Citation: Simon J, Millikan N, Yom J, Grooms D. Neurocognitive challenged hops reduced functional performance relative to traditional hop testing. *Phys Ther Sport*. 2020;41:97-102. doi:10.1016/j.ptsp.2019.12.002

Review submitted by: Anna Wilson

Background/Objective: The purpose of this study was to determine the relationship between single-leg hop tests with and without neurocognitive challenge.

Methods: This was a cross-sectional study that included 22 college-aged participants without lower extremity surgery within the past 6 months or other injury within the past 6 weeks, ligament damage to the ankle, knee, or hip, and any lower extremity injury that limits participation. Testing included single-leg hop, single-leg crossover hop, single-leg triple hop, and single-leg 6m hop under traditional and neurocognitive conditions. Neurocognitive hop testing was based on a protocol previously established during a study that demonstrated high test-retest reliability. Pearson correlations and MANOVA were performed for statistical analysis.

Results: Correlations ranged from 0.86 to 0.92 between traditional and neurocognitive hop tests. The repeated measures MANOVA was significant for condition for both legs ($p < 0.05$). Specifically, the crossover hop (average percent decrease 10.37%), triple hop (average percent decrease 7.13%), and 6-m hop (average percent decrease 81.67%) were statistically different between traditional and neurocognitive conditions ($p < 0.05$).

Conclusion: The addition of neurocognitive reactive and anticipatory components to simulate more sport specific scenarios may improve functional testing for return to sport.

Commentary: I don't think that the results are surprising that you perform worse on single leg hop test with an additional neurocognitive challenge. But something of this nature is worth thinking about implementing in return to sport testing. Research like this on healthy subjects can be good to establish normal differences between the different conditions, and then can open up opportunities to further progress research to add in post-op or injured athletes to compare to these norms. Another interesting addition to hop testing would be doing something like the beep test to reach near maximal fatigue and then perform the series of hop testing with the idea of assessing performance while fatigued. This type of protocol would assess more than just reaction time and dual task, like in this study, and potentially add in other sport specific aspects. A downside, though, of making something like this a part of objective testing for return to sport decision would be the time it may take to have a series of studies leading up to more conclusive numbers that can help with decision making.

Salem, H. S., Park, D. H., Thon, S. G., Bravman, J. T., Seidl, A. J., Mccarty, E. C., & Frank, R. M. (2020). Return to Golf After Shoulder Arthroplasty: A Systematic Review. ***The American Journal of Sports Medicine,*** **036354652092307. doi:10.1177/0363546520923070**

Review Submitted By: Helen Shepard

Purpose: To review current guidelines in literature on returning to golf after shoulder arthroplasty.

Methods: Two independent reviewers searched PubMed, Embase, and Cochrane Library for articles to include in this systematic review. Search terms were "shoulder," "arthroplasty," "replacement," and "golf." Studies on total shoulder arthroplasty, shoulder hemiarthroplasty, and reverse shoulder arthroplasty were included. Other outcomes of interest included indications for surgery, surgical technique, rehabilitation protocol, amount of time post surgery for returning to golf, and patient-reported outcome measures.

Results: A total of 10 studies were included in the systematic review, of which 8 described general return to sport and only 2 specifically discussed golf performance after shoulder arthroplasty. Two studies on patients who underwent total shoulder arthroplasty sited return to golf rates ranging from 89% to 100% after 5.1 to 8.4 months. Two studies that included patients post total shoulder arthroplasty and hemiarthroplasty reported return to golf rates of 77% to 100% after 5.4 and 4.8 months, respectively. Two studies included patients post reverse shoulder arthroplasty with return to golf rates of 50% and 79% after 5.3 and 6 months, respectively. One study included patients only post hemiarthroplasty and sited a return to golf rate of 54% at 6.5 months. Rehabilitation protocol was only published in 3 studies and subjective level of play was reported in 2 studies with most participants reporting an improvement in their ability.

