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Returning to Activity Following Concussion

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Learning Outcomes

- Identify signs and symptoms of concussion
- Select appropriate evaluation tools for analysis of occupational performance
- Select appropriate interventions to address impairments with occupation, client factors, and performance skills

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What is a Concussion?

- According to the CDC (2016):

  "A concussion is 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. This sudden movement can cause the brain to bounce around or twist in the skull, stretching and damaging the brain cells and creating chemical changes in the brain"

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Incidence of Concussion

- 1.6 million to 3.8 million annually (Langlois et al., 2006)
  - Number likely to be higher due to incidence of unrecognized concussions
- National Concussion Surveillance System
  - Current data systems may only capture 1 out 9
  - Promote prevention, treatment and recovery
- Causes:
  - Sports-Related Concussion (SRC)-most common
  - Falls
  - Car Accidents
  - Work Injuries

4

Signs and Symptoms

Thinking/ Remembering	Physical	Emotional/ Mood	Sleep
Difficulty thinking clearly	Headache Fuzzy or blurry vision	Irritability	Sleeping more than usual
Feeling slowed down	Nausea or vomiting (early on) Dizziness	Sadness	Sleep less than usual
Difficulty concentrating	Sensitivity to noise or light Balance problems	More emotional	Trouble falling asleep
Difficulty remembering new information	Feeling tired, having no energy	Nervousness or anxiety	

(CDC, 2016)

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Recovery from Concussion

- Recovery time refers to the amount of time required to recover from symptoms resulting from a concussion
  - Average recovery time is about 7-10 days
  - 90% of concussions sustained during sports fully recover within 30 days (McCrea et al., 2003; Meehan et al., 2014; Zuckerman et al., 2012)
- Factors affecting recovery:
  - Severity and duration of symptoms
  - Type of symptoms present
  - Age and gender
  - History of previous concussion
- (Castille et al., 2012; Conder & Conder, 2015; Giza & Kutcher, 2014; Guskiewicz et al., 2003; Majerske et al., 2008; McClincy et al., 2006; Meehan et al, 2014; Shim et al, 2015; Wasserman et al., 2015)

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Guiding Principles of Recovery

- Cognitive rest is usually recommended for the first 24-48 hours after injury when symptoms are most severe
  - Extended cognitive and physical rest may not improve recovery time
- Avoid activities in all environments (e.g., home, work, leisure) that are known to exacerbate signs and symptoms which may prolong recovery
- Adapt the environment and activity requirements:
  - Implement strategies and accommodations
  - Facilitate a gradual, progressive plan to engage in functional activities while managing symptoms

(Acord-Vira, et al., 2018; Baker, 2014, Buckley et al., 2016, Giza et al., 2013; Hall et al., 2015; Harmon et al., 2013; McCrory et al., 2013b)

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Occupational Therapy's Role

- Use the occupational profile to guide intervention plan
- Goal setting
  - Holistic client-centered approaches to treatment
- Grade and accommodate activities to maximize performance for returning to occupation
  - Return to Learn
  - Return to Work
  - Return to Play
- Modify routines and habits to facilitate recovery
- Education on managing symptoms
- Remediate client factors and performance skills

(Brayton et al., 2016, Parkinson, n.d.; AOTA Tip Sheet, 2014)

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Evaluation

- Concussion can affect an individual's ability to participate in:
  - Activities of daily living
  - Instrumental activities of daily living
  - School
  - Work
  - Driving
  - Leisure
- Top Down Approach
  - Occupational Profile
  - Analysis of Occupational Performance (Baseline)
  - Observation: direction following, attention, frustration, fatigue

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Occupational Profile

- AOTA Occupational Profile Template
  - https://www.aota.org/~/media/Corporate/Files/Practice/Manage/Documentation/AOTA-Occupational-Profile-Template.pdf
- Canadian Occupational Performance Measure
  - http://www.thecopm.ca/
- Occupational Self-Assessment
  - https://moho.uic.edu/productDetails.aspx?aid=2
- Occupational Performance History Interview (OPHI-II)
  - https://www.moho.uic.edu/productDetails.aspx?aid=31
- Activity Card Sort
  - https://myaota.aota.org/shop_aota/prodview.aspx?TYPE=D&PID=763&SKU=1247

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Symptom Checklists

- List of 17-21 symptoms experienced following concussion
- Rating scale for severity of symptoms experienced
- Examples:
  - Rivermead Post-Concussion Symptoms Questionnaire
  - Post-Concussion Symptom Scale (PCSS)
  - Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT)

The Rivermead Post-Concussion Symptoms Questionnaire*

After a head injury or accident some people experience symptoms which can cause worry or nuisance. We would like to know if you now suffer from any of the symptoms given below. As many of these symptoms occur normally, we would like you to compare yourself now with before the accident. For each one, please circle the number closest to your answer.

