RAPID RESEARCH

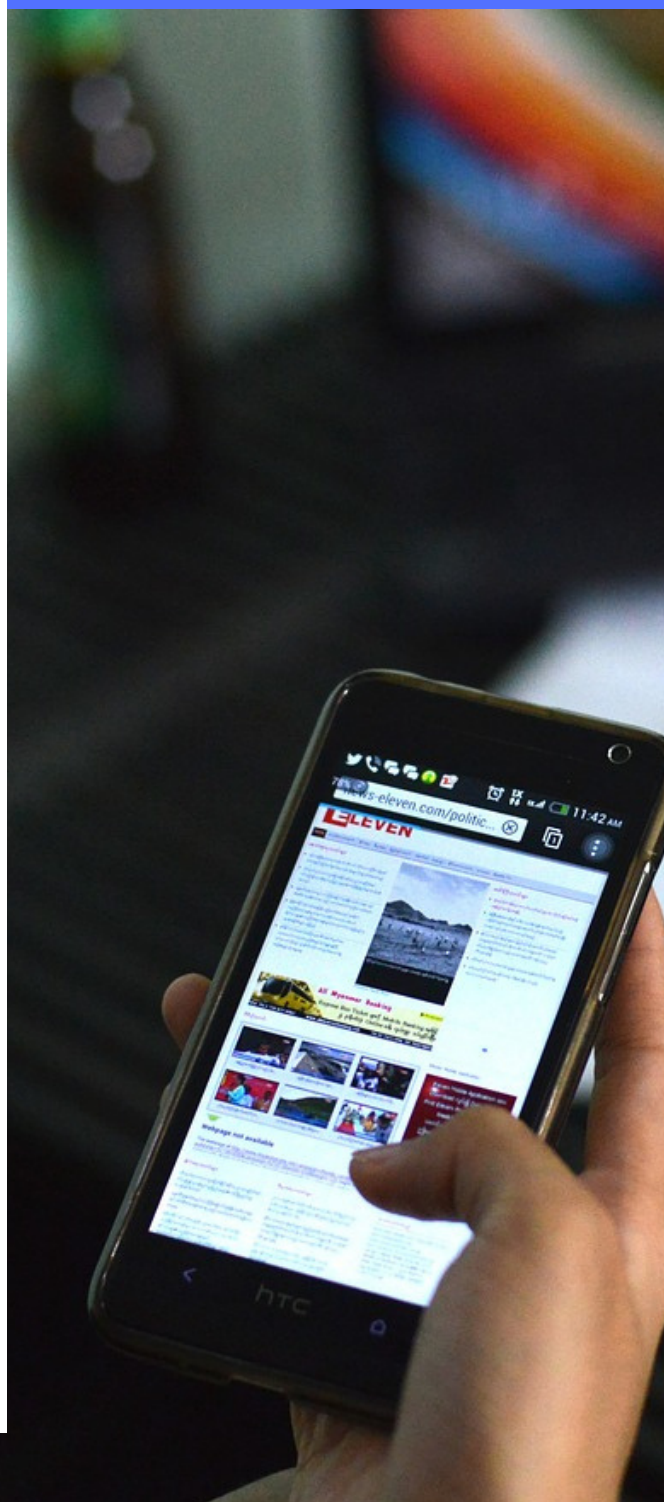
@physicaltherapyresearch

August 2022

Inside This Week:

Thoracic Spine Assessments & Exercises

- Thoracic Spine Exercise Prescription in Sport
- Thoracic Dysfunction in Whiplash Patients
- Reliability of Measuring Tx Spine Rotation with Iphone

