

Case Study: Mike

Mike is a 19 year-old male, undergraduate student at USC. He had a diagnosis of post-concussion syndrome a comorbid diagnosis of migraine and anxiety. The patient sustained a concussion when he was hit by a car while riding his bike and he hit his head on the road. At the time of OT evaluation, he was experiencing the following PCS symptoms: fatigue, migraines, difficulty concentrating, memory impairments, sleep impairments, anxiety and irritability. The patient was using medication prescribed by his neurologist and was receiving IV magnesium infusions throughout his OT plan of care.

Occupational Profile and Functional Deficits:

- Studying business and spends most of his time attending classes and studying
- Difficulty attending class and completing assignments and exams on time due to cognitive impairments, fatigue and anxiety
- Having difficulty engaging in preferred occupations, including yo-yoing, due to pain and fatigue
- Reported variable and inconsistent sleep and eating routines
- Unable to tolerate physical activity but used to go to the gym regularly prior to his concussion

Supports:

- Enrolled with disability services at university
- Motivated to implement changes to improve symptom management

The patient was seen once a week and gradually decreased frequency over the course of treatment as his symptoms improved and he became more independent with self-management. He was seen for an initial evaluation and 7 treatment sessions.

Treatment:

What occupational therapy treatment interventions would you recommend for Mike that would create occupational experiences that help to improve his ability to manage and cope with his post-concussion symptoms?

1. _____
2. _____
3. _____
4. _____
5. _____

Accommodations:

What academic accommodations would you recommend?

1. _____
2. _____
3. _____

REST TO ACTIVE RECOVERY: LIFESTYLE MANAGEMENT FOR POST-CONCUSSION

LINDSEY REEVES, OTD, OTR/L
MELINA ALLAHVERDIAN, OTS
OTAC WESTERN REGIONAL 2020
MARCH 8, 2020

LEARNING OBJECTIVES

1. By the end of this session, participants will understand the neurological basis of concussion contributing to physical, cognitive and emotional symptoms as well as common comorbidities associated with post-concussion syndrome.
2. By the end of this sessions, participants will understand common functional problems associated with post-concussion syndrome and how to perform a lifestyle-based evaluation for a person with post-concussion syndrome.
3. By the end of this session, participants will be able to identify standardized assessments and identify appropriate lifestyle management evidence-based interventions to address post-concussion syndrome symptoms.
4. By the end of this session, participants will apply their knowledge to case study examples and practice delivery of lifestyle management interventions in small groups.

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CONCUSSION BACKGROUND

“A type of traumatic brain injury--or TBI-- caused by a bump, blow or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth.”
(*What is a concussion,* 2019)

- Prevalence:
 - 2.5 million people in the U.S. sustain a TBI annually
 - 75-85% are classified as concussions or other forms of mild TBI
- Medical costs associated with TBIs: \$76.5 billion in the U.S. (West & Marion, 2016)
- 5.3 million people live with disabilities related to brain injury



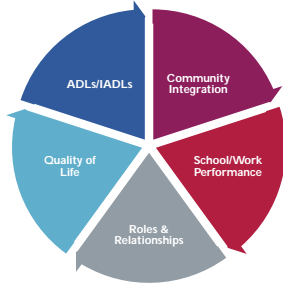
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SIGNS AND SYMPTOMS



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FUNCTIONAL IMPACT



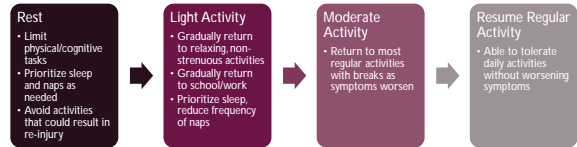
(*Severe TBI - 2019)

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RECOVERY: ACUTE STAGES

Typical concussion progression

- Symptoms alleviate in 7-10 days with rest
- Full recovery 2-4 weeks
- Contributing factors: severity, age, pre-existing conditions, Tx adherence



(*Recovery - 2019 Eisenberg, Mehan, & Mannix, 2014)

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RECOVERY: POSTCONCUSSION SYNDROME

Atypical concussion progression (red flags):

