Palpation: From Past to Present

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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**.

- Diagnosis also provides a **cultural expression** of what society is prepared to accept as normal and what it feels should be treated.

- Osteopaths and osteopathic physicians extensively use palpation to diagnose, treat and monitor changes. **What are we diagnosing?**

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…”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

<table>
<thead>
<tr>
<th>Descriptions</th>
<th>Terminology commonly used:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges use of word ‘dislocation’</td>
<td>❑ Sprain</td>
</tr>
<tr>
<td>❑ Muscular contractions causing stiff joints</td>
<td>❑ Strain</td>
</tr>
<tr>
<td>❑ Palpatory diagnosis of soft tissues and bony elements for tissue texture</td>
<td>❑ Twisted vertebrae</td>
</tr>
<tr>
<td>abnormalities, temperature changes, trophic changes and tenderness</td>
<td>❑ Deviation</td>
</tr>
<tr>
<td>❑ Spinal stiffness and rigidity</td>
<td>❑ Disordered anatomy</td>
</tr>
<tr>
<td>❑ Due to contraction of multifidus, inter‐spinal and intertransversalis muscles</td>
<td>❑ Subluxation</td>
</tr>
<tr>
<td>❑ Lesion: function of the articulations of the bone are impaired</td>
<td>❑ Dislocation</td>
</tr>
<tr>
<td>❑ Muscular contractions, ligamentous shortening, inflammatory deposits</td>
<td>❑ Displacement</td>
</tr>
<tr>
<td>❑ Loss of movements in the joints</td>
<td>❑ Derangement</td>
</tr>
<tr>
<td>❑ Motion rather than position</td>
<td>❑ Bony lesion</td>
</tr>
<tr>
<td>❑ Loss of motion was the cardinal feature</td>
<td>❑ Lesion</td>
</tr>
<tr>
<td></td>
<td>❑ Osteopathic lesion</td>
</tr>
<tr>
<td></td>
<td>❑ Spinal lesion</td>
</tr>
</tbody>
</table>

Barber (1896)  
Barber (1898)  
Davenport (1903)  
Clark (1906)  
Clark (1907)  
McCole (1935)
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
- Hildreth AG. The Sense of Touch in Osteopathic Treatment. *J Am Osteopath Assoc.*, 1932 (Dec.) 32:139-141
- 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

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. Contraction
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

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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
Even though a historical ownership has been granted\(^1\), the *articular lesion* or *dysfunction* is not unique to the osteopathic profession.

A 1996 study by Rome\(^2\) 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\(^3\)

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\(^2\)Rome PL. Usage of chiropractic terminology in the literature: 296 ways to say “subluxation”. *Chiropractic Technique* 1996; 8: 49 – 60

Terminology assessment model

Semantic Controversy

1. Terms Selected Questionnaire developed (A)
2. Is there agreement on the term?
   - No
   - Yes
   - Yes
3. Term agreed upon by Field practitioners Educators Researchers
4. Determine: uniqueness, occurrence, and origin of terms /definitions
5. Is there agreement on the term?
   - Yes
   - Term/definition consistent in literature
5. No
6. Preliminary consensus reached by nominal method
7. Assess: Retrospective availability Origin of term Appropriateness of usage (c)
8. Yes
9. Study continued Go to 1, 4, 6
10. Rational and recommendation presented to international panel (D)
11. Consensus reached by Delphi method
12. Study Continued: Go to 1, 4, 6
13. Abandon Project
14. Publish and implement nomenclature

Gatterman (2005)
What does the literature say?

What are the current challenges?
Learn the basics and conform to standards

Masterclass

Diagnostic reliability in osteopathic medicine

Nicholas Lucas, Nikola Bogdak

Department of Clinical Research, Royal Newcastle Centre and University of Newcastle, Australia

BMC Medical Research Methodology

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

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* Corresponding author
## 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

<table>
<thead>
<tr>
<th>Inconclusive</th>
<th>Not Acceptable</th>
<th>None to Slight</th>
<th>None to Fair</th>
<th>Slight</th>
<th>None / Fair</th>
<th>Fair</th>
<th>None to Substantial</th>
<th>Fair to Substantial</th>
<th>Moderate to Substantial</th>
<th>None to Almost Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>1</td>
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</tr>
</tbody>
</table>

Data extracted and analyzed from: Bergmann and Peterson (2010)
Christian Fossum, D.O.


“...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\(^1\)

<table>
<thead>
<tr>
<th>Region</th>
<th>Neutral</th>
<th>Flexion</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0 – C1</td>
<td>(\emptyset)</td>
<td>(S_xR_y)</td>
<td></td>
</tr>
<tr>
<td>C2 – C7</td>
<td>(\emptyset)</td>
<td>(R_xS_x)</td>
<td></td>
</tr>
<tr>
<td>T1 – T12</td>
<td>(S_xR_y)</td>
<td>(R_xS_x)</td>
<td></td>
</tr>
<tr>
<td>L1 – L5</td>
<td>(S_xR_y)</td>
<td>(R_xS_x)</td>
<td></td>
</tr>
</tbody>
</table>


Systematic Reviews and Reviews on Coupling Behavior

<table>
<thead>
<tr>
<th>Review</th>
<th>Region</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
<td>Lumbar</td>
<td>Great variability depending on whether side-bending or rotation is initiated first. Caution urged when using one model of coupling behavior only</td>
</tr>
</tbody>
</table>
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
• 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
• Direct evidence for such models remains illusive, and they are mostly based on speculation from indirect evidence of feasible mechanisms
• Continuing to dominate the theory of somatic dysfunction is Korr’s work on proprioceptors (muscle spindles) and spinal facilitation

3Triano 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, 4th 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?

- 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:
- 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

  - 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?

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?

<table>
<thead>
<tr>
<th>Closed Skills</th>
<th>Clinical associations:</th>
<th>Psychomotor skills</th>
<th>Open Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T.A.R.T paradigm</td>
<td>Neurocognitive paradigm</td>
<td></td>
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<table>
<thead>
<tr>
<th>Environment Predictable</th>
<th>Environment Semipredictable</th>
<th>Environment Unpredictable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowling</td>
<td>Steering a car</td>
<td>Returning a punt</td>
</tr>
<tr>
<td>Brushing Teeth</td>
<td>Fielding bouncing ball</td>
<td>Catching a butterfly</td>
</tr>
<tr>
<td>Writing</td>
<td>Carrying pan of water</td>
<td>Wrestling</td>
</tr>
</tbody>
</table>

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
S. NORMAL Ave.

S. OSTEOPATHY Ave.