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Physical Therapy Treatment of Upper Back, Neck, and Shoulder Pain: A Case Report

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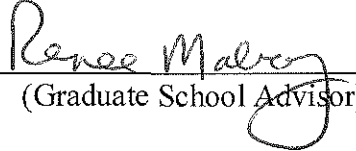
PHYSICAL THERAPY TREATMENT OF UPPER BACK, NECK, AND SHOULDER
PAIN: A CASE REPORT

A Dissertation
Submitted to the Faculty
of
The University of North Dakota
by
Lauren A. Graham

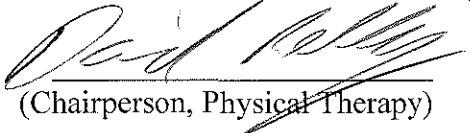
In Partial Fulfillment of the
Requirements for the Degree
of
Doctor of Physical Therapy

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This Scholarly Project, submitted by Lauren Graham in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done is hereby approved.



(Graduate School Advisor)



(Chairperson, Physical Therapy)

TABLE OF CONTENTS

LIST OF TABLES.....	iv
ABSTRACT.....	v
CHAPTER	
I. BACKGROUND AND PURPOSE.....	1
II. CASE DESCRIPTION	4
Examination.....	6
Evaluation, diagnosis, prognosis.....	8
III. INTERVENTIONS.....	10
IV. OUTCOMES.....	14
V. DISCUSSION.....	18
Reflective Practice	20
Conclusion	21
BIBLIOGRAPHY.....	22

LIST OF TABLES

1. Range of Motion measurements at initial visit and discharge	7
2. Reliability and Validity of Examination Procedures	8
3. Interventions	12

ABSTRACT

Background and Purpose. Neck, shoulder, and upper back pain may be caused by a number of different pathologies and can decrease a patient's functional ability and participation in their daily life. The purpose of this case study is to describe the use of strengthening, stretching, manual therapy, and neuroscience of pain education for decreasing pain in a patient with chronic neck, thoracic, and shoulder pain.

Case Description. The patient was a 69 year old female who had been experiencing neck, shoulder, and upper back pain for 8 months with an insidious onset. She was functionally limited and experienced pain with movement. Interventions included strengthening, stretching, joint mobilizations, soft tissue massage, trigger point release, and neuroscience of pain education.

Outcomes. After 8 physical therapy sessions over 13 weeks, the patient's pain had greatly decreased and she was able to do activities she had been limited in.

Discussion. This case suggests that strengthening, stretching, joint mobilizations, soft tissue massage, trigger point release, and neuroscience of pain education may have been beneficial in reducing pain and restoring function in this patient.

CHAPTER 1

BACKGROUND AND PURPOSE

Neck and back pain are among the most common conditions that cause people to go to the doctor. Neck pain affects approximately 15.2% of people ages 18 and older each year. It can affect any race, age, or gender but generally occurs more often in adults and is more common in females compared to males.¹ The estimated cost associated with the diagnosis and management of neck and back pain each year in the United States is \$90 billion. Another \$10-20 billion is estimated for economic losses in productivity.² A few causes of neck pain include disc degeneration or herniation, narrowing of the spinal canal (spinal stenosis), arthritis, muscle tension, trauma/injury, or more serious conditions such as cancer. There may also be no known cause. A physician will diagnose neck pain based on a person's history, symptoms, a physical examination, and diagnostic tests (such as imaging or nerve conduction studies) if necessary.³ Unless considered a medical emergency, conservative treatment is usually recommended before surgery.

Conservative treatment is used to try to decrease pain and symptoms before considering more serious options such as surgery. This can include medication, physical therapy, activity modification, and education of proper posture and body mechanics. A study by Kuijper et. al. compared three groups to treat cervical radiculopathy – treatment with a semi-hard collar and rest, physiotherapy and home exercises (conservative treatment), and a control/wait and see group. The physiotherapy group performed

exercises to strengthen the neck muscles to mobilize and stabilize the cervical spine. The authors found that the physiotherapy and collar treatment groups experienced significant reduction in arm and neck pain compared to the wait and see group.⁴ Although this patient did not experience radicular symptoms, the conservative treatment options and results can carry over to other types of neck pain. Studies have shown that exercise, including strengthening and stretching, can help to decrease neck and upper back pain. Andersen et. al. compared the effect of scapular function training versus a control group. The results showed that there was a between-group difference in pain intensity of 2 on a 10 point scale (with the experimental group having less pain), which is considered clinically significant by the authors.⁵ Bertozzi et. al. found that therapeutic exercise had medium and significant short-term and intermediate-term effects on pain and medium but not significant short- and intermediate-term effects on disability. It showed that there was a significant overall effect size supporting therapeutic exercise for its effect on pain in short and intermediate terms.⁶

