



# Palpation: From Past to Present

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THE BRITISH SCHOOL OF OSTEOPATHY



# Objectives

## ☐ Palpation

- ☐ Overview of current situation with osteopathic understanding of palpation

- ☐ Overview of the educational situation

## ☐ What are the issues with palpation?

- ☐ How do we use palpation to diagnose?

- ☐ What do we palpate?

- ☐ Communication/terminology – how do we describe findings?

- ☐ How reliable is it as a tool – who says what's right?

- ☐ How do we teach it?



# The Hand:

THE INSTRUMENT OF  
OUR DISTINCTION.



A.T. Still

**Jusepe (José) de Ribera**

**Allegorie of the sense of  
touch**

**1613**



# Diagnosis

to distinguish/discern  
through knowledge  
(Gk. dia [through]  
gnosis [knowledge])

If Palpation is used to Diagnose,  
what is it Knowledge of?



# Medical & Osteopathic Diagnosis

- ❑ A diagnosis is both the **pre-existing set of categories** agreed upon by the medical profession to designate a specific condition it considers pathological, and the process, or deliberate judgment, by which such a label is applied
- ❑ It organizes illness: identifying treatment options, predicting outcomes, and providing an **explanatory framework**<sup>1, 2</sup>
- ❑ Diagnosis also provides a **cultural expression** of what society is prepared to accept as normal and what it feels should be treated<sup>1</sup>
- ❑ Osteopaths and osteopathic physicians extensively use palpation to diagnose, treat and monitor changes. **What are we diagnosing?**

<sup>1</sup>Baxter M. Diagnosis as a category and process: the case of alcoholism. *Social Science and Medicine* 12, 9 – 17, 1978

<sup>2</sup>Jutel A. Sociology of diagnosis: a preliminary review. *Sociology of Health and Illness* 31(2): 278 – 299, 2009

# ...diagnosis is interpretive and organizational

”It provides structure to a narrative of dysfunction, or a picture of disarray, and impose official order, sorting out the real from imagined, the valid from the feigned, the significant from the insignificant. On the other hand, diagnosis is an important site of contest and compromise, because it is a relational process with different parties confronting illness with different explanations, understandings, values and beliefs”

## **Intraprofessional Challenges: explanations, understandings, values and beliefs**

- ☐ Pragmatic value system built on common sense: A.T. Still comparatively and metaphorically speaking of man as a machine and fixing disordered anatomy
- ☐ Osteopathic lesion: looking for anatomical and histopathological evidence
- ☐ “Only the tissues know”: the lived experience of palpation and learning / skill acquisition from immersion in the healing process (Sutherland, Becker....)
- ☐ Multiplicity of diagnostic models: muscle energy techniques, functional techniques, counterstrain, HVLA



# Palpation and Diagnosis – What links them?

- What is palpation finding and interpreting?
  - Pathology? Lesion?
  - Normality?
  - Health?
  - Dysfunction? Pre-pathology?
  - Energy?
  - Motion
  - Stillness?
  - All of the above – None of the above
- Or does palpation do something else?

# Palpation – Possible alternatives??

- What else might palpation achieve?
  - Integrating sensations
  - Sensitizing or desensitizing neural pathways
  - Establishing or re-establishing patterns of recognition within the brain
  - Comforting/relaxing/calming – a new heuristic
  - Making a ‘bridge’ between a patient and their external world
  - Generating a new complex adaptive system

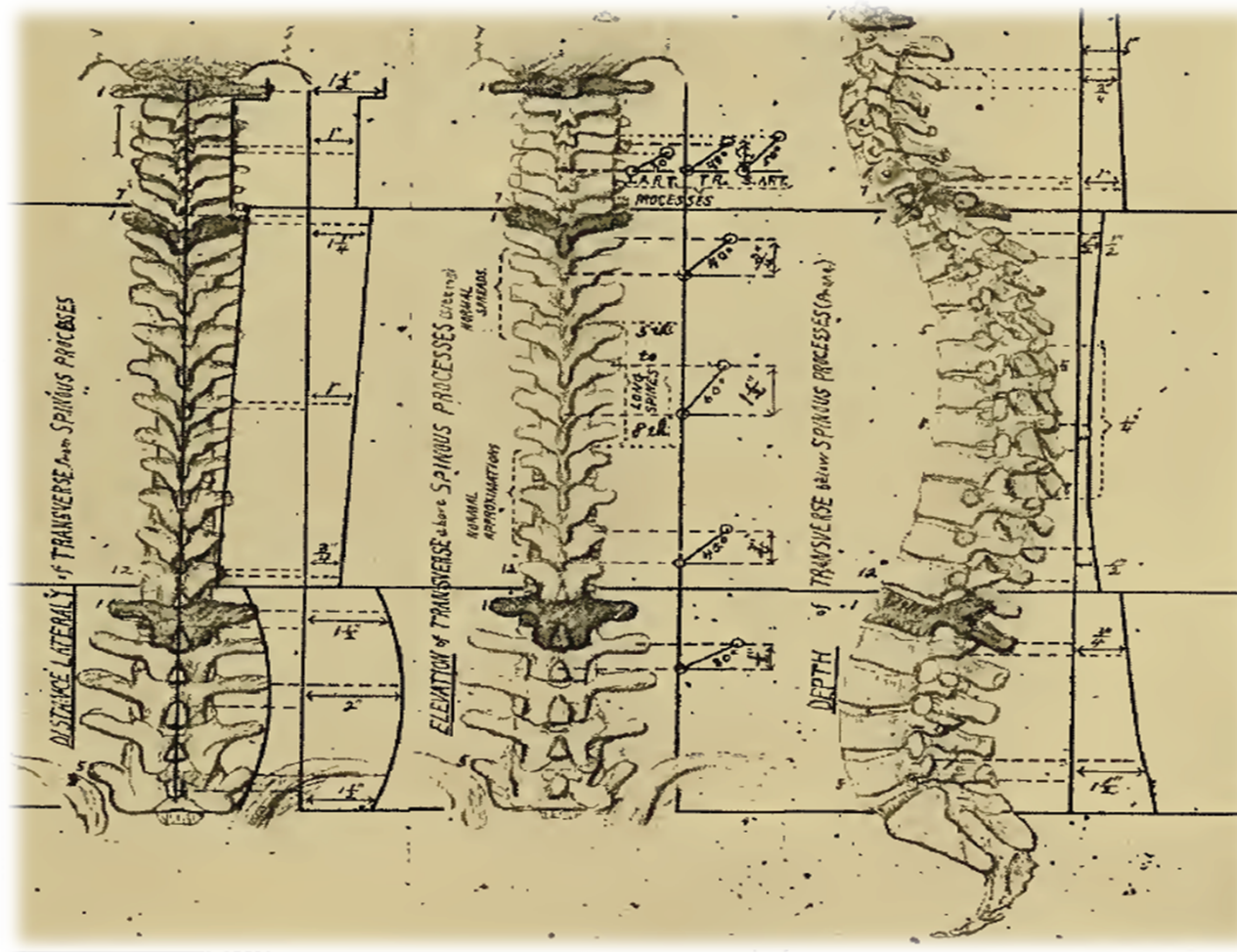
# From “twisted vertebrae” to somatic dysfunction

