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## CCA Master Class Webinar

Focus on Chiropractic Sciences and Clinical  
Research Published in the JCCA Vol. 66 No. 1

### Facilitator:

- Dr. Brynne Stainsby, DC, FCCS (C),  
Assistant Editor, JCCA

### Speakers:

- Dr. Dominique Harmath, DC
- Dr. Derick Luu, DC
- Dr. Robert Trager, DC

*CCA Master Class Series*



Guiding Better Return to Play Programs in Tennis:  
Applying the Oslo Sports Trauma Research Centre  
Overuse Shoulder Injury Questionnaire



Dr. Dominique Harmath, DC  
June 2, 2022

# Background



- The shoulder is one of the most commonly injured body parts in tennis
- Prevalence of shoulder pain in overhead athletes ranges from 21.4% to 41.6%.

# Background

- Studies reporting shoulder injury in tennis have used inconsistent criteria to define injury & used a time loss definition:
  - complete inability to train or compete



# Background

- Time-loss definition:
  - Pro: valid objective measure for injury severity
  - Con: underreporting of injuries as players often do not take time off



# The Oslo Sports Trauma Research Centre Overuse Shoulder Injury Questionnaire (OSTRC-O2)

- Reliable & valid tool to measure physical function & pain in sport
- Evaluates consequences of overuse injury & monitors changes over time
- Captures more injuries than previous questionnaires

# The Oslo Sports Trauma Research Centre Overuse Shoulder Injury Questionnaire (OSTRC-O2)

## 1. Participation

Have you had any difficulties participating in training or competition due to shoulder problems during the past 7 days?

- Full participation without shoulder problems
- Full participation, but with shoulder problems
- Reduced participation due to shoulder problems
- Cannot participate due to shoulder problems

# The Oslo Sports Trauma Research Centre Overuse Shoulder Injury Questionnaire (OSTRC-O2)

## 2. Modified Training/Competition

To what extent have you modified your training or competition due to shoulder problems during the past 7 days?

- No modification
- To a minor extent
- To a moderate extent
- To a major extent

# The Oslo Sports Trauma Research Centre Overuse Shoulder Injury Questionnaire (OSTRC-O2)

## 3. Performance

To what extent have shoulder problems affected your performance during the past 7 days?

- No effect
- To a minor extent
- To a moderate extent
- To a major extent

# The Oslo Sports Trauma Research Centre Overuse Shoulder Injury Questionnaire (OSTRC-O2)

## 4. Pain

To what extent have you experienced shoulder pain related to your sport during the past 7 days?

- No pain
- Mild pain
- Moderate pain
- Severe pain



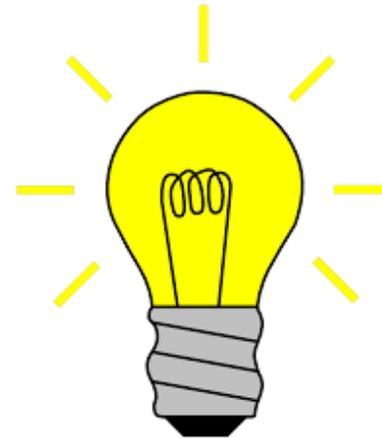
# Study Aim

- Determine whether it is feasible to conduct a cross sectional study of the one-week prevalence of shoulder pain and activity limitation in competitive tennis players



# Significance

- Knowledge on the topic may be helpful to inform tennis players to adjust their training schedules and to seek early treatment in order to avoid increases in injury severity



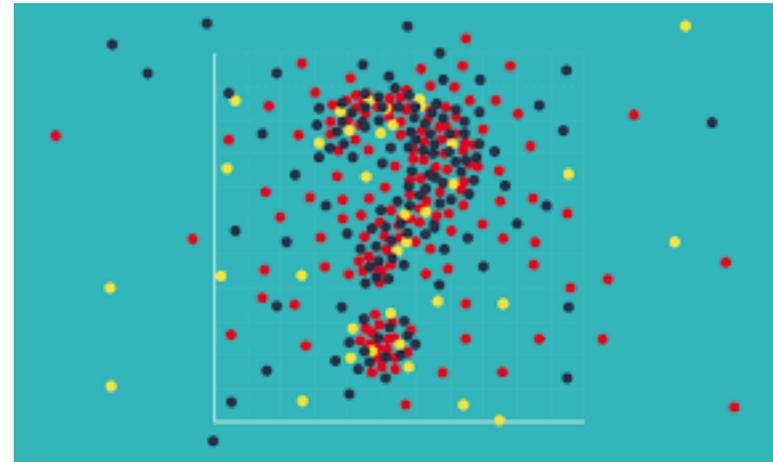
# Methods: Data Collection & Recruitment



- Tennis players were recruited in March of 2020 using a template with a link to the questionnaire
- Responses were anonymized
- Data collection: standardized electronic questionnaire through Survey Monkey (15Qs, 3min duration)
- Recruitment: \*Tennis directors, social media, & direct recruitment

# Methods-Statistical Analysis

- Categorical variables
- Participation rate
- Missing data
- Prevalence
- Injury severity
- Pain intensity