Blikstad and Gemmell performed a study comparing trigger point therapy, myofascial band therapy, and sham ultrasound using pain reduction as the main outcome measure. They found a patient was 7 times more likely to improve with trigger point therapy compared to the other two treatments. There were 15 participants in each of the three treatment groups. In the trigger point therapy group, 8 said they improved after treatment whereas only 2 participants each in the other categories stated improvement.⁷

Patient education has been explored for the effect on pain and disability. Neuroscience education sessions include explaining the neurophysiology and neurobiology of pain and how it is processed by the nervous system. The brain processes

and interprets information from tissues in the body which can modulate how one experiences pain.⁸ Neuroscience education has helped patients reduce their fear and change their perception of pain in a positive manner⁹ and improve their attitude towards the pain.¹⁰

The purpose of this case study is to describe the use of strengthening, stretching, manual therapy, and neuroscience of pain education for decreasing pain in a patient with chronic neck, thoracic, and shoulder pain.

CHAPTER 2

CASE DESCRIPTION, EXAMINATION, EVALUATION, DIAGNOSIS, AND PROGNOSIS

Case description

The patient is a 69 year old Caucasian female who was referred to physical therapy by her doctor for upper back, neck, and shoulder pain that started in January, 8 months prior to the initial PT visit in August. There was no traumatic event that caused the injury. The pain increased significantly during activities in March which caused her to increase her medication. She was still independent for most activities but experienced increased pain and her husband helped out more around the house. She had had similar pain before and tried physical therapy twice but it did not help. She was retired but formerly worked as a medical biller.

The patient had an extensive past medical history including bipolar disorder, asthma, hemochromatosis, rheumatoid arthritis, osteoarthritis, depression, osteopenia, myalgia, hypothyroidism, and heart murmur. Her past surgical history included correction of hammer toe, rotator cuff repair, bladder suspension, hysterectomy, cholecystectomy, joint replacements (1st and 2nd digit MCP joints, thenar joint), carpal tunnel release, shoulder arthroscopy, hand arthroplasty, T₈₋₉ discectomy, and septoplasty.

She had no current cardiac, metabolic, integumentary, or nervous system pathologies and was medically stable.

The patient was taking many medications for her pain and mental health disorders. Some of these included gabapentin (neurontin), lithium carbonate, trazodone (desyrel), and tramadol (ultram). During the initial examination, she stated she had fallen about 10 times in the past year. She thought this was due to the medications, occasional numbness in the leg, and balance issues.

The patient stated her pain was usually around a 7/10 (0=no pain, 10=worst pain imaginable) but increased with certain activities such as bending forward, sitting down too quickly, pushing up a hatch of a car, getting up from the floor, and extending her back. Her main hobbies included gardening and biking, both of which were then limited due to her pain. The pain was also disrupting her sleep which led to more fatigue throughout the day. The patient described her pain as thumping and had hot, electrical, sharp pain that made her have to lay down and rest. The pain starts at the base of her neck, goes down to ~T10 on the right side, and to the right scapular area. Interventions that made her pain better included resting, sitting, heat, and medication. She reported swelling in the scapular area.

The patient's goals for physical therapy included decreased pain in order to perform ADLs, IADLs, recreational activities, and exercise activities with more ease. She requested to be seen one time per week due to limited finances and \$30 copay each visit.

There were no significant co-morbidities negatively impacting her participation in physical therapy. Based on the examination, it was determined which interventions would

be performed. How the patient responded to and tolerated the interventions determined if they would continue to be performed or discontinued.

Examination

The examination techniques used included FOTO (Focus On Therapeutic Outcomes), range of motion, strength, palpation, mobilizations, and the Numeric Pain Scale. Refer to Table 2 for psychometric measurements.