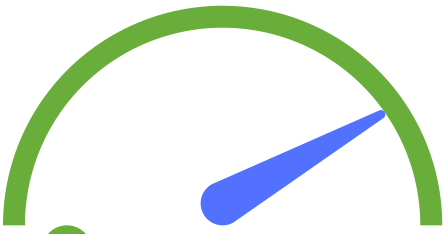


AUGUST 2022

THORACIC SPINE EXERCISE PRESCRIPTION IN SPORT

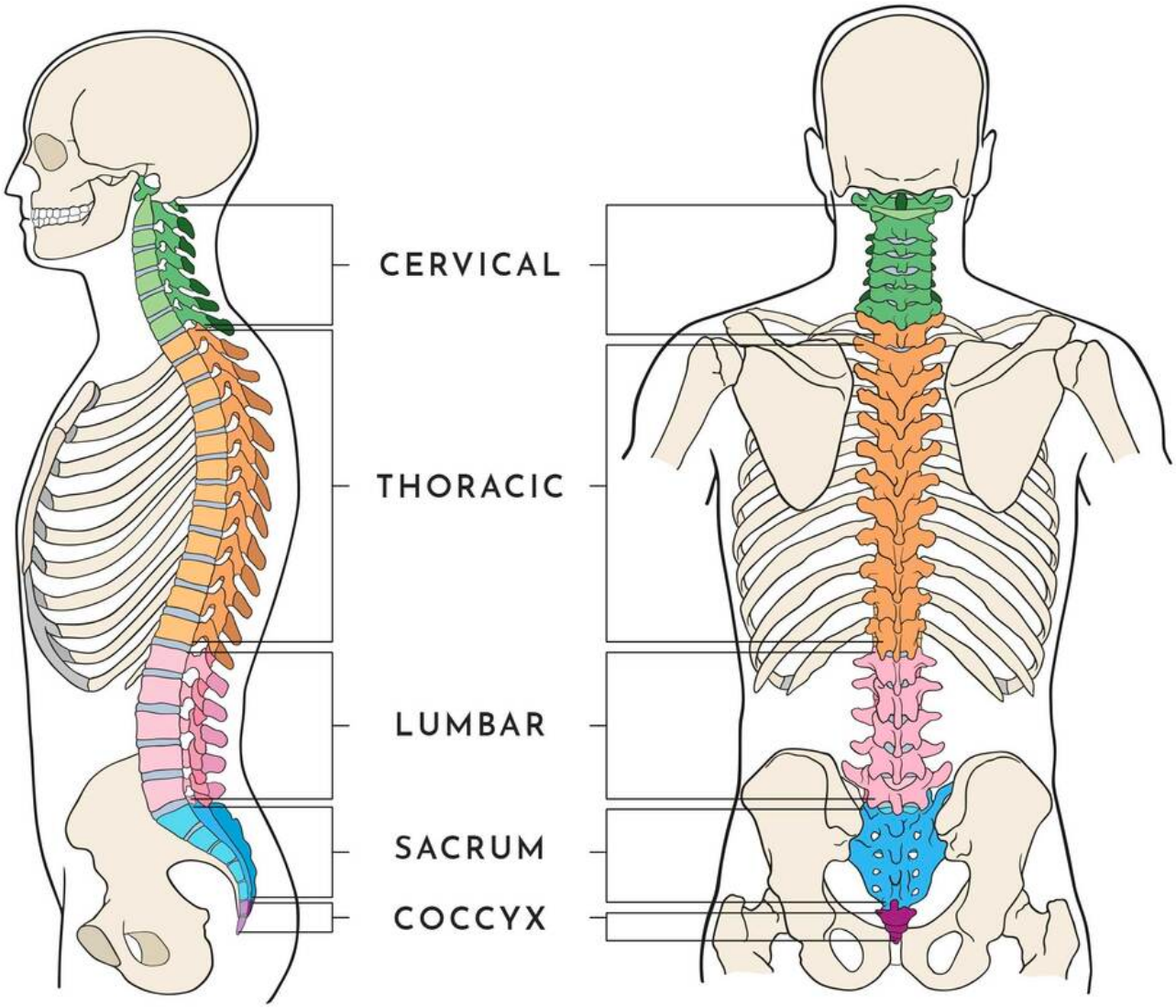
Click for Full Text (Heneghan et al. 2020)

JBI 9/11 [81%]



Quality Check
*see appx

This systematic review had 3 objectives:
1. Identify prescribed thoracic spine (Tx) exercises in sport.
2. Evaluate exercises based on aim, mobility, motor control, work capacity & strength.
3. Provide a framework to support exercise prescription.



KEY FINDINGS

2348 sources analyzed

38 exercises included (18 from articles & 20 from social media)

Mobility (9 exercises total)

Tx extension on foam roller or ball
Kneeling Tx extension stretch
Tx flexion quadruped w/ & w/o roller
Side-lying side-flexion over Swiss ball
Side-lying Tx rotation
Quadruped Tx rotation
Squat with extension and rotation
Jefferson curl
Seated side flexion w/ & w/o rotation

Work capacity (18 exercises total)

Static:	**Dynamic:**
Y-lift on Swiss ball	Upper back extension
Superman	V-ups
Pike	Half Turkish get-ups
Kneeling power-wheel rollout	Lateral sit ups
Roman chair lateral holds	W-sit ball rotation
One arm inverted row	Standing Tx extensions
Kettlebell swing	Kettlebell swing
Windmills with kettlebell	Kettlebell side bends
Lateral cable walk out	W-sit ball rotation

Motor Control (7 exercises total)

Bird-dog
Wall squat
Flexion/extension control quadruped
Half circle in side lying
Sitting side flexion (mermaid)
Upper back rotation with lunges
Standing wood chop/chop and lift

Strength (7 exercises total)

Front lever
Deadlift
Partner backwards fall
Side pull prowler
Partner push
Battle ropes
Side medicine ball throws

Overall level of evidence for each outcome was level 5.

