# To Image or Not to Image: Clinical Review to Address Low Back Pain

**MAJ Nicole H. Brown, DPT, OCS, SCS, TPS**

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# Presenter

MAJ Nicole H. Brown, DPT, OCS, SCS, TPS

Therapeutic Pain Specialist, Pain Fellow in Training

Board Certified Orthopedic and Sports Clinical Specialist

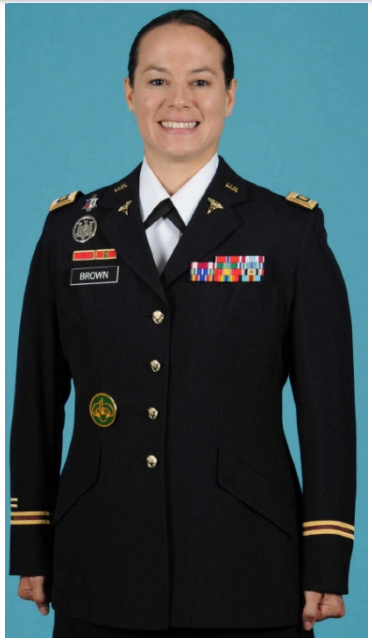
Assistant Service Chief, Physical Therapy

Brooke Army Medical Center

U.S. Army

FT Sam Houston, TX

# MAJ Nicole H. Brown




- MAJ Nicole H. Brown serves as the Assistant Chief of the Outpatient Physical Therapy Service at Brooke Army Medical Center, consisting of five outpatient clinics in the San Antonio area.
- MAJ Brown is very passionate about pain neuroscience education. She is a Therapeutic Pain Specialist and currently a Pain Fellow in Training who has presented at several conferences, conducted continuing education courses and is a guest lecturer for the US Army Baylor DPT program.
- While at Walter Reed Military Medical Center (WRNMCC), MAJ Brown played an integral part of the leadership team. She served as the OIC of the Amputee Physical Therapy Service for the Military Advanced Training Center and as the Deputy Chief of the Physical Therapy Service.
- She was handpicked to serve as physical therapy consultant to the White House. In this capacity, she dealt regularly with high level government officials either serving as their physical therapist or coordinating care.
- In 2017, MAJ Brown served as the physical therapy consultant to the Republic of Georgia for a military training team mission. MAJ Brown started a multidisciplinary pain management class, the only one of its kind in the National Capitol Region.
- Her civilian education includes a Bachelor's of Science in Education in Sports Science from the University of Kansas and a Doctorate in Physical Therapy from Baylor University.
- She has additional certifications as a Board Certified Orthopedic Clinical Specialist and Board-Certified Sports Clinical Specialist and as a Certified Strength and Conditioning Specialist.

# Disclosures

- MAJ Nicole. H. Brown has no relevant financial or non-financial relationships to disclose relating to the content of this activity.
- The views expressed herein are those are those of the author(s) and do not reflect the official policy or position of Brooke Army Medical Center, the Defense Health Agency, the U.S. Army Medical Department, the U.S. Army Office of the Surgeon General, the Department of the Army, the Department of the Air Force, the Department of Defense or the U.S. Government.
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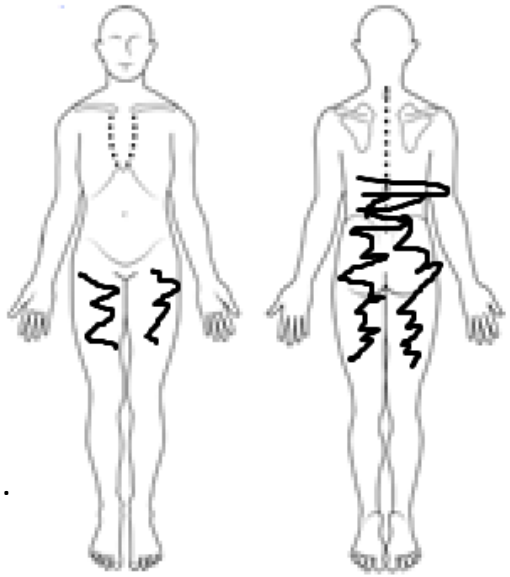
- Commercial support was not received for this activity.

# Learning Objectives

At the conclusion of this activity, participants will be able to:

1. Identify the problem of low back pain in the military and U.S. populations.
2. Recognize when to appropriately order imaging for patients with low back pain.
3. Outline how to communicate to patients about their pain and imaging without provoking fear and promoting development of catastrophic thoughts.
4. Comprehend how to leverage physical therapy as a first line treatment for patients with low back pain.

# CASE STUDY



- **PP:** 37 y/o F, Medic **Chief complaint:** low back pain "flare up"
- **PMHx:** 3rd low back pain episode in the last 5 years worse each time.
- **MOI:** Pt denies physical trauma. Insidious onset
- **Agg:** sit at a desk for > 15 min impact activity **Ease**: oxycontin, lying down in bed.
- **Previous Tx**: chiropractic, physical therapy which included TENS, lumbar traction
- **Review of Systems:** Depression, Anxiety; Denies N/T or bowel/bladder concerns
- **Radiology**: patient reports, My pain is because of my "Degenerative Disc Disease".
- **Hobbies:** Riding motorcycle; however, pt is unable to keep up with group because fatigue and pain; is only able to ride for 1 hour.
- **Patient Reported Outcomes**: START Back Score: 9; Stress: 10/10 (Higher number indicates higher levels of stress), Pain Catastrophizing Scale: 32/52;
- **PE:** +TTP diffusely; neuro exam reveals 5/5 LE, intact to light sensation, all reflexes WNL.
- **Neuro-tension tests**: positive, increases back pain and thigh symptoms respectively.
- **AROM**: Full AROM, all painful. Pt is able to achieve passive/unloaded spine range of motion without significant increase in pain.
- **Concern: She is worried because she can only sit for 15 minutes before her pain really increases. She used to be able to sit for 60 minutes before she would have back pain. She is worried that her disc spaces are wearing thin causing her pain to increase and she does not believe it is safe to perform physical exercise**

# Why should we care?

- LBP affects A LOT OF PEOPLE!
  - Up to **85%** of adults have LBP some time in their lives. (Chou, 2012)
  - **25–50%** of American adults experience low back pain yearly. (Haldeman, 2008)
- Chronic low back pain costs are about **twice** as high than for patients with acute illness
  - Depression seems to be relevant to increased health care utilization in this population. (Becker, 2010)

# Why should we care?

- Over 126 million adults in U.S. report pain over a 3-month period > 25 million suffering from daily chronic pain.
- MSK pain are the most common medical diagnosis for Vets returning from OEF/OIF/OND.
- A VA study of 91,000 Vets receiving care from VA reported 43% in pain and 63% report moderate to severe pain.
- Among Veterans with back pain, 22% reports severe pain and more likely to have severe pain compare to non-vets.
- 6% of LBP sufferers consume > 50% of the cost associated with LBP
- 10% of the claims lead to 86% of the costs

(Nahin, 2017) (Nahin, 2015) (Macnhikanti, 2010) (Lew et al., 2009) (Kerns, 2013) (Saper et al., 2016) (Haskell et al., 2009) (Linton, 2006)

# US Opioid Epidemic

- Americans (5% of world population) consume 80% of the world's opioids.
- When opioid therapy is started the probability of long-term use (>365 days):
  - 13.5% will continue opioids for 1 year after 8 days of consuming
  - 14% will continue opioids for 1 year if they receive one refill or had a second opioid prescribed
  - 30% will continue opioids for 1 year after 31 days

(Shah, 2017) (Laxmaiah, 2010)

# When should we image the back?

# Diagnostic Imaging Recommendations

*2017 VA/DoD Clinical Practice Guideline for Diagnosis and Treatment of Low Back Pain*

- Strength of recommendation: STRONG AGAINST
- For patients with acute axial low back pain (i.e., localized, non-radiating), **we recommend AGAINST,** obtaining imaging studies or invasive diagnostic tests.

