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Physical Therapy Management of Suboccipital Trigger Points and Upper Trapezius Tightness with Associated Migraines and Neck Pain.

Mary A. Haman

CASE REPORT: PHYSICAL THERAPY MANAGEMENT OF SUBOCCIPITAL TRIGGER POINTS AND UPPER TRAPEZIUS TIGHTNESS WITH ASSOCIATED MGRAINES AND NECK PAIN

by

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Signature Mary Poray, SPT

Date 10/13/20

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ABSTRACT

Introduction. Affecting roughly 1 out of every 6 Americans, migraines are the eighth-highest specific cause of disability worldwide. The purpose of this case study is to discuss and review the role of physical therapy treatment on migraine symptoms. In evaluating the case of a female with suboccipital trigger points and upper trapezius tightness with associated migraines, neck, and shoulder pain, it will be determined if physical therapy intervention can improve migraine symptoms along with improvement of cervical musculoskeletal impairment, and if so, what treatment methods are most effective.

Case Description. Patient is a 62 year old female who presents to physical therapy evaluation with a long standing history of migraines and a current flare up of left upper trapezius pain. Upon examination and evaluation, the patient is given the physical therapy diagnosis of suboccipital trigger points and upper trap tightness with associated migraines, neck, and shoulder pain.

Intervention. The patient was seen two days per week for four weeks. Sessions predominated in manual therapies with supplementary utilization of mechanical traction, cranio-cervical stretching, and postural strengthening.

Outcomes. Over the course of treatment, the patient noted improved migraine duration, cervical lateral flexion and rotation (bilaterally by 6-10 and 7-13 degrees, respectively), neck pain, and trigger point quantity and severity.

Discussion. In evaluating the case of a female with suboccipital trigger points and upper trapezius tightness with associated migraines, neck, and shoulder pain, it was determined that physical therapy intervention can moderately improve migraine symptoms along with the improvement of cervical musculoskeletal impairment, and that manual therapies, stretching, and postural training proved to be effective. Case findings congruent with current migraine related literature included reduction in migraine duration with physical therapy interventions and efficacy of manual therapy interventions. Further quality evidence is broadly needed within the topic of physical therapy prognosis, outcome assessment, and treatment of migraine diagnoses.

CHAPTER I

INTRODUCTION

According to the International Classification of Headaches, 3rd edition, beta version (ICHD -β) a migraine is an intense headache of pulsating, unilateral quality, often associated with nausea, photophobia, or phonophobia.[1] Migraines are reported to be a common disabling headache disorder. Affecting roughly 1 out of every 6 Americans, migraines are the eighth-highest specific cause of disability worldwide, as reported by the *Global Burden of Disease Survey 2010.*[2,3] A web-based survey taken in 2016 found the annual direct and indirect cost to total an average of $8,243 for individuals with chronic migraines.[4] Approximately 83% of these individuals reported some sort of migraine-related medication use, a higher percentage than any other reported treatment option. This high prevalence of migraine diagnosis and debilitation produces an increased need to explore further migraine management beyond pharmacological reliance. This case presents an opportunity to explore physical therapy as a more sustainable treatment option for an individual with chronic migraine, currently receiving primarily pharmacological treatment.

Current literature continues to support that altered synaptic transmission, vasodilation of pial arteries, and neuronal sensitization via the trigeminovascular system is the most commonly accepted cause of migraines.[5,6,7] Before further explanation of this pathology, a review of anatomy may be helpful. Trigeminovascular system (TVS) is a term used to encompass the neurochemical response of the trigeminal pathway on pial arteries.[5] These pial arteries are the arteries that supply your pia matter (the innermost layer surrounding and cushioning the brain

and spinal cord).[8] Remember the Trigeminal Nerve (CN V) conveys all pain, temperature, and touch sensation to the face and innervates muscles of mastication.[9] However, a less commonly recognized function of CN V includes meningeal sensory afference.[6] Additionally, secondary trigeminal branches project widely to somatosensory, auditory, insular, visual, and olfactory cortices.

Now that the anatomy has been reviewed, migraine pathology can be discussed in further depth. The headache phase of the migraine is thought to originate in activation of nociceptors that innervate pial and dural blood vessels. This initial activation of the meningeal pain receptors is attributed to cortical spreading depression (CSD). CSD is an altered synaptic transmission characterized by slow propagation followed by short period of cortical activity inhibition, which can present as the perceptual deficits associated with the aura of a migraine. To reflect the scope of this specific case, the continuing focus will be on the pathology of migraine without an aura. Although previous literature more often suggests that CSD does not occur in migraine without aura, some newer research disagrees, suggesting that all migraine types begin with CSD.[1] CSD has been shown to involve the local release of calcitonin gene related peptide, a very potent vasodilator, and other substances that diffuse towards the cortex surface and activate the pial nociceptors, starting the vasodilation/inflammatory response. As the sensory afferents enter the Trigeminal nucleus in the spinal cord, additional trigeminal afferents from skin and muscles are also converging before widely projecting through the cortices. This is demonstrated in figure 1 and is likely the causation of the broad spectrum of sensory symptoms associated with migraine. This implication is necessary to understand, as the case at hand, experiences migraine onset as a result of certain scents and tastes.