Descriptions	
<input type="checkbox"/> Challenges use of word ‘dislocation’ <input type="checkbox"/> Muscular contractions causing stiff joints	Barber (1896)
<input type="checkbox"/> Palpatory diagnosis of soft tissues and bony elements for tissue texture abnormalities, temperature changes, trophic changes and tenderness	Barber (1898)
<input type="checkbox"/> Spinal stiffness and rigidity <input type="checkbox"/> Due to contraction of multifidus, inter-spinal and intertransversalis muscles	Davenport (1903)
<input type="checkbox"/> Lesion: function of the articulations of the bone are impaired <input type="checkbox"/> Muscular contractions, ligamentous shortening, inflammatory deposits <input type="checkbox"/> Loss of movements in the joints	Clark (1906)
<input type="checkbox"/> Motion rather than position	Clark (1907)
<input type="checkbox"/> Loss of motion was the cardinal feature	McCole (1935)

## Terminology commonly used:

- ☐ Sprain
- ☐ Strain
- ☐ Twisted vertebrae
- ☐ Deviation
- ☐ Disordered anatomy
- ☐ Subluxation
- ☐ Dislocation
- ☐ Displacement
- ☐ Derangement
- ☐ Bony lesion
- ☐ Lesion
- ☐ Osteopathic lesion
- ☐ Spinal lesion

# Detailed Studies on Landmarks of the Spine



Bigsby MH. *Osteopathic diagnosis and technique with chapters on osteopathic landmarks*. New Jersey: Commercial Printing House 1907

# The Educated Touch: Palpatory Methods in Diagnosis

- ❑ Bigsby MH. *Osteopathic diagnosis and technique with chapters on osteopathic landmarks*. New Jersey: Commercial Printing House 1907
- ❑ Burns L. Palpation and pathology. *J Am Osteopath Assoc*. 28: 673, May 1929
- ❑ Hildreth AG. The Sense of Touch in Osteopathic Treatment. *J Am Osteopath Assoc*, 1932 (Dec.) 32:139-141
- ❑ McCole GM (ed). *An analysis of the osteopathic lesion*. Great Falls, MO: McCole Publisher 1935
- ❑ Carter HV. A Unique Diagnostic Aid. *J Am Osteop Assoc*. 1937 (Aug.) 26 :1006-1007
- ❑ Van Allen P. The Educated Touch. *Osteop. Mag.*, 1938 (Dec.) 25: 19, 10, 27
- ❑ Van Allen P, Stinson J. The development of palpation. *J Am Osteopath Assoc*. 1941; 40(5): 207 – 208
- ❑ Van Allen P, Stinson J. The development of palpation 2. *J Am Osteopath Assoc*. 1941; 40(6): 276-278
- ❑ Burns L. The teaching of osteopathic skills. *J Am Osteopath Assoc*. 46: 218, December 1946
- ❑ Webster GV. The feel of the tissues. Carmel: *Academy of Applied Osteopathy Yearbook* 1947
- ❑ Beal MC. Motion sense. *J Am Osteopath Assoc*. 53(3); November 1953: 151 - 153
- ❑ Mitchell FL Jr. the training and measurements of sensory literacy in relation to osteopathic structural palpatory diagnosis. *J Am Osteopath Assoc*. 1976; 75: 881

Considerable time has been spent discussing the art and extensiveness of palpation in osteopathic practice



# Signs and Symptoms of the Lesion

## I. Objective signs (discovered on examination)

1. Rigidity of vertebral joint tissues
  - a. Muscular
  - b. Ligamentous
  - c. Fascial
2. Malposition of bony parts
3. Perversion of movement
  - a. Deficient amount
  - b. In certain directions only
  - c. In certain positions only
4. Thickening of deep tissues
5. Contractures
6. Contractions
7. Impaired resilience of joint
8. Postural stress
9. Localized edema
10. Redness and warmth of skin over joint
11. Palor and coldness of skin over joint
12. Dilation of veins of skin over joint
13. Roughening of skin over joint

## II. Subjective signs (disclosed by patient)

1. Tender points (discovered by palpation)
  - a. At and between spinous processes
  - b. In tissues besides spinous processes
  - c. Over articular facets
  - d. Between rib heads
  - e. Between rib shafts
  - f. Between transverse processes
  - g. At costo-chondral junctions
2. Pain
  - a. In spinal joint tissues
  - b. Radiating from the spine
  - c. In back muscles
  - d. Along nerve courses
3. Pain
  - a. Constant
  - b. When muscles contract and joints move
  - c. On passive motion with muscles relaxed

## III. Therapeutic Signs

## IV. Deductive Signs

# The Diagnostic Triad: A.R.T.

“The effect of treatment is judged by reviewing the diagnostic triad – tissue, position and motion change” (Beal, 1951)

