**PHYT 822 Advance Patient Management II**

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**Spinal Module Final Assignment: Case 3, Patricia, 77 yo Female**

**Subjective analysis**

 From subjective report it seems Patricia has acute and chronic back pain issues. Her pain experience spans recent onset of sever mid-thoracic midline pain, and low back pain present with periodic exacerbations for years. Patricia’s description of her “aggs” and eases suggests a preference for flexed posture which is more often associated with vertebral stenosis than disc pathology. Further objective investigation will be addressed in the next section. He pain is increased with intra-abdominal pressure (cough/ sneeze), sitting and standing for more than 15 minutes. (Observation could conclude these are spine “flexed” positions given rounded shoulders, thoracic kyphosis, and reduced lumbar lordosis are her observed postural positions). Standing and walking likewise aggravate her symptoms. Her eases seem to be “unweighting” rather than “extension” of her back. True extension activities close the posterior border of the vertebral bodies, pressing the IV disc forward, and thereby reducing pressure on the nerve roots.

 Missing from her subjective assessment include psychosocial functioning. With her PMH and prescription of anti-depressant Zoloft, there may be a link to chronic pain that should be explored. Additionally, I would seek to uncover her prior work/ leisure/ living environments and determine level of current physical demands and support available for leverage in a treatment plan for motivational and accountability value. Of course, this information will be valuable as well concerning any genetic and environmental impact on potential differential diagnoses.

 Objectively, her posture described above, and significant ROM limitations in t-spine (flexion limited to 50% with pain, and extension more limited down to 25%, but no mention of pain) is consistent with disc pathology. Despite appearing “stable” her gait pattern, TUG, and 30s sit to stand measures all indicate increased falls risk (cutoffs are >13.5s and >=8, respectively).1,2 Additional objective measures would include more specific identification of segmental spine flexibility, identification of BMI, LE alignment, pelvic alignment, and leg length discrepancy may all reveal musculoskeletal contributions to Patricia’s pain experience. Manual muscle testing, and assessment of functional myotomes are needed with observed gait abnormalities. With pain in her legs, to her calves, slump test and SLR test for any neural mobility contribution would be indicated.

**Differential Diagnosis**

With PMH of degenerative disc (DD) disease, this should be considered as one differential diagnosis. In his clinical commentary, Beattie explained that many people experience DD as early as their 30s, and that nearly all show signs by Patricia’s age. Additionally, DD can contribute to sciatica, consistent with Patricia’s complaint of bilateral leg pain down to her calves.3 Beattie describes the sensory nerve representation of vertebral discs as having dual pathways, contributing to a diffuse pain pattern. First, the disc nerves travel segmentally to the spinal cord via the dorsal root of the adjacent nerve, as well as “…extra-segmentally through the paravertebral sympathetic chain.”3 The progression of DD may occur through either vertebral body deterioration and resulting decrease in nutrient exchange to the discs. Or, annular disruption through repeated micro-trauma which ultimately may lead to disc space narrowing and neural disruption leading to pain and altered spinal mechanics.3

 Osteoarthritis is also a consideration for Patricia. Although not documented in PMH, she has been prescribed the NSAID Mobic, which is commonly prescribed for pain related to OA.4 OA in the spine may occur at any level, and affect facet joint support. Sahin et al. found a relationship between facet joint deterioration and narrowing of foramen which leads to neural impingement and pain. Among their findings was a positive relationship between facet joint degeneration with OA and a significantly higher lumbar lordosis angle. Put another way, facet joint degeneration may present as reduced lumbar lordosis. With Patricia’s observed sitting and standing posture, this possibility should be considered for her situation.5

 Muscle spasm is an unlikely primary diagnosis, but could be considered in conjunction to Patricia’s primary diagnosis. Her poor posture in sitting and standing could contribute to weak back extensor muscles. However, when walking and standing and performing other activities of daily living, we call upon these muscles routinely. Activity modification provides rest and ability for the muscles to relax and, with time, pain subsides. Patricia’s pain has been present for “years”, so while there may be muscle spasm as part of the problem, it probably accounts more for the acute aspect.