(Pangarkar et al., 2019)

# Why should we wait to image?

# EARLY MRI MAY EQUAL WORSE OUTCOMES/INCREASED MEDICAL COSTS

- 2010 study in the *Journal of Occupational and Environmental Medicine*
  - Found **unnecessary MRIs** are **associated with** several iatrogenic effects, including **worse disability** and **increased medical costs** and surgery.
  - Two year follow up on over 3,000 cases

(Webster, 2010)

# Imaging Recommendations

- HEDIS Low back pain measures
  - The percentage of adults 18-50 years of age with a primary diagnosis of low back pain who did not have an imaging study (plain X-ray, MRI or CT scan) within **28 days of the diagnosis** (a higher score indicates better performance).
  - Low back pain imaging before 28 days and without any red flags is unlikely to result in any benefit to the patient.

(Chou, 2009)

## Recommendation

- **Don't do imaging for low back pain within the first six weeks**, unless red flags are present. (Red flags include, but are not limited to, severe or progressive neurological deficits or when serious underlying conditions such as osteomyelitis are suspected.)
- Low back pain is the fifth most common reason for all physician visits. Imaging of the lower spine before six weeks does not improve outcomes but does increase costs.

(Agency for Health Care Research and Policy (AHCPR), 2020)

# Why Worse Outcomes and Higher Costs?
# FEAR

- Miriam-Webster defines **fear** as an unpleasant often strong emotion caused by **anticipation or awareness of danger**
- Cognitions and Pain
  - It is well established that cognitions and pain are inter-related
- Catastrophization
  - Inability to foresee anything other than the worst possible outcome, however unlikely, or experiencing a situation as unbearable or impossible when it is just uncomfortable

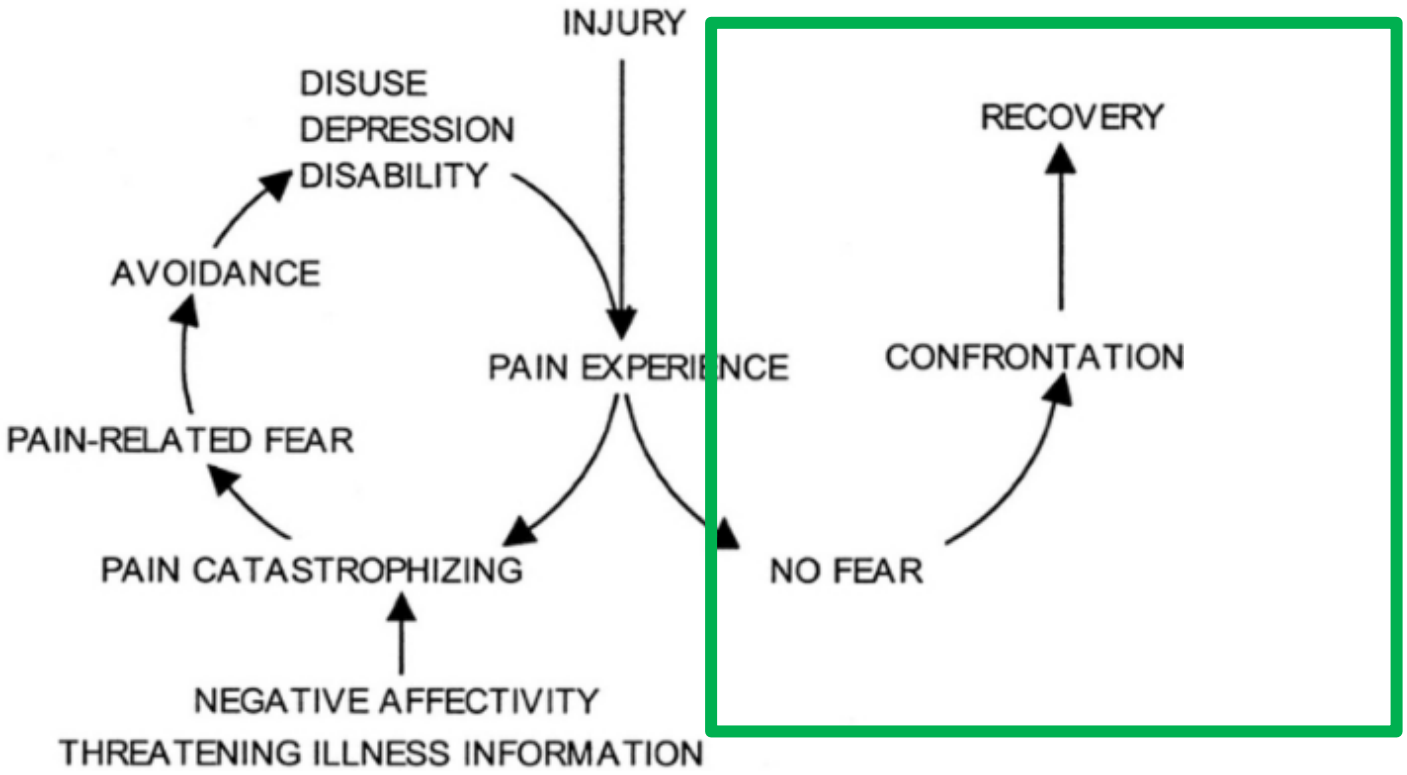


(Moseley, 2003) (Waddell, 1993) (Cleland, 2008) (Sullivan, 1995)

# Fear Avoidance Model


(Vlaeyen & Linton, 2000)

# Fear Avoidance Model




(Vlaeyen & Linton, 2000)

# Sooo, when do I order imaging?

# Diagnostic Imaging Recommendations

*VA/DoD Clinical Practice Guideline for Diagnosis and Treatment of Low Back Pain*

- For patients with LBP, we **recommend diagnostic imaging** and appropriate laboratory testing when **neurologic deficits are serious or progressive or when red flag symptoms are present**.
  - Strength of recommendation: STRONG FOR

What about chronic back pain without neuro symptoms?

- Inconclusive evidence to recommend for or against obtaining diagnostic imaging for patient with LBP for greater than one month.

# Identify Patients with Red Flags

- Red Flags are best investigated in clusters of signs and symptoms
- Initial Subjective Screen asks questions to rule out
  - ❑ Cancer
  - ❑ Ankylosing Spondylitis
  - ❑ Cauda Equina/Conus medullaris syndrome
  - ❑ Infection
  - ❑ Fracture
  - ❑ Progressive Neurologic symptoms
  - ❑ Unexplained fever or weight loss
  - ❑ IV Drug use
  - ❑ Immunosuppression
  - ❑ History of triple abdominal aneurysm
  - ❑ Prolonged corticosteroid use


(Alrwaily, 2009) (DOD/VA Low Back Pain Guidelines, 2017)

# Case Study Imaging results

IMPRESSION

1. Moderate L5-S1 spinal canal stenosis. No additional lumbar canal stenosis.

2. Compression of bilateral exiting L5 nerve roots at L5-S1 neural foramina. Additional nerve root contact at all lumbar levels except T12-L1. Correlation with dermatomal symptom level recommended.

3. Multilevel neural foraminal narrowing, worst bilaterally at L5-S1, where it is severe.

4. Grade 1 anterolisthesis of L5 on S1; however, no discrete L5 pars defects are identified. Lumbar spine oblique x-rays or lumbar spine CT could further assess.

# The Patient interpretation of imaging results

- A disc bulge, ‘slipped disc’,  ‘back is out’ equals I cannot get better.
- Degenerative changes or  “wear and tear” equals if I move too much, I will break down more.
- My back is fragile.  I need to be more careful.