- ❑ Numerous papers and texts previously focused on palpation of temperature, skin drag, pain and tenderness, position of bony landmarks
- ❑ The diagnostic triad of somatic dysfunction (osteopathic lesion) was eloquently summarized by Beal in his 1951 paper “Motion Sense”
- ❑ Methodically introduced in teaching at the Kirksville College of Osteopathic Medicine in the 1970s by Dr. Paul Kimberly, DO, FAAO
- ❑ Was not incorporated consistently in osteopathic teaching methodology until Greenman’s seminal text “*Principles of manual medicine*” in 1989
- ❑ Extended in the 1990s to T.A.R.T.
- ❑ Alternative abbreviation suggested S.T.A.R.
- ❑ Somatic dysfunction and associated clinical findings through T.A.R.T. is included in the *Glossary of Osteopathic Terminology*

# Terminology: Semantic Dysfunction

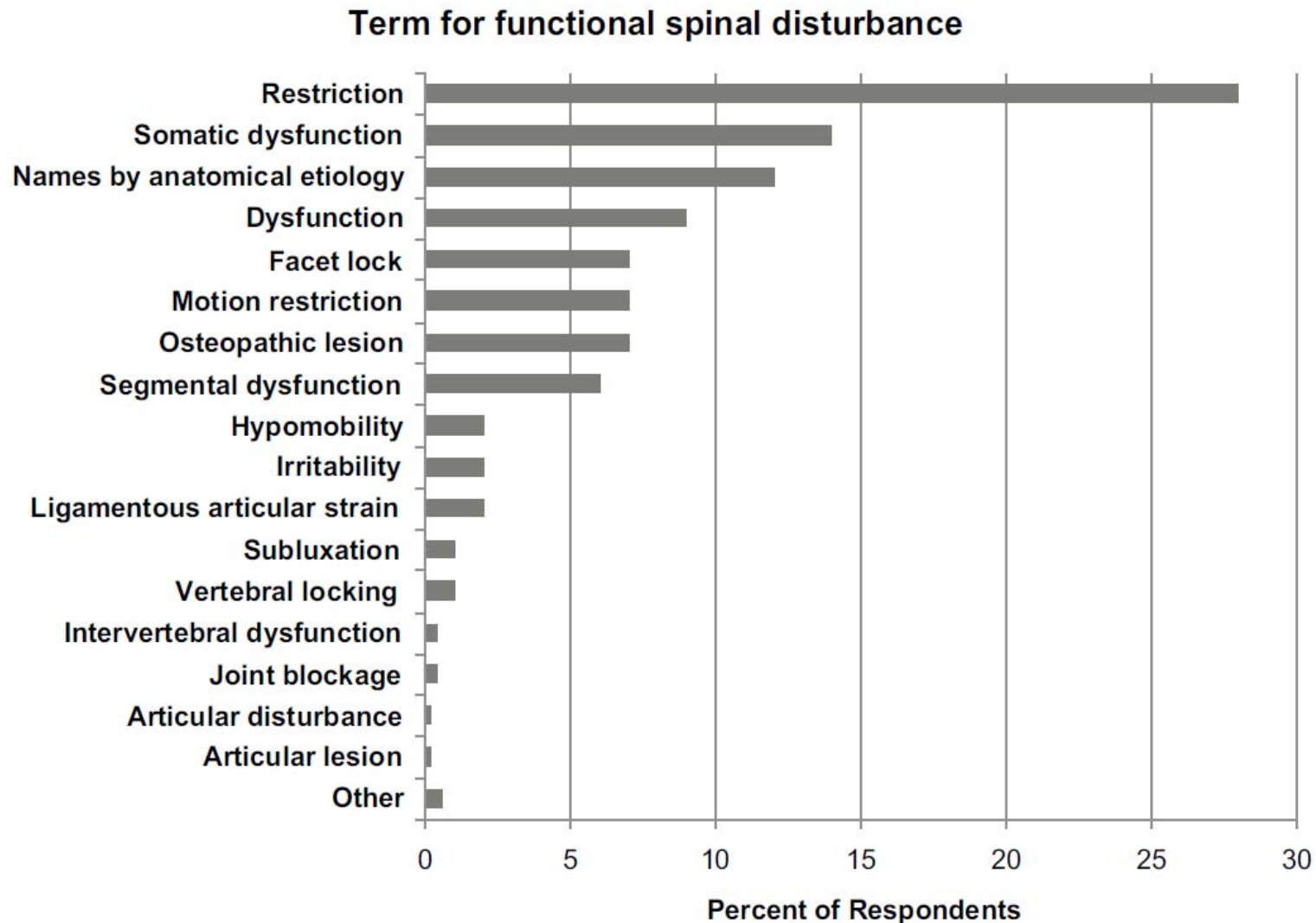
- ❑ Even though a historical ownership has been granted<sup>1</sup>, the *articular lesion* or *dysfunction* is not unique to the osteopathic profession
- ❑ A 1996 study by Rome<sup>2</sup> identified 296 synonyms for this entity
- ❑ Despite the official definition of somatic dysfunction adopted by the HA-ICD and included in the *Glossary of Osteopathic Terminology*, it is not universally accepted or used
- ❑ A 2010 study of the U.K. osteopathic profession revealed multiple terms used to describe this palpatory diagnosis<sup>3</sup>

<sup>1</sup>Cyriax EF. Commentary. *British Medical Journal* Nov 7, 1925, p. 869; Gibbons P, Tehan P, *The intervertebral lesion: a professional challenge*. *British Osteopathic Journal* XXII (2000): 11-16