0 = Not experienced at all
1 = No more of a problem
2 = A mild problem
3 = A moderate problem
4 = A severe problem

Compared with before the accident, do you now (i.e., over the last 24 hours) suffer from:

Headaches	0	1	2	3	4
Feelings of Dizziness	0	1	2	3	4
Nausea and/or Vomiting	0	1	2	3	4
Noise Sensitivity, easily upset by loud noise	0	1	2	3	4
Sleep Disturbance	0	1	2	3	4
Fatigue, tiring more easily	0	1	2	3	4
Being Irritable, easily angered	0	1	2	3	4
Feeling Depressed or Tearful	0	1	2	3	4
Feeling Frustrated or Impatient	0	1	2	3	4
Forgetfulness, poor memory	0	1	2	3	4
Poor Concentration	0	1	2	3	4
Taking Longer to Think	0	1	2	3	4
Blurred Vision	0	1	2	3	4
Light Sensitivity, Easily upset by bright light	0	1	2	3	4
Double Vision	0	1	2	3	4
Restlessness	0	1	2	3	4

Are you experiencing any other difficulties?

1. _____	0	1	2	3	4
2. _____	0	1	2	3	4

*King, N., Crawford, S., Wenden, F., Moss, N., and Wade, D. (1995) J. Neurology 242: 587-592

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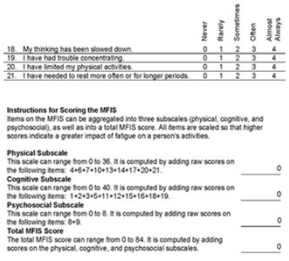
Physical Assessment

- Upper Extremity
  - Range of Motion, Manual Muscle Testing, Grip Strength
- Fatigue
  - Commonly experienced after injury
  - Sedentary daily routine can lead to deconditioning
  - Modified Fatigue Impact Scale



		Never	Rarely	Sometimes	Often	Almost Always
18.	My thinking has been slowed down.	0	1	2	3	4
19.	I have had trouble concentrating.	0	1	2	3	4
20.	I have limited my physical activities.	0	1	2	3	4
21.	I have needed to rest more often or for longer periods.	0	1	2	3	4

Instructions for Scoring the MFIS

Items on the MFIS can be aggregated into three subscales (physical, cognitive, and psychosocial), as well as into a total MFIS score. All items are scaled so that higher scores indicate a greater impact of fatigue on a person's activities.

Physical Subscale
This scale can range from 0 to 36. It is computed by adding raw scores on the following items: 4+6+7+10+13+14+17+20+21. ____0

Cognitive Subscale
This scale can range from 0 to 40. It is computed by adding raw scores on the following items: 1+2+3+5+11+12+15+16+18+19. ____0

Psychosocial Subscale
This scale can range from 0 to 8. It is computed by adding raw scores on the following items: 8+9. ____0

Total MFIS Score
The total MFIS score can range from 0 to 84. It is computed by adding scores on the physical, cognitive, and psychosocial subscales. ____0

https://www.sralab.org/sites/default/files/2017-06/mfis.pdf

Physical Assessment

- Vision and Visual Perceptual
- Balance Assessments:
- Functional Capacity Evaluation
- Further assessment of specific client factors and/or performance skills may be needed

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Cognitive Functional Evaluation

- Proposed by Hartman-Maeir, Katz, and Baum
- Modified by Tim Wolf, PhD, OTR/L
- 5 Stages
  - Occupational Profile Interview (Occupational History)
  - Cognitive Screening
  - Functional Cognitive Assessment (Performance-Based Testing)
  - Specific Cognitive domain testing (Neurocognitive Testing)
  - Environmental assessment/measures

