Physical Therapy as a first step intervention for migraine headaches

High Point University
Department of Physical Therapy

Presented by: Garrett Naze, PT, DPT, OCS, CCTT, NBC-HWC, FAAOMPT
Stephen M. Shaffer, PT, ScD, FAAOMPT

Instructor Biography

Garrett Naze, PT, DPT, OCS, CCTT, NBC-HWC, FAAOMPT

Dr. Garrett Naze is an Assistant Clinical Professor in the Department of Physical Therapy at High Point University. Having earned a Doctor of Physical Therapy from Marquette University, Dr. Naze went on to complete an orthopedic physical therapy residency program with UW-Health/Merriter Hospitals and the orthopedic manual physical therapy fellowship program at the University of Illinois at Chicago. Dr. Naze has unique training, having served as the physical therapist in the interdisciplinary Orofacial Pain Clinic at the University of Kentucky, working with dentistry and clinical psychology to manage patients with complex, chronic pain conditions. He is also a Certified Cervical and Temporomandibular Therapist (CCTT) with the Physical Therapy Board of Craniofacial and Cervical Therapeutics (PTBCCT) as well as a National Board Certified Health and Wellness Coach (NBC-HWC).
Instructor Biography

Stephen M. Shaffer, PT, ScD, FAAOMPT, FCAMPT

Dr. Stephen M. Shaffer is a full-time clinician and has managed patients with jaw, headache, and cervical spine disorders for 16 years. He completed residency and fellowship training in orthopedics at the Institute of Orthopaedic Manual Therapy in Woburn, Massachusetts and the University of Illinois at Chicago, respectively. Additionally, he completed academic doctoral training in orthopedics at Texas Tech University Health Sciences Center in Lubbock, Texas. Dr. Shaffer and his colleagues have authored multiple peer-reviewed papers and have presented at graduate programs as well as at local, state, national, and international venues. He currently works in Ontario, Canada and continues to participate in both clinical and academic research.

Outline

- The Take Home Message
- Prevalence and Impact
- What is a Migraine?
- Diagnostic Accuracy and Medical Management
- Migraine Theory
- The Trigeminocervical Complex & Neurological Sensitization
- TMD, the Cervical Spine, and Headaches
- Select OMPT Management
- Select Psychosocial Management
- Management Research Timeline
- Two Case Example Summary
The Take Home Message

Physical therapists can successfully manage migraine headaches in many but not all patients.

Knowledge and skills needed
- Background evidence
- Orthopedic manual therapy
- Biopsychosocial model
- Pain science
- Clinical reasoning
- Behavior change

Prevalence and Impact ✴✴✴
Migraine Prevalence & Impact

Global Burden of Disease Study 2010:
(Martelletti et al 2013)

- 3rd most prevalent disorder
- 7th highest cause of disability

Global Burden of Disease Study 2015:
(GBD 2016)

- 3rd to 6th highest cause of disability
  (females & males; 10-59 years)

Global Burden of Disease Study 2016:
(GBD 2017)

- "Low back pain and migraine were the leading causes of [years lived with disability] in high-income, high-middle-income, and middle-[sociodemographic index] quintile countries…"

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>High Point, NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>321,418,820</td>
<td>104,371</td>
</tr>
<tr>
<td>Adult Population</td>
<td>245,885,397</td>
<td>78,033</td>
</tr>
<tr>
<td>Adults with Migraine</td>
<td>39,341,663</td>
<td>12,485</td>
</tr>
</tbody>
</table>

Migraine prevalence is estimated to be 16% of the population (United States), generating ~$17 billion costs (Goldberg 2005, Smitherman et al 2013)

Cervicogenic: ~4-18%, comparable to migraine on impacting quality of life (Sjaastad et al 2000, van Suijlekom et al 2003, Sjaastad et al 2008)

Tension-type: 24-37% of the population at least once a month (Lyngberg et al 2005, Steiner et al 2014, Jensen 2017)
What is a Migraine?

It’s complicated and not fully understood.

“While the disease was previously regarded as primarily vascular, the importance of sensitization of pain pathways, and the possibility that attacks may originate in the central nervous system, have gained increasing attention over the last decades. At the same time, the circuitry of migraine pain, the trigeminovascular system, and several aspects of its neurotransmission peripherally and in the trigeminal nucleus caudalis, central mesencephalic grey and thalamus, have been recognized. Highly receptor-specific acute medications including 5-HT1B/D receptor agonists (triptans), 5-HT1F receptor agonists, and CGRP receptor antagonists have demonstrated efficacy in the acute treatment of migraine attacks. Because of their high receptor-specificity, their mechanisms of action provide new insight into migraine mechanisms. It is now clear that I.1 Migraine without aura is a neurobiological disorder, while clinical as well as basic neuroscience studies continue to advance our knowledge of migraine mechanisms.”

