Fatigue has been conceptualized as an experience of weariness or tiredness following mental or physical exertion, often resulting in a reduced capacity for work and limited efficiency to respond to stimuli. Fatigue can be caused by psychological or physiological forces and can be central or peripheral, which in lay terms is experienced as cognitive fatigue and physical fatigue or weariness. Fatigue is one of the most pervasive symptoms following concussion/mTBI, with 27.8% of individuals experiencing persistent fatigue at 3 months post-injury. The perception of fatigue can be out of proportion to exertion or may even occur without any exertion. One study reported a level of fatigue in patients with concussion/mTBI comparable to that of individuals with multiple sclerosis, a condition which is known to be associated with clinically-significant disease-related fatigue levels. Fatigue is multidimensional and can affect physical, cognitive, motivational and psychological (i.e., depression, anxiety) spheres. Individuals with fatigue can experience poorer problem-solving and coping skills, which then increases stress, depression which creates an ongoing cycle that contributes to disability. For instance, a state of chronic stress may be present following mTBI, which compromises the biological stress system and increases the likelihood for fatigue and stress-related disorders. Fatigue following TBI has also been found to significantly impact well-being and quality of life, and is strongly associated with somatic symptoms and perceived situational stress.

Due to its prevalence and effects, it is recommended that all patients be assessed for fatigue through a personal history with the patient and/or support person. A review of the relevant items from the Rivermead Post Concussion Symptoms Scale (Appendix 1.5) and/or a specific measure of fatigue, such as the Barrow Neurological Institute (BNI) Fatigue Scale (Appendix 11.1). The Fatigue Severity Scale (Appendix F), the Fatigue Impact Scale (Appendix F) or the Mental Fatigue Scale (Appendix F) can also assist with this.

Post-concussion/mTBI fatigue can be persistent and has been shown to still be present up to five years post-injury. Those who experience fatigue at three months post-injury are increasingly likely to continue to experience fatigue beyond six months post-injury. Due to the relationship between pituitary dysfunction, specifically growth hormone deficiency, and fatigue some have suggested a relation between the two; however recent literature has not found a significant relationship. As certain medications can cause fatigue, the practitioner should also conduct a thorough review of the patient’s medications. If the patient has been prescribed a medication that is associated with fatigue, alternatives that produce the same treatment effect without inducing fatigue should be considered. A list of medications commonly associated with fatigue can be found in Appendix 11.2. As persistent fatigue may cause other symptoms to worsen, early intervention is required in order to prevent interference with the patient’s ability to participate in rehabilitation therapies. Patients should also be provided with advice on how to cope with fatigue (see Appendix 11.3), such as general stress management techniques. If debilitating fatigue persists, consider referral to an interdisciplinary concussion clinic.

Research into treating fatigue has revealed few studies varying from non-pharmacological to pharmacological treatment. Methylphenidate has been found to improve mental fatigue and processing speed in patients with persistent post-concussion symptoms, including up to 6 months post-treatment. Caution is recommended in the use of stimulants however; as clinical experience has identified that some individuals report that stimulants provide a burst of energy followed by increased fatigue. Some non-pharmacological treatments such as exercise (e.g., aquatic therapy), mindfulness-based stress reduction, cognitive behavioural therapy and blue-light therapy could potentially be helpful in treating fatigue however more research is needed.

<table>
<thead>
<tr>
<th>RECOMMENDATIONS FOR ASSESSMENT AND MANAGEMENT OF FATIGUE</th>
<th>GRADE</th>
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</thead>
<tbody>
<tr>
<td>11.1 Determine whether cognitive and/or physical fatigue is a significant symptom by taking a focused history and reviewing the relevant items from administered questionnaires (see Appendix 11.1).</td>
<td>C</td>
</tr>
<tr>
<td>11.2 Characterize the dimensions of fatigue (e.g., physical, mental, impact on motivation) and consider alternative or contributing, treatable causes that may not be directly related to the injury. Please refer to Table 11.1 for further information about primary and secondary causes, as well as appropriate treatment strategies for different types of fatigue.</td>
<td>C</td>
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</table>
**Section 11. Fatigue**

<table>
<thead>
<tr>
<th>11.3</th>
<th>After a brief period of rest during the acute phase (24–48 hours) after injury, patients can be encouraged to become gradually and progressively more active as tolerated (i.e., activity level should not bring on or worsen their symptoms).*</th>
<th>C</th>
</tr>
</thead>
</table>
| 11.4 | If identified as a significant symptom, some key considerations that may aid in the management of persistent fatigue can include:  
• Aiming for a gradual increase in activity levels (see Appendix 11.4) that will parallel improvement in energy levels, including exercise below symptom threshold.  
• Reinforce strategies of cognitive and physical activity pacing (see Appendix 2.6) and fragmentation across the day to help patients achieve more without exceeding tolerance levels.  
• Encouraging good sleep hygiene (especially regularity of sleep-wake schedules, and avoidance of stimulants and alcohol), and proper relaxation times.  
• Using a notebook or a diary to plan meaningful goals, record activity achievement and identify patterns of fatigue.  
• Acknowledging that fatigue can be exacerbated by low mood or stress.  
• Provide patients with a pamphlet containing advice on coping strategies for fatigue (see Appendix 11.3). | C |

* NOT AN ORIGINAL RECOMMENDATION - REPEAT OF 4.5

**Table 11.1 Fatigue: Assessment and Management Factors for Consideration**

| Characteristics | • Frequency  
• Intensity  
• Time of day  
• Aggravating factors |
|---|---|
| Assessment | • Focused history  
• Physical examination  
• Barrow Neurological Institute (BNI) Fatigue Scale to assess fatigue (Appendix 11.1)  
• Consider blood test screening if appropriate (CBC, TSH, electrolytes) |
| Secondary Causes of Fatigue | • Affective disorder, including depression, anxiety  
• Sleep disorder post-concussion/mTBI  
• Metabolic causes, including hypothyroidism, anemia  
• Electrolyte abnormality (e.g., hyponatremia, hypocalcemia, etc.)  
• Polypharmacy or medication adverse effect |

**RESOURCES**

**APPENDICES**

1 Rivermead Post Concussion Symptoms Questionnaire  
2 Barrow Neurological Institute (BNI) Fatigue Scale  
3 List of Medications Associated with Fatigue, Asthenia, Somnolence, and Lethargy from the Multiple Sclerosis Council (MSC) Guideline  
4 Patient Advice Sheet on Coping Strategies for Fatigue  
5 Increasing Physical Activity to Better Manage Fatigue  
6 Parkwood Pacing Graphs  
7 Other Useful Links/References for Resources to Consider  

**TABLES**

1 Fatigue: Assessment and Management Factors for Consideration  

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Guidelines for Concussion/mTBI and Persistent Symptoms: 3rd Ed.  
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References