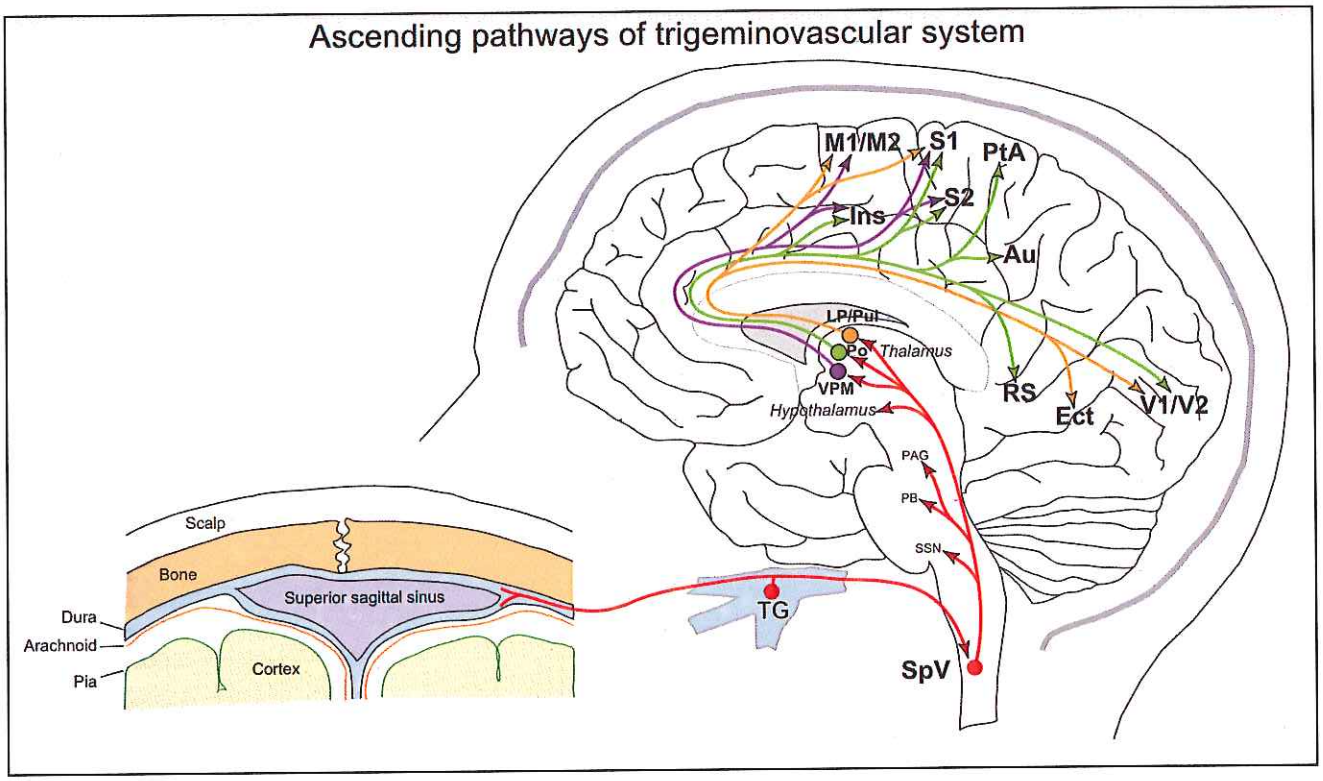

Fig. 1: Ascending Pathways of Trigeminovascular System Copied from: Migraine pathophysiology: Anatomy of the trigeminovascular pathway and associated neurological symptoms, cortical spreading depression, sensitization, and modulation of pain

The large number of inflammatory mediators released during a migraine are then capable of peripheral and central sensitization of the trigeminal nerve. Peripheral sensitization occurs when repeated stimulation of a peripheral nerve elicits a progressive increase in action potential firing during the course of the stimulation period.[9] The repetitive stimulation causes a progressive increase in activation of second order pain fibers and results in amplification of pain response. Central Sensitization is an increase in neuronal responsiveness caused by prolonged or strong activation of dorsal horn neurons from repeated or sustained noxious stimulation (e.g. inflammation). This decrease in the threshold for pain receptors, along with enlarging the neuron's receptive field, results in an increased sensitivity to pain after the stimulus is removed.[5]

The more these pathologies are studied and established, it seems that caution should be taken before assuming that physical therapy treatments will improve migraine symptoms. With

symptom cause of abnormal synaptic transmission, can physical therapy neuromuscular and musculoskeletal therapies directly apply to migraine pathologies? Across systematic reviews involving non-pharmacological migraine treatments, the results vary. Across multiple reviews, promising evidence is reported for mindfulness, meditation, yoga, tai chi, physical therapy, acupuncture, trapezius message, and migraine-behavioral management.[10,11] Yet between the systematic reviews there is contradicting evidence, as spinal manipulative therapies, exercise, and other physical therapy interventions are also argued to have weaker levels of evidence. With more extensive migraine treatment study searches, a vast majority of the compiled research evaluations result in either pharmacological therapies or other types of headaches. Furthermore, amongst individual physical therapy studies, the quality of evidence seems to be poor, and many study designs include the participants of additional headache types (i.e. cervicogenic and tension type headaches which seem to have more promising responses to non-pharmacological treatment). Therefore, the purpose of this case study is to discuss and review the role of physical therapy treatment on migraine symptoms. In evaluating the case of a female with suboccipital trigger points and upper trapezius tightness with associated migraines, neck, and shoulder pain, it will be determined if physical therapy intervention can improve migraine symptoms along with improvement of cervical musculoskeletal impairment, and if so, what treatment methods are most effective.

