IJSSPT

Patient preference or high fear: a case report describing outcomes from manual therapy and modalities for a patient with chronic back pain

Tyler D Craun, DPT

Department of Physical Therapy, University of Florida, Gainesville, Florida 32610

Correspondence: tycraun@aol.com

Purpose: Research has shown that psychological factors are often associated with the development and continuation of chronic back pain. When these factors are present in a case of chronic back pain, it is unclear as to what type of physical therapy approach should be utilized in order to best improve functional ability. The purpose of this case report is to describe the outcomes of a physical therapy treatment focusing on modalities and manual therapy based on the preference of a patient with chronic back pain and high fear. **Case Description**: A 67-year-old female presented with chronic back pain affecting her ability to perform functional activities. Scores on the Oswestry Disability Questionnaire and Fear-Avoidance Belief Questionnaire indicated disability and high fear of pain, respectively. Active trunk and cervical ROM were limited. The patient was seen for 7 visits over 4 weeks. Treatment primarily focused on modalities and manual therapy based on patient preference. **Outcomes**: No meaningful improvements on the NPRS, ODQ, FABQPA, or PCS were observed over the 4 weeks of treatment. Active trunk and cervical ROM measurements remained similar throughout treatment. **Discussion**: Patient preferences are an important component to consider when making clinical decisions, along with clinical expertise and research evidence. Some clinicians may fall into the temptation of providing passive treatments for patients with chronic back pain when patients explicitly express a strong preference for these types of interventions. Soft tissue massage, cold laser, kinesio tape, interferential current, heat packs, and therapeutic exercise were used in this case of chronic back pain. When the patient preference of modalities and manual therapy was the primary focus in treatment, no meaningful improvements in level of pain, functional ability, fear of pain, or pain catastrophizing were observed in this case. Further research is needed to determine treatments for chronic back pain that are effective in addressing the physical and psychological aspects of the condition.

Key Words: *back pain, fear, preference*

INTRODUCTION

Psychological factors are often associated with the development and continuation of chronic back pain and have been shown to play a dramatic role in the levels of disability in chronic back pain patients.[8,17,21] These factors can include fear, depression, catastrophizing, and helplessness. The Fear-Avoidance Model is a model used to describe how fear of pain leads to chronic pain and disability.[14] The model explains that after an injury, a person may respond in two different ways: avoidance or confrontation. In confrontation, the person gradually returns to performing prior physical activities during the healing process, which leads to eventual recovery. By comparison, avoidance occurs when the person avoids performing physical activity due to fear of increasing the levels of pain. This disuse hinders recovery and leads to the development of continual pain and disability. The model suggests that whether a person responds with confrontation or avoidance is influenced by certain psychological factors.

Patient preferences are a component of a model for clinical decision making from Haynes et al.[11] In this model of clinical decision making, there are three components: patient preferences, clinical expertise, and research evidence. The authors explain that each component is important and should be considered when making clinical decisions and practicing evidenced-based medicine. Further research has indicated the importance of patient preferences and expectations in treatment for

low back pain, suggesting that they are possible influencing factors on outcomes.[9,13,19] This research supports considering preference and expectation when making clinical decisions regarding treatment for patients with back pain.

When psychological factors are apparent in a case of chronic back pain, it is important to address these factors when seeking to improve functional ability.[8,21] Interventions aimed at decreasing the severity of fear, catastrophizing, and other relating psychological factors should be a fundamental goal in treatment.[8,21] Research has also suggested that it is important to consider patient preference in treatment for low back pain, which may play a role in improved outcomes.[9,13,19] The purpose of this case report is to describe the outcomes of a physical therapy treatment focusing on modalities and manual therapy based on the preference of a patient with chronic back pain and high fear.

CASE DESCRIPTION

History

Ms. B, a 67-year-old female, was referred to physical therapy by her physician with unspecified back pain. Ms. B had been in a motor vehicle accident over 15 years prior and had since had back pain of variable degrees, causing moderate pain with ambulation and recreational activity. One month prior to the physical therapy examination, she had an insidious increase in back pain, causing her to contact her physician. On the day of her physical therapy examination, she had pain along her entire cervical, thoracic, and lumbar spine and described her pain as sharp and throbbing. The back pain was always present to some degree and caused difficulty sleeping, walking, cooking, and other housework activities. Ms. B stated that the pain is increased with activity and increased with both trunk flexion and trunk extension. The pain did not radiate down either lower extremity. She had physical therapy in the past for her back pain and stated that using exercise machines and lifting weights increase her pain while heat packs, laser, and massage decrease her pain. Her goals of physical therapy were to decrease the pain and she preferred manual therapy and modalities to achieve that goal.