Functional outcomes measure. At the initial examination, the patient's FOTO score was 50 out of 100. A higher score indicates greater function with a lower score indicating greater limitations. Her predicted outcome score was a 58, based on her age, gender, and diagnosis. She rated she was limited a lot with activities like moving a table, vacuuming, and lifting/carrying things like groceries. The patient stated her pain resulted in accomplishing less work and activities and spending less time on these. Her physical fear score at intake was 26 out of 100, with a higher score indicating fear of doing activities that may increase pain.

Range of motion. The patient's gross lower extremity active range of motion was assessed by observing functional activities of getting up from the ground and climbing stairs and was within functional limits. Her upper extremity active range of motion was measured in a seated position. Upper extremity range of motion was within normal limits but most of these movements caused pain in the scapular area at end range which caused her to grimace. The patient had limited cervical and thoracic range of motion with some movements. See Table 1. Cervical flexion caused right inferior scapular pain and right lateral flexion caused joint pressure/pain in the right cervical spine.

Table 1. Range of Motion measurements at initial visit and discharge.

	Evaluation	Discharge
Cervical flexion	25°	25°
Cervical extension	82°	92°
Right cervical lateral flexion	20°	30°
Left cervical lateral flexion	35°	32°
Right cervical rotation	54°	60°
Left cervical rotation	64°	75°
Left thoracic rotation (seated)	10°	40°
Right thoracic rotation (seated)	10°	30°

Strength. Lower extremity strength was assessed grossly by observing the patient squatting, climbing stairs, and getting up from the ground. She could perform these functional activities without difficulty. Upper extremity strength was assessed bilaterally by performing modified manual muscle testing (MMT). The patient was able to hold the positions against the resistance and was given a 5/5 (normal) strength. The patient experienced pain with right arm external rotation and internal rotation localized to the right scapular and shoulder area.

Palpation. Palpation was performed to any possible myofascial trigger points of the neck, shoulders, scapular area, and full back. The patient was very tender to the following areas: bilateral upper trapezius, right T3 paraspinal decreasing among descending levels, right supraspinatus, right infraspinatus, right teres major and minor, and right latissimus dorsi. She flinched and moved away from very superficial muscular palpation. The pain was usually localized but occasionally referred to her head or down her arm.

Mobilizations. Thoracic spine mobility was assessed with the patient in a prone position using PA joint mobilizations for T2-L2 during the 2nd physical therapy visit. The patient could only tolerate grade 2 mobilizations of the lower segments and less than grade 1 on the upper segments due to muscle pain. Due to muscle guarding and pain, it was difficult to feel any stiff segments. Because of the amount of muscular pain, mobilizations were not a high priority throughout treatment.

Table 2. Reliability and Validity of Examination Procedures

	Intra-rater reliability	Inter-rater reliability	Validity
FOTO		0.57-0.89 ¹¹	“Supported” ¹¹
Goniometric measurements	0.94-0.97 ¹²	0.98 ¹³	0.97-0.98 ¹³
Manual muscle testing	0.96-0.98 ¹⁴	0.82-0.97 ¹⁴ 0.81 ¹⁵	
Numeric pain scale	0.79-0.92 ¹⁶	1.0 ¹⁶	0.8-0.88 ¹⁶

Evaluation, diagnosis, and prognosis

Based on the nature and location of the pain, the patient was given a Physical Therapy primary diagnosis of cervicalgia (ICD-10 code M54.2) and a secondary

diagnosis of pain in thoracic area (ICD-10 code M54.6). Based on the examination findings, the patient falls under the APTA practice pattern 4D: Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated With Connective Tissue Dysfunction. This was due to the decreased range of motion, pain, and possible muscle guarding. A risk factor for inclusion in this pattern is rheumatoid arthritis, which this patient has.¹⁷

The patient's prognosis was fair to good. It was determined that physical therapy could help decrease her pain with stretching, self-management techniques, self-mobilizations, and manual therapy (thoracic and cervical mobilizations and soft tissue massage), but it was unlikely that her pain would completely go away. The interventions helped decrease her pain and increase her functional abilities.

The short term goals included being able to perform activities for 1 hour with pain staying below a 3/10 and be independent with a comprehensive HEP to decrease pain and tension and to allow easier home management of symptoms. These were to be met in 3 weeks. The long term goals included being independent with a thorough HEP, pain below a 3/10 during daily activities, and tolerating walking and gardening with pain staying below 4/10. These were to be met in 6 weeks.

Physical therapy re-examined and re-evaluated the patient and progressed her plan of care as appropriate.