# Radiologist further Comment

"The following **findings are so common in normal, pain-free** volunteers that while we report their presence, they **must be interpreted with caution** and in the context of the clinical situation. Among people under the age of 40 who do not have back pain, an MRI will find that about:

5 in 10 have disk degeneration - 3 in 10 have disk signal loss (desiccation) - 3 in 10 have disk height loss - 4 in 10 have a bulging disk - 3 in 10 have a disk protrusion

Note that even 3 in 10 means that the finding is quite common in people without back pain."

(Brinjikji et al., 2015) (Jarvik et al., 2001)

# Turning off the Alarm: Is Imaging Needed?

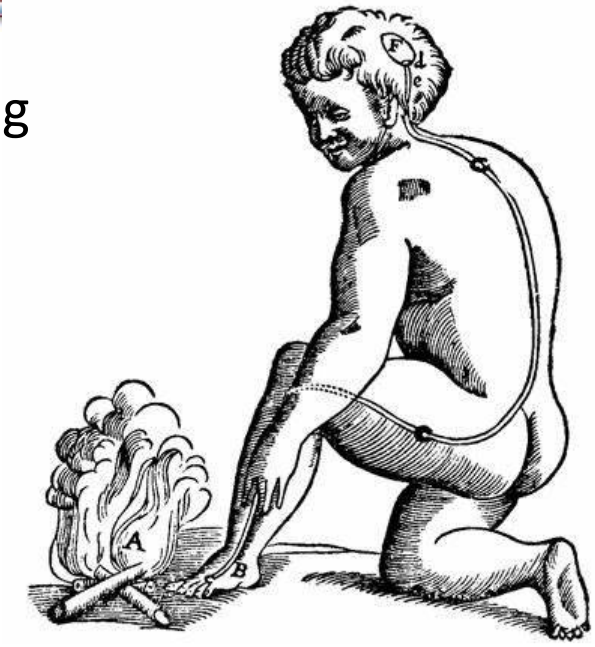
| | Age (yr) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Imaging Finding** | **20** | **30** | **40** | **50** | **60** | **70** | **80** |
| Disk degeneration | 37% | 52% | 68% | 80% | 88% | 93% | 96% |
| Disk signal loss | 17% | 33% | 54% | 73% | 86% | 94% | 97% |
| Disk height loss | 24% | 34% | 45% | 56% | 67% | 76% | 84% |
| Disk bulge | 30% | 40% | 50% | 60% | 69% | 77% | 84% |
| Disk protrusion | 29% | 31% | 33% | 36% | 38% | 40% | 43% |
| Annular fissure | 19% | 20% | 22% | 23% | 25% | 27% | 29% |
| Facet degeneration | 4% | 9% | 18% | 32% | 50% | 69% | 83% |
| Spondylolisthesis | 3% | 5% | 8% | 14% | 23% | 35% | 50% |

(Brinjikji et al., 2015)

# Communicating About Pain

The focus on the pain generator

# Cartesian Model: 1664



- Belief that the mind was incapable of influencing the body directly.

- **ORIGIN OF TRADITIONAL PAIN TREATMENT**
  - Remove or disable the offending stimulus, stop pain transmission!

- **OPTIONS TO TREAT PAIN LIMITED TO:**

1. Taking your foot out of the fire/Avoiding the fire
2. Put out the fire
3. Cut the connection to the fire

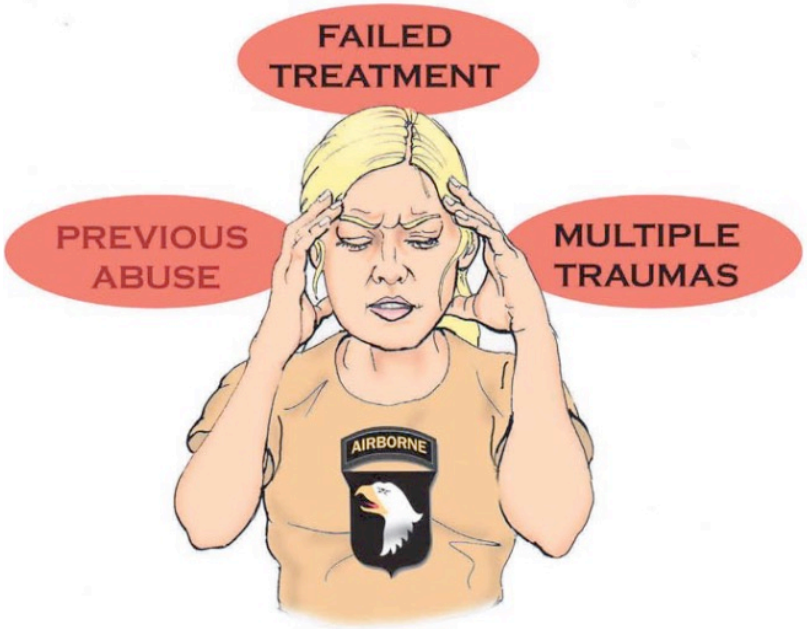
(Murphy et al., 2015)

# Neuromatrix Theory of Pain

- Melzack
  - Brain possesses a neural network — **the body-self neutromatrix**
    - Integrates multiple inputs to produce the output pattern that evokes pain.
  - Pain '**Neurosignature**' output of the neuromatrix
    - patterns of nerve impulses produced by neural programs that determine the particular qualities and other properties of the pain experience and behavior.
  - Multiple inputs act on the neuromatrix contribute to the output neurosignature include
    - Sensory inputs (cutaneous, visceral and other somatic receptors)
    - Visual and other sensory inputs
      - ▻ Influence the cognitive interpretation of the situation
    - Cognitive and emotional inputs from other areas of the brain
    - Intrinsic neural inhibitory modulation
    - Activity of the body's stress-regulation systems,
      - ▻ i.e. Cytokines, endocrine, autonomic, immune and opioid systems.

# PAIN = PROTECTIVE RESPONSE OF THE BRAIN

An unpleasant sensory and **emotional** experience associated with **actual or potential** tissue damage or described in terms of such damage. International Association for the Study of Pain