Conclusion: Most patients can expect to return to golf after shoulder arthroplasty at about 6 months post surgery. The rate of return seems to be faster with traditional total shoulder arthroplasty compared to reverse shoulder arthroplasty and hemiarthroplasty. Other studies have shown that total shoulder arthroplasty outperforms hemiarthroplasty in the categories of patient satisfaction, durability, complication profile, and reoperation rate, which may contribute to these findings. Other contributions may include preoperative characteristics of the patients and indications for surgery. Rotator cuff tear arthropathy is the primary diagnosis for a majority of reverse shoulder cases but osteoarthritis in the primary diagnosis for total shoulder arthroplasty. Knowing that a golf swing relies predominantly on the rotator cuff may lead to the predisposition of patients who had a reverse shoulder arthropathy having more difficulty with returning to golf. Secondly, patients who had a repairable subscapularis tendon demonstrated a higher rate of return to sports than those who did not. Finally, being able to return to golf results in higher patient satisfaction post surgery.

Commentary: This article is helpful in order to provide patients with a realistic expectation of return to golf after shoulder arthroplasty. Golf is a popular sport amongst all ages, but especially in the population that also makes up the bulk of patients undergoing shoulder arthroplasty.

Therefore, it is common for patients to inquire about returning to sport. Being able to use literature to support the answer and set realistic expectations is important. Authors concluded that “most” patients will be able to return to golf after 6 months, however, some of the ranges in included studies are massive. One study averaged 8 months, but the range was 2-24 months. It would be unfortunate to suggest to a patient that he or she will be playing golf in 6 months only to have it be 2 years. More research is indicated on predictors of returning to golf in order to suggest more accurate timelines. For example, assessing the pre surgery status of patients may help determine the likelihood of fast recovery. As the authors mentioned, differentiating patients that are undergoing surgery for arthritis vs rotator cuff tear is important. Lastly, return to sport is a major influencer of patient satisfaction. This article helps set patients up for feeling like their surgery was a success by providing data on returning to golf.

Citation: Reynolds B, Puentedura EJ, Kolber MJ, Cleland JA. Effectiveness of Cervical Spine High Velocity Low Amplitude Thrust Added to Behavioral Education, Soft Tissue Mobilization, and Exercise in Individuals With Temporomandibular Disorder (TMD) With Myalgia: A Randomized Clinical Trial [published online ahead of print, 2020 Jan 6]. *J Orthop Sports Phys Ther*. 2020;1-40. doi:10.2519/jospt.2020.9175

Review Submitted by: Steven J. Lagasse

Objective: To assess the therapeutic benefits of cervical spine manipulation versus sham manipulation, when combined with behavioral education, soft tissue mobilization, and a home exercise program on patients with acute TMD (temporomandibular dysfunction).

Methods: This study was a prospective longitudinal randomized clinical trial. The primary measures assessed were active jaw range of motion, Numeric Pain Rating Scale (NPRS) for jaw pain, the Tampa Scale for Kinesiophobia for TMD (TSK-TMD), Jaw Functional Limitation Scale (JFLS), and Global Rating of Change (GROC). Subjects were allowed to participate based on inclusion and exclusion criteria. Subjects were randomly assigned to either the control group (cervical manipulation n = 25) or the experimental group (sham manipulation n = 25) via computer-generated randomization. The assessors collecting data, as well as the participants, were blinded to treatment group allocation. Treatment procedures were a combination of manual therapy, education, and therapeutic exercise. The subjects were randomly selected to receive additional cervical spine manipulation or sham manipulation in addition to these treatments. Cervical manipulation techniques were C0/1 distraction technique and a C2/3 up-slope technique. The sham group received identical treatments, however, instead of a thrust, the treating therapist held the pre-thrust position for 15 seconds. Baseline measures were taken on the first visit. After baseline measures, subjects were provided with same-day treatment and then were immediately remeasured. Following the initial session, subjects were treated and measured three additional times at one-week intervals.

Results: Significant differences in the JFLS and TSK-TMD were found for subjects in the experimental group. All remaining primary outcomes measures showed non-significant differences. However, the NPRS for jaw pain was approaching significance.

Conclusion: Cervical thrust manipulation may improve function and decrease fear in those patients suffering from TMD when combined soft tissue mobilization, education, and therapeutic exercise.

Commentary: The primary strength of this study was the methodology which included subject randomization, and blinding of both the subjects and assessors. Additionally, the authors' sham intervention closely matched the experimental group's intervention. The study also managed to retain all of their subjects, although one subject from each group missed a treatment session due to unrelated illness. Finally, this study clearly states how they used power and attrition percentage to come tot heir sample size of 42 subjects.