- Persistence of symptoms 1 month after injury
- Headache, fatigue cognitive difficulty, irritability, sleep disturbances



Post-Concussion Syndrome

- Symptoms persist beyond 1-2 months after injury
- 15-30% of mild TBI develop post-concussion
- Risk Factors: older age, female, severity of concussion, Hx of multiple concussions, Hx of migraines
- Emphasis on "active" rehabilitation instead of rest

(Graham, Rivera, Ford, & Spicer, 2014; Eisenberg, Mehan, & Mannix, 2014; Gagnon et al., 2016)

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COMPREHENSIVE OT EVALUATION

Assessment of premorbid function, occupational history, roles, and current functional status

Physical, cognitive, psychosocial, emotional, behavioral, sensory, vision assessments

Constraints to academic, vocational, social, community activity participation

Individualized treatment plan and patient-centered care

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EVALUATION: CONCUSSION SPECIFIC TIPS

- Ask about specific physical, cognitive, emotional, sleep symptoms
- Common comorbidities: migraine or headache, neck pain, depression, anxiety
- Baseline activity tolerance: physical activity, sensory stimuli, cognitive tasks
- Awareness of triggers and strategies that alleviate symptoms
- Watch out for fear avoidance behaviors and risks of increasing sensory sensitivity
- Assess risk for medication overuse
- Activity restrictions from MD



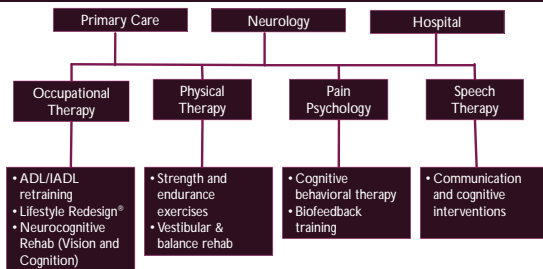
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OT OUTCOME MEASURES

- ✓ Canadian Occupational Performance Measure
- ✓ RAND SF-36 Health-Related Quality of Life Survey
- ✓ Post-Concussion Symptom Scale
- ✓ Headache Measures: HIT-6, HMSE, MIDAS
- ✓ Sensory Assessments
- ✓ Mental Health Assessments
- ✓ Cognitive Assessments
- ✓ Vision Assessments

(Moris, 2014; Carpenter et al., 2001; Sakro et al., 2010; French et al., 2000; McLeod & Leach, 2012)
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CONCUSSION CLINIC AT USC



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OT LIFESTYLE INTERVENTIONS

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LIFESTYLE INTERVENTIONS



(CDC, 2016; Clark et al., 1997)

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DISEASE SELF-MANAGEMENT: RESEARCH



- Brain injury education
- Common signs and symptoms
- Typical recovery progression
- Recommended activity levels based on stage of recovery

(Gravel et al., 2013)

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DISEASE SELF-MANAGEMENT: INTERVENTION

- Symptom tracking
- Trigger ID
 - Irregular eating routines
 - Dehydration
 - Physical, cognitive, emotional overexertion
 - Poor sleep habits
 - Stress
 - Environmental/sensory stimuli
- Patient Resources: CDC "Heads Up"



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ACTIVITY PACING/ENERGY CONSERVATION: RESEARCH

Physical

- 72% of patients with PCS who participated in a PROGRESSIVE exercise rehabilitation program returned to full daily functioning (Baker et al., 2012)

Cognitive

- Higher levels of cognitive activity was correlated with longer recovery time: Patients who reduced cognitive activity by 50% were asymptomatic in 100-150 days compared to those engaging in higher levels of cognitive activity who took up to 300-500 days to recover (Brown et al., 2014)

Clinical Guidelines

- CDC Protocols: https://www.cdc.gov/headsup/providers/return_to_activities.html
- CIF Protocols: <https://www.cifstate.org/sports-medicine/concussions/index>

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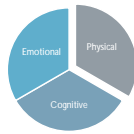
ACTIVITY PACING/ENERGY CONSERVATION: INTERVENTIONS

Activity Pacing

- Alternate between activity and rest
- Increase overall activity strategically
- Avoid “crash and burn”
- Be able to do more over a longer period of time

