Guidelines for Concussion / Mild Traumatic Brain Injury & Persistent Symptoms

Second Edition

For adults (18+ years of age)







Module 11: Persistent Fatigue

Ontario Neurotrauma Foundation
Fondation ontarienne de neurotraumatologie

MODULE 11: PERSISTENT FATIGUE

Ontario Neurotrauma Foundation
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Please note, the project team independently managed the development and production of the guideline and, thus, editorial independence is retained.

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The recommendations and resources found within the *Guidelines for Concussion/Mild Traumatic Brain Injury & Persistent Symptoms* are intended to inform and instruct care providers and other stakeholders who deliver services to adults who have sustained or are suspected of having sustained a concussion/mTBI. These guidelines are not intended for use with patients or clients under the age of 18 years. These guidelines are not intended for use by people who have sustained or are suspected of having sustained a concussion/mTBI for any self-diagnosis or treatment. Patients may wish to bring their healthcare and other providers' attention to these guidelines.

The recommendations provided in these guidelines are informed by best available evidence at the time of publication, and relevant evidence published after these guidelines could influence the recommendations made within. Clinicians should also consider their own clinical judgement, patient preferences and contextual factors such as resource availability in clinical decision-making processes.

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Unique Features & Symbols in the Current Guideline

Hyperlinks

To improve ease of use, the current guideline has embedded hyperlinks to improve navigation between sections, appendices, and so on. For example, by clicking any heading in the table of contents above, you will be taken directly to that particular section in the current PDF document. Also, anytime there is mention of a particular table, figure, appendix or section, you can simply click on it to go directly to that item.

Symbols

The following symbol has been placed to the left of each guideline recommendation that should be prioritized for implementation. This was determined by expert consensus members during the endorsement/prioritization process, where experts were allowed to provide 20 prioritization votes (see Methodology in the Complete Version). Guideline recommendations with a summed prioritization score greater than 20 are key clinical practice guidelines recommendations for implementation.

The following symbol has been placed to the left of one key guideline recommendation in each of the sections that did not include a recommendation with a prioritization score greater than 20 (determined by expert consensus members during the endorsement/prioritization process).

At the bottom of each page in the current document, there is a hyperlinked footer that can be used to return to the table of contents as desired. Also, clicking “Return to Last Page” will take you back to the previously viewed page. (Note: When scrolling through the pages, the “Return to Last Page” button will only return to the last page that was scrolled through).

11 Persistent Fatigue

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 is one of the most pervasive symptoms following mTBI, and it can actually be out of proportion to exertion or may even occur without any exertion.[1] In a recent study, participants reported a level of fatigue comparable to that of individuals with multiple sclerosis, which is known for clinically significant disease-related fatigue levels.[2] Fatigue is multidimensional and can affect physical, cognitive, motivational, psychological, and subjective aspects.[3] Patients can experience poorer problem-solving and coping skills, which increases stress, depression, and fatigue, and creates an ongoing cycle that contributes to disability.[2] 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.[4] 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.[3,4]

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 significant other to corroborate. A review of the relevant items from the Rivermead Post Concussion Symptoms Questionnaire (Appendix 1.5) and/or a specific measure of fatigue, such as the Barrow Neurological Institute (BNI) Fatigue Scale[5] (Appendix 11.1), can assist with this.

Post-mTBI fatigue can be persistent and has been shown to still be present up to five years post-injury.[3] Those who experience fatigue at three months post-injury are increasingly likely to continue to experience fatigue beyond six months post-injury.[6] Because certain medications can cause fatigue, the practitioner should also review the patient's medication use. 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 causes other symptoms to worsen, early intervention is required in order to prevent interference with the patient's ability to participate in rehabilitation therapies.[3,7] Patients should also be provided with advice on how to cope with fatigue (Appendix 11.3), such as general stress management techniques.[3] If debilitating fatigue persists, consider referral to a brain injury specialist or rehabilitation program.

RECOMMENDATIONS FOR ASSESSMENT AND MANAGEMENT OF PERSISTENT FATIGUE		
		GRADE
11.1	Determine whether fatigue is a significant symptom by taking a focused history and reviewing the relevant items from administered questionnaires (Appendix 11.1).	C
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.	C
11.3	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 that will parallel improvement in energy levels. • Reinforce that pacing activities across the day will help patients to achieve more and to avoid 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

Table 11.1 Fatigue: Assessment & 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-mTBI • Metabolic causes, including hypothyroidism, anemia • Electrolyte abnormality (e.g., hyponatremia, hypocalcemia, etc.) • Polypharmacy or medication adverse effect

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References

1 Dijkers MPJM, Bushnik T. Assessing fatigue after traumatic brain injury: An evaluation of the Barroso Fatigue Scale. *Journal of Head Trauma Rehabilitation*. 2008;23:3-16.