Source: ICHD 2018
### Various Types of Migraines

| 1.1 | Migraine without aura |
| 1.2 | Migraine with aura |
| 1.2.1 | Migraine with typical aura |
| 1.2.1.1 | Typical aura with headache |
| 1.2.1.2 | Typical aura without headache |
| 1.2.2 | Migraine with brainstem aura |
| 1.2.3 | Hemiplegic migraine |
| 1.2.3.1 | Familial hemiplegic migraine |
| 1.2.3.1.1 | FHM type 1 |
| 1.2.3.1.2 | FHM type 2 |
| 1.2.3.1.3 | FHM type 3 |
| 1.2.3.1.4 | FHM, other loci |
| 1.2.3.2 | Sporadic hemiplegic migraine |
| 1.2.4 | Retinal migraine |
| 1.3 | Chronic migraine |
| 1.4 | Complications of migraine |

Source: ICHD 2018

### Diagnostic Criteria – Migraine without Aura

A. **At least five attacks** fulfilling criteria B–D

B. Headache attacks **lasting 4–72 hours** (when untreated or unsuccessfully treated)

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

Source: ICHD 2018
Diagnostic Criteria – Cervicogenic Headache

A. Any headache fulfilling criterion C
B. Clinical and/or imaging evidence of a disorder or lesion within the cervical spine or soft tissues of the neck, known to be able to cause headache
C. Evidence of causation demonstrated by at least two of the following:
   1. Headache has developed in temporal relation to the onset of the cervical disorder or appearance of the lesion
   2. Headache has significantly improved or resolved in parallel with improvement in or resolution of the cervical disorder or lesion
   3. Cervical range of motion is reduced and headache is made significantly worse by provocative maneuvers
   4. Headache is abolished following diagnostic blockade of a cervical structure or its nerve supply
D. Not better accounted for by another ICHD-3 diagnosis.

ICHD 2018

Diagnostic Criteria – Cervicogenic Headache

1. Unilateral headache without side-shift
2. Symptoms and signs of neck involvement:
   - Pain triggered by neck movement or sustained awkward posture and/or external pressure of the posterior neck or occipital region
   - Ipsilateral neck, shoulder, and arm pain
   - Reduced range of motion
3. Pain episodes of varying duration or fluctuating continuous pain
4. Moderate, non-excruciating pain, usually of a non-throbbing nature
5. Pain starting in the neck, spreading to oculo-frontotemporal areas
6. Anesthetic blockades abolish the pain transiently provided complete anesthesia is obtained or sustained neck trauma a relatively short time prior to the onset
7. Various attack-related phenomena: autonomic symptoms and signs, nausea, vomiting, ipsilateral edema, and flushing in the periocular area, dizziness, photophobia, phonophobia, blurred vision in the ipsilateral eye

Antonaci et al 2001
Differentiating Headaches

“The brain has limited mechanisms to express pain.” (Cady 2014)

- Secondary headaches can present with the same symptoms as any headache disorder (Ravishankar 2006, Schankin et al 2012)

Just because the symptomatology suggests a primary headache does not mean a patient is not a candidate for physical therapy:

- Let the physical examination and treatment response guide your reasoning

Diagnostic Accuracy and Medical Management
Accurate Migraine Diagnoses?

“Despite accurate individual recognition of episodic migraine and chronic tension-type headache, participants were poor at recognizing that features of these primary headache disorders can co-exist to comprise a uniform diagnosis of chronic migraine.” (Yadav et al 2017)

“Among those consulting a healthcare professional, 126 (24.6%) received an accurate diagnosis and 56 of those with a correct diagnosis (44.4%) received both acute and preventive pharmacologic treatments…” (Dodick et al 2016)

We will likely find that many patients:

- Both misdiagnosis and missed diagnoses are likely common
- Many people are likely taking unnecessary medication