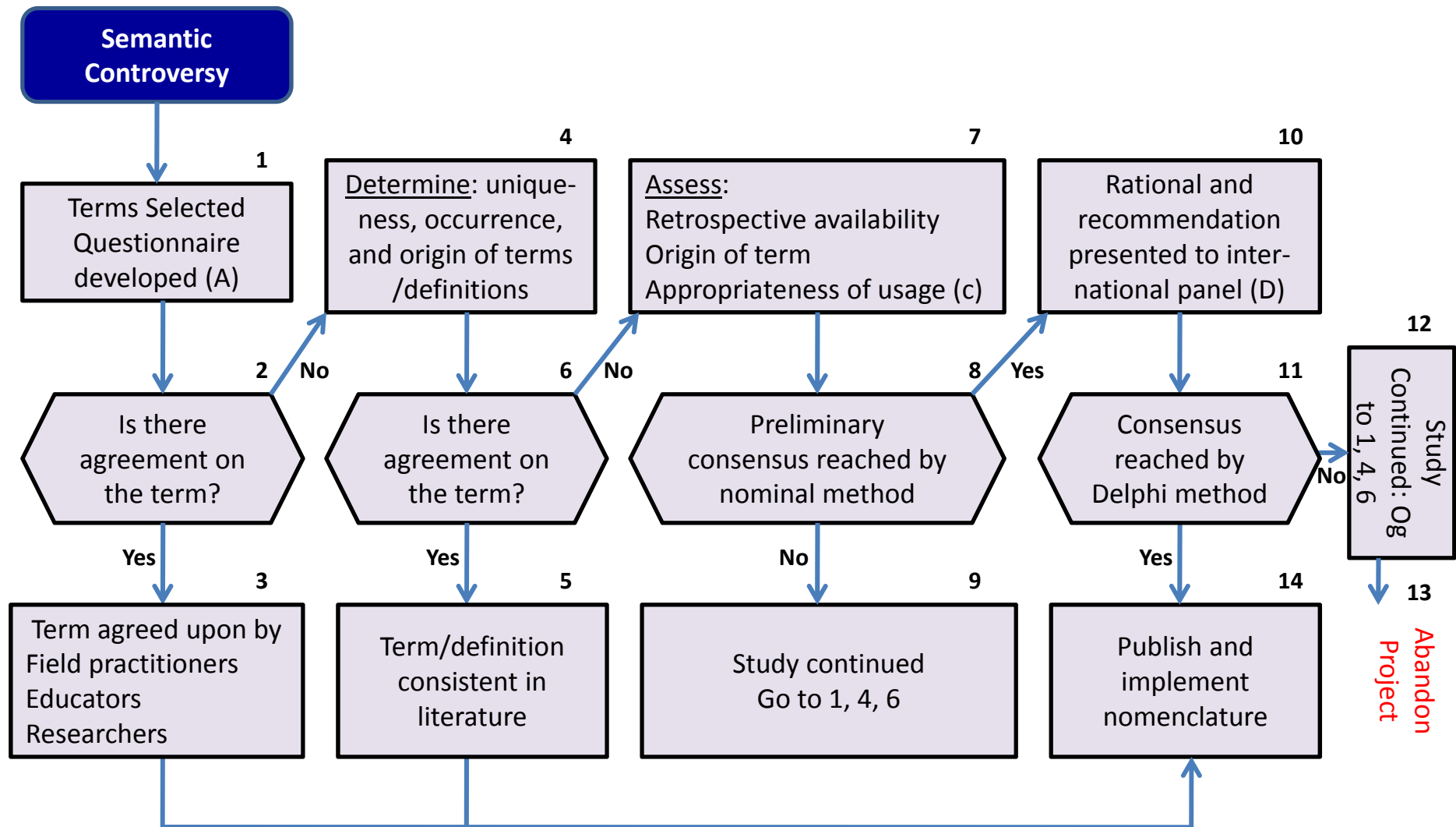
<sup>2</sup>Rome PL. Usage of chiropractic terminology in the literature: 296 ways to say “subluxation”. *Chiropractic Technique* 1996; 8: 49 – 60

<sup>3</sup>Fryer G, Johnson JC, Fossum C. The use of spinal and sacroiliac joint procedures within the British osteopathic profession. Part 1: Assessment. *International Journal of Osteopathic Medicine* 13(2010): 143 - 151

Fryer G, Johnson JC, Fossum C. The use of spinal and sacroiliac joint procedures within the British osteopathic profession. Part 1: Assessment. *International Journal of Osteopathic Medicine* 13(2010): 143 - 151



# Terminology assessment model







What does the  
literature say?

What are the  
current  
challenges?

# Learn the basics and conform to standards

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Masterclass

## Diagnostic reliability in osteopathic medicine

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Epidemiology

## BMC Medical Research Methodology



Open Access

Research article

### Reproducibility of the STARD checklist: an instrument to assess the quality of reporting of diagnostic accuracy studies

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## The development of a quality appraisal tool for studies of diagnostic reliability (QAREL)

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# Motion Palpation Interexaminer Reliability Studies

- ❑ Number of studies: 48
- ❑ Study dates: 1980 - 2007
- ❑ Providers: DOs / DCs / PTs
- ❑ Number of “descriptors” in reporting: 17

