



Manual Therapy
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Professional Issue
Understanding why the thoracic region is the 'Cinderella' region of the spine
N.R. Heneghan A, A. Rushton

- Limited research of the thoracic spine, 'Cinderella' region
- Thoracic dysfunction is under-explored
- Thoracic spine manipulation is beneficial for managing neck and shoulder pain
- Thoracic spine may be viewed as a 'silent contributor' to clinical presentations
- Further research of thoracic spine pain and dysfunction is needed

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Thrust joint manipulation utilization by U.S. physical therapists

Emilio J. Puentedura, Rebecca Slaughter, Sean Reilly, Erwin Ventura & Daniel Young



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Questions...

TJM to the C spine not taught to same degree as other regions of spine in first degree PT programs

PTs tend to use it less frequently in clinical practice

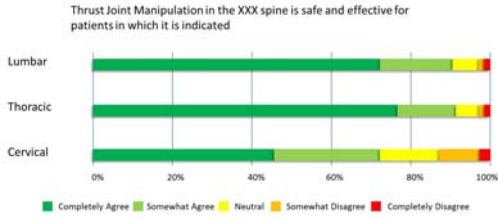
How is TJM to the spine viewed by US PTs?

- Utilization of TJM within the 3 spinal regions
- Thoughts about safety and efficacy of TJM in each spinal region
- Perceived barriers to utilization of TJM by US PTs

	Group (n = 1000)	Males (n = 478)	Females (n = 519)	P value
Age (mean ± SD)	39.8 ± 10.67	39.5 ± 10.07	39.9 ± 11.17	.583
Years of practice (mean ± SD)	13.5 ± 10.61	13.0 ± 9.81	14.1 ± 11.24	.097
Entry-level Degree				.003*
• DPT	42.9%	47.9%	52.1%	
• MPT/ MSPT	31.2%	55.8%	44.2%	
• BPT/ BSPT	23.0%	39.0%	61.0%	
• Certificate/ Other	2.9%	37.9%	62.1%	
Highest earned Degree				.000*
• PhD/ Dsc/ EdD	4.1%	70.7%	29.3%	
• DPT	59.7%	50.5%	49.5%	
• MPT/ MSPT	19.9%	48.7%	51.3%	
• BPT/ BSPT	11.7%	31.0%	69.0%	
Manual Therapy/ Clinical Specialty Certification	48%	57.7%	42.3%	.000*

Safe and Effective

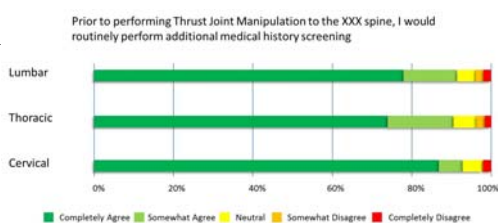
Thrust Joint Manipulation in the XXX spine is safe and effective for patients in which it is indicated



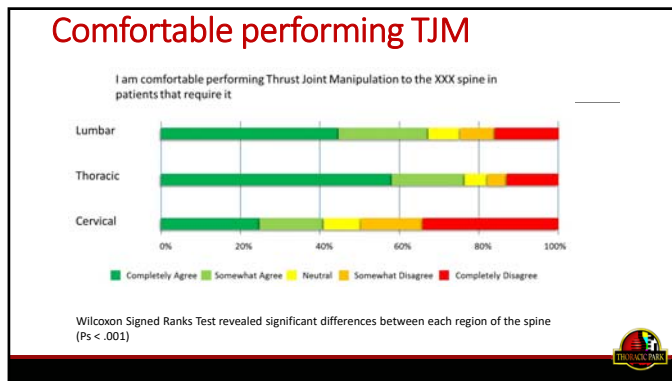
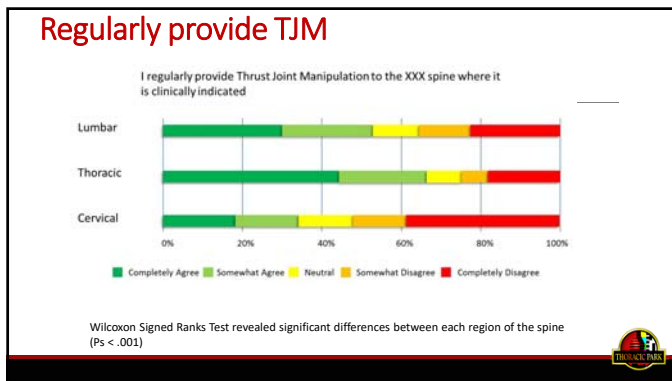
Wilcoxon Signed Ranks Test revealed significant differences between thoracic and lumbar spines (p=.001); between thoracic and cervical spines (p=.000); and between lumbar and cervical spines (p=.000).