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Some of the common abortive treatments for migraine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>Drugs</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Analgesics</td>
<td>Aspirin</td>
</tr>
<tr>
<td>Combinations</td>
<td>Aspirin and</td>
</tr>
<tr>
<td></td>
<td>Paracetamol and</td>
</tr>
<tr>
<td></td>
<td>Caffeine</td>
</tr>
<tr>
<td></td>
<td>Paracetamol and</td>
</tr>
<tr>
<td></td>
<td>Codeine</td>
</tr>
<tr>
<td>Ergot alkaloids</td>
<td>Dihydroergotamine NS</td>
</tr>
<tr>
<td>NSAIDs:</td>
<td></td>
</tr>
<tr>
<td>Nonspecific</td>
<td>Naproxen sodium</td>
</tr>
<tr>
<td></td>
<td>Ibuprofen</td>
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<tr>
<td></td>
<td>Diclofenac</td>
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<tr>
<td></td>
<td>Rofecoxib</td>
</tr>
<tr>
<td>Selective COX 2 inhibitors</td>
<td></td>
</tr>
<tr>
<td>Triptans (SHT agonist)</td>
<td>Sumatriptan</td>
</tr>
<tr>
<td></td>
<td>Sumatriptan NS</td>
</tr>
<tr>
<td></td>
<td>Sumatriptan SC</td>
</tr>
<tr>
<td></td>
<td>Naratriptan</td>
</tr>
<tr>
<td></td>
<td>Eletriptan</td>
</tr>
<tr>
<td></td>
<td>Rizatriptan</td>
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<tr>
<td></td>
<td>Zolmitriptan</td>
</tr>
<tr>
<td></td>
<td>Zolmitriptan NS</td>
</tr>
<tr>
<td></td>
<td>Frovatriptan®</td>
</tr>
<tr>
<td>Opioids</td>
<td>Butorphanol NS</td>
</tr>
</tbody>
</table>

Benoliel & Eliav 2013
# Topiramate vs Exercise

**Varkey et al 2011: Estimates of the between group effect size (Hedges’ g)**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose, mg</th>
<th>Adverse Events</th>
<th>Contraindications</th>
<th>Relative Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propranolol (SR)</td>
<td>80–240</td>
<td>Bradycardia, Hypotension, Fatigue, Sleep disturbances, Dyspepsia, Depression</td>
<td>Asthma, Depression, Cardiac failure, Raynaud disease, Diabetes</td>
<td>Hypertension, Angina</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>10–50</td>
<td>Sedation, Weight gain, Dry mouth, Blurred vision, Constipation, Urinary retention, Postural hypotension</td>
<td>Mania, Urinary retention, Heart block, Insomnia</td>
<td>Anxiety, Depression, TTH, Other chronic pains</td>
</tr>
<tr>
<td>Sodium valproate</td>
<td>500–1000</td>
<td>Nausea, vomiting, Alopecia, Tremor, Weight gain/loss</td>
<td>Liver disease, Bleeding disorder, Mania</td>
<td>Epilepsy, Anxiety</td>
</tr>
<tr>
<td>Topiramate</td>
<td>25–200</td>
<td>Dizziness, confusion, language problems, paresthesias, nausea, anorexia, diplopia</td>
<td>Renal disease, Respiratory disorders, Glaucoma</td>
<td>Overweight</td>
</tr>
</tbody>
</table>

Benoliel & Eliav 2013
**Topirimate vs Exercise**

Varkey et al 2011: Estimates of the between group effect size (Hedges' g)

A. Pre-existing headache disorder
B. ≥ 10-15 days per month
C. Regular overuse for > 3 months of 1+ drugs for headache

10+ days per month:
- Triptans
- Ergotamine
- Opioids
- Combination Drugs

15+ days per month:
- Acetaminophen
- Aspirin
- NSAIDs

ICHD 2018
Table 1.—SNOOP4 Mnemonic for Secondary Headache Disorders

<table>
<thead>
<tr>
<th>Mnemonic</th>
<th>Clinical Presentation</th>
<th>Common Secondary Headache Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic</td>
<td>• Unexplained fever, chills, weight loss</td>
<td>Primary or metastatic tumors, meningitis, brain abscess, temporal arteritis</td>
</tr>
<tr>
<td></td>
<td>• New onset headache in patient with malignancy, immunosuppression or HIV</td>
<td>Malignant, inflammatory, and vascular disorders of the brain</td>
</tr>
<tr>
<td>Neurologic</td>
<td>• Complaints of motor weakness, sensory loss, diplopia or ataxia</td>
<td>Vascular events such as subarachnoid hemorrhage (most common), CVA, carotid dissection, cerebral</td>
</tr>
<tr>
<td></td>
<td>• Abnormal neurological examination</td>
<td>vasoconstriction syndromes, dural venous thrombosis</td>
</tr>
<tr>
<td>Onset sudden</td>
<td>• Headache reaches peak intensity in &lt;1 minute</td>
<td>Malignant, inflammatory disorders, and temporal arteritis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neoplastic, inflammatory disorders, and temporal arteritis</td>
</tr>
<tr>
<td>Onset after age 50</td>
<td>• New onset headache after age 50</td>
<td>Malignant, inflammatory, and vascular disorders of the brain</td>
</tr>
<tr>
<td>Pattern change</td>
<td>• Progressive headache (evolution to daily headache)</td>
<td>Malignant, inflammatory, and vascular disorders of the brain</td>
</tr>
<tr>
<td></td>
<td>• Precipitated by valsava</td>
<td>Chiai malformation, primary and metastatic lesions of brain, hydrocephalus</td>
</tr>
<tr>
<td></td>
<td>• Postural aggravation</td>
<td>Low pressure headache syndromes, cervicogenic headaches, intracranial hypertension, POTS</td>
</tr>
<tr>
<td></td>
<td>• Papilledema</td>
<td>Malignant and inflammatory disorders of brain, idiopathic intracranial hypertension, dural venous thrombosis</td>
</tr>
</tbody>
</table>

†Adapted from Dodick D. Semin Neurol. 2010;30:74-81.
CVA = cerebrovascular accident; HIV = human immunodeficiency virus; POTS = postural orthostatic tachycardia syndrome.