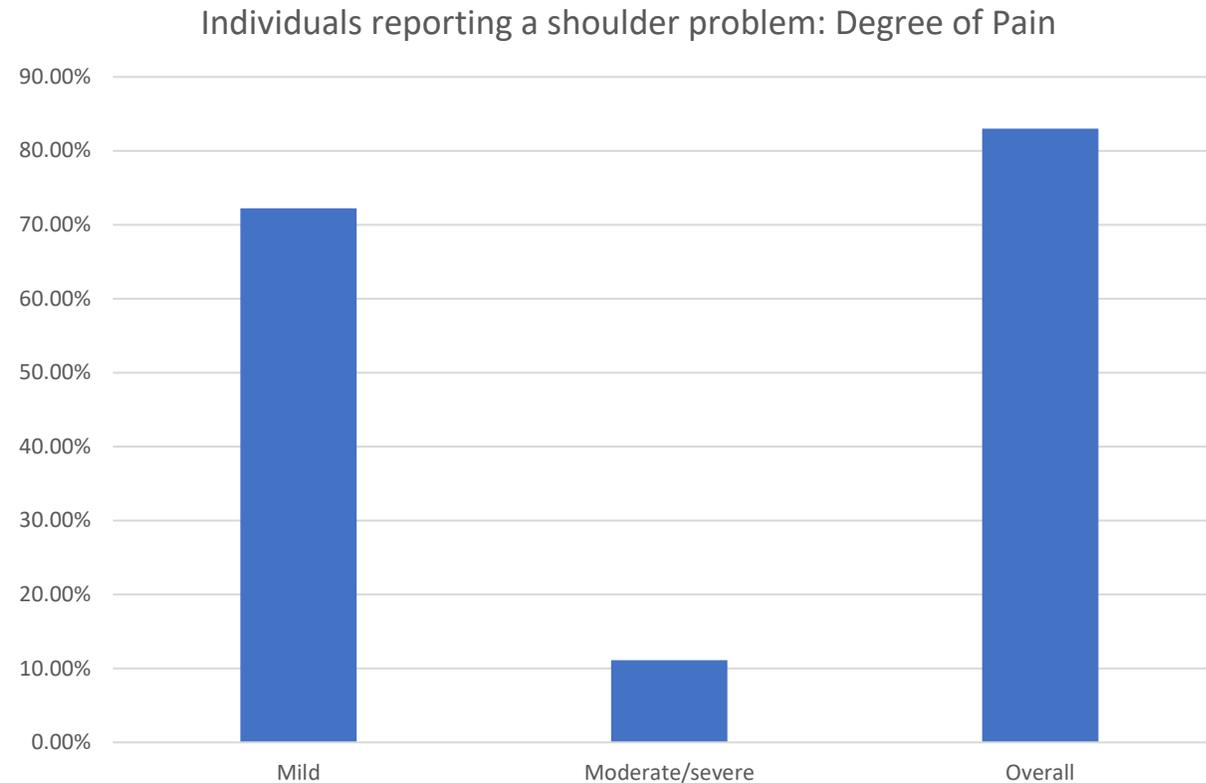
# Results: Feasibility

- 43 players were included
- 88.9% overall participation rate
- 100% completion rate
- No missing data to report

