature/texture/tone

S – Special tests

Summary

- We looked at the reliability according to published research on:
  - Pain provocation – most reliable clinical indicators
  - Palpatory stiffness – stiffness alone not yet convincing
  - Motion Palpation – if using proper design good reliability
  - Leg length Inequality – good reliability (but not at identifying which segment is subluxated)
  - Manual muscle testing – not convincing when it comes to identifying subluxations
  - Instrumentation (thermography and surface EMG in particular) – not reliable
  - Multi-test approach – good reliability

- More research needs to be done to work out which analysis approaches have been examined using poor study methods, and which ones are actually unreliable.
- Need to test for validity!

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Thank You

DR. HEIDI HAAVIK

ENLIGHTENING THE WORLD ABOUT THE SCIENCE OF CHIROPRACTIC

HAAVIK RESEARCH

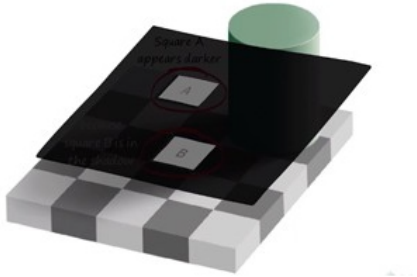
Introduction to Chiropractic Care

The introduction to chiropractic video series is the perfect way to gain an understanding of why chiropractic care may help you and your family.

The Beginners Guide to Chiropractic

In this first introductory video we explore what chiropractic is all about, and how it works, then we briefly explore the evidence informed effects of chiropractic care.

View video ›



How the Brain Perceives the World

Did you know that your brain and central nervous system are constantly changing? It's quite amazing – from one day to the next your brain is not the same.

View video ›

The Beginners Guide to Chiropractic

The Beginners Guide to Chiropractic

The word chiropractic derives from the Greek words "cheir", meaning hand, and "practikos" meaning skilled in or concerned with. The origin of the word chiropractic can be traced back to D.D. Palmer who coined it in 1895 when he founded chiropractic.

> Chiropractic care is really about total health and wellbeing

What does a Chiropractor do?

A chiropractor is a healthcare professional who specializes in the health and function of the spine and nervous system. Because of this focus on the spine, many people think chiropractors can only help with problems such as back pain, neck pain and headaches. They can often help with these issues but there is much more to chiropractic than just pain.

This is the first video in our animated series "Introduction to Chiropractic". In this video, we outline what a chiropractor does, then we briefly explore the effects of care. It is a perfect one to watch for anyone that is curious about chiropractic care, and how it can help their family.

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The Beginners Guide to Chiropractic

In this first introductory video we explore what chiropractic is all about, and how it works, then we briefly explore the evidence informed effects of chiropractic care.

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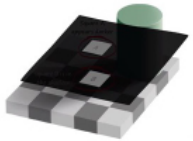


How the Brain Perceives the World

Did you know that your brain and central nervous system are constantly changing? It's quite amazing – from one day to the next your brain is not the same.

View video ›

Break the Pain Cycle

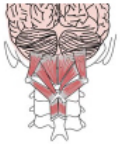
Did you know that pain is created in your brain to let you know that something is not ok within your body? Feeling pain is good because it is actually helpful and informative.

View video ›

Chiropractic Care and Migraines

Did you know that 1 in 6 people in the world experience migraines regularly? The World Health Organisation consider them to be the most debilitating of all neurological disorders.

View video ›



Chiropractic Affects your Brain

Your brain receives information about your body from the environment and your organs. Did you know that the muscles in your body are also sensory organs?

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What is that Pop?

If you have been adjusted before by a chiropractor you may have noticed a strange popping sound. Don't worry – it is just the formation of gas within a joint.

View video ›

Lower Back Pain

Scientists have worked out that at any one time, over 500,000,000 people around the world are suffering from low back pain and it is now the leading cause of disability worldwide.

View video ›

Growing Pains

We've all heard of growing pains right? But did you know that what we call growing pains aren't associated with growing? So they're not actually growing pains at all.

View video ›

Pain and the Immune System

Research studies have shown that the way you feel pain all depends on what's going on for you – and most importantly – what you think and feel about the situation.

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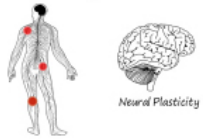
Chiropractic and Headaches

Headaches are a sign that something is not right. Your brain will create for you the sensation of pain if it thinks there is something wrong or if there is a potential problem.

View video ›



Pain is Created in Your Brain

Did you know that the scientists now know that the feeling of pain is something your brain decides that you should experience – if it believes that there is a problem?

View video ›

Chronic Pain

Chronic pain is the second-most common reason people see a doctor and miss work. More than one-third of people with chronic pain become disabled by their pain to some degree.