2 Juengst S, Skidmore E, Arenth PM, Niyonkuru C, Raina K. Unique Ccontribution of fatigue to disability in community-dwelling adults with traumatic brain injury. *American Congress of Rehabilitation Medicine*. 2013;94:74-79.

2 Cantor JB, Ashman T, Gordon W et al. Fatigue after traumatic brain injury and its impact on participation and quality of life. *Journal of Head Trauma Rehabilitation*. 2008;23:41-51.

3 Bay E, de Leon M. Chronic stress and fatigue-related quality of life after mild to moderate traumatic brain injury. *Journal of Head Trauma Rehabilitation*. 2011;26(5):355-363.

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5 Krupp LB, Larocca NG, Muir-Nash J, et al. The Fatigue Severity Scale: application to patients with Multiple Sclerosis and Systemic Lupus Erythematosus. *Archives of Neurology*. 1989;46:1121-1123

6 Norrie J, Heitger M, Leathem J, Anderson T, Jones R, Flett R. Mild traumatic brain injury and fatigue: A prospective longitudinal study. *Brain Injury*. 2010; 24(13-14): 1528-1538.

Appendix 1.5

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, Wade D. The Rivermead Post Concussion Symptoms Questionnaire: A measure of symptoms commonly experienced after head injury and its reliability.* Journal of Neurology. *1995;242:587-592.*

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Appendix 11.1

Barrow Neurological Institute (BNI) Fatigue Scale*

Name: _____ **Date**: _____

Please rate the extent to which each of the items below has been a problem for you since your injury. You should chose only ONE number from 0–7 on the scale below when making your response.

0	1	2	3	4	5	6	7
Rarely a problem		*Occasional problem but not frequent*		*A frequent problem*		*A problem most of the time*	

1. How difficult is it for me to maintain my energy throughout the day? _____
2. How difficult is it for me to participate in activities because of fatigue? _____
3. How difficult is it for me to stay awake during the day? _____
4. How difficult is it for me to complete a task without becoming tired? _____
5. How difficult is it for me to stay alert during activities? _____
6. How difficult is it for me to build my energy level once I wake up in the morning? _____
7. How difficult is it for me to stay out of my bed during the day? _____
8. How difficult is it for me to stay alert when I am not involved in something? _____
9. How difficult is it for me to attend to something without becoming sleepy? _____
10. How difficult is it for me to last the day without taking a nap? _____

TOTAL: ☐

11. Please circle your OVERALL level of fatigue since your injury:

0	1	2	3	4	5	6	7	8	9	10
No problem										*Severe problem*

* Borgaro SR, Gierok S, Caples H, Kwasnica C. Fatigue after brain injury: Initial reliability study of the BNI Fatigue Scale. *Brain Injury.* 2004;18:685–690. Reproduced with permission from the authors and Informa Healthcare.

Appendix 11.2

List of Medications Associated with Fatigue, Asthenia, Somnolence, and Lethargy from the Multiple Sclerosis Council (MSC) Guideline*

Medications are cited that cause symptoms in > 5% of patients

MEDICATIONS	RATE OF SYMPTOMS
Analgesics	
Butalbital	■
Butorphanol (Stadol NS)	●
Dihydrocodeine	■
Fentanyl (Duragesic transdermal)	●
Hydrocodone (Vicoprofen)	●
Morphine	■
Oxycodone (Oxycontin)	●
Tramadol (Ultram)	●
Anticonvulsants	
Carbamazepine (Tegretol)	◆
Clorazepate (Tranxene)	■
Divalproex (Depakote)	●
Felbamate (Felbatol)	●
Gabapentin (Neurontin)	●
Lamotrigine (Lamictal)	●
Phenobarbital	▲
Primidone (Mysoline)	▲
Antidepressants	
Buspirone (Buspar)	●
Clomipramine (Anafranil)	●
Doxepin (Sinequan)	◆
Fluoxetine (Prozac)	●
Fluvoxamine (Luvox)	●
Mirtazapine (Remeron)	●
Nefazodone (Serzone)	●
Paroxetine (Paxil)	●
Sertraline (Zoloft)	●
Trazodone (Desyrel)	●
Tricyclic agents	■
Venlafaxine (Effexor)	●
Antihistamines	
Astemizole (Hismanal)	●
Azatadine (Trinalin)	■
Azelastine (Astelin)	●
Cetirizine (Zyrtec)	●
Chlorpheniramine	◆
Diphenhydramine	■
Loratadine (Claritin)	●
Phenylephrine	◆
Terfenadine (Seldane)	●