MAIN TAKEAWAYS

There are no trials investigating the effectiveness of thoracic spine exercises in prevention or rehabilitation of sports injuries.

Overall, 38 Tx exercises were found across research and social media.

This research provided a framework for practitioners to clinically reason outcome focused thoracic spine exercise prescription, focusing on, mobility, motor control, work capacity and strength.

Consideration of parameters such as speed, range, starting positions would further strengthen the value of this framework in practice.

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THORACIC DYSFUNCTION IN WHIPLASH PATIENTS

Click for Full Text (Heneghan et al. 2018)

JBI 10/11 [90%]

Quality Check
*see appx

This systematic review examined the scope and nature of dysfunction/impairment in the thoracic spine region following whiplash injury and in whiplash associated disorder (WAD).

KEY FINDINGS

38 studies including over 50,000 people were included.

Thoracic Spine Pain

High prevalence (>60%)

Higher for those with more severe presentations and in the acute stage

Chest pain

Low prevalence of (<22%)

Thoracic Outlet Syndrome

Relatively high prevalence (31-74%) & association with brachial plexus symptoms

Muscle Dysfunction

Heightened activity of the sternocleidomastoid (SCM) or delayed onset of action of the Serratus-anterior with heightened levels of activation during flexion

Myofascial Pain & Trigger Points

High prevalence in scalene muscles, SCM & mid/lower fibers of trapezius muscle (48–65%)

Thoracic Posture or Mobility

Inconclusive Evidence

MAIN TAKEAWAYS

There is considerable evidence of thoracic pain and dysfunction in patients at all stages following whiplash injury.

Additional high quality research is required to further characterize dysfunction across other structures in the thoracic region, including but not limited to the thoracic spine (mobility and posture) and thoracic muscles (stiffness, activation patterns).

In turn this may inform the design of clinical trials targeting such dysfunction.

RELIABILITY OF MEASURING TX SPINE ROTATION WITH IPHONE

AUGUST 2022

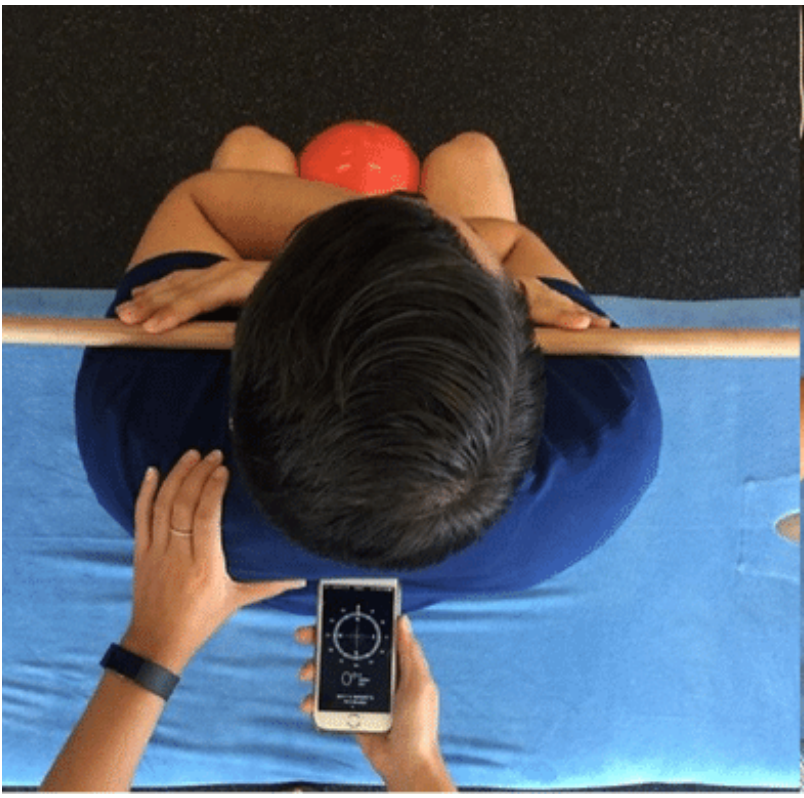
Click for Full Text (Furness et al. 2018)

JBI 10/10 [100%]

Quality Check

*see appx

This research determined the reliability and validity of the iPhone app (Compass) when assessing thoracic spine (Tx) rotation ROM in healthy individuals.