CHAPTER II

CASE DESCRIPTION

The patient was a 62 year old female who presented to physical therapy evaluation with a long standing history of migraines and a current flare up of left (L) upper trapezius pain. She reported this pain had been present for approximately 2 months with no injury to report, but she had been balancing a very heavy schedule with work, family illness, and moving houses. Pain was reported as aching in L upper trap and would shoot into her shoulder and up her neck with unspecified movements. When she had migraines, she reported her pain as 10/10 unilateral, pulsating (usually on the L), and they were often set off by strong scents and sugar intake. With medication/injections and heat she could get her pain down to a 2/10.

The ICHD 3-β is the current widely accepted diagnostic system used in research and recommended in practice guidelines for headaches.[1] Based on the patient's description, her symptoms met the ICHD 3-β diagnosis of "Migraine without Aura", and her chart reported this diagnosis and treatment for the past 20 years. The ICHD 3-β diagnostic criteria for Migraine without Aura, is listed in figure 2 on the following page. The patient's chart also included past medical history of chronic allergic rhinitis, depression, dyslipidemia, and renal insufficiency. All of these were reported to be medically managed and followed by respective specialists.

The patient had been seeing the neurologist for botox injections every 2-3 months and had begun Emgality shots at home over the last few months, which, per the patient's report, helped when she had intense migraine symptoms. Emgality is a self-delivered injection prescribed for once-monthly use to reduce migraine frequency. With her migraine management

improving, she had begun to notice underlying neck and shoulder pain. She called her primary care physician for a referral to physical therapy and was given the medical diagnosis of neck pain.

Diagnostic criteria:

A. At least five attacks[1] fulfilling criteria B–D
B. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)[2,3]
C. Headache has at least two of the following four characteristics:
   1. unilateral location
   2. pulsating quality
   3. moderate or severe pain intensity
   4. aggravation by or causing avoidance of routine physical activity (e.g. walking or climbing stairs)
D. During headache at least one of the following:
   1. nausea and/or vomiting
   2. photophobia and phonophobia
E. Not better accounted for by another ICHD-3 diagnosis.

Fig 2: Migraine without Aura Diagnostic Criteria.
Printed From: The International Classification of Headache Disorders, 3rd edition beta version

Additionally, the patient was working two full time jobs as an in-home care provider for clients with disabilities. She reported being able to still attend work because her clients required less physically demanding work, but migraine symptoms made it extremely hard to focus on her duties. Her husband was also undergoing medical management for continued unknown health complications. They were currently in the process of downsizing their home and moving. Her personal goals were to return to gardening in the spring, be able to walk more, and feel less reliant on medication for migraine management, if possible. In past summers she had been unable to maintain her garden as she would have liked because when she looked down for long periods of time her neck tightened up and often led to migraine symptoms. She currently hadn't been able to walk leisurely as a result of busy scheduling, fatigue, and pain.

The following evaluation was based off of Dutton's Orthopedic Examination, Evaluation, and Intervention, 5e.[12] The patient was observed to sit with rounded shoulders and had a mild increased kyphotic curve. All cervical active range of motion (AROM) measures were limited and painful. The documented measures were taken via goniometer with the patient in sitting, feet supported on floor, and no back rest. See Table 1 for the initial evaluation AROM measures.

Table 1: Initial Evaluation Cervical AROM

Measurements listed in degrees		
Flexion	50	
Extension	40	
Side Bending	22 R	24 L
Rotation	52 R	53 L

Shoulder strength was within normal limits (WNL) and equal bilaterally, grossly assessed with resisted isometrics into flexion, abduction, internal and external rotation, and patient positioned the same as explained for goniometry. Pain was noted in her L upper trap for all shoulder strength testing. All L side special tests were also noted to be painful in the L upper trap but bilaterally presented as follows in Table 2.