MEDICATIONS	RATE OF SYMPTOMS
Antihypertensive	
Acebutolol (Sectral)	●
Amiloride (Moduretic)	●
Atenolol (Tenoretic, Tenormin)	●
Benazepril (Lotensin)	●
Betaxolol (Kerlone)	●
Carteolol (Cartrol)	●
Clonidine (Catapres, Combipress)	●
Diltiazem (Tiazac)	●
Doxazosin (Cardura)	●
Guanadrel (Hylorel)	●
Guanfacine (Tenex)	●
Labetalol (Normodyne, Trandate)	●
Metoprolol (Lopressor, Toprol)	●
Nifedipine (Adalat)	●
Perindopril (Aceon)	●
Prazosin (Minipress, Minizide)	●
Anti-Inflammatory	
Fenoprofen (Nalfon)	●
Ketorolac (Toradol)	●
Naproxen (Anaprox, Naprelan, Naprosyn)	
Tolmetin (Tolectin)	●
Antipsychotic	
Clozapine (Clozaril)	●
Mesoridazine (Serentil)	■
Molindone (Moban)	■
Olanzapine (Zyprexa)	●
Risperidone (Risperdal)	●
Asthma Drugs	
Fluticasone (Flovent)	●
Terbutaline	●
Carbonic Anhydrase Inhibitors	
Dichlorphenamide (Daranide)	◆
Cardiac	
Bepridil (Vascor)	●
Amiodarone (Cordarone)	●
Disopyramide (Norpace)	●
Flecainide (Tambocor)	●
Nifedipine (Procardia)	●
Quinine (Cardioquin, Quinidex)	●
Sotalol (Betapace)	●

Legend

● >50%	● 25-50%	● 10-25%	● 5-10%
■ Most Frequent	■ Among Most Frequent	■ Among Frequent	▲ Can Develop During Therapy
◆ Most Common	◆ Among Most Common	▲ Occasional	

* Adapted from the Multiple Sclerosis Council (MSC) Guideline.

MEDICATIONS	RATE OF SYMPTOMS	MEDICATIONS	RATE OF SYMPTOMS
Medications are cited that cause symptoms in > 5% of patients			
Diabetic Agents		**Nicotine Agents**	
Glipizide (Glucotrol)	●	Habitrol	●
Troglitazone (Rezulin)	●	Nicotrol nasal spray	●
		Prostep	●
Gastrointestinal			
Dicyclomine (Bentyl)	●	**Sedative Hypnotics**	
Granisetron (Kytril)	●	Alprazolam (Xanax)	●
Metoclopramide (Reglan)	●	Clonazepam (Klonopin)	●
		Diazepam (Valium)	◆
Genitourinary		Estazolam (ProSom)	●
Terazosin (Hytrin)	●	Quazepam (Doral)	●
		Secobarbital (Seconal)	◆
Hormone Replacement		Temazepam (Restoril)	●
Depo-Provera (medroxyprogesterone)	●	Triazolam (Halcion)	●
Progesterone cream (Crinone)	●	Zolpidem (Ambien)	●
Leuprolide (Lupron)	●		
(Lupron depot preparation)	●	**Other**	
		Dexfenfluramine (Redux)	●
Immune Modulators		Fenfluramine (Pondimin)	◆
Interferon beta-1a (Avonex)	●	Scopolamine (Transderm Scop)	●
Interferon beta-1b (Betaseron)	●		
Muscle Relaxants			
Carisoprodol (Soma)	■		
Cyclobenzaprine (Flexeril)	●		
Dantrolene (Dantrium)	■		
Diazepam (Valium)	◆		
Tizanidine (Zanaflex)	●		

Legend

● >50%	● 25-50%	● 10-25%	● 5-10%
■ Most Frequent	■ Among Most Frequent	■ Among Frequent	▲ Can Develop During Therapy
◆ Most Common	◆ Among Most Common	▲ Occasional	

* Adapted from the Multiple Sclerosis Council (MSC) Guideline.