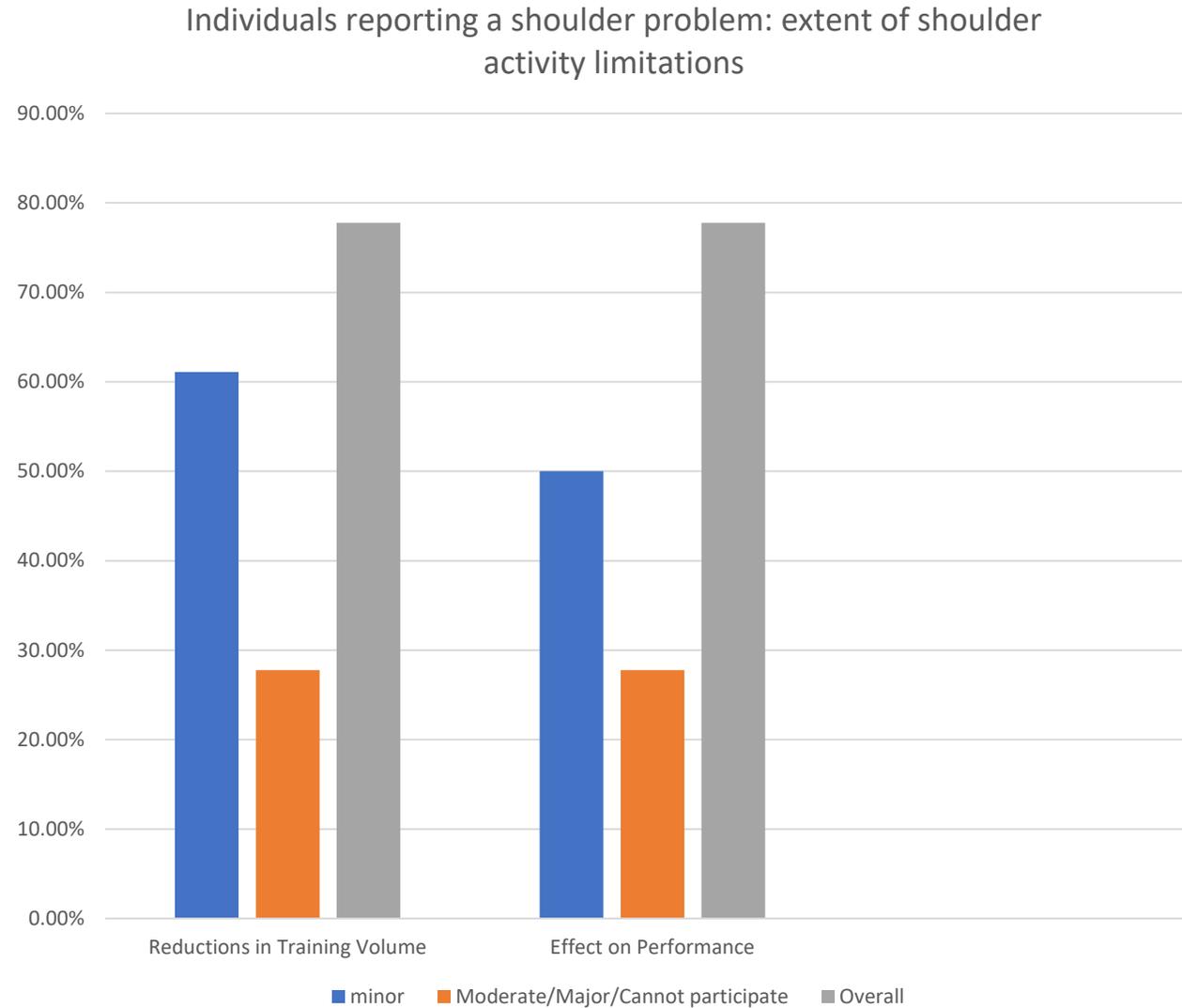


# Results: Shoulder Pain & Activity Limitation

- One-week proportion: 41.9%.
- Mean injury severity: 33/100



# Results: Shoulder Pain & Activity Limitation



# Discussion



- The proportion of those with shoulder pain and activity limitation far exceeded the 12% estimate
- Nearly 44% of players were still training and competing despite moderate reductions in training volume or performance

# Conclusions

- It is feasible to conduct a cross sectional study on the one-week prevalence of overuse related shoulder pain and activity limitation in competitive tennis players living in Toronto

# Clinical Implications

- Understanding the prevalence of shoulder pain and activity limitation is necessary to develop future injury prevention strategies and implement early treatment interventions

# Take Home Points

Tennis players will play through injury & pain

1. Educate athletes on potential consequences of playing through injury
2. Modify training & competition schedules accordingly
3. Use the OSTRC-O2 to:
  - Identify how a shoulder injury may effect a player's physical function & game
  - Track changes over time

# THANK YOU

## Thesis Committee Members:

- Dr. Kazemi
- Dr. Côté
- Dr. Boynton

## Special thank you:

- Dr. Hogg-Johnson

# **EXERCISE REHABILITATION FOR NEUROGENIC THORACIC OUTLET SYNDROME: A SCOPING REVIEW**

Canadian Chiropractic Association (CCA)

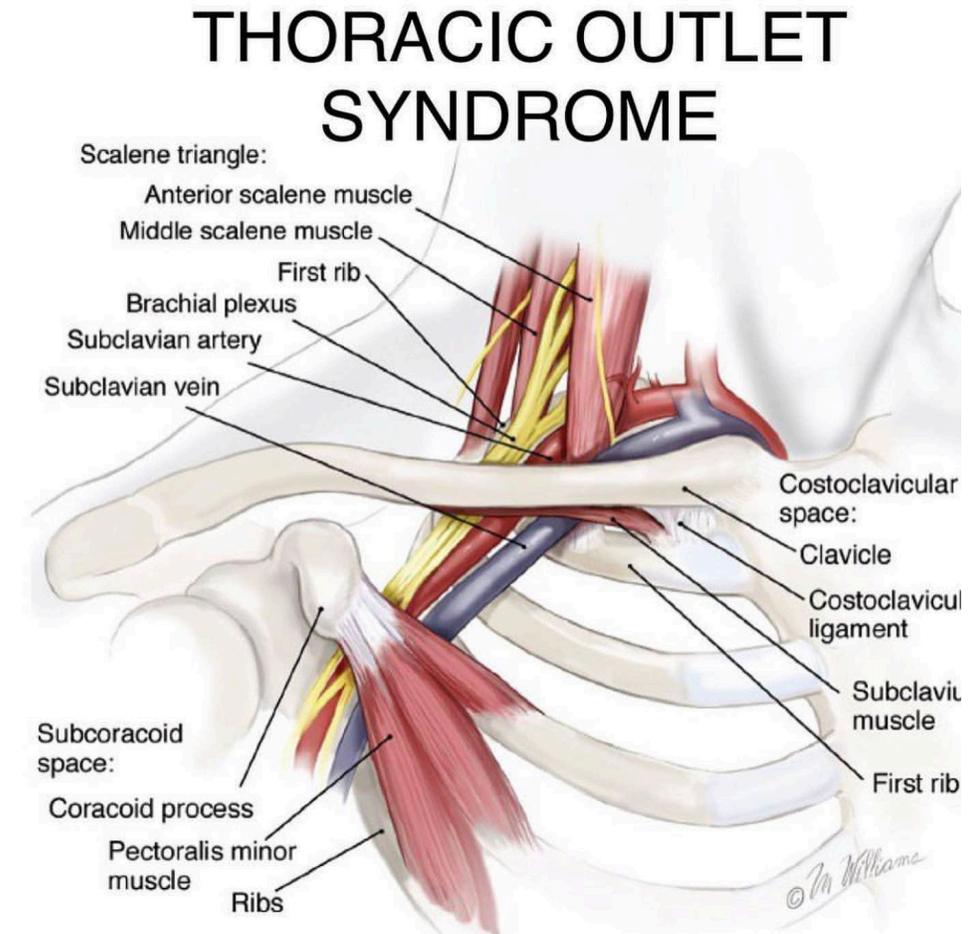
Derick Luu, DC

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June 02, 2022

# THORACIC OUTLET SYNDROME

- **True NTOS**
- **Disputed NTOS**
- Management: (Lo et al. 2011 - Sys Review)
  - exercise rehabilitation
  - manual therapy
  - hot/cold therapy
  - electrophysical modalities
  - supportive devices (strapping, tapping)
  - Exercise therapy hypothesized to decrease symptoms by increasing the thoracic outlet space through stretching and strengthening of certain muscles groups leading to increase joint space and decrease pressure on the brachial plexus.



