

**Larsson R, Bernhardsson S, Nordeman L. Effects of eccentric exercise in patients with subacromial impingement syndrome: a systematic review and meta-analysis. BMC Musculoskeletal Disorders. 2019;20(1). doi:10.1186/s12891-019-2796-5.**

**Review Submitted by: Barrett Coleman**

**Objective:** To determine the effect of eccentric exercise on pt's function and pain who have been diagnosed with subacromial impingement.

**Methods:** Systematic searches of PubMed, Cochrane Library and PEDro by two independent authors. Included studies were assessed using the PEDro scale for quality and the Cochrane scale for clinical relevance by two independent authors. Data were combined in meta-analyses. GRADE was applied to assess the certainty of evidence

**Results:** Sixty-eight records were identified with seven studies included in the meta-analysis (n = 281). Post-treatment pain was significantly lower after eccentric exercise compared with other exercise but didn't meet the MCID for VAS. Eccentric exercise provided no significant post-treatment improvement in function (DASH scores) compared with other exercise. Painful eccentric exercise showed no significant difference compared to pain-free eccentric exercise. **Conclusions:** Eccentric exercise may provide a small but not clinically important reduction in pain compared to other interventions. It is uncertain whether eccentric exercise improves function (DASH scores) more than other types of exercise.

**Commentary:** This article found good articles that were very homogenous, making it easy to put them together in a meta-analysis (the interventions were detailed and similar, the outcomes were the same, and follow ups post-treatment and long-term). Unfortunately, the datasets included people that may not have necessarily had tendinopathic changes.

The inclusion criteria was Neer's, Jobe's, and Hawkins-Kennedy with pain being present for 3-6 months. These special tests aren't specific enough to be testing tendon tissue while running the risk of having high false positives. Only three of the seven studies used palpation of rotator cuff muscles or imaging to confirm tendinopathic changes. The timeframe of pain of the previous three to 6 months does not capture the history we tend to look for with tendinosis of other locations (long-term history with repeated flare ups that is no longer responding to previously effective treatment of rest).

Due to this, it may not be appropriate to extrapolate the findings of this study to someone who has more confirmatory evidence of rotator cuff tendinopathy. Since shoulder dysfunction is multifactorial, it may still be beneficial to use eccentric exercises with certain populations as piece of an overall treatment plan consisting of other interventions addressing multiple impairments.

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**Grimes, J. K., Puentedura, E. J., Cheng, M. S., & Seitz, A. L. (2019). The Comparative Effects of Upper Thoracic Spine Thrust Manipulation Techniques in Individuals With Subacromial Pain Syndrome: A Randomized Clinical Trial. *Journal of Orthopaedic & Sports Physical Therapy*, 49(10), 716–724. doi: 10.2519/jospt.2019.8484**

**Review Submitted by: Helen Shepard**

**Objective:** To assess the impact of two distinct thoracic thrust manipulation techniques (seated and supine) compared to sham manipulation on pain, function, and satisfaction as well as biomechanical changes in individuals with subacromial pain syndrome.

**Methods:** Participants were randomly assigned to a seated thoracic thrust manipulation, supine manipulation, or sham manipulation. Each group had 20 participants that were screened for inclusion and exclusion criteria. Self reported pain, function, and satisfaction were examined using the Penn Shoulder Score. Pre and post measures of scapular upward rotation and posterior tilt were taken as well as peak force generated by middle trapezius, lower trapezius, and serratus anterior. Pectoralis minor muscle length was also assessed. All measures were assessed immediately after manipulation except the Penn Shoulder Score was assessed at 48 hours post manipulation.

**Results:** Analysis of data showed no significant between group differences for any assessed variables.

**Conclusion:** This study showed that there was no immediate or short term effect of two distinct thoracic manipulation techniques on shoulder pain and function compared to sham in individuals with subacromial impingement syndrome. Previous studies had examined scapular movement impairments as a factor in pain and function after thrust manipulation, no changes were seen between the seated and supine technique (researchers hypothesized seated would show greater improvement due to shoulder angle). This study questions the effectiveness and utility of thoracic thrust manipulation in patients with subacromial impingement syndrome, though a limitation of the study was that participants were only mildly affected by their shoulder pain and most were not actively being treated.