CHAPTER 3

INTERVENTIONS

The patient was seen for 8 physical therapy visits over 13 weeks. Table 3 outlines the interventions performed at each visit (including frequency, sets, repetitions, color of theraband used, soft tissue massage, trigger point release, and mobilizations). The patient was deemed appropriate for physical therapy treatment. The plan of care included spinal mobilizations, soft-tissue massage, trigger point release, stretches, and strengthening exercises. These were appropriate interventions to help the patient increase her range of motion and strength, decrease her tenderness to palpation, and improve her joint mobility.

Soft Tissue Massage and Trigger Point Release. The pain experienced by the patient during palpation and thoracic spine joint mobilizations led to addressing any trigger points in the scapular and upper back/neck area. Initially, the patient only tolerated very light pressure during trigger point release and soft tissue massage. After a few sessions, she was able to tolerate moderate pressure.

Stretches. Stretches performed included levator scapula stretch, slump scapular stretch, pectoralis stretch, and vertical and horizontal foam roll.

Therapeutic Exercise. The upper body ergometer (UBE) was used at the beginning of each treatment session. Strengthening exercises included the following: Ws, external

rotation bilaterally, skiers, latissimus dorsi pull downs, rows, prone on elbows (POE) with scapular approximation and forward reaches, and POE with chin retraction and rotation to left and right. All of these exercises helped to strengthen the scapula, shoulder, arm, and cervical muscles.

Neuroscience of pain education. Neuroscience of pain education was also used with this patient. When individuals are in pain, they usually want to learn about pain and how it works. The patient was informed that pain does not adequately represent the health of the tissue, but that it may be due to nerves that are extra-sensitive.¹⁸ A graph and “alarm system” metaphor was used to help the patient understand this complex issue in an easier way. Tissue damage causes the alarm system to become more sensitive and closer to the nerve’s firing level. Due to this, it does not take a lot of movement or activity to activate this alarm system. Therefore, movements that are typically pain-free actually inflict pain and cause one to become fearful of repeating that movement, even though it is not damaging the tissue further. The patient was educated on these points and was very intrigued by it.¹⁹

Table 3. Interventions

Session	Soft Tissue Massage/ Trigger Point Release	Mobilizations	Therapeutic Exercise
1	Examination: assessed through palpation, did not perform	Examination: did not assess	Levator scapula stretch (3x30 seconds, each side)* Slump scapular stretch (3x30sec)* Vertical and Horizontal foam roll on thoracic spine (2x30 seconds each)*
2	STM ^a : paraspinals, upper trapezius, levator scapulae, scapular muscles (specifically T ₄₋₅ area) TPR ^b : rhomboids/paraspinals 3x90 seconds Instructed in use of lacrosse ball for self-STM at home*	PA mobilizations from T2-L2 (grade 2 on lower segment, barely grade 1 on upper segments)	Levator scapula stretch Slump scapular stretch Vertical and Horizontal foam roll on thoracic spine UBE ^c (5 minutes-warm up) W's (2x15 repetitions; orange TB ^d)* ER ^e bilaterally (2x15 repetitions; red TB)*
3			UBE W's ER bilaterally POE ^f with scapular approximation and forward reaches (2x10 reps)
4	STM: Upper back and scapular musculature TPR: Scapular musculature 3x60 seconds Introduced to Theracane		UBE POE with scapular approximation and forward reaches POE with chin retraction and rotation to left and right (1x10 reps) Pec stretch in a corner (3x30 seconds)*
5			UBE W's (progressed to red TB) ER bilaterally Lat pull downs (2x10 reps; green TB)* Chin retraction with rotation while leaning forward on elbows while sitting (1x10 reps)* Discontinued vertical and horizontal foam roll
6	STM: Upper back and scapular musculature TPR: Scapular musculature 3x60 seconds		UBE Lat pull downs Chin retraction with rotation while leaning forward on elbows while sitting Rows (2x10 reps; green TB) Skiers (2x10 reps; green TB)* Pec stretch in the corner (3x30sec)
7	Not available		
8	See below		

*Denotes exercise was added to patient's home exercise program

^aSoft tissue massage
^bTrigger point release
^cUpper body ergometer

^dTheraband
^eExternal rotation
^fProne on elbows

Vertical and horizontal foam roll on thoracic spine was discontinued on the 5th visit from treatment and the patient's home exercise program due to it increasing pain.