## AIM OF OUR SCOPING REVIEW

Analyze the literature, from inception to March 2021, on rehabilitative exercises for true and disputed NTOS

To provide a **broad and comprehensive overview of different exercise protocols** that have been published and to provide an update to the literature from the systematic review by Lo et al. (2011).

Review the **clinical reasoning** behind different exercise protocols which will help guide rehabilitation clinicians such as chiropractors and physiotherapists in their clinical decision-making and exercise prescription in the management of NTOS.

# SCOPING REVIEW VS. SYSTEMATIC REVIEW

Scoping review	Systematic review
Evaluates the status of a given topic in the literature	Evaluates effectiveness of an intervention
Does not assess quality of studies	Assess quality of studies
No appraisal tool is used	Appraisal tool is used (e.g – AMSTAR 2)
Seeks to evaluate the breadth of a topic	Seeks to evaluate the depth of a topic
Can be used to determine the feasibility of a systematic review	

# METHODS

Framework of Levac et al. to guide our scoping review:

- (1) identifying the research question
- (2) identifying relevant studies
- (3) study selection
- (4) charting the data
- (5) collating, summarizing, and reporting the results

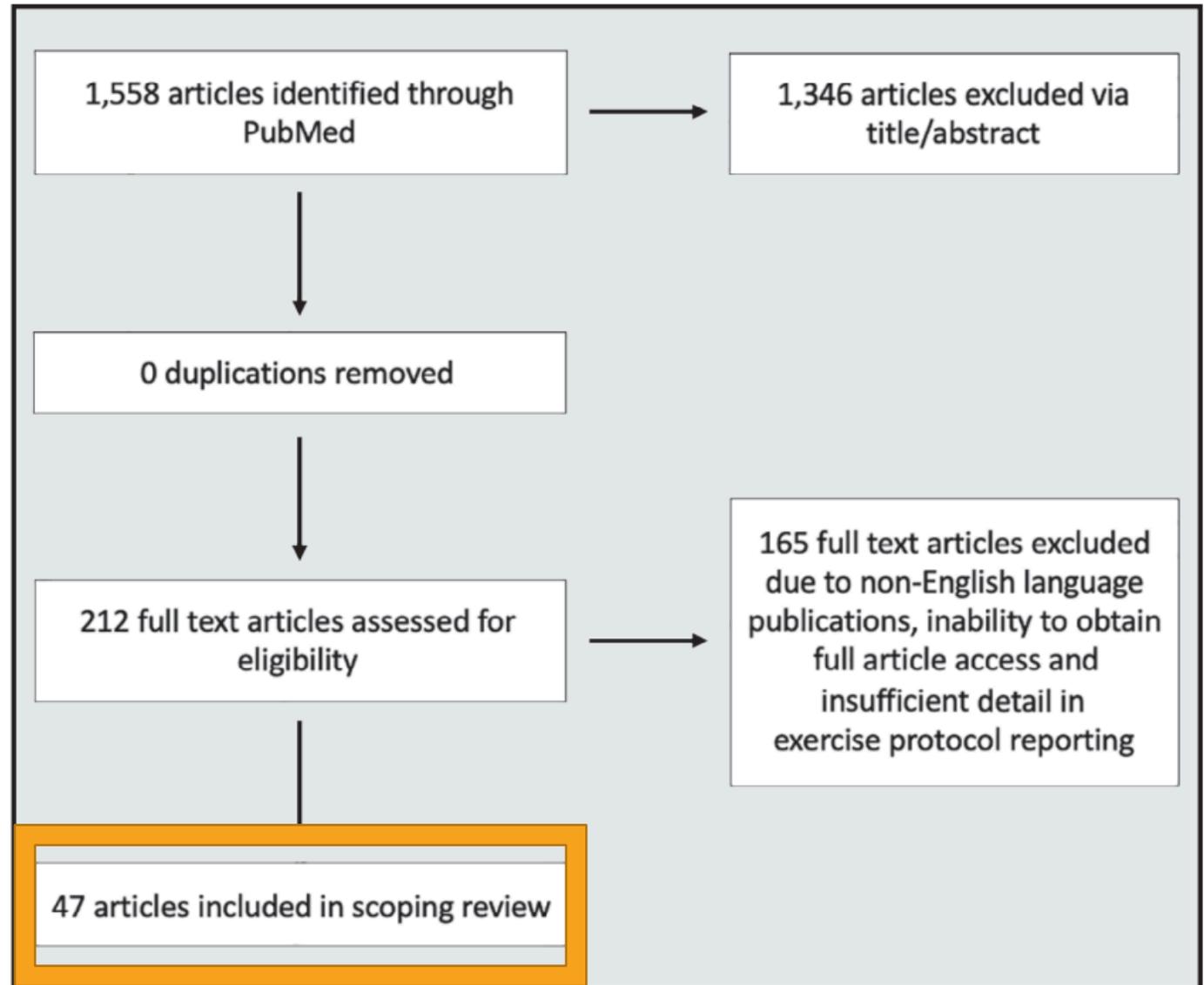


Figure 1.  
*Article flow through review process*

# RESULTS

Of the 47 articles:

→ 26 narrative and literature reviews

→ 5 retrospective studies

→ 3 prospective studies

→ 3 non-randomized control trials

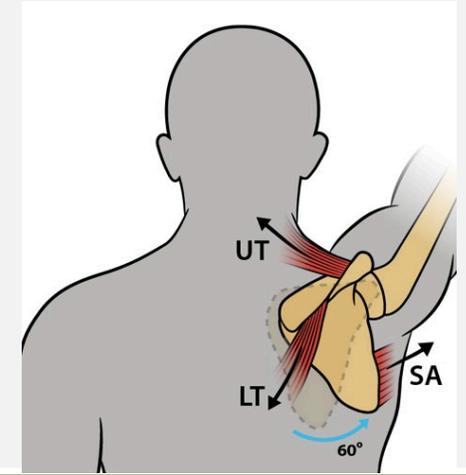
→ 3 case series, 5 case studies

→ 2 clinical commentaries

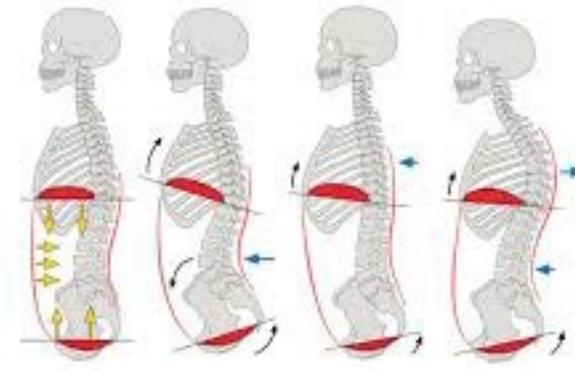
## Exercise protocols



Stretching and strengthening of specific muscle groups (Peet & Britt's method)



Addressing scapular kinematics (drooping shoulder)



Cardiovascular conditioning/breathing mechanics



Nerve gliding (neurodynamics)

## Appendix 2.

*Evidence summary table of author, year of publication, study design, treatment type, description of exercises and rationale.*

Author, year	Study design	Treatment (exercise alone or combined with other modalities)	Description of exercises (type, sets/reps, duration)	Rationale for exercise
Abe et al. 1999	Narrative review	Exercise followed by orthopaedic bracing	Serratus anterior, levator scapulae, and erector spinae muscle isometric strengthening.	Isometric shoulder girdle exercises in positions of relief.
Aktas et al. 2019	Case report	Ultrasound-guided botulinum toxin injection to pectoralis minor	“Stretching exercises to the pectoral muscles were added to the rehabilitation program”	No rationale listed.
Aligne and Barral 1992	Narrative review	Physical therapy utilizing mobilizations and exercise therapy	Isometric sternocleidomastoid, serratus anterior and superior trap exercises. Physical therapy sessions: 3x week for 1 <sup>st</sup> month, twice weekly for the 2 <sup>nd</sup> month, 6-8 sessions as needed in the future.	Enlarge the costoclavicular passage to decrease the constraints of the neurovascular elements.
Balderman et al. 2019	Retrospective cohort study of prospectively collected data, 130 participants with nTOS undergoing physical therapy.	N/A	Scalene and pectoralis muscle stretching and relaxing exercises, with a focus on shoulder girdle and scapular mobility, mechanics, postural improvement, and diaphragmatic breathing, using caution with strengthening, weight training, and the use of resistance bands	No rationale listed.
Boezart et al. 2010	Narrative review + case report	No treatment administered, just opinion	Nerve gliding exercises, 4-6 months of conservative therapy for specific neck and shoulder exercises. Strength training, weightlifting, and neck traction	Nerve gliding relieves tension on nerves of brachial plexus during arm and neck movements. 4-6 months of conservative therapy recommended by Kenny et al. 1993.
Brown 1983	Narrative review	Physical therapy	Shoulder shrugs with 10lb weights in each hand. Bilateral arm abduction with pronated hands with weight in each hands. Wall push-ups	Restoration of normal postures.
Campbell 1996	Case series	Case 1: exercises, posture repositioning strategies, ice and heat, discontinuing upper extremity exercise, soft tissue mobilizations, strengthening	Case 1: Cervical side bend stretches, and pelvic tilt exercises combined with deep breathing  Prone middle and lower trapezius strengthening and latissimus strengthening of 5 repetitions each	No rationale listed.

# CLINICAL RATIONALES



## **Biomechanical paradigm:**

- i) postural correction
- ii) “decompression” of the thoracic outlet by strengthening the muscles responsible for shoulder girdle elevation
- iii) establishing normal scapular control
- iv) facilitation of weak or inhibited muscles
- v) decreasing pressure on the neurovascular bundle by lengthening the surrounding musculature to restore proper muscular balance
- vi) decreasing intraneural pressure
- vii) “re-energizing” tissues and “reprogramming” the central engram to normalize muscle length
- viii) enlarging the costoclavicular passage by improving muscular flexibility and joint stability
- ix) restoring normal joint motion
- x) decreasing the shortening of muscles to prevent recurrence of “trigger points”