**Radiology**

 Clinical practice guides for low back pain created by physicians (American College of Physicians) and physical therapists (APTA) have concluded that radiology is limited in usefulness for initial conservative treatment. Since there are risks of false positive (and negative) findings, imaging is best reserved for surgical planning or severe neurological deficits. Routine imaging is considered unnecessary.6,7 Nonetheless, there is literature to support using additional imaging for diagnosis of certain conditions:

 DD could be confirmed with MRI. Because of the subtle structures within the intervertebral disc. In simplified description, the disc is comprised of the nucleus pulposus, a central structure surrounded by the annulus fibrosus. Beattie describes 4 tissue layers that are interwoven and that MRI is the preferred imaging to observe the subtleties of that tissue as well as any vertebral body deterioration discussed above.3

 OA could be investigated with CT scan. This offers a number of advantages for facet joint imaging. For example, CT allows for facet joint imaging in 3 planes, allowing views of all surfaces. Plus, CT scans can limit the superpostioning of images, has excellent contrast capacity and finally is best for observing joint space narrowing.5

**Pharmacology**

In looking at her list of prescribed medications, Patricia seems to have pain relief covered with Flexeril and Mobic for muscle spasms and OA respectively. She has Zoloft prescribed for anti-depression and Crestor and Zetia for cholesterol control. Precautions and PT Implications are included in this table:4 It should be noted that Flexeril (muscle relaxer) is considered moderate quality evidence for acute back pain, but insufficient evidence long-term use and on chronic low back pain by Qaseem et al.6

|  |  |  |  |
| --- | --- | --- | --- |
| **MEDS name/ class** | **Indication** | **Precautions** | **PT Implications** |
| Flexeril (skeletal muscle relaxer) SMR | Acute mm spasm, pain | Dizziness, drowsiness, HA, arrhythmia | Monitor pain, stiffness, HR, EKG,  |
| Zoloft(antidepressant) | Major depressive disorder, OCD,  | Nueroleptic malignant syndrome (NMS),Dizziness, drowsiness, HA, diarrhea, nausea, dry mouth, | Signs of NMS – hyperthermia, diaphoresis,generalized mm rigidity, alert for increased depression and suicidal thoughts |
| Crestor(Lipid lowering) | Hypercholesteremia | Rhabdomyolysis, abdominal pain, constipation, weakness | Caution if pain, weakness is accompanied by fever, dark-urine. Immediate MD ref and cease exes. |
| Zetia(lipid lowering) | Hypercholesteremia | Angioedema, rash, pancreatitis  | Notify MD if:Rashes, welts, burning/ itch skin.Abdominal pain after eating |
| Mobic(NSAID) | Relief of OA and RA. Analgesic | GI bleed, exfoliative dermatitis, & additional dermatology issues. | Signs of GI – bleeding, abdominal pain, & skin reactions-notify MD immediately  |

**Exam procedures/ Special Tests**

Flexibility (spinal mobility) to identify any restrictions and directional preference.

1. Note restrictions and degrees or % limitation and pain reports, which indicate positive test.
2. Begin with cervical then thoracic spine AROM and PROM for flexion, extension, side-bending, and rotation.
3. Add resisted testing with isometric contractions to all movements.
4. Add palpation and Passive Accessory Intervertebral Motion (PAIVM) – central PA mobilizations, and unilateral for rotation for thoracic spine.

Neurological special tests to identify nature of leg pain. I am expecting a positive test from one or more neuro special tests with her leg pain presentation and description.

1. Functional myotome testing, heel walk (L4) and toe walk (S1-2). Ask Patricia to walk on heels then on toes for 10s. Positive test is weakness, compensation, or inability to complete the tests, and indicated L4 or S1-2 involvement
2. Slump test, dural mobility of L4-S3. Seated edge of table, ask Patricia to slump upper chest forward with over-pressure. If no increase in pain, flex neck with over-pressure. If no pain, passively extend knee. If no pain, passively dorsiflex foot. Positive if pain on any position with relief on head lift (extension). Pain may be relieved or worsen with head movement.
3. Straight leg raise. Test sciatic nerve, mechanical movement of neural tissue and sensitivity to stress or compression. Ask Patricia to lie supine, passively raise her straight leg (slightly adducted and medially rotated). Stop when she complains of pain or tightness in back of leg, then slightly lower leg until relief. Then passively dorsiflex her foot and/ or flex neck. Several positives: Reproduction of pain in 35-70 degrees flex range; Reproduction of pain with dorsiflexion; Reproduction of pain with neck flexion.