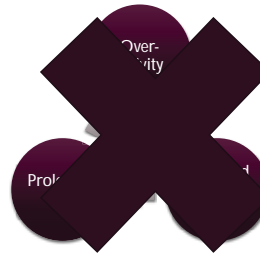
Energy Conservation

- Assessing energy levels (spoon theory)
- Modify activities as needed
- Physical, mental, emotional
- Daily routines (eating, exercise, sleep, stress management)

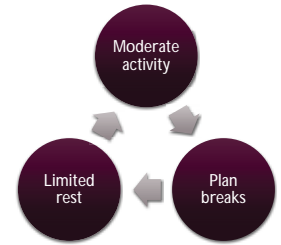


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Over-Activity Cycle



Activity-Rest Cycle



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ACTIVITY PACING: INTERVENTIONS

- Large scale and small scale pacing
- Plan rest breaks between activities
- Planning ahead/scheduling
- Frequent “check-ins” before, during, after activity (mindfulness) to increase awareness and early recognition of fatigue



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ENERGY CONSERVATION: INTERVENTIONS

- Remember sources of energy: physical, mental, emotional
 - Energy assessments: spoon theory, charged battery
- Activity modification strategies to gradually increase tolerance
 - Frequency, duration, body positions, level of assistance, environmental factors
- Strategies:
 - Prioritize
 - Set limits/boundaries
 - Delegate, eliminate, simplify tasks



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COMMUNITY INTEGRATION: RESEARCH

- “Prolonged rest, longer than 3 days to a week, may contribute to prolonged symptoms” (Thomas et al., 2015)
- Post- concussion symptoms are correlated with reduced return to work (Chu et al., 2017)



SYMPTOM MANAGEMENT & GRADUAL RETURN TO ACTIVITY

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COMMUNITY INTEGRATION: INTERVENTIONS

- Gradual return to school/work/play
- Accommodations
- Assertive communication/self-advocacy
- Sensory strategies
- Activity pacing and energy management
 - ID community activity
 - Create plan based on current activity tolerance including plan for rest breaks
 - Problem solve environmental barriers or sensory exposure risks
 - Self-regulation strategies



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ACCOMMODATIONS

“Any change in the work environment or in the way things are customarily done that enables an individual with a disability to enjoy equal employment opportunities”



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ACCOMMODATION EXAMPLES

Work	School
<ul style="list-style-type: none"> • Gradual return to work plans • Modified work schedule <ul style="list-style-type: none"> • Telecommute • Flexible start/end time • Modification of work tasks to avoid triggers • Increased cognitive supports <ul style="list-style-type: none"> • Written communication vs. verbal communication • Scheduled meetings with supervisor • Environmental modifications <ul style="list-style-type: none"> • Ergonomic recommendations • Modifying office location to minimize light/sound input • Sensory strategies <ul style="list-style-type: none"> • Hats, sunglasses, earplugs, headphones • Pacing schedule 	<ul style="list-style-type: none"> • Modified attendance • Reduced workload (in-class, homework) • Breaks during the day • Starting later in the school day • Deadline extensions • Additional time for testing • Testing in a separate room <ul style="list-style-type: none"> • No fluorescent lighting • Minimal distractions • Ability to eat/drink in classroom • Reduced participation in PE class • Allow handwritten assignments vs. electronic

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ACCOMMODATIONS: RESOURCES

- Work:
 - Job Accommodation Network (JAN)
 - <https://askjan.org/a-to-z.cfm>
- School:
 - California Interscholastic Federation (CIF)
 - https://www.cifstate.org/sports-medicine/concussions/CIF_Physician_Recommended_School_Accommodations_Following_Concussion.pdf
- Collaborate with referring provider
- Remind patient that these are recommendations

Category	Accommodation	Notes
Work	Job Accommodation Network (JAN)	1-800-526-7074
School	California Interscholastic Federation (CIF)	https://www.cifstate.org/sports-medicine/concussions/CIF_Physician_Recommended_School_Accommodations_Following_Concussion.pdf
Other	Collaborate with referring provider	
Other	Remind patient that these are recommendations	