# DISCUSSION



## Several concerns for clinicians to consider:

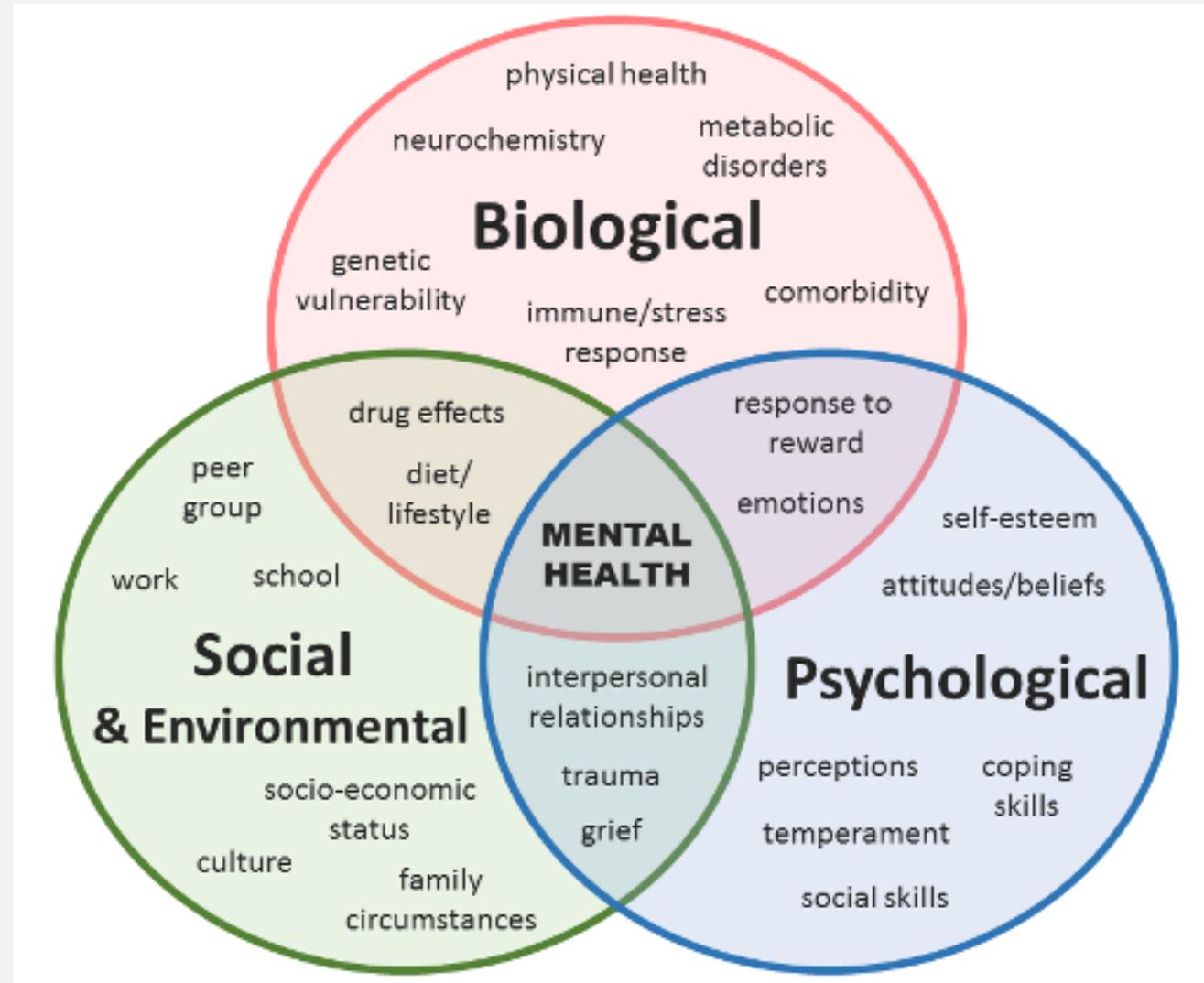
- Disagreements between authors/studies in which particular muscle groups needed stretching vs. strengthening.
- No clinical trials examining scapular focused exercises vs. other protocols – not known if changing scapular kinematics result in a change of NTOS symptoms.
- Assessment for “scapular dyskinesia” suffers from poor inter-reliability and methodological quality – some studies showing improvements in shoulder pain occurred without changes in scapular kinematics.
- Inconsistency in exercise dosage (sets, reps, frequency, duration, intensity).
- Authors advocated for “postural correction” however postural changes were not assessed in any of the studies.

# CLINICAL IMPLICATIONS

- Lack of agreement on specific muscle group stretching vs. strengthening may lead clinicians to **focus on symptom modification and exercises related to meaningful functional goals.**
- Clinical examination and exercises targeted to **change scapular kinematics and posture may not be necessary.**
- Variation in exercise dosages across studies may encourage clinicians to practice **shared decision making** with their patients.

Consider a **biopsychosocial framework** when considering how exercise helps with NTOS symptoms:

- improvements in pain self-efficacy
- better pain coping strategies
- decrease in fear avoidance behavior
- increase in “affordances” or action opportunities that the individual has to perform daily activities,
- positive contextual factors related to the clinician-patient interaction.





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# Conservative management of pediatric temporomandibular disc displacement presenting as juvenile idiopathic arthritis: a case report