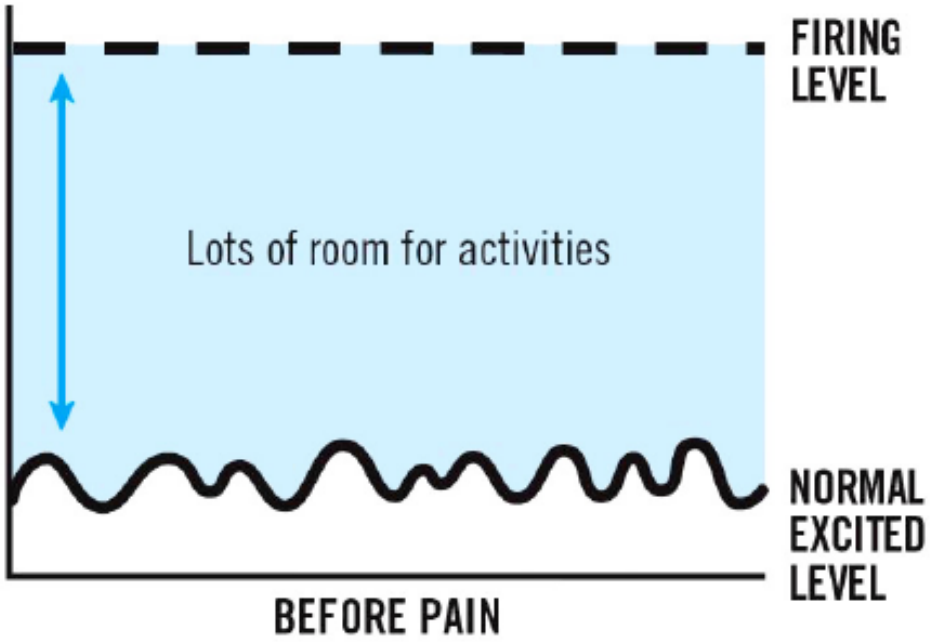


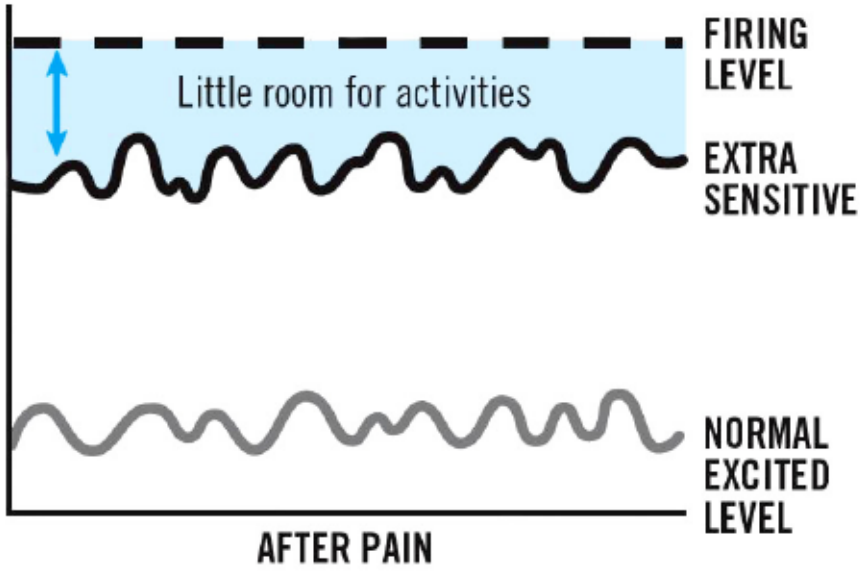

https://phc.amedd.army.mil/PHC%20Resource%20Library/TG379_Soldiers_Stress.pdf#search=your%20nerves%20on%20guard%20duty
(Benedict , 2019)

# Pain Definitions

- Sensitization
  - Increased responsiveness of neurons to their normal input or recruitment (**hyperalgesia**) of a response to normally subthreshold stimulus (**allodynia**)
- Peripheral Sensitization
  - Increased responsiveness and reduced threshold of nociceptors to stimulation of their receptive fields
- Central Sensitization
  - Increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input

# Sensitive Nerves




(evidenceinmotion.com, n.d.)

# What the Patient hears

Defense Health Agency

Neck of an 80-year-old

Avoid bending

It's all in your head

Your back is out of alignment!

Your back is not stable

Take this pill for your pain

Pinched nerve

Your MRI looks awful

You have terrible posture

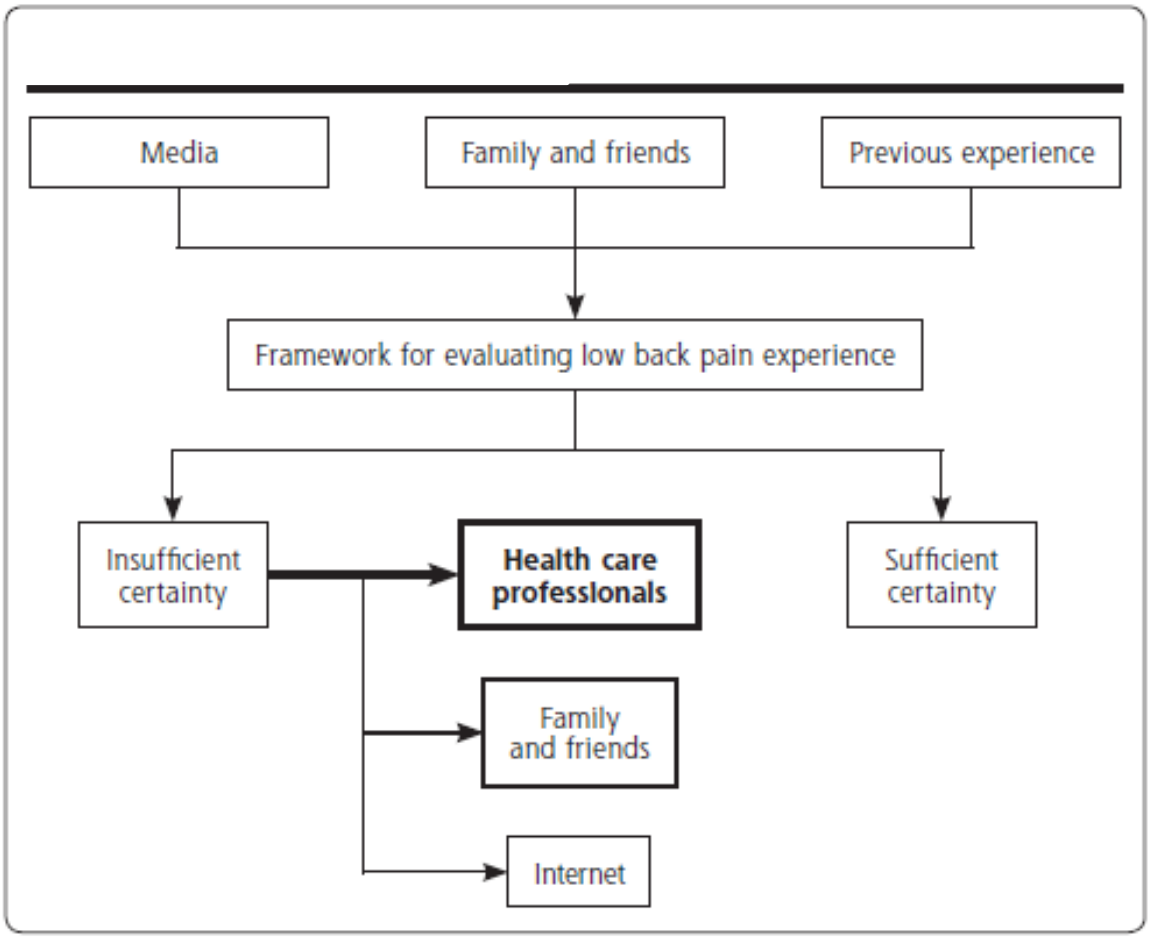
Worst back I've ever seen!

Slipped disc

Stop doing (Insert Exercise)

You are bone on bone

# The Enduring Impact of What Clinicians Say to People With Low Back Pain




(Darlow et al., 2013)