Examination

The numeric pain rating scale (NPRS) was used throughout Ms. B's duration in physical therapy. This scale asks patients to rate their pain on a 0-10 scale, with 0 corresponding to no pain and 10 corresponding to worst pain possible. Ms. B rated her current pain at her examination a 7, her best pain over the past few days a 5, and her worst pain over the past few days an 8. She was tender to palpation and demonstrated hypersensitivity along her entire cervical, thoracic, and lumbar paraspinals.

Active cervical and trunk range of motion (ROM) were measured using a goniometer. Measurements for trunk flexion and extension ROM were taken with the stationary arm of the goniometer perpendicular to the ground and the moving arm in a line parallel with the patient's sternum.

Oswestry Low Back Pain Disability Questionnaire (ODQ) is a self-report scale used to assess the functional ability of patients with back pain. The ODQ measures the percent disability of a patient as a result of back pain.[4] The ODQ has been demonstrated to have high test-retest reliability and moderate construct validity when correlated with the visual analogue scale.[4] Ms. B scored a 34/50 on the date of her initial examination.

The Fear-Avoidance Belief Questionnaire (FABQ) and Pain Catastrophizing Scale (PCS) are two scales used to examine and quantify certain psychological factors that are present in a patient with pain.[18,20] The FABQ is a 16 item self-report scale that examines and quantifies the role of fear in physical activity and work, and it is based on how much a patient agrees with certain statements related to the fear of pain.[20] The questionnaire is divided into two subscales, a physical activity subscale (FABQPA) and a work subscale (FABQW). Each subscale is scored separately. It is important to note that by design, not all items are considered when scoring the FABQ. The FABQPA score based on the responses from 4 items and the FABQW based on the responses from 7 items. The FABQPA has been shown to be valid and have high test-retest reliability in the population of people with chronic back pain.[10,20] The PCS is a 13 item self-report scale that examines and quantifies the tendency of someone to magnify his or her pain.[18] The PCS has been shown to have high reliability and to be a valid index of catastrophizing ideation.[10,18]

Both the FABQPA and the PCS were used in the care of Mrs. B. The FABQPA was used to assess Ms. B's fear of pain with physical activity, while the PCS was used to assess Ms. B's tendency to catastrophize. The FABQW was not used in the care of Ms. B because she was retired. Ms. B scored a 16/24 on the FABQPA and a 14/52 on the PCS on the date of her initial examination.

Evaluation

Testing revealed that Ms. B had decreased cervical and trunk ROM related to her back pain. Her impairments were causing difficulty with functional mobility including standing, walking, squatting, cooking, and other household activities. Based on the FABQPA, a

high fear of pain was present. Catastrophizing was also present, but not to such high degree.

Based on patient preference and clinical practice guidelines from the American College of Physicians and American Pain Society, manual therapy and modalities were included in the patient's plan of care in order to decrease her pain and improve functional ability.[2,9,13,19] The clinical practice guidelines include massage therapy as a recommended treatment for chronic low back pain based on moderate-quality evidence, but state that there is insufficient evidence to support use of modalities including interferential current (IFC), low-level laser therapy, or heat packs.[2] The clinical practice guidelines and current research have indicated the importance of exercise therapy for patients with chronic back pain,[2,15] therefore therapeutic exercise was also included in Ms. B's plan of care. However due to her preferences, the therapeutic exercise was planned to be used less than typically warranted by a patient with chronic back pain. It was decided that Ms. B will be seen for 2-3 treatments of physical therapy per week for 4 weeks with good rehab potential to reach her prior level of function.

INTERVENTION

Ms. B was seen for 7 visits over a 4 week span. Along with education about proper posture and log roll technique for getting into and out of bed, interventions included soft tissue massage, MR4 Cold Laser, kinesio tape, IFC, heat packs, stretching exercises, ROM exercises, abdominal stability exercises, scapular stability exercises, and cervical chin tucks. Of these, the soft tissue massage and MR4 Cold Laser were explicitly requested by the patient. The therapeutic exercises performed for each visit are represented in Table 1. While Mrs. B was educated about the benefits of exercise for decreasing pain and improving mobility, no formal education or intervention tailored to reducing her fear of pain was given during the course of her treatment.