**Commentary:** This study showed no significant effect of thoracic manipulation improving multiple variables in relation to patients with subacromial impingement syndrome. Researchers commented that this may be related to the fact that participants were not significantly impaired by their shoulder pain so there was not as much room for change. It would be interesting to see

a similar study done with inclusion criteria ensuring participants were affected enough by their shoulder pain to see possible changes. Another interesting point is the possible effect of two different manipulation techniques. Previously, I thought a prone technique would be best to avoid pressure through an irritable shoulder, however, researchers originally hypothesized that the supine technique would cause more scapulothoracic changes which would positively affect shoulder pain variables. It would be interesting to see future studies analyzing this effect with more symptomatic participants.

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**French SD, Nielsen M, Hall L, et al. Essential key messages about diagnosis, imaging, and self-care for people with low back pain: a modified Delphi study of consumer and expert opinions. Pain. 2019;160(12):2787-2797. doi:10.1097/j.pain.0000000000001663**

**Review submitted by: Anna Wilson**

**Objective:** The purpose of this study was two-fold- 1) establish a list of the most important consumer-oriented key messages about low back pain in consumer friendly language and 2) identify and compare ranked order of importance of these messages by people with low back pain and by international experts on low back pain.

**Methods:** This first part of this study was a Delphi survey with experts in the field and consumer participants. A list of key messages was derived from clinical practice guidelines, then the participants rated each statement based on their opinion of importance using a 6-point Likert scale (essential; very important; moderately important; slightly important; not at all important; and undecided/do not know). After this a focus group of consumers was formed to discuss the key messages identified in the Delphi survey and rephrase as needed into more consumer friendly messages. Finally, all of the statements were presented to consumer and expert participants to be ranked based on their perceived importance.

To be considered an expert in the field, participants were required to meet at least one of 4 inclusion criteria: (1) an author on at least 2 papers per year in the past 5 years that involved clinical research related to low back pain, (2) invited to give a plenary or keynote presentation on low back pain at an international conference in the past 5 years, (3) obtained nationally competitive grant funding as the lead chief investigator for a clinical research grant investigating low back pain in the past 5 years, or (4) other evidence of a major contribution to the low back pain research field. Consumers had to meet the following inclusion criteria- previously had or were currently experiencing low back pain, had previously sought information about their low back pain on the Internet, fluent in English, and have access to a computer and the Internet to complete the online Delphi survey.

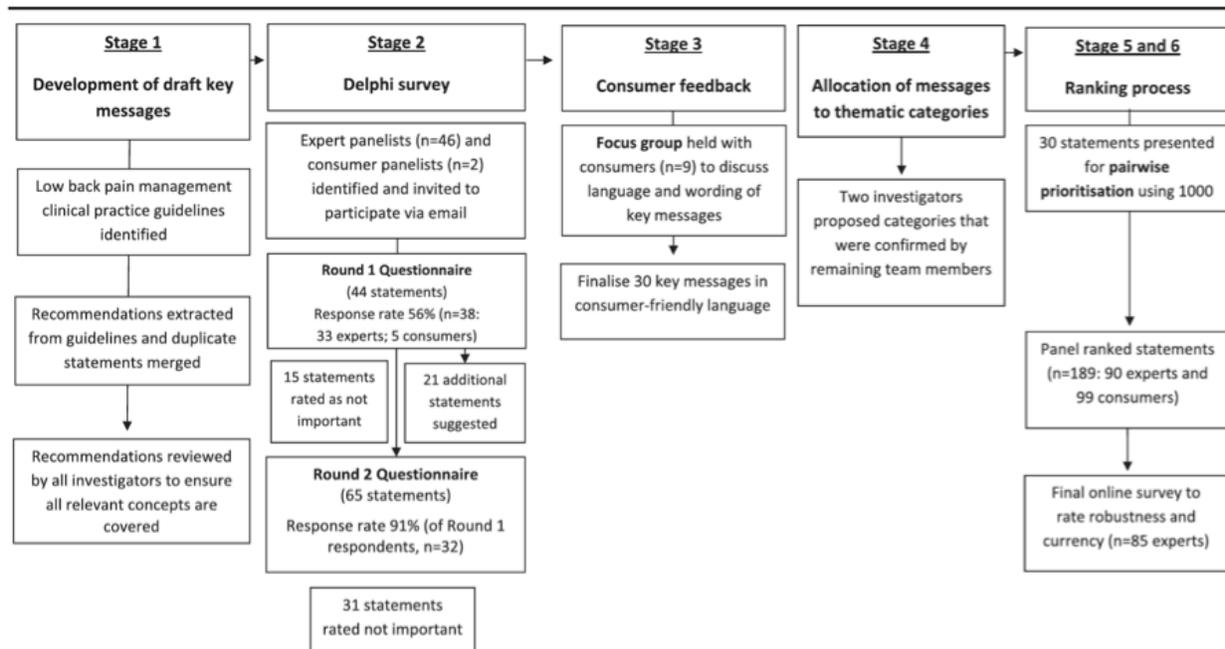


Figure 1. Overview of study phases and key message development process.