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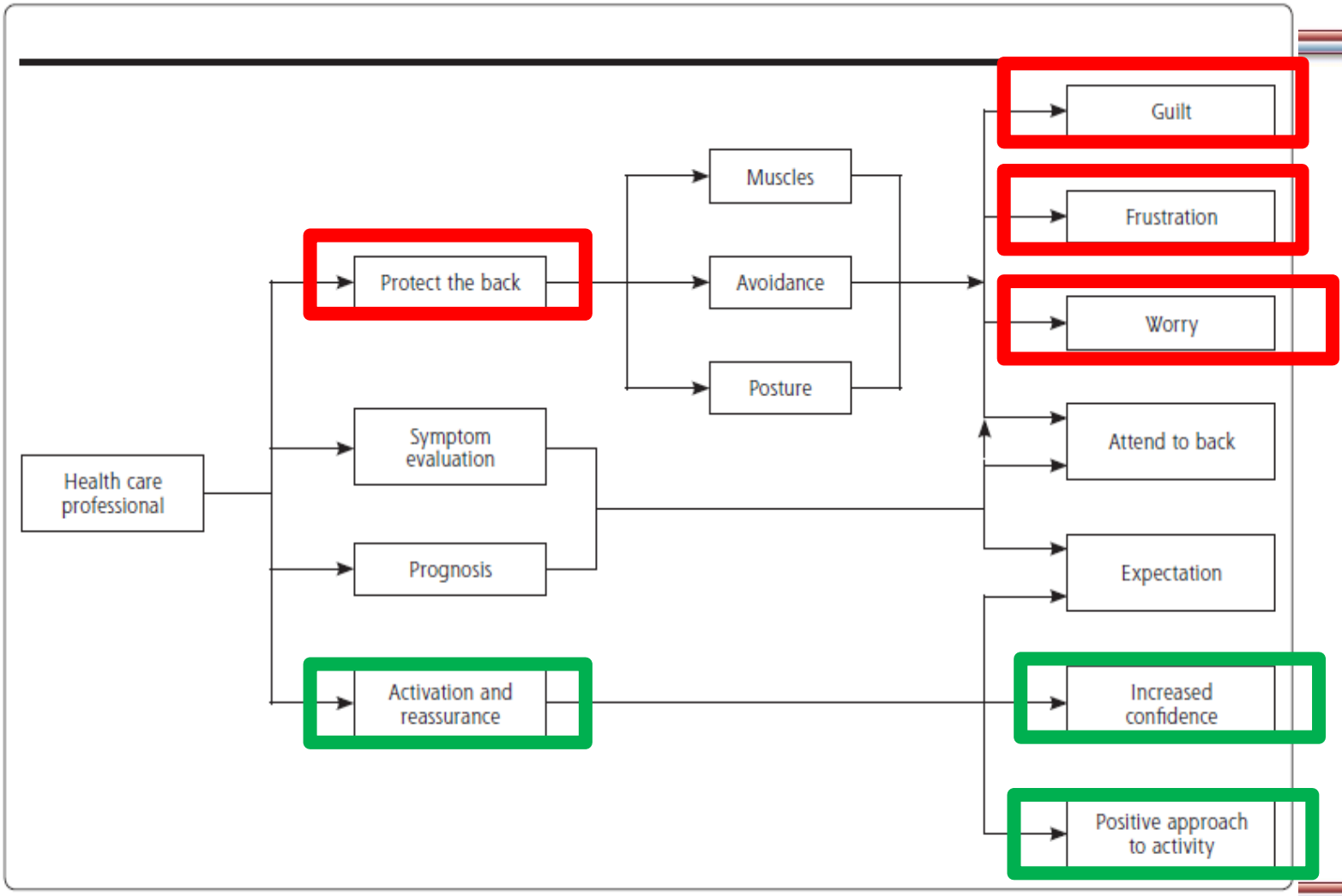



(Darlow et al.,2013)

# HOW DANGEROUS IS THIS?

- SAMPLE – SCRUTIZINE --RESPOND
- INPUTS/SAMPLES
  - Brain samples itself based off:
    - Past experiences
    - Knowledge
    - Beliefs and culture
    - Past successful behaviors, past successful behaviors observed in others
  - Environment
  - Tissues
- SCRUTIZINES
  - After the brain scrutinizes all these unconscious pieces of information it asks itself, "**How dangerous is this really?"**
- OUTPUT/RESPONSE
  - If it is determined that is dangers it leads to
  - Altered behavior, altered physiology, PAIN

(Gifford, 1998)

# Priming the Patient

You're healing so well!

Sore but safe

Be the tortoise not the hare

Something is better than nothing

Your back is strong and stable!

How can we modify so you can?

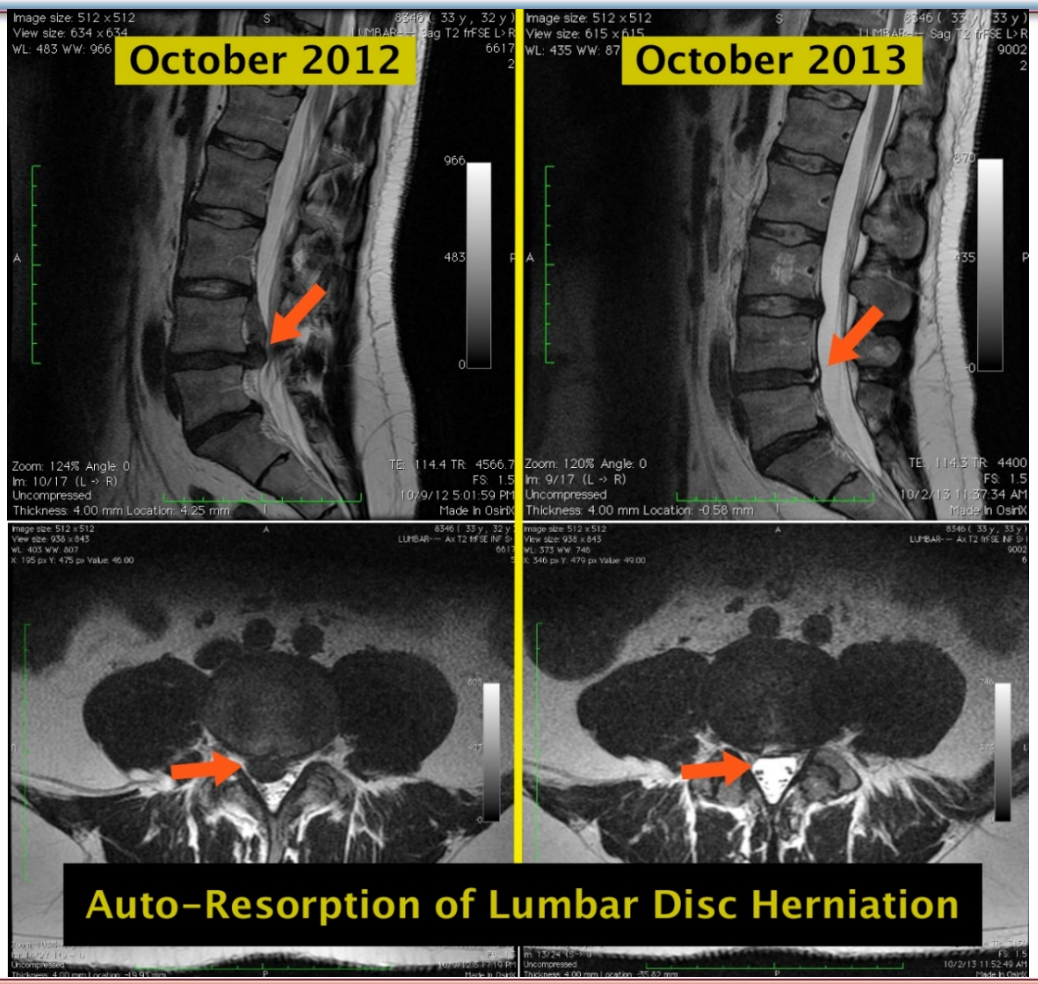
Your imaging looks normal for your age

Hurt doesn't equal harm

You're moving so well!