CONTINUED

Cognitive Screens

- Montreal Cognitive Assessment (MoCA)
  - https://www.mocatest.org/
- MiniMental State Exam
  - https://www.parinc.com/Products/Pkey/237

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Performance Based Cognitive Assessment

- Executive Function Performance Test (EFPT)
  - https://www.ot.wustl.edu/about/resources/executive-function-performance-test-efpt-308
- Complex Task Performance Assessment (CTPA)
  - https://www.ot.wustl.edu/about/resources/assessments-388
- Assessment of Motor and Process Skills (AMPS)
  - https://www.innovativeotsolutions.com/tools/amps/

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Specific Domain Testing

- Neuropysch testing if available
- ImPACT
  - https://impacttest.com/
- Attention
  - Integrated Visual and Auditory Continuous Performance Test (IVA-2)
    - https://www.braintrain.com/iva2/
  - Test of Everyday Attention
    - https://www.pearsonclinical.com/psychology/products/100000182/test-of-everyday-attention-the-tea.html
- Memory
  - Rivermead Behavioral Memory Test
    - https://www.pearsonclinical.com/psychology/products/100000644/rivermead-behavioural-memory-test-third-edition-rbmt-3.html
  - Contextual Memory Test
    - http://pearsonclinical.in/solutions/contextual-memory-test/

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Case Study-Brad

- 18 year old senior high school student
- Part-time employee at fast food restaurant
- Sustained concussion 30 days ago from a fall
- Physical therapy 2x/week to address balance and dizziness
- Referral for occupational therapy to address difficulties with returning to school and resuming previous activities

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Occupational Profile-COPM

Occupational Performance Issues	Importance	Performance	Satisfaction
School	10	2	1
Hanging out with friends	6	5	4
Video Games	5	3	2
Part-time job	7	1	1

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Symptom Checklist

- Symptoms reported within last 24 hours and level of severity
- Mild-headache, balance, dizziness, sensitivity to light, irritability, drowsiness
- Moderate-fatigue, feeling slowed down, feeling like “in a fog”, difficulty concentrating, difficulty remembering
- Symptoms worsen with physical and cognitive activity

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Physical Assessment

- ROM-WFL
- MMT
  - 4/5 bilateral shoulder flexion, abduction, int/ext rotation, neck flexion, extension
  - 5/5 all other movements
- Fatigue- 0 to 84 scale
  - Physical subscale=24/36
  - Cognitive subscale=30/40
  - Psychosocial subscale=2/8
  - Total=56/84

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MoCA

- Score of 26/30
- Areas missed:
  - Attention
  - Language
- Normal ≥ 26/30

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IVA-Response Control & Attention

- Overall response score = 24
- Auditory response score = 18
  - Prudence=20
  - Consistency=45
  - Stamina =35
- Visual response score = 65
  - prudence=30
  - consistency=100
  - stamina 110
- Overall attention score = 40
  - Auditory attention score = 67
    - Vigilance=93
    - Focus=64
    - Speed=77
  - Visual attention score = 32
    - Vigilance=15
    - focus=80
    - speed=75
  - Sustained visual attention = 15
  - Sustained auditory attention = 43

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General Interventions

- Modifying/adjusting daily routine/schedule
- Developing organizational strategies
- Using planner and cell phone for reminders
- Using accommodations for school
- Cognitive skill training with functional activity

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CONTINUED

Interventions for School

- Return to Learn
  - Specific graduated protocol for students to gradually return to the classroom
    - No Activity, gradual reintroduction of cognitive activity, homework at home before school work at school, school reentry, gradual reintegration into school, resumption of full cognitive workload (Master, Gioia, Leddy, & Grady, 2012).
    - Daily activities at home, school activities, part-time school, return to school full time (McCrory, et al., 2017).
- Returning too early to the classroom can have negative effects on student's ability to perform at pre-injury levels that may affect eligibility
- Long-term consequences on college completion, choice of career and livelihood with premature return to learn

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CONTINUED

Short-Term Accommodations

- Allows for gradual return to classroom as tolerated
- Need to be individualized and flexible
- Lengthy process if traditional route of receiving accommodations is utilized
- Not available at all schools or backed by legislation for short term accommodations