There are several limitations to this study. The two treating therapists are AAOMPT trained fellows with 17 and 38 years of experience. This may make replicating certain manual techniques difficult for clinicians without this specialization. The authors failed to report P values for the between-group baseline measures. Although it can be assumed that groups did not demonstrate baseline differences, providing this information would help strengthen the study. Subject blinding was also not assessed which does not provide information as to whether or not the control group felt their sham intervention was of benefit. The demographic in this study were primarily female (86%). This may reduce the generalizability of this study. Finally, the study utilized an array of outcomes measures. This reduces this study's ability to make a specific prediction or pursue a specific answer to their research question. To the authors' credit, many of these limitations were acknowledged in the limitation section of the article.

Oliveira BIR de, Smith AJ, O'Sullivan PPB, et al. 'My hip is damaged': a qualitative investigation of people seeking care for persistent hip pain. *Br J Sports Med*. 2020;54(14):858-865. doi:10.1136/bjsports-2019-101281

Review Submitted by: Taylor Blattenberger PT, DPT

Objective: To explore how people seeking care for persistent hip pain and disability make sense of their symptoms

Methods: Sixteen participants were recruited for data collection from a single private orthopaedic surgery clinic in Australia. Participants were adults, 18 years or older, experiencing hip pain in the groin, lateral hip, or gluteal region that were identified as candidates for surgery but had agreed to participate in physiotherapy-directed cognitive functional intervention. Participants completed an online questionnaire to collect demographic data as well as clinical characteristics of their pain and outcome measures.

Individual interviews were conducted in person or over the phone prior to initiation of physiotherapy treatment. An academic physiotherapist with experience in qualitative interviewing conducted these interviews. Participants were asked about the cause of their symptoms, the consequences of their symptoms, the expected duration of their symptoms, and the control they had over their symptoms. These interviews were coded inductively and the researchers identified themes.

Results: Results of each theme can be broken down into the following categories:

Perceptions of Causes: Common narratives for onset of hip pain were high intensity physical activity early in life or altered or excessive movements of the hip. Older participants saw hip pain as a normal part of aging. Participants differentiated causes of pain between what they perceived to be the problem (lay causes), and what health care professionals had told them (informed causes). Participants tended to identify with whichever causes provided them the most hope of recovery or the ones that made more sense to them.

Diagnostic Jargon: Participates that had undergone diagnostic imaging tended to use anatomical terms such as “acetabulum” and “gluteal muscles” as well as perceived tissue damage descriptions such as “fissuring” and “tearing.” Perceptions regarding imaging were mixed. Some saw the anatomical diagnosis as validation of their symptoms, but others found the information to be frightening and discouraging.

Fixing Damage and Controlling Symptoms: Participants were optimistic that there were solutions to their symptoms. Those with tissue damage believed passive options such as stem cell injection, plasma injection, or surgery could address structural abnormality. Others that perceived symptoms as a result of “unstable” structures believed that strengthening of the hip and core muscles would improve their symptoms. The repeat experience of failed treatments increased feelings of distress and reduced perceived control over symptoms.

Exercise, Sleep, and Mental Health: Consequences of prolonged hip pain included inability to exercise. Inability to exercise was perceived to increased irritability and frustration and negatively impact general health. Impaired sleep was another key consequence, which was perceived to create a cascade of impaired concentration and poor work and interpersonal experience.

Conclusion: Participants in this study reported negative beliefs relating to damage hip structures, which lead to activity avoidance, and disrupted sleep, which ultimately may threaten physical and mental wellbeing.

Commentary: The authors of this study identified a cascade of outcomes in those with hip pain. They see that a pathoanatomical diagnosis leads to the belief that pain is due to damaged structures, which can be damaged further with continued intense, excessive, or altered movement. Avoidance is then employed to reduced damage while passive treatments are sought to mend damaged structures. Because of the poor correlates between anatomical “damage” and pain, these interventions can be unsuccessful and reduce confidence. Continued avoidance, reduced perceived control, and persistent symptoms lead to prolonged physical disability and poor mental wellbeing.

Perhaps, if we can change the initial narrative that these patients hear when they first consult a health care professional we can alter their path down this cascade. If the symptoms are explained without blaming "damaged" structures we can improve sense of control, decrease activity avoidance, and ultimately improve outcomes. More appropriate narratives to provide patients with less harmful beliefs can be found in the table below.