**Results:** There were significant differences between the priority of experts and consumers. Within the patient group, the rank order of themes was (from most important to least important): (1) red flags (2) principles of managing low back pain, (3) reassurance, (4) stay active, and (5) disease knowledge. The order for experts was: (1) stay active, (2) red flags, (3) reassurance, (4) unnecessary investigation, and (5) disease knowledge.

In general, the ranking process highlighted that experts considered the most important messages for patients are those related to remaining active, reassurance that back pain is a normal experience and not necessarily related to serious harm, identification of features that may indicate more serious pathology requiring expert assessment, and avoidance of unnecessary imaging. Messages related to principles of management were ranked low by the experts. By contrast, individuals with low back pain prioritized messages related to identification of more serious pathology and principles of management. People with low back pain considered messages about avoiding unnecessary imaging to be the least important.

**Conclusions:** The list of 30 messages identified through the Delphi study should be used to promote evidence-based messages about diagnosis, imaging, and general self-care as a part of educational materials for those with low back pain. The authors identified that, in general, it appeared that consumers placed emphasis on knowledge with a “what can you do for me” outlook compared to experts who placed more of an emphasis on “what you can do for yourself.” This identifies a knowledge gap in information and understanding between health care practitioners and patients with low back pain, where it appears that practitioners are influenced by evidence and consumers are influenced by beliefs.

**Commentary:** The development of messages based on clinical practice guidelines, methods of the Delphi study, thorough inclusion criteria to identify experts in the field, good to excellent response rate, utilizing a focus group of consumers to ensure “consumer friendly” messages, multiple rounds of surveying, and a large sample size are all strengths of this article. A few weaknesses of the study were the small number of consumers part of the Delphi study and a small sample size for the focus group making these results less representative of a larger population. Participants included had prior involvement in research and treatment for low back pain, which may be a more specific subset of patients with low back pain. This story fits with the subject demographic of greater than 50% of the participants having back pain greater than or equal to 10 years and close to 50% having pain rating severity of greater than or equal to 5. This was a limitation identified by the authors, but I feel that this makes the results of this study pretty applicable to clinical practice because these are often the patients that we see.

For the most part messages of reassurance were not of great importance for consumers but were for practitioners. The biggest contrast within this theme was for the messages of “Your pain may not necessarily be related to extent of damage in your back. Hurt doesn’t necessarily mean harm.” and “It is rare for low back pain to be caused by a more serious health problem.” While there is no information provided on why consumers felt this way, it is interesting to me that these messages that are often difficult for patients to hear weren’t ranked as important. Another finding that goes along with this is consumers consider the statement “in around 95% of cases, it is not possible to pinpoint the cause of back pain” not of great importance. This is an interesting finding and leaves me with the biased question of did they truly find these not important or was this lack of importance associated with lack of satisfaction with perceived ambiguity of low back pain without a specific diagnosis or cause for pain?

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**Citation: O’Keeffe M, O’Sullivan P, Purtill H, et al Cognitive functional therapy compared with a group-based exercise and education intervention for chronic low back pain: a multicentre randomised controlled trial (RCT). British Journal of Sports Medicine Published Online First: 19 October 2019. doi: 10.1136/bjsports-2019-100780**

**Review Submitted by: Lauren Carroll**

**Objective:** To determine if individualized cognitive functional training (CFT) is more effective at treating non-specific chronic low back pain (CLBP) than group-based exercise with pain Education.

**Methods:** 206 adults with CLBP were randomized into a CFT group (n=106) or group-based exercise with pain education (n=100). The CFT group received ~5 treatments on average while the group intervention consisted of 4 classes on average (6 maximum) over 6-8 weeks.

Disability and pain intensity (within the last 7 days) were the primary outcome measures utilized, with follow ups at 6 months and 12 months after the trial.

**Conclusions:** CFT intervention reduced perceived disability greater than group exercise with pain education at 6 and 12-month follow ups, but there was no significant difference in pain intensity between the two groups.