Motion is lotion

# Auto-Resorption of Lumbar Disc Herniation




(Zhong, 2017)

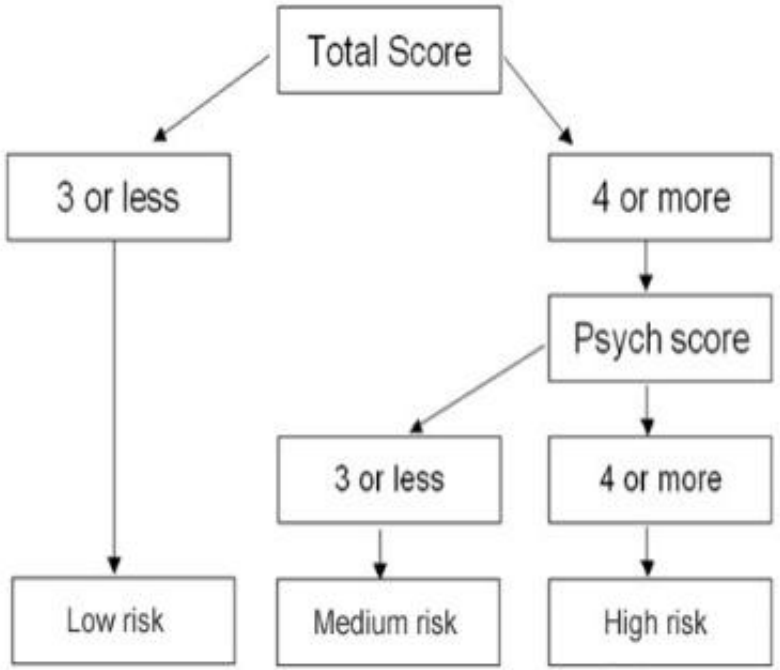
# Is abnormal findings normal?

- Rotator Cuff
  - 1/3 people over age 30 have abnormal findings on MRI
  - 2/3 people over age 70 have abnormal findings on MRI
- Knees
  - 25% to 50% of MRI's show knee degeneration in pain-free people
  - MRI scans of 35% of collegiate basketball players with no knee pain show significant abnormalities

(Reilly, 2006) (Munk, 2004) (Bedson, 2008) (Major, 2002)

# A BETTER APPROACH: Refer to PT

# START BACK SCREENING TOOL Hill 2008




Patient name: _____ Date: _____

Thinking about the **last 2 weeks** tick your response to the following questions:

| | | Disagree 0 | Agree 1 |
|---|---|---|---|
| 1 | My back pain has **spread down my leg(s)** at some time in the last 2 weeks | ☐ | ☐ |
| 2 | I have had pain in the **shoulder** or **neck** at some time in the last 2 weeks | ☐ | ☐ |
| 3 | I have only **walked short distances** because of my back pain | ☐ | ☐ |
| 4 | In the last 2 weeks, I have **dressed more slowly** than usual because of back pain | ☐ | ☐ |
| 5 | It's not really safe for a person with a condition like mine to be physically active | ☐ | ☐ |
| 6 | **Worrying thoughts** have been going through my mind a lot of the time | ☐ | ☐ |
| 7 | I feel that **my back pain is terrible** and **it's never going to get any better** | ☐ | ☐ |
| 8 | In general I have **not enjoyed** all the things I used to enjoy | ☐ | ☐ |

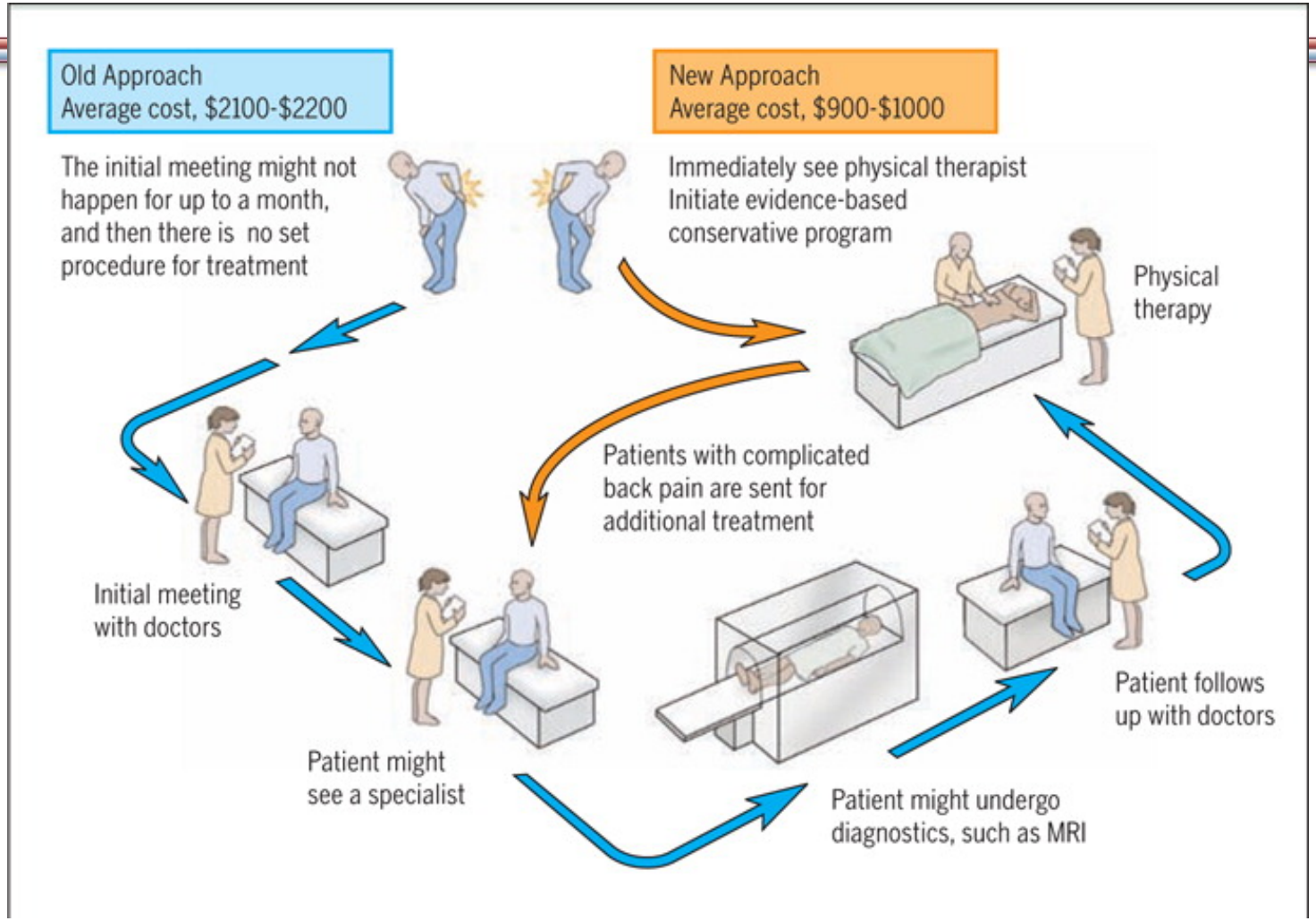
9. Overall, how **bothersome** has your back pain been in the **last 2 weeks**?

| Not at all | Slightly | Moderately | Very much | Extremely |
|---|---|---|---|---|
| ☐ 0 | ☐ 0 | ☐ 0 | ☐ 1 | ☐ 1 |

**Total score (all 9):** _____ **Sub Score (Q5-9):**_____


Funded by Arthritis Research UK

# Virginia Mason example for a pathway for LBP management




(Flynn, 2011)

# What do PTs know?

Musculoskeletal Knowledge Score

| | |
|---|---|
| Orthopedic Surgeons | 94% |
| PTs – Board Cert | 81% |
| PTs – no Board Cert | 74% |
| Family Physicians | 61% |
| Internists | 54% |

(Childs et al., 2005)

# Low Evidence Treatments for Patients with Low back pain

*2017 VA/DoD Clinical Practice Guideline for Diagnosis and Treatment of Low Back Pain*

INSUFFICIENT EVIDENCE TO SUPPORT FOR OR AGAINST:

- Therapeutic Ultrasound
- Electric Stimulation unless for muscular training after knee surgery
- Lumbar Traction
- Lumbar supports
- Spinal mobilization/manipulation as a stand-alone treatment

What's common about these treatments?

- All are passive!