Robert J. Trager, DC

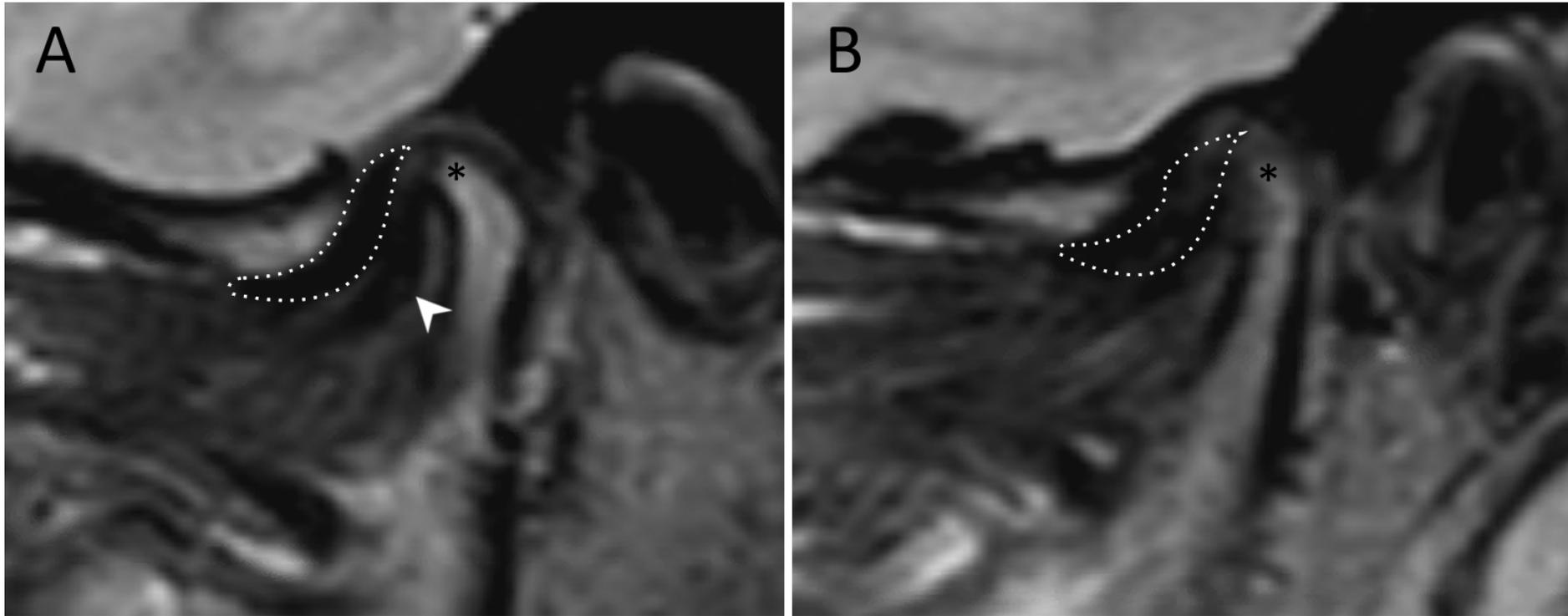
# TMJD in Adolescents

- Age 10-19; prevalence 7-30%
- Myofascial pain
- Anterior disc displacement with reduction
- Arthritis uncommon (<0.01%)



# Case report

- 11-year-old girl
- 1.5-year history of UL TMJ pain/trismus
- Pediatric rheumatologists had diagnosed JIA after MRI w/ contrast
- Rx methotrexate, injection, arthrocentesis
- Chiropractor → mechanical TMD/disc origin
- PNF/acupuncture → improved