**Commentary:** This article did an excellent job of defining CFT and giving a particular protocol for the training and education provided to the PTs that then administered the CFT to the patients in that group. The protocol is defined from a previous RCT by these authors and is referenced in the online supplementary file in the article. The population of this RCT is a strength because it includes qualities that we can expect to see clinically, with minimal exclusions. Another strength of this article is that the CFT was administered by the same PT at each location (3 PTs total), which decreases variation in delivery of the intervention.

I think this article is relevant clinically because it demonstrates that we can decrease short term and long-term perceived disability with 3-5 sessions of similar, individualized CFT in people with chronic low back pain. I think that this article displays the value in pursuing further pain science education and application of it with patients rather than just relying on exercise to reduce pain and disability in this population.

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**Hoit, G., Whelan, D. B., Dwyer, T., Ajrawat, P., & Chahal, J. (2019). Physiotherapy as an Initial Treatment Option for Femoroacetabular Impingement: A Systematic Review of the Literature and Meta-analysis of 5 Randomized Controlled Trials. The American Journal of Sports Medicine. <https://doi.org/10.1177/0363546519882668>**

**Review Submitted by: Steven J. Lagasse**

**Objective:** The purpose of this article was to investigate the best currently available literature regarding femoral acetabular impingement (FAI) and the effectiveness of physical therapy intervention as a treatment approach.

**Methods:** Systematic searches were performed on the MEDLINE (Ovid SP), EMBASE, and PubMed databases for FAI and “physiotherapy OR nonoperative management”. Only randomized control trials (RCTs), and quasi-RCTs that focused on the treatment of FAI were included. The author used the Detsky scale, a 21-point measure of methodological rigor of RCTs, to ensure only high-quality RTCs were utilized.

**Results:** A total of 694 abstracts were gathered, 662 of which were excluded. The full texts of the remaining 32 articles were reviewed, in which another 27 articles were excluded. Five

studies ultimately met the inclusion criteria for this meta-analysis. According to the Detsky scale, all five studies had a score of  $\geq 75\%$ , which is considered to be of high quality. After analyzing

these studies, the authors concluded that three similar themes differentiated the treatment and control groups: Core strengthening vs. non-core strengthening, active strengthening vs. passive modalities, and supervised physical therapy vs. unsupervised physical therapy. Standard mean differences (SMD) were performed to account for the different patient-reported outcome measures utilized between studies when comparing the three aforementioned themes. Pooled analysis demonstrated that core strengthening was statistically superior to no core strengthening, active physical therapy resulted in improved functional outcomes compared to passive modalities, and supervised physical therapy demonstrated significant benefit compared to unsupervised therapy. The results of this meta-analysis suggest that patients treated with protocols focused on supervised, core-focused, and active strengthening reported significantly better outcomes than those treated with either unsupervised, non-core focused, or passive modalities.

**Conclusions:** In patients with FAI, supervised physical therapy, which focused on core strengthening and active approaches, was found to be significantly more effective than physical therapy which was unsupervised, passive, and non-core specific. Because of this, it may be beneficial for patients with FAI to attempt conservative treatment approaches such as physical therapy before participating in surgical intervention.

**Commentary:** This meta-analysis does well in championing for patients with FAI to pursue conservative treatment before that of surgical. Although this article is not without its limitations, the authors did perform a comprehensive review regarding the possible limitations. The most important of these limitations is the lack of sample size (124 patients) and inability to generalize their findings, as the average subject was 35 years old and predominantly female (76%). Overall, additional high-quality evidence is warranted to derive a sound physical therapy protocol when attempting to treat FAI.

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**Mihata T, Morikura R, Hasegawa A, et al. Partial-Thickness Rotator Cuff Tear by Itself Does Not Cause Shoulder Pain or Muscle Weakness in Baseball Players. Am J Sports Med. 2019;47(14):3476-3482. doi:10.1177/0363546519878141**

**Review Submitted by: Taylor Blattenberger PT, DPT**

**Objective:** To assess the effects of partial-thickness rotator cuff tears on pain and strength in baseball players

**Methods:** The authors collected data on 87 male university baseball players during

an annual medical check. Each subject completed a questionnaire regarding pain and perceived shoulder function in regards to sport. The authors assessed strength of both shoulders utilizing a hand-held dynamometer, scapular dyskinesia measured by observation, and posterior shoulder tightness assessed by a supine horizontal flexion test. All these measures were combined together in the Hara test to assess total shoulder condition. A single orthopedic surgeon completed ultrasonography of both shoulders. Following the ultrasonography subjects were allocated in one of four groups: (1) No tear, (2) Supraspinatus tear, (3) Infrapinatus tear, (4) Tears of both the infrapinatus and supraspinatus. These four groups were compared against each other using strength measures and the rate of shoulder pain.