Table 2: Initial Evaluation Special Tests

Vertebral Artery Test (Cervical Quadrant Test)	Negative, no associated symptoms
Spurling's	Negative, no pain or nerve symptoms elicited down arm
Cervical Flexion Rotation Test	Negative, greater than 45 degrees and equal bilaterally
O'Brien's	Negative, no pain or clicking in glenohumeral joint
Hawkin's-Kennedy	Negative, no pain in subacromial space
Bear Hug	Negative, strong

Vertebral artery assessment is important in assuring the integrity of the artery before it is put in compromised positions for cervical assessment. Although systematic review shows only 0-9% specificity with a general lack of consistency and quality across studies,[13] the VAT is still generally used in physical therapy practice to demonstrate precaution taken of vertebral artery compromise. Spurling's and Cervical Flexion Rotation Tests (CFRT) were used to rule out cervical radiculopathy as the cause of trapezius pain and cervicogenic headache, respectively. Recent consolidated research finds CRFT to be highly sensitive and specific for cervicogenic headache with an average positive test of 33 degrees.[14] Additionally, Dutton's Orthopedic Examination reports that CRFT is studied to be 86% sensitive and 100% specific.[12] O'Brien's and Hawkin's-Kennedy were administered to rule out shoulder joint pathology such as labral tear and impingement. Bear hug (19% sensitive and 99% specific for subscapularis tears) along with resisted isometrics of the shoulder, were utilized to rule out rotator cuff tear or pathology.

Bilateral upper trapezius, levator scapulae, cervical paraspinals, and suboccipital muscles were tender to palpation with the L reported to be more tender than the R. Tightness and trigger points were also noted throughout this musculature on the L greater than the R. Tenderness and hypomobility were associated with central, posterior-anterior joint play to all cervical vertebrae.

The patient denied any numbness or tingling through her upper extremities. She also presented with near normal mobility through gait, transfers, and bed mobility. The mild limitation noted was only that she pushed up from the chair with bilateral upper extremities and increased trunk flexion to rise from sitting at standard height. She also performed bed mobility and ambulation at a slower pace with hesitancy to head movement.

Upon evaluation, the patient was determined to be appropriate for therapy and given the physical therapy diagnosis of suboccipital trigger points and upper trap tightness with associated

migraines, neck, and shoulder pain. Based on special tests and strength assessments the upper trapezius pain and tightness did not appear to be a result of glenohumeral pathology. Additionally, the denial of numbness or tingling and negative Spurling's test ruled out that the shoulder pain was resultant of nerve root pathology. Because the patient at hand had cervical spine musculoskeletal dysfunction and headache symptoms, it was determined with a negative CFRT that the patient's symptoms were likely not resultant of cervicogenic headache. The patient was assessed to have trigger points and tightness through cervical and scapular musculature, resulting in limited cervical ROM, producing pain, and possibly contributing to migraine symptoms.

Although the efficacy of migraine treatment with physical therapy was unknown to the therapist at the time of evaluation, the presence of physical impairments and pain, treatable by therapeutic interventions, negative VAT findings, and physician referral to therapy, indicated that the patient was appropriate for therapy. Due to continuing lack of available, quality evidence for the use of physical therapy treatment of migraine, terms of specific time, dosing, and ability to achieve outcomes was primarily based on student of physical therapy education and previous experience in patients with cervical musculoskeletal impairment.[17] The patient was presented with a plan of care to be seen 2 times a week for 8 weeks to address limited cervical ROM, pain, and trigger points. Furthermore, it was to be determined to what degree cervical limitations were contributing to patient's migraine symptoms, once trigger points and muscle tightness were fully eliminated.

CHAPTER III

INTERVENTIONS

The patient was observed and treated by the student physical therapist (SPT) 2 times a week for 4 weeks, and the SPT was unable to remain with the patient until discharge status due to completion of the clinical rotation. In the first week, the patient was set up with a home exercise program (HEP) to be performed once or twice a day consisting of supine cervical retractions, scapular squeezes, and upper trapezius and levator scapulae stretches with self over pressure. These exercises were chosen to address postural impairments and promote normal alignment of the thoracic and cranio-cervical regions. A detailed explanation of therapeutic exercise interventions included in this chapter, not thoroughly described within the text, are listed in Appendix 1. Therapy sessions consisted of manual cervical distraction to patient's tolerance, cervical central and transverse posterior-anterior (PA) mobilization grade II-III, suboccipital release, and soft tissue mobilization (STM) to bilateral cervical paraspinals and upper trapezius.

Systematic review and meta-analysis reports that manual therapy should be considered as an effective approach in treatment of tension-type and migraine headache.[15] Although the review reports limited availability of current literature pertaining to migraine headache alone, the migraine-specific randomized controlled trials within the meta-analysis found the most promising evidence for the manual therapies of cervical mobilization, myofascial release, and ligamentous release.[16] This information and the lack there of further evidence was incorporated in selecting the listed manual therapies above. In addition, passive (therapist assisted) levator scapulae stretching was performed, as was upper trapezius stretching with resisted active

contraction into shoulder elevation followed by relaxation and therapist assisted ROM increase into shoulder depression. This contract-relax cycle utilizes proprioceptive neuromuscular facilitation technique which literature clearly supports as an effective means to increase ROM via stretching.[17]

In week 2, treatment consisted of continuation of previous therapies with progression to grade IV mobilizations of cervical central and transverse PA glides and addition of trigger point release to rhomboid muscles as well. Postural exercises were increased, laying supine on a towel roll along the spine with associated arm movements that promote scapular retraction, such as bilateral D2 flexion and shoulder horizontal abduction with external rotation. The patient was also placed with her back against the wall to promote good posture while performing a wall angel as described in the appendix and latissimus dorsi stretch with elbows bent, forearms pressed together, and moving through shoulder flexion ROM. The HEP was progressed from supine cervical retraction to a seated position. While there is more available evidence for balance training for patients with migraine, there is little literature on postural alignment exercise for migraine treatment. Therefore, the selection and continued progression of postural exercise was based on the patient's postural impairments, response to treatment, and previous clinical experience with cervical impairments.