Table – 1: Therapeutic Exercise Performed During Treatment

Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7
TA contractions	TA contractions	TA contractions	TA contractions	Upper Body ergometer with core engaged	Shoulder flexion AAROM using pulleys	Shoulder flexion AAROM using pulleys
Lower trunk rotations	Lower trunk rotations	Upper Trap stretch	Lower trunk rotations	Upper trap stretch	Posterior capsule shoulder stretch	Posterior capsule shoulder stretch
Upper Trap stretch	Upper Trap Stretch		Upper Trap stretch		Seated theraband rows with core engaged	Seated theraband rows with core engaged
	Pectoral Stretch		Core engaged sitting on Swiss ball			Seated theraband shoulder extensions
	Core engaged sitting on Swiss ball		Hip flexion/ extension AROM			Seated trunk flexion AROM – hands on Swiss ball
			Chin tucks			
			Scapular retractions			

KEY: **TA** = transverse abdominus; **Trap** = trapezius; **AAROM** = active assisted range of motion; **AROM** = active range of motion

Immediately after the examination, the MR4 cold laser was used according to patient preference. In a randomized controlled trial by Djavid et al, low level laser therapy combined with exercise was more beneficial in relieving pain compared to exercise alone in a chronic back pain population.[3] The laser was used on the chronic pain setting and was applied for 5 minutes to the cervical paraspinals and 5 minutes to the lumbosacral paraspinals of Ms. B. A study by Bae et al. found that using kinesio tape along with other modalities including hot packs and transcutaneous electrical simulation (TENS) for 12 weeks significantly reduced the pain ratings and Oswestry disability index scores in a sample of chronic back pain patients when compared to baseline.[1] Her initial treatment ended with the application of kinesio tape. The kinesio tape was applied transversely in an X shape to the upper back of Ms. B to stimulate the rhomboid muscles and encourage improved posture with shoulders retracted. A handout was given to Ms. B about the use and benefits of kinesio tape and she stated that she liked the tape and felt better before leaving the clinic.

On her second visit, Ms. B was asked to begin treatment by using the NuStep exercise machine, however she refused to do so claiming that in the past, the machine only makes her pain worse. This is important to report as it further demonstrates the psychological fear of pain evident in this case. While the benefits of exercise were again explained to Ms. B, no formal education tailored to reduce her fear of pain was given. Due to her explicit refusal to engage in the activity, she was no longer asked to use the NuStep throughout her treatment. On this visit, the kinesio tape was left on her upper back after she reported that she liked it. A new single strip was added transversely across her low back for support. Ms. B again received MR4 cold laser therapy on the chronic pain setting to her cervical and lumbar paraspinals for 5 minutes each. Treatment also included reviewing correct posture, long roll technique, and importance of engaging her transverse abdominus for supporting her spine.

On her 3rd visit, manual therapy involving soft tissue massage (STM) was added to her treatment, based on her initial preference. STM was provided for 15 minutes to her bilateral upper trapezius, levator scapulae, lower trapezius, and rhomboid muscles. The MR4 cold laser was again used on the chronic pain setting to Ms. B's cervical and lumbar paraspinals for 5 minutes each. The X-shaped kinesio tape on her rhomboids and single strip kinesio tape across her low back were each replaced on the 3rd visit. Also, a new piece of kinesio tape in a Y shape was applied vertically on her cervical spine for support.

The MR4 cold laser and STM were used in identical fashion on Ms. B's 4th visit, along with continued reinforcement of proper posturing and body mechanics. The X-shaped kinesio tape on her rhomboids was left on Ms. B. The single strip across her low back and the Y-shaped tape on her cervical spine were both replaced.