The patient's 8th visit was her last visit. Her goals, range of motion, strength, and palpation were reassessed. The entire home exercise program was verbally reviewed and certain exercises were physically reviewed if needed. Ways to progress the exercises were discussed. The patient reported feeling very comfortable with her home exercise program and she is managing her significantly lessened pain.

CHAPTER 4

OUTCOMES

At the 3rd PT visit the patient reported she was self-managing her symptoms with heating pads, massagers, and exercises. She was resting every hour which was helping her tolerate the rest of the day (she was able to keep doing things in the afternoon and evening). This was helping to improve her quality of life throughout the day. She purchased a lacrosse ball and was doing self-massage/trigger point release at the end of her exercise session each day. When the patient came in for her 4th PT session she reported that she had a bad fall 4 days before which caused her shoulder/upper back to be more sore but was doing better when she came in. She did some of her exercises right after the fall which she thinks helped with the pain. At the 5th visit the patient reported she was sleeping through the night much better due to less pain. Her pain was decreased to 5/10 with activity, and she was able to do 30 minute walks 5 times per week.

During the 6th visit the patient reported she was “3,000 times better.” She loved the Theracane she ordered and thought it helped. She decreased her pain medications to one pain pill at night and two Aleve in the morning (less than she was taking before starting therapy). The pain was not constant anymore and she could complete housework and gardening without as much pain. The 6th visit was also a re-examination/re-

evaluation. The patient's physical therapy goals were assessed and at this time she had met or partially met all of them.

On her last visit, the patient reported that she had not taken a pain pill for 3 weeks and had limited to no pain. She used a heating pad occasionally if she felt like the pain/tightness was progressing. The patient was very compliant with her home exercise program and knew it was important for her to do if she wanted to maintain where she was or keep improving.

Upper extremity testing at discharge showed 5/5 strength with slight pain in the scapula area with ER and IR only. Tenderness to palpation had localized to over the right rhomboid area only (this felt like tightness or pressure, not pain). Shoulder ROM was within functional limits but she still grimaced at the end range of most motions. See Table 1 for initial versus final range of motion measurements. All cervical ROM measurements increased over the course of treatment except for flexion which stayed the same and left lateral flexion decreased by 3°. At evaluation, she had pain in the right inferior scapular area with cervical ROM but at the last session she had no pain with this.

Overall, the patient responded well to all interventions, with the exception of the vertical and horizontal foam roll on her spine, which was discontinued on the 5th visit. Over time, she could tell she was gaining strength because she was able to perform the exercises more easily, with greater resistance, and maintaining proper form. She was able to tolerate more pressure and was less tender with soft tissue massage and trigger point release. Although this caused the patient discomfort while pressure was being given, she

reported it did help lessen her pain afterwards. The patient stated the stretches always felt great and she did them many times throughout the day.

The FOTO questionnaire was completed at the initial evaluation, a re-examination, and at discharge. The patient's score at intake was 50 and it was predicted her discharge score would increase by 8 points to 58 (a higher number means greater function). Her actual discharge score was a 69. At discharge she said she was not limited at all with activities including lifting, pulling, and carrying, able to accomplish more activities in less time, and stand for as long as she would like. Her physical fear at intake was 26 and at discharge it was 19 which means she was less fearful to do things that might increase her pain. The patient's initial CMS G-Code was CK – At least 40% but less than 60% (limited). At discharge and based off the FOTO questionnaire, her G-Code was CJ – At least 20% but less than 40% (limited).

FOTO also asks patient satisfaction questions at their last treatment. The patient stated she was very satisfied with the following:

- The information given to her about her condition.
- Her input in setting treatment goals.
- The availability of convenient appointments.
- The access to the facility location.
- The level of courtesy and respect shown to her by her treatment team.
- The treatments for her condition.
- The overall results of her treatment.

- She would tell a friend that she was very satisfied with her experience at the facility.

All of the therapy goals were met. She would walk 5 times per week with pain staying less than 4/10 and could garden for an hour with pain less than 4/10. The pain is no longer stopping her function, it's just uncomfortable. The patient was very enthusiastic about life and not having to deal with her pain levels like she previously had to.

The patient was encouraged to continue performing her home exercise program to manage her symptoms and possibly prevent another flare-up. She was independent on proper posture and body mechanics to keep her spine in proper alignment and not put unnecessary strain on her body. She had received neuroscience of pain education so she knew that by performing activities she was not going to cause any actual damage to the tissues.