For the duration of week 3, the patient had a lasting migraine through the whole week, but she said the intense headache phase was shorter than usual and verbalized that she would like to continue treatments. Therapy was still progressed with previous manual therapies and the addition of banded bilateral shoulder horizontal abduction, banded bilateral shoulder external rotation, and banded rows. Corner pectoralis stretching was also added. The patient tolerated the week of therapy well despite being in a post-migraine state. She noted that she would leave the

therapy sessions 1-2 levels of pain higher than when she came, but she felt as though the sessions had a positive affect over the duration of the days to follow.

Week 4 therapy marked the addition of mechanical cervical traction at a static pull of 15 lbs for 8-10 minutes with 1 minute ramp up/down and 15 degrees of neck flexion. No literature was found for migraine treatment with mechanical traction. Utilization of this treatment was based on the patient's response to manual cervical distraction and environmental factors. The patient owned a cervical traction unit at home, so exploring her migraine response to treatment in the clinic presented an opportunity for beneficial home treatment. Scapular mobilization in side lying was also added into therapy to patient's tolerance in scapular depression, retraction, and protraction. Full sessions this week were based in only manual therapies and mechanical traction while the patient continued postural exercises in her HEP.

In the last recorded session, exactly 4 weeks from initial evaluation, traction was increased to 20 lbs for 15 minutes, and patient was set up to begin traction at home with these parameters as well. This session consisted of a continuation of previous treatments performed in the clinic and client's postural based HEP. Unfortunately the SPT was unable to follow progress after this point due to the ending of the 9 week clinical rotation. It was planned for the patient to continue therapies with adjustments as seen fit by the supervising clinical instructor.

In summary of interventions administered over the course of this report, there were 9 total sessions. After the initial eval, the average session was 45 minutes, consisting of 2 manual therapy units and either 1 therapeutic exercise or 1 manual traction unit. Of the total 28 units over the course of the report, approximately 60% of the charges were utilized for manual therapies.

Available interventions that were considered, but not utilized throughout the course of treatment include dry needling and grade V manipulations. This decision was attributed to lack of available research, but they are options of treatment that could have been explored if existing strategies were unsuccessful. After more extensive literature searches, a number of recommended interventions were also available that were not utilized. Systematic review and meta-analysis for the use of physical therapy in the treatment of migraines, found the most promising evidence to be the use of aerobic exercise for migraine treatment.[18] Furthermore, systematic review and meta-analysis evaluating the effect of aerobic exercise on migraine symptoms found moderate evidence for the use of aerobic exercise and recommended following American College of Sports Medicine guidelines for moderate intensity aerobic exercise.[19] Additionally, beyond trigger point release, broader exploration of myofascial release techniques could have been beneficial, as the previous systematic review did not specify myofascial techniques utilized.[15] Some interesting techniques needing further areas of up to date research include palate and external acoustic meatus techniques that propose to relive pressure off the trigeminal nerve.[20]

CHAPTER 4

OUTCOMES

Upon initial contact, the patient's biggest complaints were L upper trapezius pain and a long-standing history of migraines. Examination findings demonstrated substantial limitation in cervical range of motion with the greatest deficits in side-bending and rotation. Also noted, were posterior cervical and scapular muscle tenderness with trigger points throughout. Following initial evaluation, patient goals were written with the main objectives to reduce trigger points, reduce migraine frequency, and increase cervical range of motion. Specific goal documentation from the initial evaluation can be referenced in Appendix 2.

After the first week of therapy, the patient was already noticing mild reductions in pain and decreased duration ("to a few hours") of some migraines that usually last for days. Reporting to her third session she was excited to report to her therapist that a strong scent had set off an intense migraine over the weekend. She noted that it felt like a migraine that usually lasts for weeks, but it dissipated within hours which had never happened before. The therapist could tell this marked an increase in patient trust, curiosity of pathology, and enthusiasm to try new therapies. Her neck pain and trapezius tightness had switched sides with migraine symptoms to the R, and she explained that happened from time to time when her migraines would switch sides, though they were predominantly on the L. Into week 2, the patient was tolerating therapy well and demonstrating good control and range of motion with cervical and scapular retractions. Her muscle tightness and trigger points were still moderate and persistent, but she continued to note improvements in pain to 3/10.

For the duration of week 3, the patient had a lasting migraine through the whole week, but she said the phase of intense pain was shorter than usual, reduced from 3-4 days to 1-2. Pain remained around a 4/10 for a majority of the week, but trigger points and muscle tightness were noted to be less persistent and diminished throughout the sessions. The patient reported that their new house was now nearing completion to move in, and with downsizing, it was promising for her to be able to cut down to one full time job.