Migraine Theory

❖❖❖
Migraine Theory – Risk Factors

- Overuse of acute medications
- Ineffective acute treatment
- Obesity
- Metabolic syndrome
- Craniomandibular disorders
- Depression

Migraine Theory – Comorbidities

- Allergies
- Emphysema
- Sinusitis
- Circulation problems
- Bronchitis
- Emphysema
- Allergies
- Circulation problems

- Anxiety
  - Bipolar disorder
- Chronic Migraine

- Chronic pain
- Depression

- Bronchitis
- Heart disease
- Hypertension
- Hypercholesterolemia
- Stroke
- Ulcers
- Arthritis
- Circulation problems

*significantly more common in people with chronic migraine than in those with episodic migraine*
Migraine Theory – Triggers

Dietary
- Alcohol
- Water deprivation
- Monosodium glutamate
- Aspartame
- Tyramine
- Phenylethylamine
- Flavonoids
- Nitrates

Behavioral
- Sleep cycle
- Mental overwork
- Stress
- Daily hassles

Physiological
- Hypoglycemia
- Hypoxia
- Infection
- Estrogen

Environmental
- Noise
- Weather and pollution

Migraine Theory:
Homeostatic and Neuroprotective

Sleep
Emotional Stress
Health and Diet
Tissues
Genetics

Borkum 2016

Borkum 2018
The Trigeminocervical Complex & Neurological Sensitization

(Bartsch et al 2003)
The Trigeminocervical Complex & Neurological Sensitization

- Published data: (Wright 2000b)
  - Palpation with verbal reports of referral patterns
  - Wide distribution of referred pain
  - See the next two slides

Note: 230 patients with TMD; Do not memorize the pain referral patterns. Just remember that they are broad, highly variable for each structure, and overlap a lot from structure to structure.
The Trigeminocervical Complex & Neurological Sensitization
(Dwyer et al 1990)

Note: 5 normal subjects; more subjects and a comparison to people with symptoms would have been better.
The Trigeminocervical Complex & Neurological Sensitization

(Fukui et al 1996)

C2, C3, C4
C2, C3, C4
C2, C3, C4
C2, C3, C4
C0-C2

Note: 61 patients suspected of having facet joint pathology

The Trigeminocervical Complex & Neurological Sensitization

(Cooper et al 2007)

C2-3
C2-3
C2-3 and C5-6

Note: 194 patients with neck and headache pain; to the best of our knowledge more recent studies on this topic do not exist.
Splenius capitis

Splenius cervicis
Upper site
Lower site

Splenius cervicis

Myalgia & Referred Pain

(Simons et al 1999)

17 patients with upper thoracic pain

Infraspinitus
Rhomboid
Levator scapulae
Scalene
Iliocostalis thoracis

Ortega-Santiago et al 2019
TMD, the Cervical Spine, and Headaches: How do they relate?

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Headache Pain ↔ TMD – What’s the Relationship?

“Temporomandibular disorder symptoms are more common in migraine, [episodic tension type headache], and [chronic daily headache] relative to individuals without headache. Magnitude of association is higher for migraine. Future studies should clarify the nature of the relationship.”

(Gonçalves et al 2010)

TMD symptoms in people with vs. without headache:
- 56.5% vs. 31.9% → 1 TMD symptom
- 65.1% vs. 36.3% → 2 TMD symptoms
- 72.8% vs. 37.9% → ≥ 3 TMD symptoms

The association between headache and TMD has been noted elsewhere as well (Bertoli et al 2007, Anderson et al 2011, Bender 2012, Tomaz-Morais et al 2015, Tchivileva et al 2017)
Migraine and TMD?

“Women with migraine are more likely to have muscular and articular TMD, suggesting that both disorders might be clinically associated, which demonstrate the importance of physical therapy assessment in the multidisciplinary team.” (Gonçalves et al 2013a)

“The relationship between migraine and TMD is complex from pathophysiological and clinical perspectives. From a clinical perspective, migraineurs often have pain in the TMD area, in addition to the headache. TMD, in turn, is associated not only with pain in the jaw but also often with headache pain…” (Gonçalves et al 2012)

Migraine and TMD?