- ✓ Inconclusive
- ✓ None
- ✓ Not Acceptable
- ✓ None to Slight
- ✓ Almost None

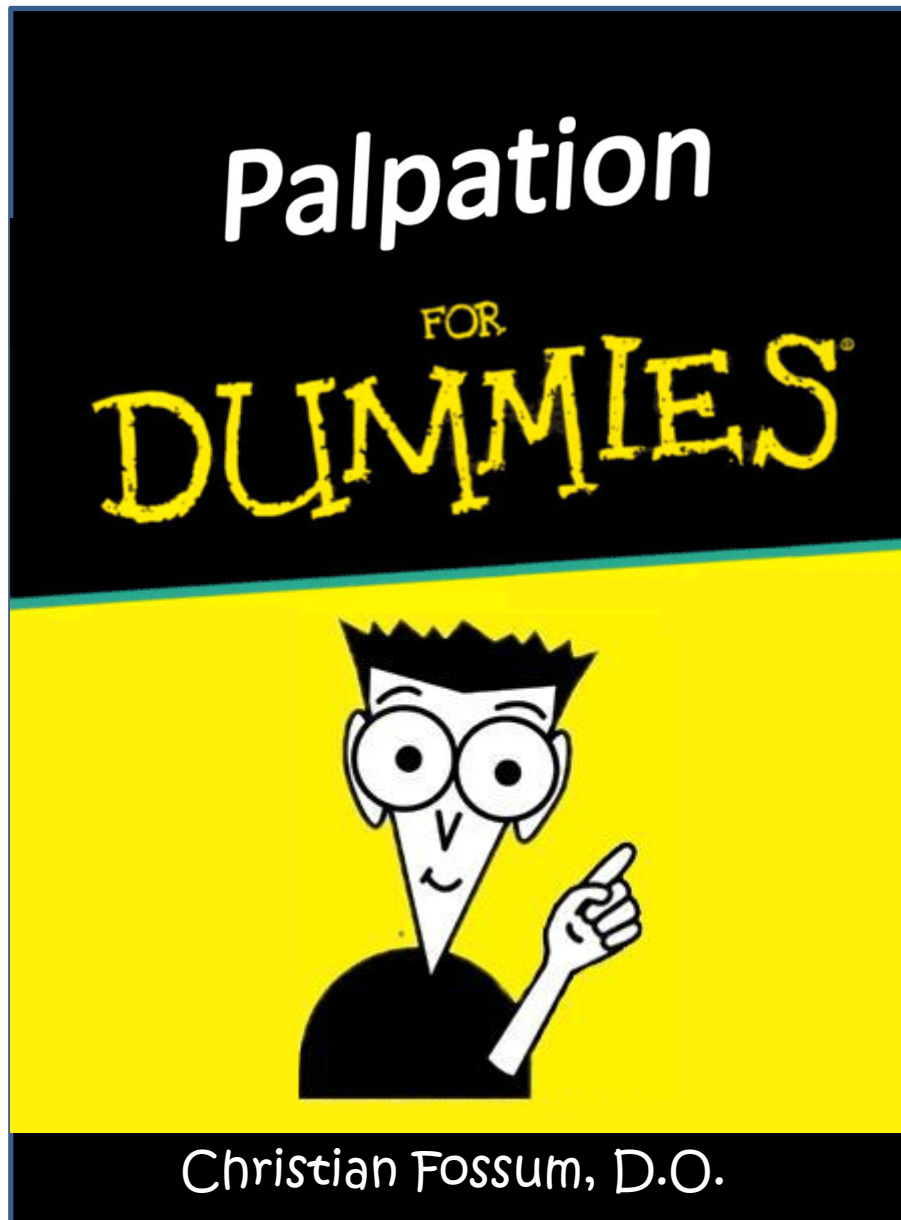
- ✓ None to fair
- ✓ Poor to fair
- ✓ Slight to moderate
- ✓ Fair to moderate
- ✓ None to moderate
- ✓ Fair

- ✓ Moderate
- ✓ None to substantial
- ✓ Fair to Good
- ✓ Fair to Substantial
- ✓ Moderate to Substantial
- ✓ None to Almost Perfect

- ❑ Reporting on Degree of reliability

Inconclusive	Not Acceptable None	None to Slight Almost None	None to Fair Poor to Fair	Slight	None / Fair / Slight to Moderate	Fair	None to Substantial	Fair to Substantial Moderate to Substantial	None to Almost Perfect
8	2	6	6	7	9	3	2	6	1

Data extracted and analyzed from: Bergmann and Peterson (2010)



## Somatic Dysfunction

Palpation of Tenderness    Palpation of Asymmetry    Palpation of ↓ Function    Palpation of TTA's

- ❑ Stochkendahl MJ et al. Manual examination of the spine: a systematic critical literature review of reproducibility. *J Man Physiol Ther* 2006; 29: 475-85
- ❑ Stovall BA, Kumar S. Reliability of bony anatomic landmark asymmetry assessment in the lumbopelvic region: application to osteopathic medical education. *J Am Osteopath Assoc.* 2010; 110(11): 667 - 674
- ❑ Cook C, Hegedus E. Diagnostic utility of clinical tests for spinal dysfunction. *Manual Therapy* 16(2011): 21 - 25

”...stand alone clinical tests provide only marginal value in diagnosis and future studies should consider clusters of clinical tests; a mechanism that more closely reflects clinical decision making”

## Coupling Behavior of the Spine: Underlying Models Are Challenged

Physiological Motions of the Spine <sup>1</sup>			
Region	Neutral	Flexion	Extension
C0 – C1	∅	$S_X R_Y$	
C2 – C7	∅	$R_X S_X$	
T1 – T12	$S_X R_Y$	$R_X S_X$	
L1 – L5	$S_X R_Y$	$R_X S_X$	

Physiological Motions of the Spine based on Fryette's Observations (1918, 1954) and included in Ward RC (ed.) Foundations for Osteopathic Medicine. Baltimore:2003

Systematic Reviews and Reviews on Coupling Behavior		
Review	Region	Conclusion
Cook C et al. Coupling behavior of the cervical spine: a systematic review of the literature. J Manipulative Physiol Ther 2006; 29: 570 - 575	Cervical	3D analysis of lower cervical lend some support to coupling behavior for diagnosis and treatment. 2D analysis of upper cervical spine questionable
Sizer P et al. Coupling behavior of the thoracic spine: a systematic review of the literature. J Manipulative Physiol Ther 2007; 30: 390 - 399	Thoracic	More in vivo investigations needed to determine coupling behavior. ++ Differences in study design, measurement methods and tissue preparation.
Legaspi O et al. Does the evidence support the existence of lumbar spine coupled motion? A critical review of the literature. J Ortho Sports Phys Ther 2007; 37(4): 169 - 178	Lumbar	Inconsistency in reported patterns of coupled motion. Caution urged when applying concepts to diagnosis and clinical reasoning
Cook C et al. Coupling behavior of the lumbar spine: a review of the literature. Journal of Man and Manip Therapy 2003; 11(3): 137-145	Lumbar	Great variability depending on whether side-bending or rotation is initiated first. Caution urged when using one model of coupling behavior only