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Faculty Practice

March 8, 2022

Re: **SEYMOUR BARNES**

To whom it may concern:

My patient, **SEYMOUR BARNES (DOB: 1976)**, is currently being treated for **POSTURAL ORTHOSTATIC TOLERANCE (POT) and ANXIETY DISORDER**, which cause the following functional limitations and symptoms:

- Dizziness
- Fatigue
- Headaches

This letter is to inform you of the reasonable and necessary accommodations that, after evaluation and treatment, I have determined **SEYMOUR BARNES** would benefit from in order to help improve self-management of condition during the working. The Americans with Disabilities Act states employers are required to provide employees with "reasonable and necessary" accommodations at work to enable employee functioning as best as possible. Through discussion and treatment with **SEYMOUR BARNES**, I have identified the following accommodations as supports needed to promote health and functioning at work:

1. ---
2. ---
3. ---

Please contact me if you have any questions about these recommendations. I look forward to working with you to make **SEYMOUR BARNES** experience as optimal as possible.

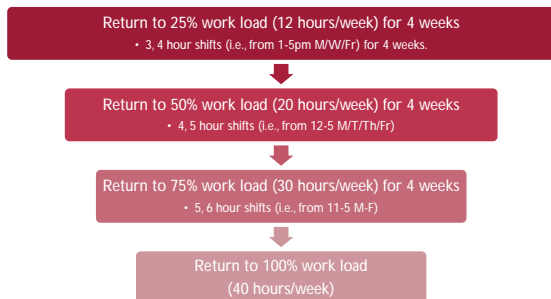
Sincerely,

Handwritten Signature

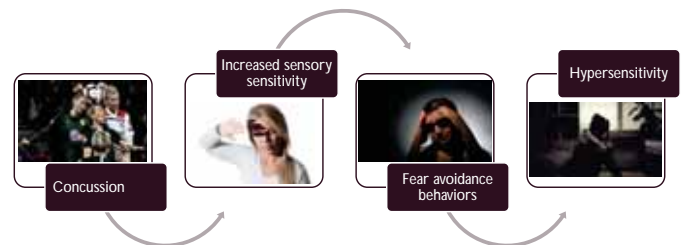
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SEYMOUR BARNES
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ACCOMMODATIONS: GRADUAL RETURN TO WORK



SENSORY STRATEGIES: RESEARCH



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SENSORY STRATEGIES: INTERVENTIONS

Light	Sound	General
<ul style="list-style-type: none"> Avoid bright, fluorescent lighting Use sunglasses Wear a hat with a brim Use FL-41 or blue-light blocking glasses Install software on the computer to monitor brightness (i.e., Flux.x) Take vision breaks 	<ul style="list-style-type: none"> Shop at times of day when there are less crowds or shop in smaller stores if possible Hold conversations in quieter places Use earplugs or headphones Introduce background noise: white noise machine, soothing music 	<ul style="list-style-type: none"> Avoid sensory overload (monitor your environment) Implement self-regulation strategies and relaxation techniques Gradual sensory exposure

SENSORY STRATEGIES: INTERVENTIONS

DATE:								
Activity	Tolerance	M	T	W	Th	Fr	Sat	Sun
Outdoor light exposure	20 minutes							
Indoor light exposure	10 minutes							
Sound exposure	30 minutes							
Computer screen tolerance	15 minutes							
Reading	10 minutes							

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SELF-ADVOCACY: INTERVENTIONS

- Assertive communication training
 - Eliminate qualifying statements
 - Use "I" statements
 - Replace "should" statements with "I choose to"
 - Facts, feelings, needs
 - Preparing for meetings/appointments



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SLEEP ROUTINES: RESEARCH

- Difficulty falling or staying asleep is correlated with 3-4x longer post-concussion recovery time
- Sleep disturbances can exacerbate other post-concussion syndrome symptoms including cognitive deficits, headache, fatigue, anxiety and depression

hypersomnia

insomnia

delayed-sleep phase shift

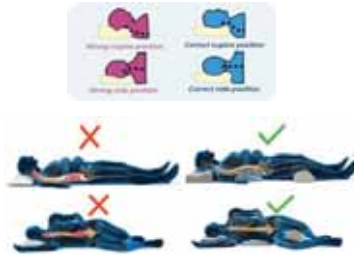
disrupted sleep-wake cycles

(Bramley et al., 2017)