“Headaches occurred in 45.6% of the control group (30.9% had migraine and 14.7% had tension-type headache [TTH]) and in 85.5% of individuals with TMD. Among individuals with TMD, migraine was the most prevalent primary headache (55.3%), followed by TTH (30.2%); 14.5% had no headache.” (Franco et al 2010)

“TMD is an important comorbidity of migraine and difficult to distinguish clinically from tension-type headache, and this headache was more frequent in the dental center than at the medical center.” (Silva et al 2014)
Headache Pain ↔ TMD – What’s the Relationship?

“Literature reports show that there should be no dividing line between the knowledge of both orofacial pain specialists and headache physicians. On the contrary, these 2 specialists should share their work regarding the management of patients with TMD and headache, whether or not the two conditions are associated.” (Speciali et al 2015)

Based on a broad understanding of the available evidence:

- Rehabilitation professionals (e.g. therapists and assistants) can become both musculoskeletal orofacial pain and headache specialists and in some ways we can fulfill this role better than medical, dental, and/or neurological providers. However, in some instances a multi-disciplinary approach will be superior.
- One of the key variables is that non-Physical Therapy orofacial and headache specialists are lacking in musculoskeletal training or have the time requisite to engage in behavior change technologies.

Cervical Spine Dysfunction and headaches/TMD


ROM and forward head posture were equal between groups but migraineurs had joint hypomobility at C0-1 (Tali et al 2014)
Migraine and Cervical Spine Dysfunction?

“Women with migraine showed reduced cervical rotation than healthy women (P=0.012). No differences between episodic and chronic migraine were found in cervical mobility. Significant differences for flexion-rotation test were also reported… (P<0.001). Referred pain elicited on manual examination of the upper cervical spine mimicking pain symptoms was present in 50% of migraineurs… No differences on [joint position sense error test] or posture were found among groups (P>0.121).” (Ferracini et al 2017)

A possibility – OMPT treatment of cervical spine impairments may help resolve migraine symptoms

- Clinically speaking, therapy services frequently and drastically reduce migraine symptoms in some patients
- Misdiagnosis or neuroprotective/neurological sensitization

TMD, headaches, and the Cervical Spine

General Conclusions:

- If thoroughness and positive patient outcomes are our primary goals then we cannot compartmentalize TMD, headache, and neck pain
- We can and should evaluate each of the three areas but if we fail to find something to work on and/or cannot improve the patient with our musculoskeletal services then the patient must be referred to a different provider (e.g. medical, dental, and/or neurological)
A Thorough Approach to Migraines

“Once a diagnosis of [chronic migraine] is made, a treatment plan should be developed. This includes evaluating and treating mood disorders, minimizing stress, practicing good sleep hygiene, and avoiding triggers. Other comorbid factors should be addressed, including sleep disorders, neck pain, fibromyalgia, and obesity. Preventive treatment is usually necessary, and a plan for ‘rescue’ approaches is essential.” (Dougherty et al 2015)

If we are not addressing these variables then our orthopedic treatments may be less likely to succeed (and visa versa).
Migraine Headaches and Physical Therapy

How do we handle these situations?

- Perform a thorough evaluation:
  - Take psychosocial variables into account
- Treat the bio-psycho-social impairments (dose dependent)
- Refer / collaborate when required (e.g. medical management)
- Routinely follow up on headache variables and adjust accordingly

General conclusions:

- Based on the available evidence, a thorough MSK evaluation is warranted but guarantees should not be made
- If/when we fail to help sufficiently, try other options

Migraine Headaches and Physical Therapy – Select Psychosocial Screening

Over the past 2 weeks, have you been bothered by these problems?

- Feeling nervous, anxious or on the edge?
- Not being able to stop/control worrying?
- Feeling down, depressed, or hopeless?
- Little interest or pleasure in doing things?
- Thoughts that you would be better off dead or hurting yourself in any way?

PHQ-4 ≥ 3 is (+) for each subscale

(Kroenke et al 2009)
Migraine Headaches and Physical Therapy – Select Psychosocial Screening

Please answer the following:

**PRIMARY CARE PTSD ≥ 3 below line is (+) X/5**

Have you experienced a traumatic event (serious accident; fire; disaster such as a hurricane, tornado, or earthquake; physical or sexual attack or abuse; war; homicide; or suicide)?

- [ ] Yes
- [ ] No

If yes, in the past month, have you:

- Have had nightmares about it or thought about it when you did not want to?
- Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?
- Were constantly on guard, watchful, or easily startled?
- Felt numb or detached from others, activities, or your surroundings?
- Felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?