For week 4, the final full week of therapy, she still presented with trigger points at the beginning of each session, but they continued to be less persistent and produce less intense pain with pressure. Her pain was reported at a 2/10 at the end of the week. Based on patient report, it seemed her cervical musculoskeletal state was more stable, independent of migraine flair ups. In return, migraine duration was consistently reduced as musculoskeletal symptoms did not increase headache irritation. The patient no longer reported increased migraine symptoms with activities such as grocery shopping and reading.

In week 5, the patient attended one session prior to therapist departure. The patient said she had constant lingering headaches still, but the duration of intense pain was consistently much reduced, and intensity was also improved. Her posture remained the same in natural sitting/standing but not permanently deformed as she was able to correct with muscle activation. Her muscle tension and trigger point goals were almost met and cervical AROM was improved. Table 4 displays the progress note AROM measurements, performed by the same therapist and with the same technique as the initial examination.

Table 4: Progress Note Cervical AROM

Measurements in Degrees		
Side Bending	32 R	30 L
Rotation	65 R	60 L

Over the course of treatment, the patient noted improved migraine duration, cervical lateral flexion and rotation (bilaterally by 6-10 and 7-13 degrees, respectively), neck pain, and trigger point quantity and severity. Functionally she reported less fatigue and inability to focus at work, as well as the ability to look up and down from reading a book and turn head while driving without sharp pain. The progress note goal achievements are listed in Appendix 2.

CHAPTER V

DISCUSSION

The purpose of this case study was to discuss and review the role of physical therapy treatment on migraine symptoms. In evaluating the case of a female with suboccipital trigger points and upper trapezius tightness with associated migraines, neck, and shoulder pain, it was determined that physical therapy intervention moderately improved migraine symptoms for the patient along with the improvement of cervical musculoskeletal impairment, and that manual therapies, stretching, and postural training proved to be effective. The patient was seen two days per week for four weeks. Sessions predominated in manual therapies with supplementary utilization of mechanical traction, cranio-cervical stretching, and postural strengthening. Over the course of treatment, the patient noted decreased migraine duration, improved cervical lateral flexion and rotation (bilaterally by 6-10 and 7-13 degrees, respectively), decreased neck pain, and decreased trigger point quantity and severity. Functionally she reported less fatigue and inability to focus at work, as well as the ability to look up and down from reading a book and turn head while driving without sharp pain. Although the duration of intense migraine symptoms reduced from 3-4 days to less than 24 hours, the frequency of migraines was reported to maintain the same. It is hypothesized that this is because migraines are resultant of sensitization to neural input, such as scent and taste in this patient's case. Therefore, since physical therapy did not address the desensitization of these systems, the migraines continued to occur at the same frequency. However, it seems decreased cervical muscle tightness and trigger points created more musculoskeletal stability, independent of migraine flair ups. In return, migraine duration

was consistently reduced as musculoskeletal symptoms did not increase and aggravate headache symptoms. It is hypothesized that this is because the trigeminal nerve, where sensory convergence occurs, is located in the same area of the upper cervical spinal cord where cervical muscle afferents enter the spinal tract.[21] It is shown that noxious stimulation of muscle afferents also increases spinal cord neuron excitability. Consequently, tight, painful neck muscles innervated by upper cervical nerve roots, may contribute to trigeminovascular inflammatory cascade activation.

These findings were congruent with current literature that the patient reported reduction in migraine duration with physical therapy.[18] In conjunction with this, it may be beneficial to write therapy goals and track progress based on migraine duration rather than frequency, as seen in this case. Another congruence with current literature was the efficacy of manual therapy treatments.[15] The patient at hand responded well to a broad range of techniques and heavy dosing of manual therapies, reporting consistent pain reduction through the plan of care. However, further evidence is still needed on type, intensity, and dosing of manual treatments.

Further literature-based recommendations that were not utilized in this case are as follows. Research strongly suggests the use of a quality of life functional assessment in outcome measurement of migraine symptoms.[22] However, this research also suggests a lack of clarity in measurement properties of headache-specific quality of life measures. The strongest evidence exists for the HIT-6 (Headache Impact Test) and MSQv2.1 (Migraine Specific Quality of Life), yet there is no standardized/normative data nor consistent report of validity for these measures.[22,23,24] While specific questions from these measures could still be utilized in writing headache-related goals, it may be more beneficial to utilize a well-studied, generalized quality of life measure, such as the Short Form- 36, to better track progress and compare to normative

data.[25] Current literature also suggests the use of aerobic exercise in migraine treatment.[18] This is contrary to expected implication, as it is specifically listed in the diagnostic criteria that migraines are often aggravated by routine physical activity. This can be noted in item four of figure 3, referenced earlier in chapter 2. Therefore, aerobic conditioning was not aware to be a proposed, effective treatment at the time of this case.

Nonetheless, it is found that some of the most evidence exists for the use of aerobic training in the physical therapy treatment of migraines.[18,19] Dosing is not yet established, so it is recommended to utilize American College of Sports Medicine aerobic guidelines for moderate intensity exercise.[19] Beyond these findings it is unrealistic to make further recommendations for physical therapy diagnosis, prognosis, intervention, and dosing as there is a lack in availability, quality, and consistency in current research.