KEY FINDINGS

30 participants included.
(Tx) rotation ROM was measured using both the current clinical gold standard, a universal goniometer (UG) and the Smart Phone Compass app.
Universal Goniometer (UG) Stats:
Avg. Tx Rotation: 63deg (±11.3)
Intra-rater Reliability: 94-98%
Inter-rater Reliability: 72-85%
Compass App Stats:
Avg. Tx Rotation: 60.1deg (±10.7)
Intra-rater Reliability: 96%-98%
Inter-rater Reliability: 87-89%

Significant correlation was found between the UG and the Compass app, demonstrating good concurrent validity (r = 0.835)

The UG was found to consistently measure slightly higher values than the compass app.

MAIN TAKEAWAYS

Both the UG and Compass app offer reliable methods for measurement when the 'seated rotation bar in front' technique is adhered to.

Clinicians may find the Compass app offers greater convenience and efficiency than the UG, meaning that it could be introduced into practice with confidence that it provides reliable measurements both within and between raters.

Considering the levels of agreement are clinically unacceptable the devices should not be used interchangeably for initial and follow up measurements.

GIVE US YOUR FEEDBACK!

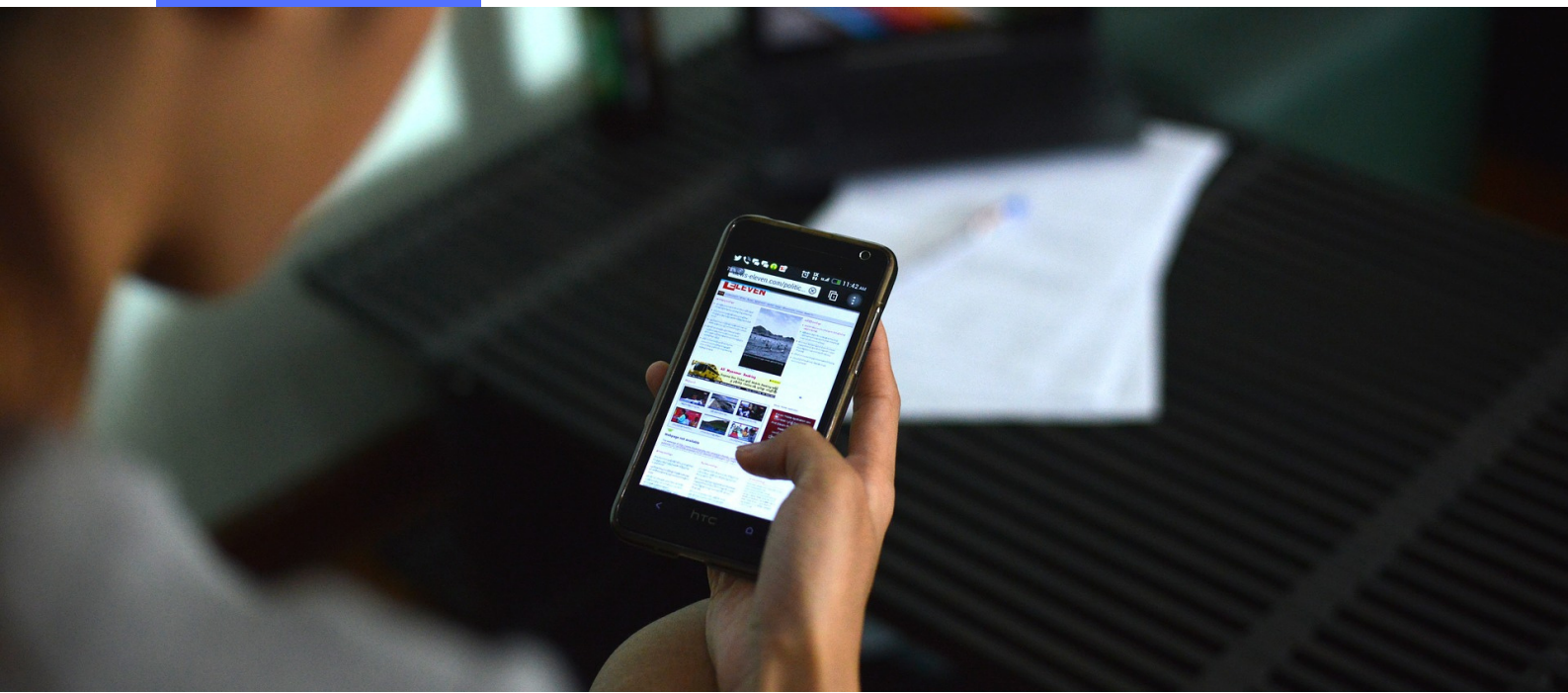
MEMBERS

We are on a mission to make research more accessible, easier to interpret, and quicker to implement.