Table 4 Suggested alternative health messages when communicating with people with persistent hip pain

Health messages reported by participants in the study linked with unhelpful health behaviours	Alternative evidence-based health messages that aim to promote positive health behaviours for people with hip pain
Your hip pain is due to damaged structures in your hip joint (eg, labral tears and arthritis)	'Pathoanatomical' changes such as labral tears and hip joint arthritis are common in pain-free populations.[30] This means that other factors are also important to explain hip pain. Pain in the hip structures is influenced by multiple factors such as sleep, fatigue, mood, strength, physical activity and body weight.[40] Many of these factors are influenced by things you can do for yourself. We can make a plan to address these.
Hip tendons spontaneously break down in people over 50 years… loading them will damage them further	'Pathoanatomical' changes relating to the hip tendons are common in pain-free populations. Tendon health is influenced by lots of factors such as muscle strength, engagement in physical activity, psychological health and levels of obesity.[54 55] Addressing these factors can keep tendons healthy with ageing. It is important to know that it is safe and helpful to engage in graduated exercise with tendon tears—rest and activity avoidance is unhelpful.[43]
Your hip is unstable and needs controlling and stabilising	Hip joints are very stable structures.[56] Maintaining muscle strength and mobility around the hip is important for joint health, while guarding and holding muscles tense can be unhelpful.
Being too lordotic can lead to wear/arthritis on your hips	There is no evidence that spine and pelvis posture predicts hip arthritis. People have a range of postures and body shapes and the body can learn to adapt to movement and load.
Engaging in weight bearing and loaded exercise will damage the hip structures more	Engaging in graduated weight bearing exercise is safe and does not damage the hip structures in people with osteoarthritis. In fact exercise is important to maintain the health of your joint.[57]
With your damaged/arthritic hip structures a joint replacement is inevitable	Developing an understanding of your hip pain, building confidence to move, getting strong and active, as well as maintaining a healthy body weight, can reduce pain, disability, need for medication and in many cases the need for surgery.[43]
I think we better get you on some antidepressants to manage your mental health, as exercising vigorously like you used to in order to manage your mental health is not safe for you now	Physical activity is important for mental health.[58] Exercise is safe as long as it is graduated and has huge health benefits.[57]
You need a cortisone injection for your hip pain	While cortisone injections can provide short-term pain relief for some people, the effects do not last[59 60] and may increase osteoarthritis progression especially when repeated.[61] Understanding the factors linked to your pain, building confidence to strengthen your hip, becoming active and managing your weight is a more effective way to manage your pain in the long run.[43]

Citation: Areeudomwong, P., Jirarattanaphochai, K., Ruanjai, T., Buttagat, V., Clinical utility of a cluster of tests as a diagnostic support tool for clinical lumbar instability, *Musculoskeletal Science and Practice* (2020), doi: https://doi.org/10.1016/j.msksp.2020.102224.

Review Submitted By: Lauren Carroll

Objective: Analyze the diagnostic accuracy of several individual clinical lumbar instability (CLI) tests and a cluster of CLI tests to identify diagnostic support tools to more accurately diagnose and treat CLI patients.
Methods: Analytical cross-sectional design with 200 patients with convenience sampling performed in Thailand.
Results: Cluster with ≥3 positive findings was the most accurate cluster with a specificity of 91.7% and LR+ of 5.76. The most accurate test overall in isolation was the painful catch sign test with/without abdominal drawing in maneuver (ADIM) with a sensitivity of 72.80%, LR+ of 2.38, and LR- of 0.39.
Conclusion: A cluster of 3 out of the 4 assessed tests was found to be a cost effective and clinically useful tool in identifying patients with CLI.

Commentary: There are quite a few limitations with this study, even though it appears to have good statistical support. The patient population used for this study was very narrow, with only patients between 40-60 years old with complaints of back pain for a minimum of 3 months, although the authors did not specify if it was a continuous 3-month time span or 3 months total of back pain. There is also no gold standard for this cluster of tests to be compared to, which the authors did point out in the article. I think this article is helpful in that it presents a clinical cluster that is easy to reproduce and time efficient, especially for trying to confirm this CLI population that may be a little tricky to identify. The tables below summarize the clinical tests that were utilized and break down the statistics on each measure.