In brief, upon reflective practice and literature review, the following implications were reached. Additional questioning on migraine specifics should have been included in collecting history information. More precise report of migraine duration, frequency, and intensity at therapy start and completion is vital in determining treatment efficacy. Further understanding of previously utilized or attempted lifestyle modification was also indicated as lifestyle modification, in areas such as diet and activity, can be a very impactful source of education for patients with migraine. Incorporation of a migraine diary is suggested to track these symptoms and lifestyle behaviors throughout the plan of care. Additional examinations that should have been used include quality of life outcome measurement, either headache/migraine specific or generalized, emphasis on migraine duration in goal creation and symptom assessment, specific numeric quantity and location of trigger points, and measurement of all cervical ROM at progress note in correspondence to initial eval measures. Specific plan of care modification

should have integrated aerobic training. No additional referrals were identified for this patient as her interdisciplinary team was already quite extensive.

It is determined that areas to seek further evidence for this case include type, intensity, and duration of manual therapies and aerobic treatment. Incorporated treatments without available research evidence included cervical mechanical traction and postural exercise. Additional considered, but not used, treatments without available evidence for migraine treatment included dry needling, electrical stimulation, and spinal manipulation. Further evidence is also needed for migraine specific quality of life measure standardized/normative data, as well as all migraine prognostic data. Any of these topics would be good implications for future research.

It should be noted that there were various limitations within this case. The biggest limitation was the inability to follow this patient to discharge. Upon case-completion, the patient had demonstrated moderate improvement in status, but musculoskeletal pathologies were not fully resolved, and it cannot be assumed that migraine status would continue to improve with full resolution of these impairments. Moreover, a second limitation exists due to the presence of cranio-cervical impairments. Because of these impairments, it cannot be directly implied that the listed interventions would improve the status of a patient with only a migraine diagnosis. It can only be implicated the degree to which the cranio-cervical impairments were aggravating or contributing to the migraine symptoms. The quality of the case would also have been greatly improved with the use of a migraine diary to report daily symptoms and medication use. Measurement of migraine status was very subjective, relying on patient report, open to subject bias and placebo effects. Improved tracking of migraine symptoms and management is suggested. The patient was on a relatively new medication, Emgality. Although she reported its

use only as a reactive therapy to migraines lasting over 3-4 days (a one-time occurrence during the first half of the plan of care), it is difficult to fully separate the effects of physical therapy and this new medication without detailed migraine diary documentation.

In summary, the purpose of this case study was to discuss and review the role of physical therapy treatment on migraine symptoms. In evaluating the case of a female with suboccipital trigger points and upper trapezius tightness with associated migraines, neck, and shoulder pain, it was determined that physical therapy intervention moderately improved migraine symptoms for the patient along with improvement of cervical musculoskeletal impairment, and that manual therapies, stretching, and postural training proved to be effective.

Reflective Practice

In patient care, I truly believe it is vital to be able to constructively reflect upon treatment practices, to generate continual learning, stimulate improvement, and deliver every patient the highest quality of care. In developing this case, I was able to more thoroughly examine each component of care and available research than is usually achievable for each individual patient in a routine schedule. This allowed for areas of learning that can by applied for my future patient practices. Opportunities for improvement were discovered in the following areas.

Starting with the history interviewing, it would have been beneficial to have additional questioning on migraine specifics. More precise report of migraine duration, frequency, and intensity at therapy start through completion is vital in determining treatment efficacy. Further understanding of previously utilized or attempted lifestyle modification also would have been valuable to incorporate into the history as lifestyle modification, in areas such as diet and activity, can be a very impactful source of education for patients with migraine. I could have better implemented this with the incorporation of a migraine diary to track these symptoms and lifestyle behaviors throughout the plan of care.

After further research, additional examination and assessment that I would have utilized include a quality of life outcome measurement, emphasis on migraine duration in goal creation and symptom assessment, specific numeric quantity and location of trigger points, and measurement of all cervical ROM at progress note in correspondence to initial eval measures. Based on research it would have been acceptable to select either a general quality of life measure with normative data or a migraine specific questionnaire. Personally, I would have liked to select

a migraine specific outcome measure to facilitate more specific goal writing and assessment. Overall, upon reflection, though all selected procedures were determined to be acceptable and appropriate, I think this was my weakest area of patient care for this case. My measurement of migraine status was very subjective, relying on patient report, open to subject bias and placebo effects. More specific and detailed assessment, both initially and throughout the plan of care, would have allowed better identification of progress to determine what treatment strategies were most beneficial.

Specific plan of care modification I would recommend is the addition of aerobic training, because the highest quality of existing evidence for conservative treatment of migraines indicates such. Additionally, it would have specifically worked towards the patient's goal to be able to return to a more physically active lifestyle. I would have incorporated this with gradual implementation of a walking program in addition to her HEP. Then reflectively, more detailed assessment would have refined treatment prioritization and dosing, as it was able to better determine sources of improvement. However, I do not have any additional recommendations for referrals with this patient as her interdisciplinary team was already quite extensive.