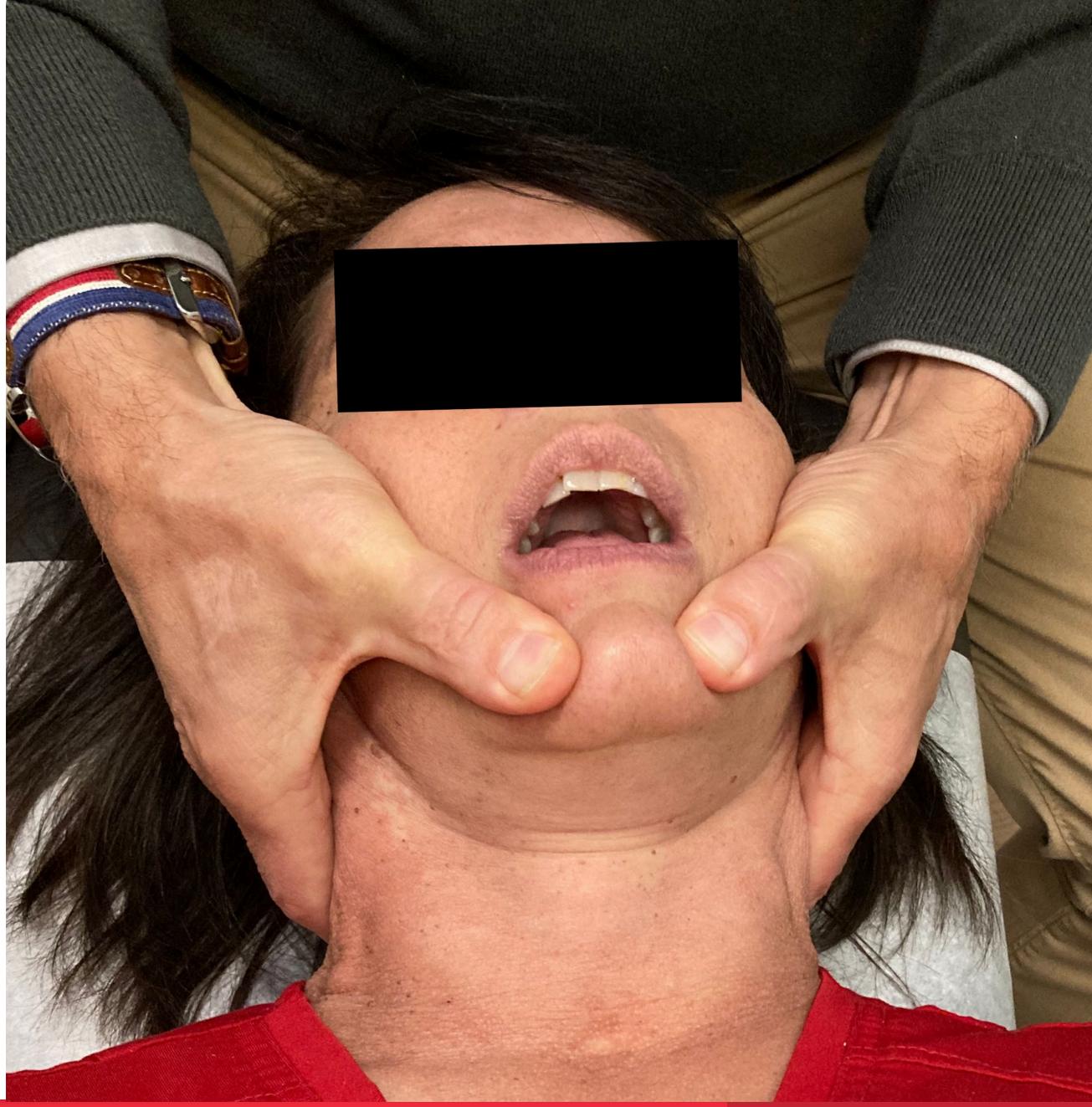


*Figure 1: Oblique sagittal T2-weighted MRIs of the left (A) and right (B) TMJ with the mouth closed. The articular disc (dotted line) is displaced anteriorly from its normal position near the top of the mandibular condyle (\*). Thickening of the lateral pterygoid muscle tendon (arrowhead) is seen parallel and subjacent to the disc, more clearly seen in image A, producing the “double disc” sign.*



*Figure 2: Coronal fat-saturated T1-weighted MRI with contrast, at the left mid-mandibular condyle shows synovial enhancement (arrows), focal condylar marrow enhancement (arrowhead).*





# Pitfalls

- Where do patients go?
- Imaging findings misleading
- Lack of agreed-upon treatments



Image: Doctor Popular

# Stepped care

- Conservative treatments first
- Manual therapy, spinal manipulation if indicated
- Growing evidence supports manual therapies for TMD



# Contact Information

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Researchgate





## Focus on Chiropractic Sciences and Clinical Research Published in the JCCA Vol. 66 No. 1

Thursday, June 02, 2022

**Drs Dominique Harmath, Derick Luu, Robert Trager**

### JCCA Articles

#### [Article \(1\): The one-week prevalence of overuse-related shoulder pain and activity limitation in competitive tennis players living in Toronto: a feasibility study.](#)

Tennis is a demanding aerobic and anaerobic sport with repeated overhead motions placing significant loads through the dominant shoulder. The shoulder is one of the most common body parts affected when it comes to injuries in tennis. Despite injury, many players continue playing through pain rather than adjusting their training schedules or taking time off. This often results in an increase in injury severity. We aimed to determine the feasibility of conducting a cross-sectional study to estimate the one-week prevalence of overuse-related shoulder pain and activity limitation in competitive tennis players.

Learning objectives:

1. Understand why injury reporting should be based on more than just “time loss”
2. Know when to use the Oslo Sports Trauma Research Centre Overuse Shoulder Injury Questionnaire

#### **Article (2): Exercise rehabilitation for neurogenic thoracic outlet syndrome: a scoping review.**

Exercise rehabilitation has been proposed for the management of Neurogenic Thoracic Outlet Syndrome (NTOS). To date there have been no reviews of the literature regarding exercise rehabilitation for NTOS and their proposed clinical rationale. Understanding various exercise protocols and their clinical rationale may help guide rehabilitation clinicians in their exercise selection when managing NTOS. A scoping review was conducted on exercise rehabilitation for NTOS from inception to March 2021 in the PubMed database. Forty-seven articles met the inclusion criteria. This scoping review provides a broad overview of the most common exercise protocols that have been published and examines the purported clinical rationale utilized in the management of NTOS.

Learning objectives:

1. To review the current literature on exercise rehabilitation for Neurogenic Thoracic Outlet Syndrome (NTOS)
2. To examine the clinical rationales on exercise rehabilitation for NTOS
3. To discuss, critically appraise and clinically apply the current literature on exercise rehabilitation for NTOS

### **Article (3): Conservative management of pediatric temporomandibular disc displacement presenting as juvenile idiopathic arthritis: a case report.**

There is limited research regarding management of temporomandibular disorders (TMD) in adolescents, in particular those with imaging signs of juvenile idiopathic arthritis (JIA). Our case report describes an 11-year-old girl who presented to a chiropractor with chronic temporomandibular joint (TMJ) pain and trismus. Previously, pediatric rheumatologists diagnosed JIA based on magnetic resonance imaging findings of the TMJ. However, the chiropractor questioned the JIA diagnosis, instead relating symptoms to a mechanical TMD/disc origin. Manual therapy, TMJ exercises, and acupuncture improved TMJ pain and opening without symptom recurrence. This case illustrates the success of stepped care in adolescent TMD and highlights the role of a chiropractor within an integrative setting.

Learning objectives:

1. Review the epidemiology and differential diagnosis of temporomandibular joint disorders in adolescents
2. Understand the rationale for utilizing proprioceptive neuromuscular facilitation techniques for the TMJ in conjunction with spinal manipulation
3. Review the potential pitfalls of adolescent TMJ management and utility of the stepped care model

### **Supporting References:**

- Christidis, Nikolaos, et al. "Prevalence and treatment strategies regarding temporomandibular disorders in children and adolescents—A systematic review." *Journal of oral rehabilitation* 46.3 (2019): 291-301.
- La Touche, Roy, et al. "Manual therapy and exercise in temporomandibular joint disc displacement without reduction. A systematic review." *CRANIO®* (2020): 1-11.
- Lee, Yoon-Joo, et al. "Systematic review of the correlation between temporomandibular disorder and body posture." *Journal of Acupuncture Research* 34.4 (2017): 159-168.
- Calixtre, Letícia Bojikian, et al. "Effects of cervical mobilization and exercise on pain, movement and function in subjects with temporomandibular disorders: a single group pre-post test." *Journal of Applied Oral Science* 24 (2016): 188-197.