Cluster findings	Sensitivity (95% CI)	Specificity (95% CI)	Positive predictive value (95% CI)	Negative predictive value (95% CI)	Positive likelihood ratio (95% CI)	Negative likelihood ratio (LR-)
≥1 test with positive findings	96.70 (93.11–100)	21.30 (13.58–29.02)	51.10 (43.72–58.58)	88.50 (76.18–100)	1.23 (1.11–1.37)	0.15 (0.05–0.49)
≥2 tests with positive findings	89.10 (82.77–95.49)	63.00 (53.86–72.07)	67.20 (58.88–75.54)	87.20 (79.76–94.60)	2.41 (1.86–3.11)	0.17 (0.09–0.32)
≥3 tests with positive findings	47.80 (37.62–58.03)	91.70 (86.45–96.88)	83.00 (72.91–93.13)	67.30 (59.77–74.93)	5.76 (2.96–11.11)	0.57 (0.46–0.70)
All 4 tests with positive findings	5.40 (0.80–100)	100.00 (100-100)	100.00 (100-100)	55.40 (48.41–62.36)	Inf. (∞)	0.94 (0.90–0.99)

Remark: ADIM; abdominal drawing-in maneuver, CI; confidence interval.

Test item	Sensitivity (95% CI)	Specificity (95% CI)	Positive predictive value (95% CI)	Negative predictive value (95% CI)	Positive likelihood ratio (95% CI)	Negative likelihood ratio (95% CI)
Apprehension sign test	17.40 (9.65–25.13)	92.60 (87.65–97.53)	66.70 (47.81–85.53)	56.80 (49.50–64.14)	2.35 (1.05–5.23)	0.89 (0.80–0.99)
Instability catch sign test with/without ADIM	67.40 (57.81–76.97)	63.00 (53.86–72.07)	60.80 (51.31–70.26)	69.40 (60.26–78.51)	1.82 (1.37–2.42)	0.52 (0.37–0.72)
Painful catch sign test with/without ADIM	72.80 (63.74–81.92)	69.40 (60.76–78.13)	67.00 (57.78–76.22)	75.00 (66.51–83.49)	2.38 (1.75–3.25)	0.39 (0.27–0.56)
Prone instability test	80.40 (72.33–88.54)	50.90 (41.50–60.35)	58.30 (49.69–66.84)	73.50 (65.46–85.23)	1.64 (1.32–2.04)	0.39 (0.24–0.60)

Remark: ADIM; abdominal drawing-in maneuver, CI; confidence interval.

Citation: Areeudomwong, P., Jirarattanaphochai, K., Ruanjai, T., Buttagat, V., Clinical utility of a cluster of tests as a diagnostic support tool for clinical lumbar instability, *Musculoskeletal Science and Practice* (2020), doi: https://doi.org/10.1016/j.msksp.2020.102224.

Review Submitted By: Lauren Carroll

Objective: Analyze the diagnostic accuracy of several individual clinical lumbar instability (CLI) tests and a cluster of CLI tests to identify diagnostic support tools to more accurately diagnose and treat CLI patients.
Methods: Analytical cross-sectional design with 200 patients with convenience sampling performed in Thailand.
Results: Cluster with ≥3 positive findings was the most accurate cluster with a specificity of 91.7% and LR+ of 5.76. The most accurate test overall in isolation was the painful catch sign test with/without abdominal drawing in maneuver (ADIM) with a sensitivity of 72.80%, LR+ of 2.38, and LR- of 0.39.
Conclusion: A cluster of 3 out of the 4 assessed tests was found to be a cost effective and clinically useful tool in identifying patients with CLI.

Commentary: There are quite a few limitations with this study, even though it appears to have good statistical support. The patient population used for this study was very narrow, with only patients between 40-60 years old with complaints of back pain for a minimum of 3 months, although the authors did not specify if it was a continuous 3-month time span or 3 months total of back pain. There is also no gold standard for this cluster of tests to be compared to, which the authors did point out in the article. I think this article is helpful in that it presents a clinical cluster that is easy to reproduce and time efficient, especially for trying to confirm this CLI population that may be a little tricky to identify.

Cluster findings	Sensitivity (95% CI)	Specificity (95% CI)	Positive predictive value (95% CI)	Negative predictive value (95% CI)	Positive likelihood ratio (95% CI)	Negative likelihood ratio (LR-)
≥1 test with positive findings	96.70 (93.11–100)	21.30 (13.58–29.02)	51.10 (43.72–58.58)	88.50 (76.18–100)	1.23 (1.11–1.37)	0.15 (0.05–0.49)
≥2 tests with positive findings	89.10 (82.77–95.49)	63.00 (53.86–72.07)	67.20 (58.88–75.54)	87.20 (79.76–94.60)	2.41 (1.86–3.11)	0.17 (0.09–0.32)
≥3 tests with positive findings	47.80 (37.62–58.03)	91.70 (86.45–96.88)	83.00 (72.91–93.13)	67.30 (59.77–74.93)	5.76 (2.96–11.11)	0.57 (0.46–0.70)
All 4 tests with positive findings	5.40 (0.80–100)	100.00 (100-100)	100.00 (100-100)	55.40 (48.41–62.36)	Inf. (∞)	0.94 (0.90–0.99)

Remark: ADIM; abdominal drawing-in maneuver, CI; confidence interval.