Conclusively, upon completing this case report, I determined that there is a substantial gap in quality evidence for conservative management of migraines. Identified areas that I would like to see further evidence to specifically further the development of this case include type, intensity, and duration of manual therapies and aerobic treatment. Further evidence is also needed for migraine specific quality of life measure standardized/normative data, as well as all migraine prognostic data. Additional treatments that I utilized without available research evidence for migraine intervention included cervical mechanical traction and postural exercise. Some further treatment options I did not utilize in this case that still require further investigation

include dry needling, electrical stimulation, and spinal manipulation. Any of these topics would be good implications for future research.

Largely, I thought that in depth evaluation of my patient management for this case was a valuable process. The knowledge I acquired will undoubtably carry over, not only for the treatment of my future patients with migraines, but also for all of my future patients. The most generalized opportunity for improvement discovered was more thorough examination and assessment to better monitor progress.

Appendix 1: Therapeutic Exercises

Supine Cervical retractions	Lying in supine, patient performs cervical retraction, tucking chin to chest and keeping gaze straight forward (not nodding), holding for 1 second and returning to start position. Exercise progresses to self over pressure with hand at chin, then to sitting and self over pressure.
Scapular squeezes	In tall sitting, patient performs scapular adduction and depression holding for 3 seconds before relaxing and repeating.
Upper Trapezius stretch	In tall standing or sitting, patient performs lateral cervical flexion (bringing ear closer to shoulder) and providing self over pressure as tolerated with ipsilateral hand. Patient holds stretch for 20-30 sides on both sides.
Levator scapulae stretch	In tall standing or sitting patient flexes and rotates cervical spine (looking at her armpit) and provides self over pressure as tolerated with ipsilateral hand. Patient holds stretch for 20-30 sides on both sides.
Wall angel	With feet approximately 1 foot from the wall, knees slightly bent, and back to wall, patient performs posterior pelvic tilt, and cervical retraction to maintain contact with the wall from sacrum to head for the duration of the exercise. Maintaining this posture, patient places the dorsum of her hands on the wall at her side and moves arms through abduction/adduction ROM maintaining contact with the wall.
Lattisimus Dorsi Stretch	With feet approximately 1 foot from the wall, knees slightly bent, and back to wall, patient performs posterior pelvic tilt, and cervical retraction to maintain contact with the wall from sacrum to head for the duration of the exercise. Maintaining this posture, patient presses elbows and forearms together in front of them (hands in a prayer position) at 90 degrees of shoulder flexion with elbows bent and moves through shoulder flexion/extension until finger tips touch the wall over head and return to start position.
Banded bilateral shoulder horizontal abduction	Standing with good posture, patient holds an end of long resistance band in each hand. With arms out straight in front of her she moves her hands through horizontal abduction and returns to start position in a slow controlled motion.
Banded bilateral shoulder external rotation	Standing with good posture, patient holds an end of long resistance band in each hand. With elbows at side and bent to 90 degrees and palms up, patient externally rotates at the shoulder so that hands move away from each other against the resistance band and then slowly returns to start position.
Banded rows	With a resistance band anchored in the middle and the patient holding each end with arms straight out in front, she pulls her elbows back to her side against the resistance band and squeezes her shoulder blades together and slowly returns to starting position.
Corner pectoralis stretch	Standing in a split stance facing a corner of the room, the patient places a forearm flat on each wall. She then shifts her weight forward squeezing her shoulder blades together and feeling a stretch through her anterior chest and shoulder. Patient actively shifts forward and back for a dynamic stretch.

Appendix 2: Patient Goals

Initial Evaluation Goals

Short term goals to be completed in 3 weeks are: Following PT interventions patient will:

1. Be independent in HEP to decrease duration of POC and maintain improvements made through therapy.
2. Demonstrate improved postural awareness and will be able to sit/stand with reduced rounded shoulders in order to decrease further irritation of neck and shoulders.
3. Present with minimal to no upper trapezius and suboccipital trigger points to reduce frequency of migraines.

Long term goals to be completed in 6 weeks are: Following PT interventions patient will:

1. Report reduced frequency of migraines to less than or equal to 1 occurring every 3 weeks.
2. Demonstrate improved AROM of cervical side bending and rotation by 10 degrees bilaterally to reduce compensation patterns while performing ADLs.
3. Be able to tolerate walking for 10 minutes without an increase in symptoms to be able to enjoy a more active lifestyle.

Progress Note Goals

MET:

1. Be independent in HEP to decrease duration of POC and maintain improvements made through therapy.
2. Be able to tolerate walking for 10 minutes without an increase in symptoms to be able to enjoy a more active lifestyle.

ALMOST MET:

1. Demonstrate improved AROM of cervical side bending and rotation by 10 degrees bilaterally to reduce compensation patterns while performing ADLs.
2. Present with minimal to no upper trapezius and suboccipital trigger points to reduce frequency of migraines.

NOT MET:

1. Demonstrate improved postural awareness and will be able to sit/stand with reduced rounded shoulders in order to decrease further irritation of neck and shoulders.
2. Report reduced frequency of migraines to less than or equal to 1 occurring every 3 weeks.

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