# Somatic Dysfunction

- "Impaired or altered function...."
- In the U.K. and throughout Europe there is a lack of uniform terminology and descriptors for this clinical entity<sup>1</sup>
- Several theoretical models proposed, based on proprioceptively and nociceptively driven cascades of events, to explain somatic dysfunction and the clinical palpatory findings associated with it<sup>2</sup>
- Direct evidence for such models remains illusive, and they are mostly based on speculation from indirect evidence of feasible mechanisms<sup>3</sup>
- Continuing to dominate the theory of somatic dysfunction is Korr's work on proprioceptors (muscle spindles) and spinal facilitation

<sup>1</sup>Fryer G, Fossum C, Johnson JC. The use of spinal and sacroiliac joint procedures within the British osteopathic profession Part 1: Assessment. *International Journal of Osteopathic Medicine* xxx (2010): 1 – 9

<sup>2</sup>Fossum C, Fryer G. Cervical joint manipulation procedures applied to patients with headache. In: Fernandez-de-las-Penas C, Arendt-Nielsen L, Gerwin RD, *Tension-type and cervicogenic headache*. Boston: Jones and Bartlett Publishers 2009

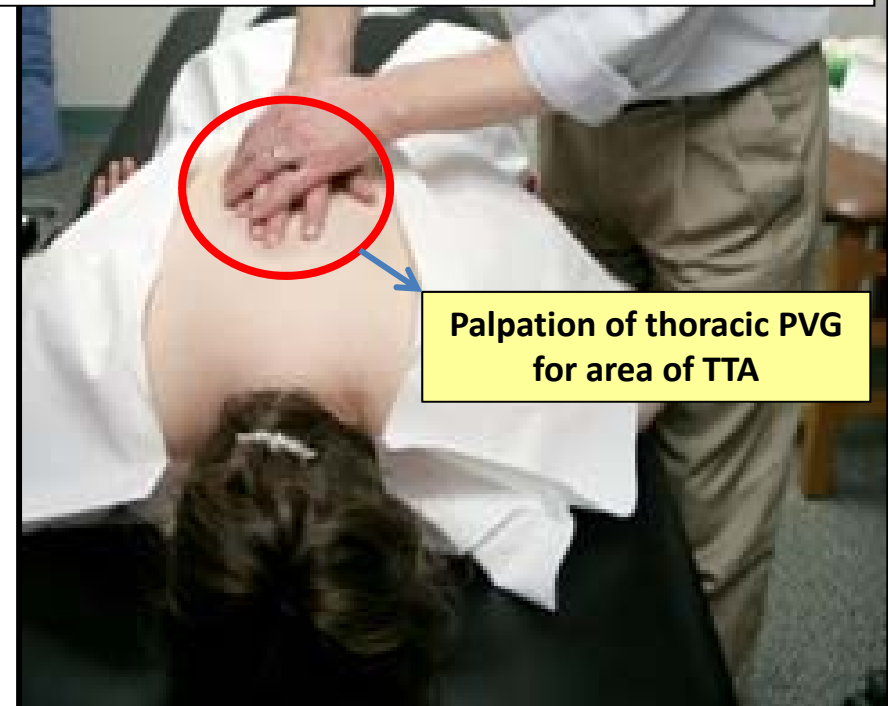
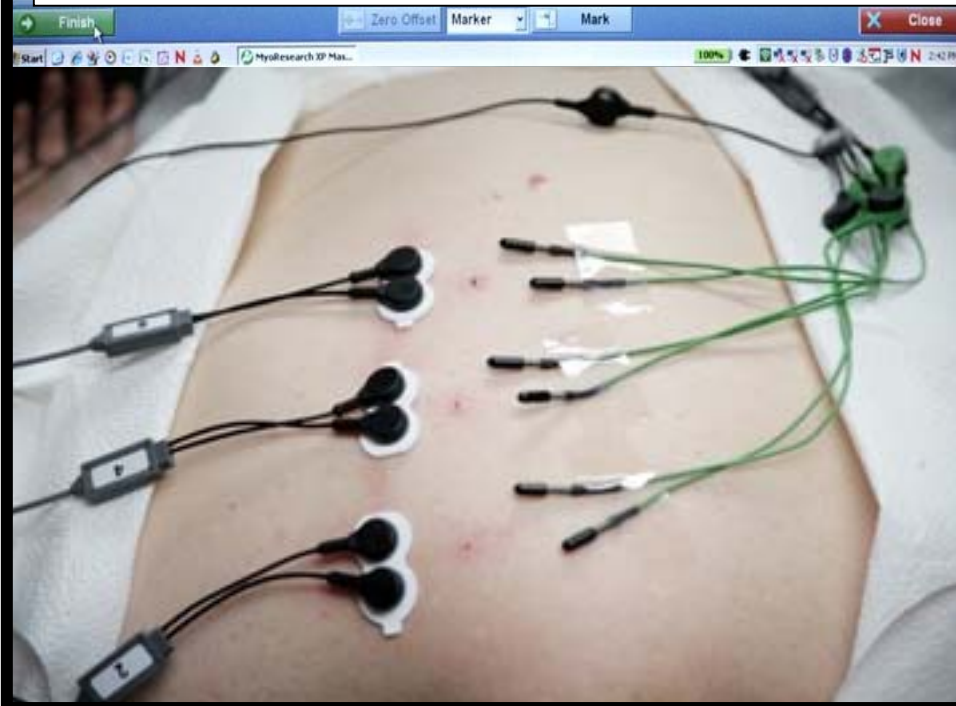
<sup>3</sup>Triano JJ. Biomechanics of spinal manipulative therapy. *Spine Journal* 2001; 1: 121 - 130

# Are we up to speed?

- ❑ DeStefano L. *Greenman's principles of manual medicine*. Philadelphia: Lippincott Williams & Wilkins, 4<sup>th</sup> Ed., 2010
  - ❑ *"There are two primary tissue abnormalities that account for palpable changes, namely muscle hypertonicity, secondary to increased alpha motor neuron stimulation; and altered activity of the "skin viscera," the pilomotor, vasomotor and secretomotor functions that are under the control of the sympathetic division of the autonomic nervous system" (p13)*
- ❑ Are the palpable changes in muscle tone necessarily associated with the somatic dysfunction associated with increased alpha motor neuron stimulation resulting in hypertonicity?
- ❑ What about the increasing evidence base that the monosegmental muscle, the culprit in somatic dysfunction, frequently atrophies in response to the acute onset of pain?