# Calming the Nervous System:
# Be an Advocate for an Active Lifestyle

*2017 VA/DoD Clinical Practice Guideline for Diagnosis and Treatment of Low Back Pain*

- Advise patients to **stay active** and provide information about self care options (strong for)
- For chronic low back pain consider offering clinician directed exercises and exercises programs that may include Pilates, yoga, tai chi (weak for)
- Does exercise type matter?
  - "There is no clinically important difference between motor control exercises and other forms of exercises or manual therapy for acute and chronic LBP." (Saragiotto, 2016)
- Graded exercise approach

# PT can help patients be active!

What does good therapy look like?

- Adequately dosed 8-16 visits over 2-3 months, home program
- Active care based
  - Exercise therapy, education, self management
- Patient education
  - Internal locus of control, self management, long term focus

# Key Takeaways

- Be mindful of the appropriate time to image patients for low back pain
- Ordering imaging too early can result in increased healthcare costs and decreased prognosis
- Communicate imaging results using careful words that promote reassurance instead of words that may provoke fear
- Advise patients to **stay active** and provide information about self care options
- Physical therapy is a great first line treatment for patient with low back pain

# References


Alrwaily, M., Timko, M., Schneider, M., Stevans, J., Bise, C., Hariharan, K., & Delitto, A. (2016). Treatment-Based Classification System for Low Back Pain: Revision and Update. Physical Therapy, 96(7), 1057-1066. https://www.doi.org/10.2522/ptj.20150345

Becker, A., Held, H., Redaelli, M., Strauch, K., Chenot, J. F., Leonhardt, C., Donner-Banzhoff, N. (2010). Low Back Pain in Primary Care. Spine, 35(18), 1714-1720. https://www.doi.org/10.1097/brs.0b013e3181cd656f

Bedson, J., & Croft, P. R. (2008). The discordance between clinical and radiographic knee osteoarthritis: A systematic search and summary of the literature. BMC Musculoskeletal Disorders, 9(1). https://www.doi.org/10.1186/1471-2474-9-116

Bowyer, B. S., & Rockville. (1995). How to Obtain the Clinical Practice Guideline Acute Low Back Problems in Adults. The Back Letter, 10(1), 3-5. https://www.doi.org/10.1097/00130561-199501000-00004

Brinjikji, W., Luetmer, P., Comstock, B., Bresnahan, B., Chen, L., Deyo, R., Jarvik, J. (2014). Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations. American Journal of Neuroradiology, 36(4), 811-816. https://www.doi.org/10.3174/ajnr.a4173

# References


Bydon, M., Garza-Ramos, R. D., Macki, M., Baker, A., Gokaslan, A. K., & Bydon, A. (2014). Lumbar Fusion Versus Nonoperative Management for Treatment of Discogenic Low Back Pain. Journal of Spinal Disorders and Techniques, 27(5), 297-304. https://www.doi.org/10.1097/bsd.0000000000000072

Childs, J. D., Whitman, J. M., Sizer, P. S., Pugia, M. L., Flynn, T. W., & Delitto, A. (2005). A description of physical therapists' knowledge in managing musculoskeletal conditions. BMC Musculoskeletal Disorders, 6(1). https://www.doi.org/10.1186/1471-2474-6-32

Chou, R., Fu, R., Carrino, J. A., & Deyo, R. A. (2009). Imaging strategies for low-back pain: Systematic review and meta- analysis. The Lancet, 373(9662), 463-472. https://www.doi.org/10.1016/s0140-6736(09)60172-0

Chou, R. (2011). Diagnostic Imaging for Low Back Pain: Advice for High-Value Health Care from the American College of Physicians. Annals of Internal Medicine, 154(3), 181. https://www.doi.org/10.7326/0003-4819-154-3-201102010-00008

Chou, R., Deyo, R. A., & Jarvik, J. G. (2012). Appropriate Use of Lumbar Imaging for Evaluation of Low Back Pain. Radiologic Clinics of North America, 50(4), 569-585. https://www.doi.org/10.1016/j.rcl.2012.04.005

# References


Cleland, J. A., Fritz, J. M., & Childs, J. D. (2008). Psychometric Properties of the Fear-Avoidance Beliefs Questionnaire and Tampa Scale of Kinesiophobia in Patients with Neck Pain. American Journal of Physical Medicine & Rehabilitation, 87(2), 109-117. https://www.doi.org/10.1097/phm.0b013e31815b61f1

Darlow, B., Dowell, A., Baxter, G. D., Mathieson, F., Perry, M., & Dean, S. (2013). The Enduring Impact of What Clinicians Say to People With Low Back Pain. *The Annals of Family Medicine*, *11*(6), 527–534. https://doi.org/10.1370/afm.1518

Etal, J. M. (1994). Magnetic Resonance Imaging of the Lumbar Spine in People Without Back Pain. The Nurse Practitioner, 19(9), 19. https://www.doi.org/10.1097/00006205-199409000-00004

Fritz, J. M., & George, S. Z. (2002). Identifying Psychosocial Variables in Patients with Acute Work-Related Low Back Pain: The Importance of Fear-Avoidance Beliefs. Physical Therapy, 82(10), 973-983. https://www.doi.org/10.1093/ptj/82.10.973

George, S., & Beneciuk, J. (2013). Faculty Opinions recommendation of Primary care referral of patients with low back pain to physical therapy: Impact on future health care utilization and costs. Faculty Opinions – Post-Publication Peer Review of the Biomedical Literature. https://www.doi.org/10.3410/f.717969063.793468611

# References


Haldeman, S., & Dagenais, S. (2008). A supermarket approach to the evidence-informed management of chronic low back pain. The Spine Journal, 8(1), 1-7. https://www.doi.org/10.1016/j.spinee.2007.10.009

Hashemi, L., Webster, B. S., Clancy, E. A., & Volinn, E. (1997). Length of Disability and Cost of Workers Compensation Low Back Pain Claims. Journal of Occupational & Environmental Medicine, 39(10), 937-945. https://www.doi.org/10.1097/00043764-199710000-00005

Henschke, N., Maher, C. G., Refshauge, K. M., Herbert, R. D., Cumming, R. G., Bleasel, J., Mcauley, J. H. (2009). Prevalence of and screening for serious spinal pathology in patients presenting to primary care settings with acute low back pain. Arthritis & Rheumatism, 60(10), 3072-3080. https://www.doi.org/10.1002/art.24853

Hill, J. C., Dunn, K. M., Lewis, M., Mullis, R., Main, C. J., Foster, N. E., & Hay, E. M. (2008). A primary care back pain screening tool: Identifying patient subgroups for initial treatment. Arthritis & Rheumatism, 59(5), 632-641. https://www.doi.org/10.1002/art.23563

Jarvik, J. G., Hollingworth, W., Martin, B., Emerson, S. S., Gray, D. T., Overman, S., Deyo, R. A. (2003). Rapid Magnetic Resonance Imaging vs Radiographs for Patients with Low Back Pain. Jama, 289(21), 2810. https://www.doi.org/10.1001/jama.289.21.2810

# References


Jiang, H. (2017). Incidence of Spontaneous Resorption of Lumbar Disc Herniation: A Meta-Analysis. January 2018 Pain Physician, 1(21;1). https://www.doi.org/10.36076/ppj.2017.1.e45

Kerns, R. D. (2013). Transforming Pain Care in the United States Department of Veterans Affairs. The Clinical Journal of Pain, 29(2), 93-94. https://www.doi.org/10.1097/ajp.0b013e31826b6ce8

Kovacs, F. M., Seco, J., Royuela, A., Peña, A., & Muriel, A. (2011). The Correlation Between Pain, Catastrophizing, and Disability in Subacute and Chronic Low Back Pain. Spine, 36(4), 339-345. https://www.doi.org/10.1097/brs.0b013e3181cfba29