**Results:** Of the 87 subjects, 41 (47%) of them presented with articular-sided partial-thickness rotator cuff tear in the dominant shoulder. Of these 41 subjects only 7 reported shoulder pain meaning 83% of subjects with rotator cuff tears were asymptomatic. The rate of shoulder pain did not differ between those with and without partial thickness rotator cuff tears.

Analysis dominant and non-dominant shoulder strength in each group revealed that those with isolated supraspinatus tears and those with combined supraspinatus and infrapinatus tears were stronger in the affected arm than the unaffected arm in abduction. All other movements and groups did not yield significant results. Posterior shoulder tightness did not have a significant correlation with pain. Rates of shoulder pain were significantly higher in those with scapular malposition and dyskinesia. Those with a low Hara score (0-7/11, indicating "pathological total shoulder condition) were significantly more likely to report shoulder pain than those with a high Hara score (8-11/11).

**Conclusion:** The presence of an articular-sided partial-thickness rotator cuff tear does not cause pain or weakness in the affected shoulder of university baseball players.

**Commentary:** This study's results go against traditional thought in regards to rotator cuff tears. Theoretically, one would assume that deficits in the supraspinatus and infrapinatus would negatively affect external rotation and abduction strength. This was not the case in this study. These results speak to the ability of the remaining tendon to adapt to pathological changes in this population.

This article supports the idea that tissue damage is neither necessary, nor sufficient to cause pain. The rate of pain in each group did not differ significantly. Although, it is important to note that the authors only assessed the integrity of the rotator cuff tendons, therefor other pathology may have been present in the symptomatic patients without tears.

Overall, this study clearly shows that rotator cuff pathology may be present in asymptomatic baseball player and should not be labeled as the sole source of pain and disability. A full assessment of shoulder health should be performed in these patients to understand the true cause of pain and dysfunction.

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**Adriaan Louw, Kevin Farrell, Breanna Choffin, Brooke Foster, Grace Lunde, Michelle Snodgrass, Robert Sweet, Matthew Weitzel, Rebecca Wilder & Emilio J. Puentedura (2019): Immediate effect of pain neuroscience education for recent onset low back pain: an exploratory single arm trial, Journal of Manual & Manipulative Therapy, DOI: 10.1080/10669817.2019.1624006**

**Review Submitted by: Brandon Reynolds**

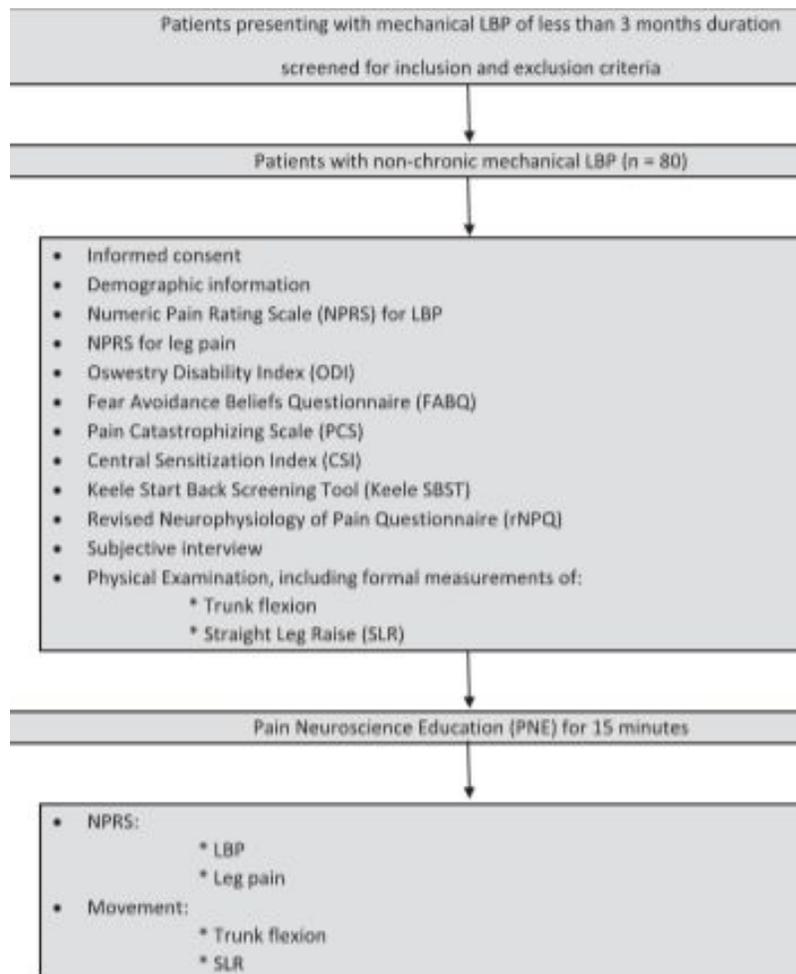
**Objective:** To determine if pain neuroscience education (PNE) is related to improving pain and movement in patients with non-chronic low back pain.