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Accommodations	Implications for School	Signs/Symptoms
Excused Absences	Allows for complete cognitive rest from school work	Could be beneficial for all symptoms following SRC
Rest Breaks	Allows student to return to school and leave environment for brief periods of time to get relief from stimuli increasing symptoms	Could be beneficial for all symptoms following SRC
Extension of Assignments/Tests Deadlines	Allows students to have increased time to prepare, complete assignments or tests, and recall information learned	Difficulty concentrating, information processing, handling full workload, headaches, memory problems, excessive fatigue
Extended Time to Take Test	Allows students more time to focus and process information and recall information learned	Difficulty concentrating, diminished information-processing speed, headaches, memory problems
Wearing sunglasses or turning down lights	Allows student to attend class and decrease risk of exacerbating symptoms caused by sensitivity to different lighting (e.g., fluorescent vs. natural lighting)	Visual sensitivity, blurred or double vision, headaches
Quiet Rooms for Activities/Exams	Allows student an alternative environment to complete activities (e.g., lunch, labs, group meetings) to decrease risk of exacerbating symptoms	Difficulty concentrating, easily distracted, decreased attention, light or noise sensitivity, memory problems
Use of Reader or Note Taker for Tests/Assignments	Allows student to return to class to focus on content without dividing attention to take notes, decrease the demands on visual and verbal memory	Difficulty concentrating, vision problems (e.g., scanning, reading), memory problems
Preferential Seating	Allows student to return to class and sit closer to professor or away from symptoms causing lights/sounds.	Difficulty concentrating,
Tutor	Allows student to receive extra support for academic demands	Could be beneficial for all symptoms following SRC

Note. Adapted from McGrath, 2010; Halstead et al, 2013; Hall et al., 2015

fppt.com

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Case Study-Allison

- 50 year old
- Single mom of 10 year old son
- Sustained concussion from fall 6 months ago
- Worked fulltime as a director
  - Currently part-time
- Student pursuing masters degree
- Requires assistance with everyday activities from family

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Occupational Profile-COPM

Occupational Performance Issues	Importance	Performance	Satisfaction
Work	10	2	1
College course	10	1	1
Parenting/leisure	10	3	2
Finances	8	4	3
Morning/night routines	8	4	4

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Symptom Checklist

- Symptoms reported within last 24 hours and level of severity
- Mild-headaches, noise sensitivity, sleep disturbances, restlessness
- Moderate-fatigue, irritability, feeling depressed, feeling frustrated
- Severe-forgetfulness, poor concentration, taking longer to think
- Symptoms worsen with physical and cognitive activity

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Physical Assessment

- ROM-WFL
- MMT-5/5

- Fatigue- 0 to 84 scale
  - Physical subscale=21/36
  - Cognitive subscale=38/40
  - Psychosocial subscale=6/8
  - Total=65/84

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MoCA

- Score of 28/30
- Areas missed:
  - Language
    - Repetition
    - Fluency

- Normal ≥ 26/30

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General Interventions

- Modifying/adjusting daily routine/schedule
  - Part time schedule at work
  - Developing morning and evening routines
  - Addressing sleep disturbances
  - Time with daughter for leisure
- Developing organizational strategies
- Using planner and cell phone for reminders
- Using accommodations for work environment
- Cognitive skill training with functional activity
- Return to Learn- assist with accommodations
- Managing finances

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Resource Facilitation

- Promoting access to services
- Coordinating services
- Educating employers
- Access to public transportation
- State agencies

CONTINUED

Job Coaching

- Professional or para-professional
- Addresses all areas of job performance
- Remove supports as able to perform as expected
- Requires a supportive therapeutic relationship

CONTINUED

Recommendations for Sleep

- Sleep important for recovery
- Strategies to help improve sleep:
  - Gradual decrease of sleeping/resting during day while simultaneously increasing physical activity (following guidelines for returning to activity).
  - Set a schedule/bedtime routine/wake up routine
  - Limit time spent on electronics and watching TV prior to going to sleep and during the night if trouble sleeping
  - Avoid watching TV or playing on electronics while in bed
  - Decrease lighting in room, use darkening curtains

(Brayton et al., 2016; AOTA Tip Sheet, 2014)

Conclusion

- Return to productive activity is essential to occupational therapy intervention post concussion
- Assessment and intervention activities need to be based on the client's goals and occupational performance problems identified with the occupational profile
- Regardless of approach, therapeutic relationship is a critical foundation for success
- Advocacy and education key components for effectiveness

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Questions?

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