Lew, H. L., Otis, J. D., Tun, C., Kerns, R. D., Clark, M. E., & Cifu, D. X. (2009). Prevalence of chronic pain, posttraumatic stress disorder, and persistent postconcussive symptoms in OIF/OEF veterans: Polytrauma clinical triad. The Journal of Rehabilitation Research and Development, 46(6), 697. https://www.doi.org/10.1682/jrrd.2009.01.0006

Linton, S. J., Hellsing, A., & Halldén, K. (1998). A Population-Based Study of Spinal Pain Among 35-45-Year-Old Individuals. Spine, 23(13), 1457-1463. https://www.doi.org/10.1097/00007632-199807010-00006

# References


Linton, S. J., & Nordin, E. (2006). A 5-Year Follow-Up Evaluation of the Health and Economic Consequences of an Early Cognitive Behavioral Intervention for Back Pain: A Randomized, Controlled Trial. Spine, 31(8), 853-858. https://www.doi.org/10.1097/01.brs.0000209258.42037.02

Louw, A., Zimney, K., Puentedura, E. J., & Diener, I. (2016). The efficacy of pain neuroscience education on musculoskeletal pain: A systematic review of the literature. Physiotherapy Theory and Practice, 32(5), 332-355. https://www.doi.org/10.1080/09593985.2016.1194646

Major, N. M., & Helms, C. A. (2002). MR Imaging of the Knee: Findings in Asymptomatic Collegiate Basketball Players. American Journal of Roentgenology, 179(3), 641-644. https://www.doi.org/10.2214/ajr.179.3.1790641

Milgrom, C., Schaffler, M., Gilbert, S., & Holsbeeck, M. V. (1995). Rotator-cuff changes in asymptomatic adults. The effect of age, hand dominance and gender. The Journal of Bone and Joint Surgery. British Volume, 77-B(2), 296-298. https://www.doi.org/10.1302/0301-620x.77b2.7706351

# References


Modic, M. T., Obuchowski, N. A., Ross, J. S., Brant-Zawadzki, M. N., Grooff, P. N., Mazanec, D. J., & Benzel, E. C. (2005). Acute Low Back Pain and Radiculopathy: MR Imaging Findings and Their Prognostic Role and Effect on Outcome. Radiology, 237(2), 597-604. https://www.doi.org/10.1148/radiol.2372041509

Moseley, G. (2003). A pain neuromatrix approach to patients with chronic pain. Manual Therapy, 8(3), 130-140. https://www.doi.org/10.1016/s1356-689x(03)00051-1

Munk, B., Lundorf, E., & Jensen, J. (2004). Long-term outcome of meniscal degeneration in the knee Poor association between MRI and symptoms in 45 patients followed more than 4 years. Acta Orthopaedica Scandinavica, 75(1), 89-92. https://www.doi.org/10.1080/00016470410001708180

Nahin, R. L. (2015). Estimates of Pain Prevalence and Severity in Adults: United States, 2012. The Journal of Pain, 16(8), 769-780. https://www.doi.org/10.1016/j.jpain.2015.05.002

Nahin, R. L. (2017). Severe Pain in Veterans: The Effect of Age and Sex, and Comparisons With the General Population. The Journal of Pain, 18(3), 247-254. https://www.doi.org/10.1016/j.jpain.2016.10.021

# References


Pangarkar, S. S., Kang, D. G., Sandbrink, F., Bevevino, A., Tillisch, K., Konitzer, L., & Sall, J. (2019). VA/DoD Clinical Practice Guideline: Diagnosis and Treatment of Low Back Pain. Journal of General Internal Medicine, 34(11), 2620-2629. https://www.doi.org/10.1007/s11606-019-05086-4

Pengel, L. H. (2003). Acute low back pain: Systematic review of its prognosis. Bmj, 327(7410), 323-0. https://www.doi.org/10.1136/bmj.327.7410.323

Reilly, P., Macleod, I., Macfarlane, R., Windley, J., & Emery, R. (2006). Dead Men and Radiologists Don't Lie: A Review of Cadaveric and Radiological Studies of Rotator Cuff Tear Prevalence. The Annals of The Royal College of Surgeons of England, 88(2), 116-121. https://www.doi.org/10.1308/003588406x94968

Saper, R. B., Lemaster, C. M., Elwy, A. R., Paris, R., Herman, P. M., Plumb, D. N., Weinberg, J. (2016). Yoga versus education for Veterans with chronic low back pain: Study protocol for a randomized controlled trial. Trials, 17(1). https://www.doi.org/10.1186/s13063-016-1321-5

# References


Saragiotto, B. T., Maher, C. G., Yamato, T. P., Costa, L. O., Costa, L. C., Ostelo, R. W., & Macedo, L. G. (2016). Motor Control Exercise for Nonspecific Low Back Pain. Spine, 41(16), 1284-1295. https://www.doi.org/10.1097/brs.0000000000001645

Shah, A., Hayes, C. J., & Martin, B. C. (2017). Characteristics of Initial Prescription Episodes and Likelihood of Long-Term Opioid Use — United States, 2006–2015. MMWR. Morbidity and Mortality Weekly Report, 66(10), 265-269. https://www.doi.org/10.15585/mmwr.mm6610a1

Sher, J. S., Uribe, J. W., Posada, A., Murphy, B. J., & Zlatkin, M. B. (1995). Abnormal findings on magnetic resonance images of asymptomatic s houlders. The Journal of Bone & Joint Surgery, 77(1), 10-15. https://www.doi.org/10.2106/00004623-199501000-00002

Staiger, T. O., Paauw, D. S., Deyo, R. A., & Jarvik, J. G. (1999). Imaging studies for acute low back pain. Postgraduate Medicine, 105(4), 161-172. https://www.doi.org/10.3810/pgm.1999.04.682

Sullivan, M. J., Bishop, S. R., & Pivik, J. (1995). The Pain Catastrophizing Scale: Development and validation. Psychological Assessment, 7(4), 524-532. https://www.doi.org/10.1037/1040-3590.7.4.524

The US Department of Health and Human Services. (1994). AHCPR Clinical Practice Guideline- Acute Low Back Problems in Adults. http://d4c2.com/d4c2-000038.htm

# References


Vlaeyen, J. W., & Linton, S. J. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. Pain, 85(3), 317-332. https://www.doi.org/10.1016/s0304-3959(99)00242-0

Vogel, S. (2009). NICE clinical guidelines. Low back pain: The early management of persistent non-specific back pain. International Journal of Osteopathic Medicine, 12(4), 113-114. https://www.doi.org/10.1016/j.ijosm.2009.09.002

Waddell, G., Newton, M., Henderson, I., Somerville, D., & Main, C. J. (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. https://www.doi.org/10.1016/0304-3959(93)90127-b

Webster, B. S., & Cifuentes, M. (2010). Relationship of Early Magnetic Resonance Imaging for Work-Related Acute Low Back Pain With Disability and Medical Utilization Outcomes. Journal of Occupational and Environmental Medicine, 52(9), 900-907. https://www.doi.org/10.1097/jom.0b013e3181ef7e53

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# Recommended Reading/Websites

- Benedict, T. (2019). Your Nerves on Guard Duty: A Pain Neuroscience Approach to Stress and Pain in Soldiers
  - https://phc.amedd.army.mil/PHC%20Resource%20Library/TG379_Soldiers_Stress.pdf#search=your%20nerves%20on%20guard%20duty
- Defense and Veterans Pain Management Initiative
  - http://www.dvcipm.org/
- VHA Pain Management
  - https://www.va.gov/painmanagement/
- PainEDU
  - https://www.painedu.org/resources.asp
- Websites geared for patients
  - American Chronic Pain Association
    - https://theacpa.org/

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