(Morris et al. 2011)

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Migraine Headaches and Physical Therapy – Select Psychosocial Screening

Please rate your current (i.e. last two weeks) quality of sleep:

**INSOMNIA SEVERITY INDEX ≥ 7 is (+) X/28**

- Difficulty falling asleep?
  - 0: None
  - 1: Mild
  - 2: Moderate
  - 3: Severe
  - 4: Very Severe

- Difficulty staying asleep?
  - 0: None
  - 1: Mild
  - 2: Moderate
  - 3: Severe
  - 4: Very Severe

- Problems waking up too early?
  - 0: None
  - 1: Mild
  - 2: Moderate
  - 3: Severe
  - 4: Very Severe

- How satisfied/dissatisfied are you with your current sleep pattern?
  - 0: Very Satisfied
  - 1: Satisfied
  - 2: Moderately Satisfied
  - 3: Dissatisfied
  - 4: Very Dissatisfied

- How noticeable to others do you think your sleep problem is in terms of impairing your quality of life?
  - 0: Not noticeable at all
  - 1: A little
  - 2: Somewhat
  - 3: Much
  - 4: Very much Noticeable

- How worried/distressed are you about your current sleep problem?
  - 0: Not worried at all
  - 1: A little
  - 2: Somewhat
  - 3: Much
  - 4: Very much worried

To what extent do you consider your sleep problem to interfere with your daily functioning (i.e. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, etc.)?

- 0: Not interfering at all
- 1: A little
- 2: Somewhat
- 3: Much
- 4: Very much interfering

(Morris et al. 2011)
Migraine Headaches and Physical Therapy – Select Systems Screening

\[
\begin{align*}
\text{Chronic pain} & = \text{Reduced heart rate variability} \quad + \\
& \quad \text{Reduced baroreflex sensitivity}
\end{align*}
\]

“…comorbid hypertension reported in previous population studies may be due in part to chronic pain-related decrements in cardiovascular regulation.”
(Bruehl et al 2018)

*Of 285 physical therapists surveyed, only 68 (24%) measured HR and BP in the outpatient setting (Albarrati 2019)

Select Testing / Treatment Techniques – PAIVM with Prepositioning
Select Testing / Treatment Techniques – Medial / Lateral TMJ Glides

Select Testing / Treatment Techniques – Anterior TMJ Glide
Plan of Care – An Overview of Rules

There are a handful of key rules that we should rely upon:

- Impairment based treatment
- Prioritize impairments/tissues (i.e. develop a hierarchy of relative importance)
- Manual therapy should be our primary treatment option
- Concordant sign should help us modify and improve our decisions
- We must address comorbidities and psychosocial variables to maximize likelihood of improvement

Plan of Care – Prioritizing Treatment Options

- How should we prioritize impairment/tissues?
  - Concordant sign
  - Best response to treatment
  - Comorbidities and psychosocial variables (could be moved up or down depending on the patient)
  - Most painful
  - Most restricted
  - Adjacent finding
  - Minor findings
Plan of Care – A Biopsychosocial Approach

Education:

- Using de-catastrophizing language throughout episode of care:
- Validate their experience, e.g. “That’s makes sense.”
- Highlight stiffness
- Adaptive changes are normal
- Aging is not pathological
- Neural irritability and sensitization can be addressed
- Reflection & processing vs. cheerleading
- Establish expectations & rehabilitation potential
- Evaluation findings, assessment, & plan

Plan of Care – A Biopsychosocial Approach

OMPT:

- Day 1; letting the patient tell his/her story, initial treatment, concordant sign, building rapport
- Ongoing; daily re-assessment, testing, and concordant sign
  - Typically begin with more manual treatments
  - Use manual time to focus on education tasks
- Progress towards self-care
- Establish elevated self-efficacy
Plan of Care – A Biopsychosocial Approach

Psychosocial variables:
- Day 1: prepare the patient to begin addressing one psychosocial variable (next slide)
  - Use intake results to:
    - Help dose OMPT treatment
    - Devise multifaceted psychosocial plan
  - Establish that we will use the findings to structure the path forward:
    “There are a lot of things that can contribute to your pain. As a result, there are a lot of ways that we can try to help you control the pain. We are going to go about this very scientifically and see what works so that we can maximize the likelihood of you getting better.”