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SLEEP ROUTINES: INTERVENTION

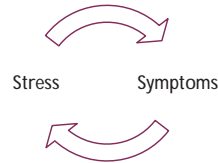
- Sleep hygiene
 - consistent sleep/wake cycles
 - activity/exercise during the day
 - supportive environment
- Sleep positioning
 - maintain neutral spine alignment
 - additional support for the spine
- Sleep wind-down
 - relaxation strategies before sleep



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STRESS MANAGEMENT/SELF-REGULATION: RESEARCH

Psychosocial factors including anxiety and depression influence the persistence of post-concussion symptoms (Potter et al., 2015)



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STRESS MANAGEMENT/SELF-REGULATION: INTERVENTIONS

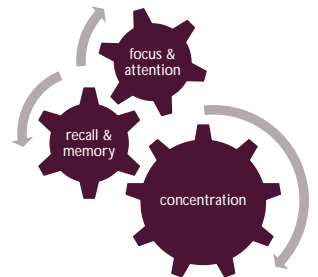
- Stress trigger identification
 - Understanding signs and symptoms
- Self-regulation
 - Timing of strategies
- Relaxation training
 - Diaphragmatic breathing
 - Meditation and mindfulness
 - Visualization
- Health-promoting coping strategies



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COGNITION: RESEARCH

- Physical and cognitive overexertion after concussion may delay recovery (Reddy & Collins, 2009)
- Recent research shows prolonged rest beyond the first couple of days might hinder rather than aid recovery (Loddy et al., 2016)
- Compensatory strategies can be used to improve energy management and avoid cognitive overexertion



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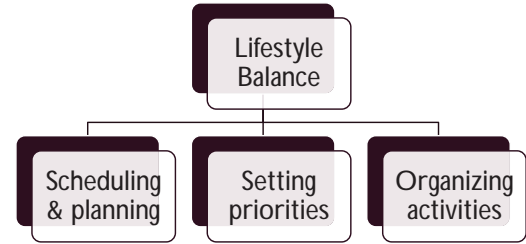
COGNITION: INTERVENTIONS

- Compensatory cognitive strategies:
 - Time-management
 - Pacing with cognitive tasks
 - Reminders
 - Visual cues
 - Auditory cues
 - Social supports



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TIME MANAGEMENT



(Simon & Collins, 2017)

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PHYSICAL ACTIVITY: RESEARCH

- Energy deficit due to increased need for glucose to support recovery leads to a period of vulnerability where the brain is at risk for additional injury
- Exercise using a predetermined stopping criterion (the symptom-exacerbation threshold) can be used to help regain aerobic capacity and speed recovery (Laddy et al., 2016)



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PHYSICAL ACTIVITY: INTERVENTIONS

- Start at 50% of anticipated tolerance
- Pacing strategies
 - modifying intensity, resistance, duration, etc.
- Symptom monitoring
 - i.e. a heart rate monitor
- Avoiding contact-related activities
 - Low impact cardio first
- Caution with weight-lifting
 - Body mechanics and positioning



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EATING ROUTINES: RESEARCH

- Recommendations for post-concussion recovery:
 - Ketogenic diet — current theory is glucose levels drop initially after injury (Galberg et al., 2019)
 - Giving body source of food to increase glucose to aid with recovery
 - Magnesium rich foods (fruits, vegetables, coconuts)
 - Omega 3 fatty acids (fish, walnuts) — clearance required before consuming



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EATING ROUTINES: INTERVENTION

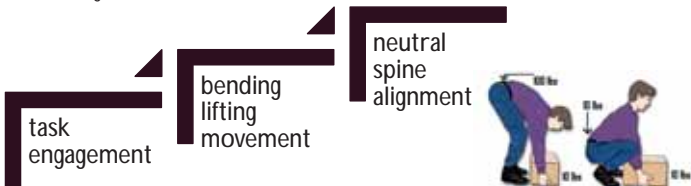
- Importance of consistent eating routines for improved blood glucose regulation
- In collaboration with nutritionist, dietician, and neurologist