Psychosocial assessment to identify potential referral opportunities or determine likelihood of fear or catastrophizing component of Patricia’s pain experience, whether there is an error in central nervous system processing. Often patient education on pain neuromatrix and application of graded physical activity and biofeedback may help a patient like Patricia, if appropriate, learn to manage her pain symptomology.8,9

* 1. Fear Avoidance Behavior Questionnaire (FABQ). For Patricia, a score of >= 15/24 for FABQ (physical activity sub-scale) would indicate higher than average fear of activity.10

**Outcome measures**

 Oswestry Disability Index(ODI) – Validated pain disability measure of activities of daily living. The scoring ranges from “minimal disability” (0-20%) through “crippled” (61-80%). Above 80% is rated “the patient is either bed bound or exaggerating their symptoms.”11

 Numeric Rating Scale (NRS) – Similar to the VAS, this is a simple subjective rating of pain from 0 – 11 (no pain to worst pain imaginable). According to Physiopedia.com, an improvement (decrease) in numeric rating of 2 or more represents a significant improvement.12

 Both the ODI and NRS were selected as preferred outcome measures (78% and 75%, respectively) by an international multidisciplinary panel of researchers convened to establish consistency in outcome reporting of back pain.13

**Interventions**

Therapeutic exercises: Level I evidence supports progressive endurance exercises for a patient like Patricia, acute and chronic back pain experiences. Walking, cycling, treadmill, or dance programs are examples of endurance activities that could be applied. Delitto et al. go on to explain that for patients with underlying psychosocial factors aerobic endurance exercises not only improve physical functioning, they also address pain perception.7 No specific exercise prescription has been proposed, but recommendation for graded increase toward the recommended Physical Activity Guidelines for US Citizens may be developed and used for Patricia. Any program will proceed with strict monitoring and assessment of response. Careful education on precautions and warning signs for adverse events will be provided. Qaseem et al. indicated therapeutic exercise receives moderate-quality evidence in small gains of function and pain relief. Moderate quality evidence showed no clear superior specific training programs (more than 20 RCTs compared).6 What follows is a conservative endurance and resistance progression program for Patricia, with general guidelines proposed by American College of Sports Medicine14. Exercise (endurance and resistance training) also is recommended for prevention of re-injury by Delitto et al.7

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Exercise | Weeks | Frequency | Intensity | Notes |  |
| Walking, cycling, TM or dance | 1-3 | 3-5d/ week | RPE 9-11(Very light- Light) | Begin at tolerable level 15 min./ day80 min/ week goal | Increase by 5 min./session/ week as tol. |
|  | 4-6 | 3-5d/ week | RPE 11-14(Light – Hard) | 25-35 min./ day100 min. week goal |  |
|  | 7-10 | 5d/ week | RPE 11-14 | 25 min./ day120 min. week goal |  |
| Resistance training,or aquatic | 1-3 | 1-2d/ week | 1-3 sets @Light Resistance3-8 reps/ set | Therabands/Hand weights/ | Gradually increase Frequency, Intensity, Time, Type  |
|  | 4-6 | 2d/ week | 3-4 sets @Light-HeavyResistance6-9 reps/ set | 1 lb./ 3 lb. / 5 lb. hand weights |  |
|  | 7-10 | 3d/ week | 3-4 sets @ Moderate-Heavy resistance8-12 reps/ set |  |  |

Manual therapy – Including superficial heat, soft tissue massage, spinal mobilizations. American College of Physicians and APTA include hands-on therapy and modalities for pain reduction and improved flexibility/ mobility for patients like Patricia. Low quality to moderate quality evidence supports heat and massage for pain and functional improvements.6 In patients with chronic back pain, manual therapy is recommended by the APTA for improvement of spinal segmental mobility as well as pain reduction.7

 Patient education – Patricia would benefit from some recent research into pain perception. Moseley described the neuromatrix conceptually as being composed of the brain as a huge information processor. Initially, pain is transmitted from sensory receptors and serves as warning to avoid harm. Once the threat subsides (over a range of time), the signal goes away. However, for some people, other habits or influences can serve to nurture the pain signals and a negative cycle of elevated pain response follows. Phantom limb phenomenon is an illustration of how the brain is experiencing pain signals but the actual threat is no longer present.15

 For patients like Patricia, if it is determined that there may be a psychosocial component to her pain rather than an anatomical or actual threat, exercises like those described above along with an education program may be beneficial. Nijs et al. provide a detailed 2 session education program involving information about pain sensation and homework to complete that guides them to a reduced pain experience. Each patient is treated with respect and acknowledgement of their experience. Through that foundation, patients learn how to recognize threats through reconceptualization of pain, altering of belief patterns, and adaptive pain responses.9