Plan of Care – A Biopsychosocial Approach

A simple but evidence based and important message:

“Outside of the clinic, any way you can improve your physical or emotional health should help you recover more quickly. Examples of this include improving your sleep, stress, nutrition, exercise, and/or surroundings. Your homework is to figure out the one thing you want to start working on.”
Patient Education Boundaries & Limitations

- Not all patients are ready to hear all messages on day one
  - Time is, of course, also limited
- Some patients may never be ready to hear certain messages
- Repetition could be the key for patient learning
- Always remember to be calm and patient
- Always know your patient's abilities to understand and utilize language
- Most patients will take weeks to learn some messages

Select Psychosocial Management

⭐⭐⭐
Patient Education – Coaching Skills

Being present & non-judgmental

Other-focused listening

Reflections
- Simple
- Complex
- Double-sided

Summarizing

What/how inquiry

Duke Integrative Medicine; Moore, Tschannen-Moran, & Jackson 2015
Patient Education – Coaching Skills

Establish vision and values
Assess current health
Choose a focus
Explore importance and confidence using a scale (next slide)
Create a SMART goal
Determine next best step

Duke Integrative Medicine; Moore, Tschannen-Moran, & Jackson 2015

Patient Education – Coaching Skills

**Brief Action Planning**

“How confident or sure do you feel about carrying out your plan (on a scale from 0 to 10)?”

- Confidence $\geq 7$
  - “Why did you say a ___ and not a (lower number)?”
- Summarize reasons for confidence

- Confidence $< 7$
  - “A ___ is higher than a zero, that’s good! We know people are more likely to complete a plan if it’s a 7 or higher.”
  - Problem Solving:
    - “Any ideas about what might raise your confidence?”
  - Plan for reinforcement and progress checks

Gutnick 2014
Cognitive Behavioral Therapy for Insomnia

1. First-line intervention for insomnia (American Medical Association)
2. 4-session treatment package
3. Delivered by mental health practitioner
4. Effective through internet-delivered format
5. Consists of sleep education/hygiene and sleep restriction/titration
Patient Education – Sleep

Sleep Hygiene

- Consistency – wake up at the same time every morning
- Resolve dilemmas (next slide)
- Bed = sleep
- Relax – taking time to wind down before bed
- Avoid stimulants/sleep inhibitors before bed (e.g. caffeine, nicotine, alcohol, engaging activities)
- Only lay down when tired – the focus is quality sleep, not quantity

Patient Education – Sleep

Worry Chart – Complete Before Bed

1. In the left column, write down all the things you are worried about that you can take care of before bed. Do what needs to be done to resolve these worries (i.e. send an important email, make sure the door is locked, etc.)
2. In the middle column, list the things that you don’t want to forget to do tomorrow (i.e. call someone back, run an errand, etc.). By writing it down, you can let your mind forget about it while you sleep.
3. In the third column, write down your worries that you cannot change. Recognize that there is nothing that can be done to fix those worries tonight and let these worries go while you sleep.

<table>
<thead>
<tr>
<th>Things I Can Change Tonight</th>
<th>Things I Don’t Want to Forget to Do Tomorrow</th>
<th>Things I Can’t Change Tonight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Sleep Titration**

Bedtime = (Wake Time) – (Average hours of sleep per night + 30 minutes)

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One Week

- **Sleep well most nights and are as alert as you would like to be in the daytime**
- **Make no changes**

One Week

- **Sleep well most nights but you feel tired most days**
- **Go to bed 15 minutes earlier**

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*Mitchell 2012, Seyffert 2016, Medalie 2017*

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**Patient Education – Stress Resilience**

- **Diaphragmatic Breathing**
- 4-7 breaths per minute; rest after the exhale
- Those who practiced ~20 minutes per day had better outcomes (clinical & HRV)

- **Hand warming biofeedback**
- **Heart rate variability biofeedback**

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*Schmidt 2013, Berry 2014, Hallman 2011*
Patient Education – Stress Resilience

“Findings from the present study do not support either feedback or guided imagery training as more effective in counteracting migraines although subjective reports do favor guided imagery as having a positive influence on the perception of migraine pain.” (Ilacqua 1994)

CTTH: “The guided imagery groups both tape and perceived happy memory had significantly more improvement than the controls in three of the outcome measures: headache intensity, headache frequency, and headache duration.” (Abdoli et al 2012)

CTTH: “More guided imagery patients (21.7%) than controls (7.6%) reported that their headaches were much better (P = .004). The guided imagery patients had significantly more improvement than the controls in three of the SF-36 domains: bodily pain (95% CI: guided imagery patients 11.0, controls 0.2), vitality (95% CI: guided imagery patients 10.9, controls 1.7), and mental health (95% CI: guided imagery patients 7.8, controls 0.4).” (Mannix et al 1999)

Patient Education – Stress Resilience

“…Happy cells are good cells. And to imagine that all around and all through there are happy cells is an excellent thing to do. Sometimes there might be something more to imagine when it comes to the cells, and this of course, is up to you. Perhaps to increase the good red blood cells. If so, how to be imagining that taking place? Maybe sending out more fighter cells to do the good work that they are meant to do, and then, the clean up crew cells to follow. How does the imagination bring this about? … Right now, make a determination to imagine happy cells throughout every nook and cranny. Like happy cells could fill every inch. All around and all through. How does this happen? Let the imagination create. It. Happy cells all around and all through, and sense how it is taking place.”