### Resting Electromyographic Activity of Deep Thoracic Transversospinalis Muscles Identified as Abnormal With Palpation

Gary Fryer, BSc (Osteopathy), PhD; Michael Bird, PhD; Barry Robbins, DO; Christian Fossum, DO (Norway); and Jane C. Johnson, MA



# What do we do when models become redundant?

TABLE 1. The rule of threes.

- The upper 3 thoracic vertebrae (T1-T3) have spinous processes (SPs) that project directly posterior and therefore the tip of the SP is in the same plane as the transverse processes (TPs) of that same vertebra.
- The next 3 vertebrae (T4-T6) have SPs that project slightly downward and therefore the tip of the SP is in a plane that is halfway between its own TPs and that of the TPs of the caudal vertebrae.
- The next 3 vertebrae (T7-T9) have SPs that project moderately downward and therefore the tip of the SP is in a plane with the TPs of the caudal vertebrae.
- The last 3 vertebrae (T10-T12) have SPs that project from a position similar to T9 and rapidly regress until T12 is more like T1 (ie, T10 SP is in the plane of the TPs of the caudal vertebra, T11 SP is halfway between its own TPs and that of the caudal vertebra, and T12 SP is in the plane of its own TPs).



- The "rule of the 3s" was introduced by Mitchell et al (1979) and has been adopted by many textbooks and educators in many health care professions (Magee, 2008, DeStefano, 2010)
- As a hypothetical model it was never anatomically validated
- More recent studies supports the premise that from T1 to T10 the TPs will be found lateral to the most prominent aspect of the SP on the vertebra above:
  - Geelhoed MA et al. A pilot study to investigate the validity of the rule of threes of the thoracic spine. *J Manual Manipulative Therapy* 13(2): 91 - 93, 2005
  - Geelhoed MA et al. A new model to facilitate palpation of the level of the transverse processes of the thoracic spine. *J Ortho Sports Phys Ther* 2006; 36(11): 876 - 881
- Reliability studies: inaccurate palpation of anatomical landmarks used in motion testing may be one cause of poor reliability

# The Expert vs. the Novice: Gold Standard?

- ❑ Questions to ponder on:

- ❑ When teaching students to diagnose dysfunction through palpation based on the T.A.R.T. findings, What are we measuring their performance against? Is the teacher the "gold standard"?

- ❑ What about exam situations?

- ❑ Although limited, research is indicating that the difference in judgments on things such as anatomical asymmetry and motion testing between novices (students) and clinical experts may not be that big

- ❑ There is even one study on perception of motion magnitude during motion testing in the lumbar spine which showed that the students performed better than the clinical experts (Björnsdottir et al, 2003)



# Measurable effect from training?

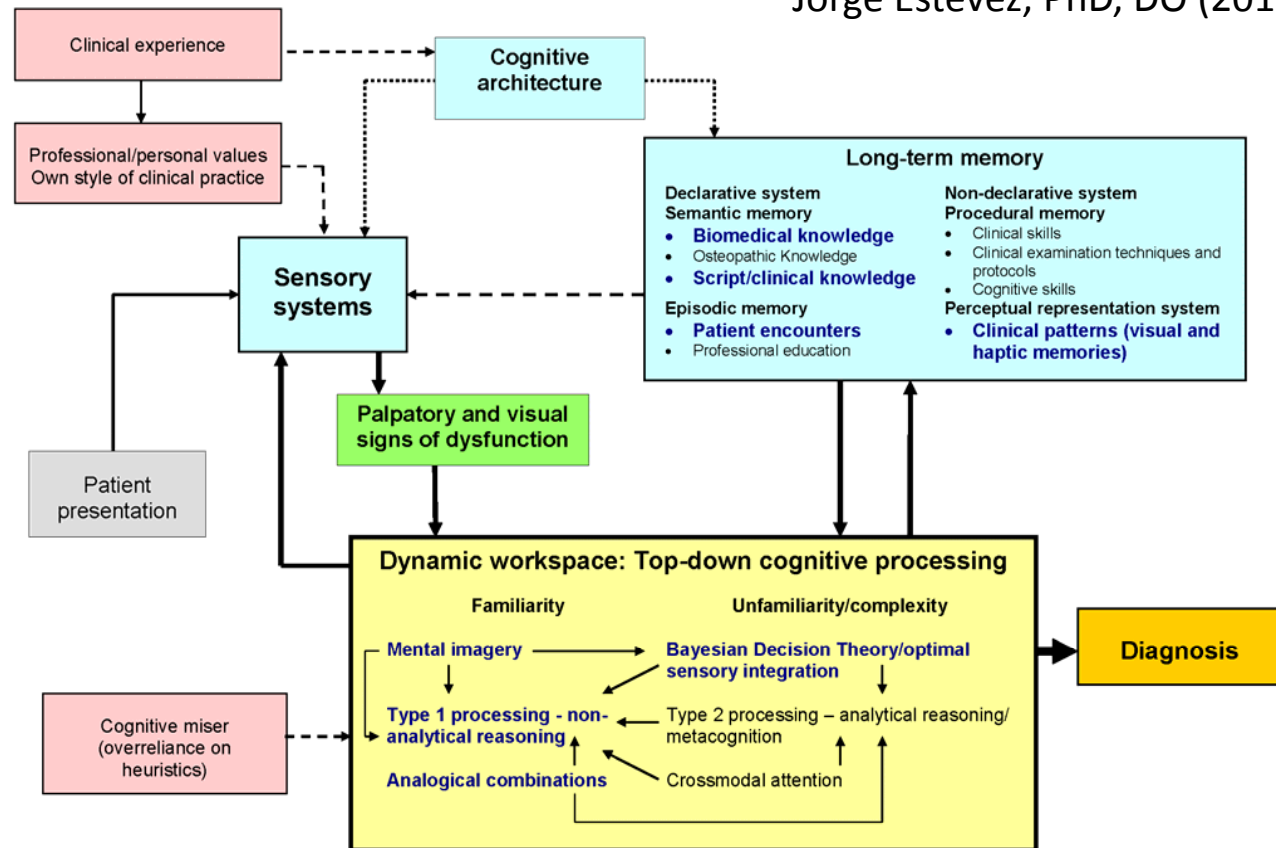
- Using various training models combined with *KP* (Knowledge of Performance) and *KR* (Knowledge of Results) may be beneficial in improving and maintaining results as well as retraining / calibrating experienced practitioners