Perform additional screening before TJM

Prior to performing Thrust Joint Manipulation to the XXX spine, I would routinely perform additional medical history screening



Wilcoxon Signed Ranks Test revealed significant differences between each region of the spine (Ps < .001)



Manipulative practice in the thoracic spine: a survey of current practice of Physiotherapists in the UK

Sally Davies, Emilio Puenteadura, Nicola Heneghan Submitted for publication

- Survey of 276 physios in the UK (53% males) – mean age 36 (8.7) yrs – means years in practice 11 (8.1)
- Only 40% use any additional screening before using TJM to the Thoracic Spine
- Preferred choice was prone manipulation (67%)
- Most consider underlying effect of TJM to be:
 - neurophysiological (54%)
 - biomechanical (45%), and
 - placebo (1%)
- Very high levels of agreement for stated contraindications (85%); precautions (75%); red flags (86%) and risks (61%)

<https://www.youtube.com/watch?v=qj8t8vta7nc>

Is it that much safer in the T spine?

Remember, US physical therapists feel most comfortable, regularly perform, and believe thrust joint manipulation is safest in the Thoracic Spine

Do serious adverse events occur in the Thoracic Spine?

<https://www.evidence.com/articles/does-chiropractic-work.php>

https://en.wikipedia.org/wiki/Spinal_adjustment

Special Issue Article

Safety of thrust joint manipulation in the thoracic spine: a systematic review

Emilio J. Puenteadura, William H. O'Grady

University of Nevada Las Vegas, School of Allied Health Sciences, Department of Physical Therapy, Las Vegas, NV, USA

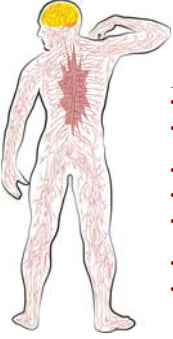
- 10 cases – reported in 7 case reports
- Females (8) more involved than males (2)
- Mean age – 43.5 years (SD = 18.73, Range = 17 -71)
- Adverse Events reported:
 - Injury (mechanical or vascular) to spinal cord (7/10)
 - Pneumothorax/ hemothorax (2/10)
 - CSF leak after dural sleeve injury (1/10)

<https://radiopaedia.org/cases/transverse-myelitis-2>


Table 3 The 10 cases of serious adverse events (AEs) reported in seven published articles

No.	Authors and year	Age (years), sex	Interval to symptom onset	Practitioner	Thoracic level manipulated	AE
1	Ruelle et al. (1999) ²¹	64, F	2 hours	Chiropractor	Lumbar and thoracic spine	Acute epidural haematoma T9–11
2	Ospenheim et al. (2005) ³⁹	60, F	Not known	Chiropractor	Upper thoracic spine	T4–5 collapse; cord compression
3		56, F	Not known	Chiropractor	Upper thoracic spine	T4 pathology; epidural tumour
4		71, F	Not known	Chiropractor	Upper thoracic spine	T4 fracture; lung CA
5		32, M	Not known	Chiropractor	Middle thoracic spine	Thoracic spondylitis, swollen cord
6	Lopez-Gonzalez and Perez-Celda (2011) ³⁹	45, F	2 hours	Chiropractor	Middle thoracic spine	T6 level paraplegia secondary to spinal cord ischaemia
7	Lee et al. (2011) ³⁹	38, F	4 hours	Chiropractor	Cervical and upper thoracic spine	Acute epidural haematoma T1–7
8	Struwer et al. (2013) ³⁹	17, M	2 days	Osteopath	Middle thoracic spine	Large left hemothorax
9	Masconi et al. (2007) ³⁷	20, F	24 hours	Lay person	Middle thorax	Right pneumothorax
10	Donovan et al. (2007) ³⁹	32, F	2 weeks	Physical Therapist	Cervical and upper thoracic spine	CSF leak and spontaneous intracranial hypotension from dural sleeve tear C8–T5

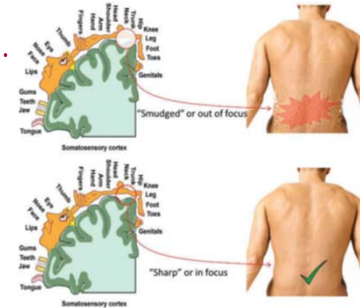
What makes the T Spine such a special region for manual therapy?