**Care delivery modifications**

 There are a number of alternatives for Patricia should she not have insurance or financial ability to pay for her PT services. UNC charity care would be an excellent possibility for Patricia. Information about this program is available through the UNC website.16

 Silver Sneakers is another resource that may help Patricia. The program is free on the web, and offers back exercises that are safe and easy to perform. Plus, Silver Sneakers has endurance programs and a social component that might be just the thing to keep her motivated.17

Bibliography

1. Raad J. Rehab Measures: Timed Up and Go. 2013. Available at: http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=903. Accessed October 1, 2017.

2. Jones CJ, Rikli RE. Measuring Functional Fitness in Senior Adults. *The Journal on Active Aging* 2002:24-30.

3. Beattie PF. Current understanding of lumbar intervertebral disc degeneration: a review with emphasis upon etiology, pathophysiology, and lumbar magnetic resonance imaging findings. *J Orthop Sports Phys Ther* 2008;38(6):329-340. doi:10.2519/jospt.2008.2768.

4. Ciccone CD. *Davis’s Drug Guide for Rehabilitation Professionals*. Ipswich, MA: eBook.; 2013.

5. Sahin MS, Ergün A, Aslan A. The relationship between osteoarthritis of the lumbar facet joints and lumbosacropelvic morphology. *Spine* 2015;40(19):E1058-62. doi:10.1097/BRS.0000000000001070.

6. Qaseem A, Wilt TJ, McLean RM, Forciea MA, Clinical Guidelines Committee of the American College of Physicians. Noninvasive treatments for acute, subacute, and chronic low back pain: A clinical practice guideline from the american college of physicians. *Ann Intern Med* 2017;166(7):514-530. doi:10.7326/M16-2367.

7. Delitto A, George sz, Van Dillen L. Low Back Pain: clinical practice guidelines linked to the international classification of functioning, disability, and health from the Orthopaedic Section of the American Physical Therapy Association. *J Orthop Sports Phys Ther* 2012;42:A1-A57. doi:10.2519/jospt.2012.0301.

8. Foster NE, Delitto A. Embedding psychosocial perspectives within clinical management of low back pain: integration of psychosocially informed management principles into physical therapist practice--challenges and opportunities. *Phys Ther* 2011;91(5):790-803. doi:10.2522/ptj.20100326.

9. Nijs J, Paul van Wilgen C, Van Oosterwijck J, van Ittersum M, Meeus M. How to explain central sensitization to patients with “unexplained” chronic musculoskeletal pain: practice guidelines. *Man Ther* 2011;16(5):413-418. doi:10.1016/j.math.2011.04.005.

10. Fear-Avoidance Beliefs Questionnaire | Shirley Ryan AbilityLab - Formerly RIC. Available at: https://www.sralab.org/rehabilitation-measures/fear-avoidance-beliefs-questionnaire#back-pain. Accessed April 22, 2018.

11. Cole, SPT S, Dickey, SPT S, Godfrey, SPT J. Oswestry Disability Index. *Shirley Ryan Ability Lab* 2013. Available at: https://www.sralab.org/rehabilitation-measures/oswestry-disability-index. Accessed April 22, 2018.

12. Numeric Pain Rating Scale - Physiopedia. Available at: https://www.physio-pedia.com/Numeric\_Pain\_Rating\_Scale. Accessed April 22, 2018.

13. Chiarotto A, Boers M, Deyo RA, et al. Core outcome measurement instruments for clinical trials in nonspecific low back pain. *Pain* 2018;159(3):481-495. doi:10.1097/j.pain.0000000000001117.

14. American College of Sports Medicine. American College of Sports Medicine position stand. Progression models in resistance training for healthy adults. *Med Sci Sports Exerc* 2009;41(3):687-708. doi:10.1249/MSS.0b013e3181915670.

15. Moseley GL. A pain neuromatrix approach to patients with chronic pain. *Man Ther* 2003;8(3):130-140. doi:10.1016/S1356-689X(03)00051-1.

16. Our Services — University Physical & Occupational Therapy. Available at: http://www.med.unc.edu/ahs/physical/university-pt/our-services. Accessed March 28, 2018.

17. The Best and Worst Exercises for Back Pain - SilverSneakers. Available at: https://www.silversneakers.com/blog/exercises-back/. Accessed April 23, 2018.