- ❑ Keating J et al. The effect of training on physical therapists' ability to apply specified forces of palpation. *Phys Ther* 1993 Jan;73(1):45-53.
- ❑ Björnsdottir SV, Kumas S. Posteroanterior motion test of a lumbar vertebra: accuracy of perception. *Disability and rehabilitation* 2003; 25(4-5): 170 – 178
- ❑ Degenhardt BF, Snider KT, Snider EJ, Johnson JC. Interobserver reliability of osteopathic palpatory diagnostic tests of the lumbar spine: improvements from consensus training. *J Am Osteopath Assoc*. 2005;105(10):465-473.
- ❑ Degenhardt BF, Johnson JC, Snider KT, Snider EJ. Maintenance and improvement of interobserver reliability of osteopathic palpatory tests over a 4-month period. *J Am Osteopath Assoc* 2010; 110(10): 579 - 586

We have yet to decide which technology is reliable, reproducible as well as time and cost efficient

# In the meantime: the biggest variable in the classroom?

Jorge Estevez, PhD, DO (2011)

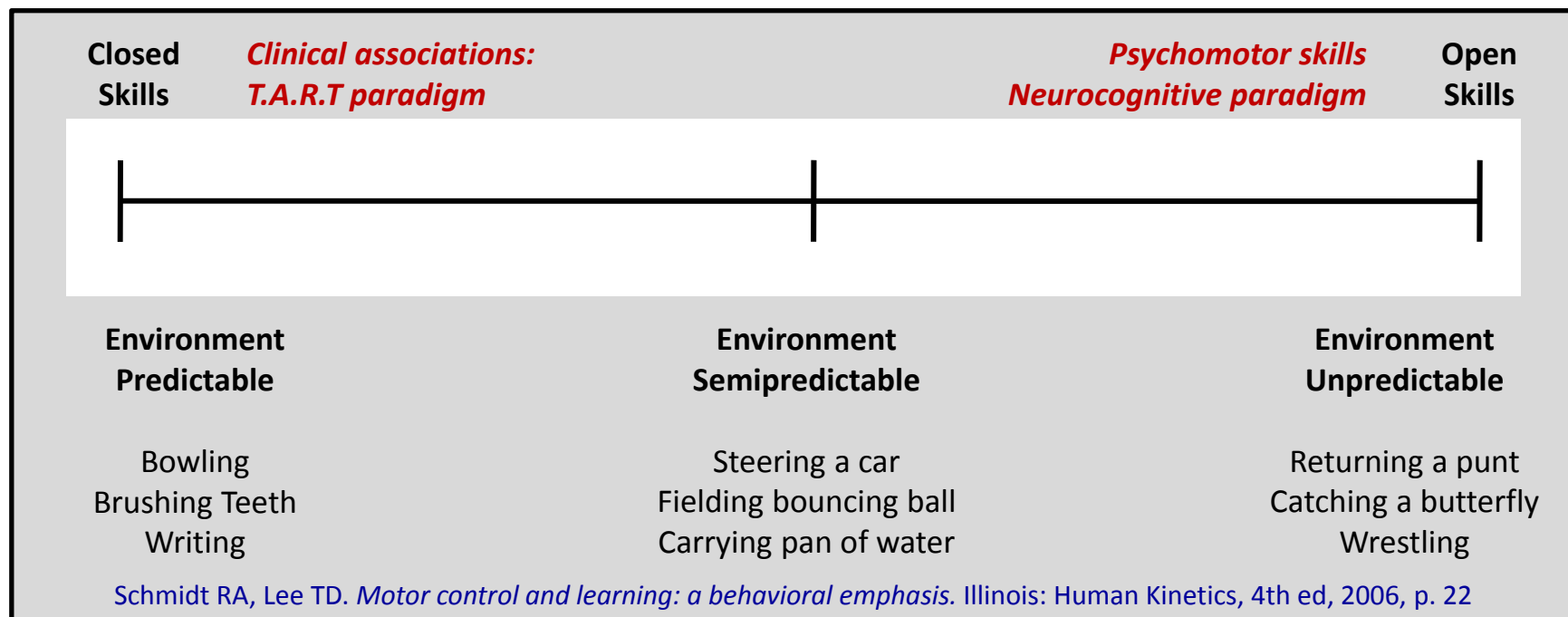


How do we prepare the student for palpation and the real life?

# In the Classroom...teaching skills

**In the classroom and at the teaching clinic, do we**

- ☐ advocate teaching palpation as a psychomotor skill, or
- ☐ concentrate only on the clinical associations of palpatory diagnosis?



# Where do we go from here?

## 1. Research

- *Critical* Reflection
- Honest Doubt
- Tendency to one of two forms of research
  - To justify what we do (low personal but ?high academic cost?)
  - To recognise the difficulties & change the paradigm (high personal cost)
- Engage with other researchers –  
neurophysiological e.g., haptic – decision-making

# Where do we go from here?

## 2. Education

- What is the purpose of teaching palpation and manual skills?
  - Do we need to move away from teacher dominated model toward helping students develop their own palpatory awareness and sensitivity?
  - Move away from a corpus of specific techniques to broad general manual skills
  - Need to standardize training – memory bank of experience (personal for student)
- Palpation is important in other healthcare areas
  - Touch in oncology
  - haptic cow in veterinary med