- Relatively stiff (hypomobile) region compared to C and L spines
- 6 synovial joints per vertebral level – CV, CT & ZPI compared to just 2 per level – ZPI in C and L spines
- Presence of sympathetic chain anterolaterally
- Relatively narrower vertebral canal for spinal cord and dura
- Abundance of segmental muscles (rotatores, levatores costarum) with perhaps *proprioceptive* vs movement function
- Protective function – lungs and heart
- Life sustaining function – breathing



Plastic brain maps...



Biologically coded
Environmentally sculpted
Changes occur in minutes...

Combining manual therapy with pain neuroscience education in the treatment of chronic low back pain: A narrative review of the literature
Emilia J. Puente-Dura PT, DPT, PhD & Timothy Flynn PT, PhD
<http://dx.doi.org/10.1080/09593985.2016.1194663>


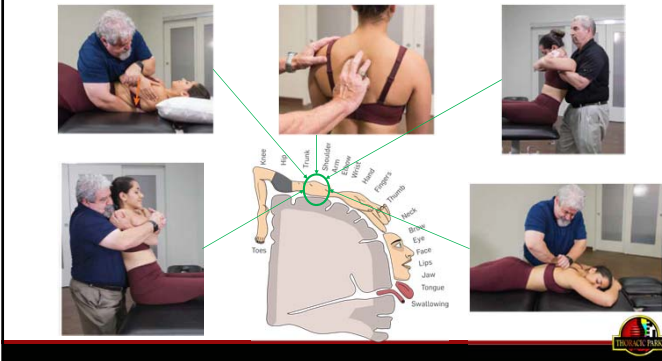




Diagram labels: Nose, Eye, Trunk, Shoulder, Neck, Head, Ear, Face, Lips, Jaw, Tongue, Swallowing, Teeth.



Using Functional Magnetic Resonance Imaging to Determine if Cerebral Hemodynamic Responses to Pain Change Following Thoracic Spine Thrust Manipulation in Healthy Individuals

CHERYL SPARKS, PT, PhD, * JOSHUA A. CLELAND, PT, PhD, * JAMES M. ELLIOTT, PT, PhD, * MICHAEL J. DYER, DPT, * KATHRYN M. SIZETELA, DPT, * and JAMES M. ELLIOTT, PhD, PT, *

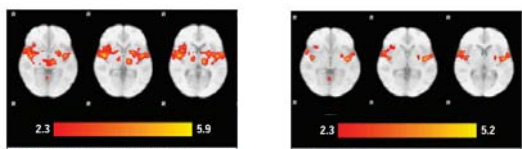



FIGURE 7. Functional images demonstrating blood oxygenation level-dependent activation of the insular cortex in response to noxious stimuli premanipulation.

FIGURE 8. Functional images demonstrating blood oxygenation level-dependent activation of the insular cortex in response to noxious stimuli postmanipulation.



Functional Magnetic Resonance Imaging of Cerebral Hemodynamic Responses to Pain Following Thoracic Thrust Manipulation in Individuals With Neck Pain: A Randomized Trial

Journal of Manipulative and Physiological Therapeutics
Volume 40, Number 9
November/December 2017

Cheryl L. Sparks, PhD, PT,* Wen C. Liu, PhD,[†] Joshua A. Cleland, PhD, PT,* Joseph P. Kelly, MSPT,* Sarah J. Dyer, DPT,* Kathryn M. Sietela, DPT,* and James M. Elliott, PhD, PT*

- 24 patients with mechanical neck pain
- Randomized to receive Thrust Manipulation or Sham to T spine
- fMRI scanning while receiving noxious stimuli pre- and post-intervention
- Significant group differences
- Thrust group – increased areas of activation in insular and somatosensory cortices
- Sham group – greater activation of precentral gyrus, supplementary motor area, and cingulate cortices

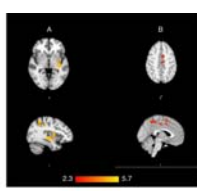




Fig 8. Functional images (axial) group mean difference in cerebral blood oxygenation level-dependent activation in 12 axial functional MRI slices between the thrust manipulation group and the sham manipulation group. *P < .05.



Summary



Thrust Joint Manipulation to the Thoracic Spine is helpful in a subset of patients with musculoskeletal dysfunction (neck > shoulder)

Thoracic dysfunction is under-explored and its management with Thrust Joint Manipulation is not well researched

Physiotherapists in the US appear to be more comfortable manipulating the thoracic spine than other regions of the spine and may not fully appreciate the risks

Adverse events following Thrust Joint Manipulation to the thoracic spine do occur and it is recommended that clinicians use sound clinical reasoning and work to develop their skills in manipulation to minimize force

The Thoracic Spine may be considered a special region on a Pain Neuroscience point of view as it is richly innervated (bottom up mediation) and restoring/ improving motion may induce favorable neuroplastic changes