On her 5th visit, Ms. B came in having removed all of her kinesio tape. She stated that she removed the tape because she experienced itching and irritation on her upper back and that there was increased redness on her skin upon removing the tape. It was decided that kinesio tape would no longer be included in her treatments due to this unexpected response. The patient was treated with STM for 20 minutes to her bilateral upper trapezius, levator scapulae, lower trapezius, and rhomboid muscles on the 5th visit. IFC and hot packs were added to her treatment on this visit, with education about their purpose in relieving pain. At the end of her treatment, IFC was applied (80 – 150 Hz) along with a moist heat pack to her lower thoracic paraspinals and bilateral upper trapezius. The IFC was applied with the moist heat pack for 15 minutes with the intensity set at patient's comfort.

Ms. B was treated with STM for 15 minutes to bilateral upper trapezius, levator scapulae, lower trapezius, and rhomboids on her 6th visit. Treatment ended with IFC, as used previously.

On her 7th visit, Ms. B received STM for 20 minutes to her bilateral mid thoracic paraspinals, lumbar paraspinals, quadratus lumborum, rhomboid, lower trapezius, and latissimus dorsi muscles. Treatment concluded with IFC (80 – 150 Hz) and a moist heat pack to her upper thoracic paraspinals and lower lumbar paraspinals for 15 minutes to patient comfort for intensity.

OUTCOMES

Trunk ROM, cervical ROM, scores on the ODQ, FABQPA, PCS, as well as current pain levels were recorded on visits 1, 3, 5, and 7 over the course of 4 weeks. This information is presented in Table 2. While Ms. B reported that she liked her treatments and felt better afterwards, her current pain score of 7/10 was exactly the same on visit 1 and visit 7. Her ODQ scores were very similar throughout the 4 weeks, with visit 7 actually being 1 point higher compared to her initial visit. When looking at her FABQPA scores, her fear of pain demonstrated an increase of 7 points from visit 1 to visit 5. Her PCS scores were similar throughout the 4

weeks. Trunk and cervical ROM also demonstrated similar values throughout her 4 weeks in physical therapy.

The minimally clinically important difference (MCID) for the ODQ and NPRS for pain has been proposed to be 13 and 2 respectively.[5,12] Based on this research, there were no meaningful differences in ODQ or NPRS scores over the course of 4 weeks.

The minimal detectable change (MDC) is a calculated estimate of how much change is required to be confident that the change exceeds measurement error. The MDC for the FABQPA and PCS have been proposed to be 5.4 and 9.1 respectively.[10] Based on this research, there was no meaningful difference in PCS scores over the 4 weeks. However, the 7 point worsening in FABQPA exceeds this MDC.

Table – 2: Clinical and Self-Report Data Collected Throughout Treatment

	Visit 1	**Visit 3**	**Visit 5**	**Visit 7**
Current Pain Level	7/10	8/10	8/10	7/10
ODQ	34/50	33/50	34/50	35/50
FABQPA	16/24	18/24	23/24	23/24
PCS	14/52	21/52	15/52	18/52
Trunk Flexion ROM	30°	30°	28°	30°
Trunk Extension ROM	10°	10°	13°	18°
Trunk Lateral Flexion ROM	R: 8°	R: 10°	R: 15°	R: 10°
	L: 8°	L: 10°	L: 18°	L: 10°
Cervical Flexion ROM	30°	30°	30°	32°
Cervical Extension ROM	20°	20°	32°	18°
Cervical Lateral Flexion	R: 18°	R: 20°	R: 25°	R: 25°
ROM	L: 20°	L: 15°	L: 30°	L: 18°
Cervical Rotation ROM	R: 60°	R: 58°	R: 58°	R: 60°
	L: 40°	L: 50°	L: 40°	L: 52°

KEY: ODQ = Oswestry Low Back Pain Disability Questionnaire; FABQPA = Fear - Avoidance Belief Questionnaire Physical Activity Subscale; PCS = Pain Catastrophizing Scale; ROM = range of motion; R = right; L = left

DISCUSSION

Current evidence supports the use of active treatments over passive treatments when treating patients with chronic back pain.[2,15] This can be difficult for clinicians to abide by when patients come in claiming that exercise only makes their pain worse and that they prefer passive treatments for relief. Compounding the difficulty may be increased psychological factors, including fear of pain, that are associated with the maintenance of chronic back pain and should be addressed during treatment.[21] With evidence about the importance of considering patient preference,[9,13,19] some clinicians may fall into the temptation of providing passive treatments when patients do have a strong preference for them, with the hope of decreasing pain, improving functional ability, and decreasing the severity of psychological factors related to their back pain. While patient preferences, clinical expertise, and research evidence are all components of clinical decision making, patient preferences were the main component emphasized in this case report. Certain exercises were therefore eliminated from treatment when the patient stated that she preferred not to do them, while other passive interventions were emphasized in treatment, as she requested.