Test item	Sensitivity (95% CI)	Specificity (95% CI)	Positive predictive value (95% CI)	Negative predictive value (95% CI)	Positive likelihood ratio (95% CI)	Negative likelihood ratio (95% CI)
Apprehension sign test	17.40 (9.65–25.13)	92.60 (87.65–97.53)	66.70 (47.81–85.53)	56.80 (49.50–64.14)	2.35 (1.05–5.23)	0.89 (0.80–0.99)
Instability catch sign test with/without ADIM	67.40 (57.81–76.97)	63.00 (53.86–72.07)	60.80 (51.31–70.26)	69.40 (60.26–78.51)	1.82 (1.37–2.42)	0.52 (0.37–0.72)
Painful catch sign test with/without ADIM	72.80 (63.74–81.92)	69.40 (60.76–78.13)	67.00 (57.78–76.22)	75.00 (66.51–83.49)	2.38 (1.75–3.25)	0.39 (0.27–0.56)
Prone instability test	80.40 (72.33–88.54)	50.90 (41.50–60.35)	58.30 (49.69–66.84)	73.50 (65.46–85.23)	1.64 (1.32–2.04)	0.39 (0.24–0.60)

Remark: ADIM; abdominal drawing-in maneuver, CI; confidence interval.

Citation: Mohamed AA, Jan Y-K, Sayed WHE, Wanis MEA, Yamany AA. Dynamic scapular recognition exercise improves scapular upward rotation and shoulder pain and disability in patients with adhesive capsulitis: a randomized controlled trial. Journal of Manual & Manipulative Therapy. 2019;28(3):146-158. doi:10.1080/10669817.2019.1622896.

Review Submitted By: Barrett Coleman

Objectives: Examine the ability of a dynamic scapular recognition exercise to improve scapular upward rotation and decrease shoulder pain and disability in patients with adhesive capsulitis of the shoulder.

Methods: A test-retest randomized controlled study design with two groups: one group received a dynamic scapular recognition exercise using a wireless biofeedback system; the control group received placebo treatment in the form of active range-of-motion (ROM) exercises of the sound upper limb. Scapular upward rotation, ROM of the shoulder joint, and the Shoulder Pain and Disability Index (SPADI) was the data collected.

Results: After two weeks, there were statistically significant differences between the study and control groups in scapular upward rotation and shoulder flexion and abduction ($P < .05$) but no difference in ER and SPADI. After two and six months, there were statistically significant differences between study and control groups in scapular upward rotation; shoulder flexion, abduction and external rotation; and SPADI scores ($P < .05$).

Conclusions: This study showed that a dynamic scapular recognition exercise significantly improves scapular upward rotation and the ROM of shoulder flexion and abduction after two weeks. At two and six months, this exercise improves scapular upward rotation; ROM of shoulder flexion, abduction, and external rotation; and SPADI scores. These improvements persisted for six months after the performance of this exercise

Commentary: The intervention design for the study group was very interesting: it was a device that emitted more sound if the pt performed more scapular upward rotation. So while they performed abduction exercises, they received feedback of how much scapulothoracic movement versus GHJ movement was performed and were encouraged to make more sound. At a neuro outpatient clinic, we used these kinds of devices with good success for all sorts of interventions. It made me think of how this could be very applicable to the outpatient ortho setting as we use external cueing for success with other movement patterns.

If the study has one drawback, it is that the control group did not receive a very good intervention to be considered a placebo. They moved their UNAFFECTED arm for the same duration that the study group received treatment. I find it hard to believe anyone in the placebo group couldn’t self-identify themselves as being in the placebo group given the interventions they received.

So, while this study can’t help you decide where scapular movement falls in the hierarchy of impairments for adhesive capsulitis treatment, I think it does speak to how direct interventions at an impairment level using a novel idea can help people with their perceived disability.