Course Manual: O’Neil 2014
Patient Education – Stress Resilience

“For salivary cortisol, a [nature experience] produced a 21.3%/hour drop beyond that of the hormone’s 11.7% diurnal drop. The efficiency of a nature pill per time expended was greatest between 20 and 30 min, after which benefits continued to accrue, but at a reduced rate... Activity type did not influence cortisol response.” (Hunter et al 2019)

Take away:
- There are multiple ways to address stress resilience
- Find what works for the patient

Management Research Timeline
Management Research Timeline – Migraine

“Both the relaxation and biofeedback groups improved significantly on total headache activity, duration of headaches, and peak headache intensity and reduced consumption of analgesic medication, while the waiting list control group did not... follow-up data at one, two, and three months showed no differences between the two treated groups...” (Blanchard et al 1978)

“The efficacy of progressive relaxation, fingertip temperature training, and EMG training of the frontalis muscles was tested against chronic migraine and tension headaches... no specific treatment emerged as clearly most effective for either type of headache. Over time, however, progressive relaxation was not as good as the other procedures in reducing the number of hours/month of headache.” (Daly et al 1983)

Management Research Timeline – Migraine

“The results of both of these studies support the use of nonpharmacological treatment, especially [relaxation training/thermal biofeedback] (RTB), for migraine. An RTB approach would be recommended as a first-line nonmedication treatment because of its demonstrated effectiveness in about half of migraineurs. PT did not achieve this same level of efficacy as a first-line treatment, but proved to be a useful adjunctive treatment for those women who had failed to achieve significant headache relief after RTB treatment. Therefore, PT may be recommended as a second-line treatment for those migraineurs who fail to achieve adequate headache improvement with RTB.” (Marcus et al 1998)
Management Research Timeline – Migraine

“PT is most effective for the treatment of migraine when combined with other treatments such as thermal biofeedback, relaxation training, and exercise. Chiropractic manipulation is probably more effective in the treatment of TTH than it is in the treatment of migraine but quality studies are lacking.” (Biondi et al 2005)

“Current evidence does not support the use of spinal manipulations for the treatment for migraine headaches.” (Posadzki et al 2011)

“[A]ny firm conclusion will require future, well-conducted RCTs on manual therapies for migraine.” (Chaibi et al 2011)

“Management Research Timeline – Migraine

“In women with TMD and migraine, migraine significantly improved only when both conditions were treated. The best treatment choice for TMD pain in women with migraine is yet to be defined.” (Gonçalves et al 2013b)

“At present no manual therapy studies exist for chronic migraine…” (Chaibi et al 2014)

“All patients with migraine should have access to acute pharmacologic treatments.” (Moriarty et al 2016)
Management Research Timeline – Migraine

“Results suggest a statistically significant reduction in the intensity, frequency and duration of migraine… Small sample sizes, inadequate use of headache classification, and other methodological shortcomings reduce the confidence in these results. Methodologically sound, randomized controlled trials with adequate sample sizes are required to provide information on whether and which physiotherapy approach is effective.” (Luedtke et al 2016)

Including – Manual therapy, MTrP treatment, strength training, psychological treatments, aerobic exercise

“We cannot assume that physical therapy promotes additional improvement in migraine treatment; however, it can increase the cervical pressure pain threshold, anticipate clinically relevant changes, and enhance patient satisfaction.” (Bevilaqua-Grossi et al 2016)

A Research Timeline – Migraine

Here are two recent and competing examples:

- Bevilaqua-Grossi et al 2016 – Manual therapy and stretching did not improve migraine variables
- D’Ippolito et al 2017 – “Patients with high-frequency migraine and comorbid mood disorders showed significant improvement after four 45-minute [osteopathic manipulative therapy] sessions.”

Take-aways:
- Migraines are complex and we do not yet understand them fully
- Management appears most effective when bio-psycho-social variables are addressed
- Dosing may be an important aspect of manual therapy efficacy
Two Case Example Summary

Two Cases – A Basic Overview

- 40-year-old female:
  - 15-year history of migraine headache
  - OMPT x24 visits
  - SANE Score: 60% improvement
  - Variables addressed:
    - Cervical spine impairments
    - TMJ impairments
  - Outstanding variables:
    - Poor response to patient education
    - Chronic sleep dysfunction
    - Elevated stress levels
    - Chronic smoker

- 30-year-old male:
  - 20-year history of migraine headache
  - OMPT x20 visits
  - SANE Score: 95% improvement
  - Variables addressed:
    - Cervical spine impairments
    - TMJ impairments
    - Excellent response to education
    - Improved sleep hygiene
    - Improved cardiovascular fitness
  - Outstanding variables:
    - Partially improved stress levels
Thank you for your attention.

Questions, comments, concerns, and/or discussion?