When patient preference of treatment was the primary focus, no meaningful improvements in level of pain, functional ability, or pain catastrophizing were observed in this case. The increase in score observed on the FABQPA actually represents a slight worsening of fear of pain. It is important to note that the observations in this case were taken in a total of four weeks, a relatively short term. It is possible that different outcomes may be observed over a longer period of treatment. Also important to note is that the preferred treatment in this case involved manual therapy and modalities. The clinical practice guidelines from the American College of Physicians and American Pain Society recommend massage therapy as a treatment for chronic low back pain based on moderate-quality evidence, however they state that there is insufficient evidence to support use of modalities including interferential current (IFC), low-level laser therapy, or heat packs and make no recommendations regarding

the use of kinesio tape.[2] It is possible that different outcomes may be observed for a different treatment, such as an active treatment involving therapeutic exercise and functional mobility. After investigating and reporting this case, the author feels strongly about managing the pain of patients with chronic low back pain using active exercise and interventions tailored to decreasing the fear of pain. Patient preferences of passive interventions should certainly be considered if present, however the author does not believe that they should be the primary focus of treatment.

Psychologically informed practice is an approach that involves influencing thoughts, feelings, and behavior and has been found to be effective in the treatment of patients with chronic back pain.[6,16] The author is interested in the outcomes of a study in which patients that have chronic back pain and a passive treatment preference are randomly placed into two groups, one that is treated with exercise therapy and a second group that is treated with exercise therapy along with psychologically informed practice. The measureable outcomes should include a functional disability measure such as the ODQ as well as psychological measures such as the FABQ and PCS. The purpose of this study would be to investigate if psychologically informed practice makes any difference in outcomes when actively treating patients that have a passive treatment preference. This will help to further advance knowledge about the chronic back pain population as well as the treatments that are effective in addressing the physical and psychological aspects of the condition.

CONCLUSION

This case report described the outcomes of an intervention focusing on modalities and manual therapy based on the preference of a patient with chronic back pain and high fear. While research has suggested the importance of considering patient preference and expectation in patients with low back pain, no meaningful improvements in level of pain, functional ability, fear of pain, or pain catastrophizing were observed in this case. Patient preferences of passive interventions should certainly be considered in a case of chronic back pain, however the author does not believe that they should be the primary focus of treatment. Further research is needed to determine treatments for chronic low back pain that are effective in addressing the physical and psychological aspects of the condition.

AKNOWLEDGEMENTS

The author would like to thank Steven Z. George, PT, PhD for his valuable mentorship and helpful editing during the case report as well as Donovan Lott, PT, PhD, CSCS for his guidance in establishing the case report. The author would also like to thank the following clinicians for their assistance in treatment and collection of outcome measures during the case: Barbara Deering, Kristy Thompson, Tammy Martich, and Nikki Miller.

REFERENCES

1. Bae, SH, Lee, JH, Oh, KA, & Kim, KY (2013). The Effects of Kinesio Taping on Potential in Chronic Low Back Pain Patients Anticipatory Postural Control and Cerebral Cortex. *Journal of Physical Therapy Science*, *25*(11), 1367–1371. doi:10.1589/jpts.25.1367
2. Chou R, Qaseem A, Snow V, Casey D, Cross JT, Jr, Shekelle P, Owens DK. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann.Intern.Med. 2007;147:478–491. http://annals.org/article.aspx?articleid=736814
3. Djavid, GE, Mehrdad, R., Ghasemi, M., Hasan-Zadeh, H., Sotoodeh-Manesh, A., & Pouryaghoub, G. (2007). In chronic low back pain, low level laser therapy combined with exercise is more beneficial than exercise alone in the long term: a randomised trial. *Aust J Physiother, 53*(3), 155-160.
4. Fairbank JC, Couper J, Davies JB, O'Brien JP. The Oswestry low back pain disability questionnaire. *Physiotherapy*. 1980;66:271–273. http://www.ncbi.nlm.nih.gov/pubmed/6450426
5. Farrar, JT, Young, JP, Jr, et al. (2001). Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain* 94(2): 149-158. http://www.ncbi.nlm.nih.gov/pubmed/11690728
6. Fritz JM, Irrgang JJ. A comparison of a modified Oswestry Low Back Pain Disability Questionnaire and the Quebec Back Pain Disability Scale. *Phys Ther*. 2001;81:776–788.
7. Gatchel RJ, Rollings KH. Evidence informed management of chronic low back pain with cognitive behavioral therapy. *Spine J.* 2008;8:40–44. doi: 10.1016/j.spinee.2007.10.007