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ERGONOMICS/BODY MECHANICS

- High prevalence of neck and shoulder pain with migraine and tension type headache (Aghnia et al., 2015)
- Ergonomic assessment along with education may impact better configuration, decreasing musculoskeletal discomfort (Stodgrass, 2019)



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CASE STUDY: MIKE

- 19 y/o male, undergraduate student
- Dx: postconcussional syndrome, migraine, fatigue, anxiety
- Pt sustained a concussion when he was hit by a car while riding his bike
- PCS symptoms at time of evaluation
 - pain, difficulty concentrating, memory impairments, sleep impairments, anxiety and irritability



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CASE STUDY: MIKE

- Occupational Profile:
 - Studying business and spends most of his time attending classes and studying
 - Difficulty attending class and completing assignments and exams on time due to cognitive impairments, fatigue and anxiety
 - Having difficulty engaging in preferred occupations, including yo-yoing, due to pain and fatigue
 - Reported variable and inconsistent sleep and eating routines
 - Unable to tolerate physical activity but used to go to the gym regularly prior to his concussion
- Supports:
 - Enrolled with disability services at university
 - Motivated to implement changes to improve symptom management



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CASE STUDY: MIKE

What occupational therapy treatment interventions would you recommend for Mark that would create occupational experiences that help to improve his ability to manage and cope with his pain?

1. _____
2. _____
3. _____
4. _____
5. _____

What academic accommodations would you recommend?

1. _____
2. _____
3. _____

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CASE STUDY: MIKE

GOAL EXAMPLES:

1. In 12 sessions, Pt will improve participation in academic computer tasks, by implementing new activity pacing and energy management strategies, to improve self-management of post-concussion syndrome and migraine, as evidenced by increasing activity tolerance for computer tasks from 10 minutes to 30 minutes.
2. In 12 sessions, Pt will improve participation in avocation IADLs, by implementing new time management and pacing strategies, to improve self-management of post-concussion syndrome and migraine, as evidenced by increasing participation from 0x/week to at least 2x/week.
3. In 12 sessions, Pt will improve participation in sleep/rest IADLs, by implementing new sleep hygiene strategies, to improve self-management of post-concussion syndrome and migraine, as evidenced by maintaining a consistent sleep-wake schedule from 11pm to 8am.

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CASE STUDY: MIKE

Occupational Performance Problem	Performance rating at evaluation	Satisfaction rating at evaluation	Performance rating at discharge	Satisfaction rating at discharge
School	7	1	9	7
Time management	2	1	9	8
Energy management	2	1	8	9
Sleep routine	3	3	8	8
Stress management	5	5	9	9
Overall scores:	3.8	2.2	8.6	8.2

Scale	Physical fxn	Role limits: Phys. Health	Role limits: emotional health	Energy/fatigue	Emotional well-being	Social fxn	Pain	General health	Health change
Score at eval	90	0	0	n/a	32	25	23	20	25
Score at D/C	100	100	100	50	76	88	100	80	100

CASE STUDY: MIKE

Outcome Measure	Evaluation	Discharge	Clinical Implications
Post-concussion symptom scale (PCSS)	61	0	Lower scores indicate decreased prevalence and severity of PCS symptoms
Migraine Disability Assessment Test (MIDAS)	Days in the last 3 months with migraine: 14-20 Average H/A pain: 6/10	Days in the last 3 months with migraine: 0 Average H/A pain: 0/10	Lower scores indicate decreased frequency of migraines and decreased pain severity
Headache Management Self-Efficacy Scale (HMSE)	92	98	Higher scores indicate improved confidence in the ability to prevent and manage headache pain and increased sense of control over pain.
Headache Impact Test (HIT-6)	75	6	Lower scores indicate lower impact of headache pain on daily life and ability to function at work, school, home and in social situations

QUESTIONS?



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Melina Allahverdian (Melina.Allahverdian@med.usc.edu)

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