Help us by giving 1 minute of your time to leave feedback for us.

We would greatly appreciate any feedback you have, as it helps us continually improve!

Leave Review



JBI Critical Appraisal Checklist for systematic reviews and research syntheses

Author: Heneghan et al. Year: 2020

		Yes	No	Unclear	Not applicable
1.	Is the review question clearly and explicitly stated?	+	☐	☐	☐
2.	Were the inclusion criteria appropriate for the review question?	+	☐	☐	☐
3.	Was the search strategy appropriate?	+	☐	☐	☐
4.	Were the sources and resources used to search for studies adequate?	+	☐	☐	☐
5.	Were the criteria for appraising studies appropriate?	+	☐	☐	☐
6.	Was critical appraisal conducted by two or more reviewers independently?	+	☐	☐	☐
7.	Were there methods to minimize errors in data extraction?	+	☐	☐	☐
8.	Were the methods used to combine studies appropriate?	+	☐	☐	☐
9.	Was the likelihood of publication bias assessed?	☐	X	☐	☐
10.	Were recommendations for policy and/or practice supported by the reported data?	☐	X	☐	☐
11.	Were the specific directives for new research appropriate?	+	☐	☐	☐

Overall appraisal: 9/11 (81%)

Comments:

Overall, a quality study, following good methods and a robust appraisal of process for such a unique study analyzing both the body of research and social media for thoracic spine specific exercises being used/prescribed. A good jumping off point for further research to improve clinical reasoning. Conclusions report a good framework of clinical reasoning, yet quality and bias were not appraised fully, and further validation is needed for these conclusions.

JBI Critical Appraisal Checklist for systematic reviews and research syntheses

Author: Heneghan et al. Year: 2018

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5.	Were the criteria for appraising studies appropriate?	+	☐	☐	☐
6.	Was critical appraisal conducted by two or more reviewers independently?	+	☐	☐	☐
7.	Were there methods to minimize errors in data extraction?	+	☐	☐	☐
8.	Were the methods used to combine studies appropriate?	+	☐	☐	☐
9.	Was the likelihood of publication bias assessed?	☐	X	☐	☐
10.	Were recommendations for policy and/or practice supported by the reported data?	+	☐	☐	☐
11.	Were the specific directives for new research appropriate?	+	☐	☐	☐

Overall appraisal: 10/11 (90%)

Comments:

Overall, this is a good quality systematic review, searching the body of research for evidence of Tx disorders related to Whiplash. Not surprising the findings, however the full scope of other associated disorders does provide extra value to this research. The low quality studies ultimately included does take some robustness away, nevertheless, the findings are valid and should be considered when assessing whiplash disorders.

JBI Critical Appraisal Checklist for diagnostic test accuracy studies

Author Furness et al Year 2018

	Yes	No	Unclear	Not applicable
1. Was a consecutive or random sample of patients enrolled?	+	☐	☐	☐
2. Was a case control design avoided?	+	☐	☐	☐
3. Did the study avoid inappropriate exclusions?	+	☐	☐	☐
4. Were the index test results interpreted without knowledge of the results of the reference standard?	+	☐	☐	☐
5. If a threshold was used, was it pre-specified?	+	☐	☐	☐
6. Is the reference standard likely to correctly classify the target condition?	☐	☐	☐	+
7. Were the reference standard results interpreted without knowledge of the results of the index test?	+	☐	☐	☐
8. Was there an appropriate interval between index test and reference standard?	+	☐	☐	☐
9. Did all patients receive the same reference standard?	+	☐	☐	☐
10. Were all patients included in the analysis?	+	☐	☐	☐

Comments:

This research, although basic was performed well, and displayed a good measure of inter and intra rater reliability for two measurement devices for thoracic rotation. When compared to a goniometer, the iphone app works very similarly when done consistently. As with most of these tests, intra-rater reliability is of the most importance, as clinically, we are making differences in the patient that results in positive outcomes. So if a iphone tells you you go from 50 to 60 degrees thoracic rotation, as long as this is consistent with the positive patient outcomes, it matters little if a goniometer shows the patient went from 45 to 55 degrees. The real results is the change and if the device measures consistently, which this research shows, in trained hands, both the goniometer and the compass app are capable of.