8. George SZ, Beneciuk JM. Psychological predictors of recovery from low back pain: a prospective study. *BMC Musculoskeletal Disorders*. 2015;16:49. doi:10.1186/s12891-015-0509-2.
9. George SZ, Robinson ME. Preference, Expectation, and Satisfaction in a Clinical Trial of Behavioral Interventions for Acute and Sub-Acute Low Back Pain. *The journal of pain: official journal of the American Pain Society*. 2010;11(11):1074-1082. doi:10.1016/j.jpain.2010.02.016.
10. George SZ, Valencia C, Beneciuk JM. A psychometric investigation of fear-avoidance model measures in patients with chronic low back pain. *J Orthop Sports Phys Ther*. 2010;40:197–205. http://dx.doi.org/10.2519/jospt.2010.3298
11. Haynes RB, Sackett DL, Gray JM, Cook DJ, Guyatt GH. Transferring evidence from research into practice: 1. The role of clinical care research evidence in clinical decisions. ACP J Club. 1996;125:A14–16. http://ebm.bmj.com/content/1/7/196.full.pdf+html
12. Johnsen, LG, Hellum, C, et al. (2013). Comparison of the SF6D, the EQ5D, and the oswestry disability index in patients with chronic low back pain and degenerative disc disease. *BMC Musculoskeletal Disorders*, 14:148. doi:10.1186/1471-2474-14-148
13. Kalauokalani D, Cherkin DC, Sherman KJ, Koepsell TD, Deyo RA. (2001). Lessons from a trial of acupuncture and massage for low back pain: Patient expectations and treatment effects. *Spine* 26:1418-1424. http://www.ncbi.nlm.nih.gov/pubmed/11458142
14. Lethem J, Slade PD, Troup JD, Bentley G. Outline of a fear-avoidance model of exaggerated pain perception-I. *Behav Res Ther*. 1983;21:401–408.
15. Murtezani A, Hundozi H, Orovcanec N, Sllamniku S, Osmani T. A comparison of high intensity aerobic exercise and passive modalities for the treatment of workers with chronic low back pain: a randomized, controlled trial. *Eur J Phys Rehabil Med*. 2011;47:359–366. http://www.minervamedica.it/en/journals/europa-medicophysica/article.php?cod=R33Y2011N03A0359
16. Nicholas MK, George SZ. Psychologically informed interventions for low back pain: an update for physical therapists. *Phys Ther*. 2011;91(5):765–776. doi: 10.2522/ptj.20100278.
17. Samwel HJ, Ever AW, Crul BJ, Kraaimaat FW. The role of helplessness, fear of pain, and passive pain-coping in chronic pain patients. *Clin J Pain*. 2006;22:245–251. http://www.ncbi.nlm.nih.gov/pubmed/16514324
18. Sullivan, M, Bishop, S, Pivik, J. (1995). The Pain Catastrophizing Scale: Development and validation. *Psychological Assessment*, 7(4), 524-532. doi:10.1037/1040-3590.7.4.524
19. Torgerson DJ, Klaber-Moffett J, Russell IT. (1996). Patient preferences in randomised trials: Threat or opportunity? *J Health Serv Res Policy* 1:194-197. http://www.ncbi.nlm.nih.gov/pubmed/10180870
20. Waddell, G, Newton, M, Henderson, I, Somerville, D, & Main, CJ. (1993). A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain, 52*(2), 157-168. http://www.ncbi.nlm.nih.gov/pubmed/8455963
21. Woby, SR, Watson, PJ, Roach, NK, & Urmston, M. (2004). Adjustment to chronic low back pain--the relative influence of fear-avoidance beliefs, catastrophizing, and appraisals of control. *Behav Res Ther, 42*(7), 761-774. doi: 10.1016/S0005-7967(03)00195-5