CHAPTER 5

DISCUSSION, REFLECTIVE PRACTICE, AND CONCLUSION

Discussion

Like mentioned earlier, the patient was seen two more times after my clinical experience was done. I did receive the final treatment note, discharge summary, and final FOTO report. I was unable to receive the 7th treatment note.

The patient achieved positive results through participating in physical therapy. Initially, her pain was always around a 7/10 but by discharge she was able to garden and go on walks keeping the pain below a 4/10. The study done by Andersen et. al. found that a difference in pain intensity of 1.5-2 on a 10 point scale is clinically significant.⁵ This patient experienced a decrease in pain of at least 3 points (sometimes more) which, based off the study by Andersen et. al., would be clinically significant. The study by Bertozzi et. al. showed that therapeutic exercise had medium and significant short-term and intermediate-term effects on pain.⁶ Based on the information given by the patient and her being able to do more activities, she experienced significant short-term effects on her pain. An example of this was her stating she was “3000 times better” after a few physical therapy treatments.

The patient experienced similar results as patients in previous studies^{8-10, 19} when educated on the neuroscience of pain, which she was very intrigued by. After this education and exercise, her fear was reduced and she had a better attitude towards her pain. She was aware that movements were not going to cause actual tissue damage. Being educated on this is possibly a contributing factor to experiencing less pain.

The examination helped to identify areas of decreased range of motion and strength, tender areas, and trigger points. Based on patient statements during the examination, it was determined what her functional limitations were. Both of these guided treatment because it was known what the patient's overall deficits were. These all led to developing her goals for physical therapy.

Her mental health disorders had a big impact on her life and exacerbated her symptoms. At the initial examination, when her pain was the worst, she said she was feeling down and it was noticeable during that session. At discharge, when her pain had greatly improved, she stated she felt better overall and it was apparent she was happier and was enjoying life more. Based on this, there seemed to be a strong correlation between her mood/depression and her symptoms.

There were many things that went well during this course of treatment. The patient understood the exercises and was able to perform them properly, even if she needed a few reminders of proper form. She was very motivated and dedicated to performing her exercises and truly felt that they helped her and knew they were important to do if she wanted to continue to improve.

A limitation of this case report is that I did not see the patient start to finish due to my affiliation ending. I referred the patient to my clinical instructor, who continued to see the patient for her 7th and 8th PT session. I gathered the information from those visits through communicating with my clinical instructor. I do not have the full picture of how her treatment ended, including how she was feeling. Although I received the information, I did not see her body language to gather the non-verbal information. Due to this, I cannot make any assumptions on intermediate- and long-term effects of therapeutic exercise.

Reflective practice

Looking back on the examination, I would have asked more questions about all of the falls the patient had experienced. She stated that in the last 12 months she had fallen approximately 10 times. The patient said she occasionally got numbness going down her leg which she thought led to the falls. All of the medications she was taking may have also played a role. She was encouraged to talk to her physician about this. There was not a written order to work on the patient's balance so we did not do this but it may have been beneficial to talk to her physician and get an order. We could have done the Berg Balance Scale and other balance assessments to get a baseline idea of any particular areas of balance she had issues with and then at discharge to see any improvements. Balance exercises could have been incorporated into her home exercise program. Working on her balance could have prevented future falls. This would save future costs to both the patient and the healthcare field.

I also could have gathered more information about the patient's rheumatoid arthritis. With many of the exercises, she had to adjust how she held the theraband due to

her hands not being able to grip small things. Some days she would be stiff or sore due to her RA but she never had an exacerbation while she was in physical therapy.

Another tool I could have used is the McGill Pain Questionnaire. This includes a list of words and the patient chooses the best words to describe their pain in each category. The three major categories are words concerned with the sensory qualities of pain, affective qualities of pain, and the overall intensity of pain.²⁰ This does much more than just putting a number to the pain, it can help describe the pain in a little more depth. Due to this patient having mental health issues, this questionnaire could have helped give a subjective report of how her pain is causing her to feel.

Conclusion

This case reports explains the use of strengthening, stretching, joint mobilizations, soft tissue massage, trigger point release, and neuroscience of pain education with a patient that was experiencing neck, shoulder, and upper back pain. These interventions helped the patient increase her participation in daily activities and decrease the pain she had been experiencing for 8 months. The positive outcomes this patient experienced suggest that the interventions performed are valuable when treating patients with similar pain.

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