View video ›

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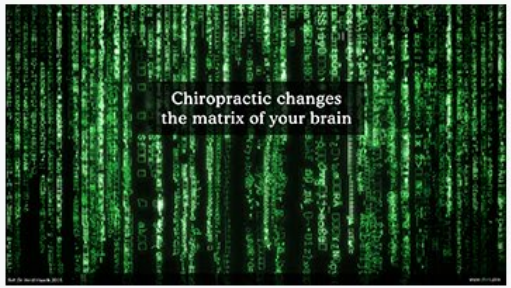

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Chiropractic Research

Research summary articles to read, download and print (members only) all backed by the latest scientific research studies.

Chronic Pain

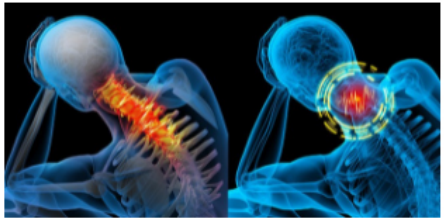
Chronic pain that has persisted for more than 3 months is no longer protective, nor informative. So, what is chronic pain and what can you do about it?

Read more »

Pain is in the Brain

Sometimes pain persists long after tissue damage has actually healed. When pain persists for more than three months we call this chronic pain.

Read more »



Neck Pain

Up to half the world's population suffers from neck pain at some stage. For some, one big problem is that it just keeps coming back, or becomes chronic.

Read more »

UNDERSTANDING PAIN

Dr. Kelly Holt
BSc, BSc(Chiro), PGDipHSc, PhD

Dr. Heidi Haavik
BSc(Physiol), BSc(Chiro) PhD

Experiencing pain is normal. Everyone experiences pain now and then.[1] Pain is supposed to be protective to make you stop doing things that may be dangerous.[2] But chronic pain that has persisted for more than 3 m hs is no longer protective, nor tive.[3] So, what is chronic pain and ut it if you suffer from it?

PAIN IS CREATED IN THE BRAIN

Dr. Kelly Holt
BSc, BSc(Chiro), PGDipHSc, PhD

Dr. Heidi Haavik
BSc(Physiol), BSc(Chiro) PhD

Did you know that scientists now know the feeling of pain is something your brain decides you should experience if it believes there is some tissue damage in your body?[1] In fact, your brain can decide that you should feel pain even if it only thinks there is a potential threat of tissue damage!!![2-5]

It may seem strange, but it's totally up to your brain to decide whether you should feel pain or not. Your brain may decide you should experience pain even if you have no actual tissue damage yet,[6] or your brain may not create the feeling of pain for you when tissue damage has actually occurred![7,8]

heals the problem.[1] This pain is helpful and informative.[1] If we listen to our body these pain experiences can be a good thing.

But for some people, pain can persist even after the initial injury that caused it healed.[9,11,12] And for some people, the pain areas that are not injured at

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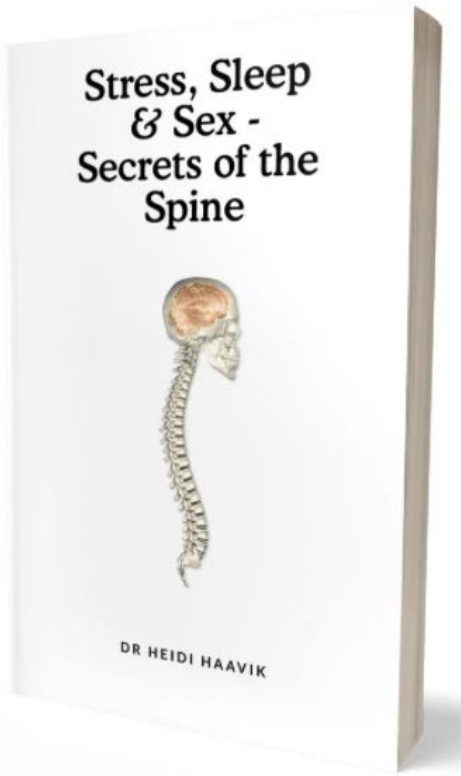
NECK PAIN AND FALLS RISK

Dr. Kelly Holt
BSc, BSc(Chiro), PGDipHSc, PhD

Dr. Heidi Haavik
BSc(Physiol), BSc(Chiro) PhD

Neck pain is very common throughout the world.[1] Up to half of all people around the world suffer from neck pain at some stage each year.[2-5] For some people, one big problem with neck pain is that it just keeps coming back, or becomes chronic, and may even increase their risk of suffering from a fall.[2,4,6,7]

Scientists know that your brain uses sensory information from your muscles and joints around your spine to help control your balance and posture and to make sure you're moving properly.[1,2] When your brain takes sensory information and uses it to help guide movements and control muscles we call this sensorimotor function.[8] One particular study looked at whether neck pain has an impact on proper sensorimotor function in older people.[7] In this study, the researchers ran a whole lot of tests of sensorimotor function, like how well the study participants controlled the movement of their eyes and how good their balance was, and they took into account their age and other conditions that they suffered from.[7]



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