**Methods:** This was a single group cohort pilot study with the intervention including a 15 minute Pain Neuroscience Education (PNE) session. Eighty patients were recruited by seven orthopedic physical therapist residents with the following inclusion criteria: (1) Patients were aged 18 to 85 years old, (2) history of low back pain with or without leg pain <3 months, and (3) a willingness to participate. Patients were excluded if they: (1) did not meet the inclusion criteria, (2) had undergone lumbar surgery, (3) could not read or understand the English language, (4) presented with any cognitive deficits from a previous diagnosis (i.e. stroke, TBI, etc.) rendering them unsuitable for the educational intervention (PNE), (5) declined to participate, or (6) presented with a medical etiology (red flag) associated with their LBP.

The seven orthopedic physical therapy residents attended a 2-day PNE class and had to score greater than or equal to a 90% on the rNPQ in order to better standardize the delivery of the interventions.

Before the intervention the patients completed the following forms: a demographics questionnaire, pain rating for both back and leg (Numeric Pain Rating Scale - NPRS), disability index (Oswestry Disability Index - ODI), Fear avoidance questionnaire (FABQ), pain catastrophizing (Pain Catastrophizing Scale), central sensitization inventory, pain knowledge (Revised Neurophysiology of Pain Questionnaire), and risk assessment (Keele STarT Back Screening Tool) and then performed an active trunk flexion and straight leg raise (SLR). Pt's then received a 15-minute one-on-one PNE session with one of the seven PNE trained

orthopedic physical therapy residents. Follow-up measurements for the NPRS of the low back and leg were performed as well as the trunk flexion and SLR.



**Results:** After performing the intervention (PNE), LBP and leg pain improved significantly but the mean change did not exceed the MCID of 2.0 for the NPRS. Both the active trunk flexion and SLR improved significantly but while the the active trunk flexion exceeded the minimal detectable change the SLR did not.

**Conclusions:** PNE may be an option in the treatment of those patients with non-chronic mechanical low back pain. This pilot study opens the door and provides a framework for more controlled studies to assess larger groups of patients over longer periods of time.

**Commentary:** Pain Neuroscience Education (PNE) is a hot subject and there is amassing research in regards to chronic low back pain. This pilot study is focusing on non-chronic mechanical low back pain and to determine if there would be any immediate change in pain, movement, and/or perceived improvement demonstrated in patients with nonchronic LBP after 15 minutes of PNE. One of the strengths of this article was the amount of information they

gathered from the patients before the intervention (NPRS, ODI, FABQ, PCS, SCI, Keele SBST, rNPQ, subjective interview, SLR, and trunk flexion). Another strength was the training that the physical therapist residents received before providing the intervention. This article did have weaknesses as well. For one, there was no control group or group to compare the intervention against and the study was not blinded. While I said the amount of information they gathered was a strength, the amount of paperwork is not very realistic to give to patients in the clinic and in my opinion is a weakness. Another weakness, which the authors elaborated on was that not all patient-reported outcome measures were re-evaluated. Another weakness was the population recruited was from a small area in Iowa. While the weaknesses outweigh the strengths on paper, I believe this pilot study is very applicable in the clinic. In this pilot-study, 15 minutes of PNE was provided and the aforementioned improvements were noted. These improvements can not only help buy in to physical therapy but help alter FABQ, pain catastrophization, and central sensitization among other things before leading into a more chronic condition. While the previous sentence may be hypothetical at this point, further studies may allow us to improve the clinical relevance of this study.

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