Appendix 11.3

Patient Advice Sheet on Coping Strategies for Fatigue*

FACT SHEET 11

Managing Fatigue

THIS FACT SHEET explains the symptoms and triggers of fatigue and provides some strategies to minimise and manage it.

Fatigue is a common and very disabling symptom experienced by people with acquired brain injury (ABI) or neurological conditions. Some people with multiple sclerosis, for example, describe an overwhelming sense of general fatigue that can occur at any time of the day. It happens without warning and the person needs to rest immediately before the symptoms get worse.

Fatigue is also a problem among carers as they find themselves managing increased workloads and greater responsibilities. Members of the rehabilitation team understand your position and can recommend support services, such as respite care, and coping strategies. Do consult with your GP or a trusted team member before your own health is affected.

What is Fatigue?

The fatigue associated with brain injury or neuromuscular damage often appears more suddenly, lasts longer and takes longer to recover from than ordinary fatigue. Make no mistake, *it is real*, and not a case of mind over matter.

What Causes Fatigue?

Fatigue can occur for no apparent reason or after relatively mild exertion. It may be caused by physical activity, but is just as likely to occur as a result of mental activity.

Planning the week's errands, organising a work schedule, calculating a weekly budget or simply reading, can be very draining. We all experience this to some extent but for the person with brain injury, it happens more easily and much more frequently.

Strategies

Fatigue can be managed with good planning and rest periods, but first carers and the family member affected need to acknowledge that it is *real*.

Symptoms

The following symptoms may all suggest fatigue:

- Withdrawal.
- Loss of appetite.
- Shortness of breath.
- Slower movement and speech.
- Short answers, quieter voice, a dull tone of voice.
- Irritability, anxiety, crying episodes.
- Increased forgetfulness.
- Lack of motivation to plan for each day.
- Lack of interest in things the person normally considers important (e.g. appearance, grooming).

Fatigue also intensifies symptoms experienced because of ABI or a neurological condition, such as:

- Poor vision.
- Slurred speech.
- Difficulty finding words.
- Poor concentration.
- Cramps or weak muscles.
- Poor coordination or balance.

The next step is to work out what triggers it and what factors make the symptoms worse, such as holding a demanding conversation for more than 10 minutes or watching a film with a complicated plot. You can then work together to develop strategies to conserve energy.

* Reproduced with permission from the BrainLink (2006) Carer's Guide (*For Those Who Care: A Practical Guide for Families of People with Neurological Conditions or Acquired Brain Injury*).

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Contingency plans: Fatigue may occur at the least convenient times – on public transport or during a meeting. You need to negotiate ways of coping when this happens. You can use specific strategies or call in extra support. Work out contingency plans with your family member. Your neuropsychologist, occupational therapist or physiotherapist can help with suggestions.

Assess your environment: Provide an environment that is easy to move around and work in. Think about how and where things are stored, bench heights, entrances, types of furnishing, lighting. For example, some people may find fluorescent lighting or dim lighting more tiring.

Assess best hours: Some people function best in the mornings, so complete demanding tasks then. Others function better in the afternoon or the evening. Organise your routine accordingly.

Schedule rest periods: Make a daily or weekly schedule and include regular rest periods. "Rest" means *do nothing at all*.

Use aids: Use mechanical aids to conserve energy for when it really counts. One man spared his legs extra effort by using his wheelchair to get from his house to the car, then from the car to the church, before walking his daughter, the bride, down the aisle.

Break it down: Break down activities into a series of smaller tasks. This provides opportunities to rest while allowing the person to complete the task. Encourage sensible shortcuts.

Set priorities: Focus on things that must be done and let the others go.

Medication highs & lows: Be aware of changes throughout the day that relate to medication. Is the person better or worse immediately after their tablets? Plan their activities around these times.

Sleep: Encourage a regular sleeping pattern. Some people may also need a regular nap – or two – during the day.

Fitness: Your family member should maintain fitness within their individual ability, that is, enough exercise to stay fit, but never to the point of causing tension, overtiredness or cramps.

Weight: Maintaining a healthy weight helps. If your family member's condition affects their ability to eat, consult a dietician and speech pathologist to ensure they have a nutritious diet that is easy to manage (See Fact Sheet 8: *Eating and Swallowing Problems*).

Weather: Hot weather can also increase fatigue. Plan around this.

Seek support: Ask for advice. In particular, an occupational therapist can visit your home and advise on an energy-conserving plan of action.

Contacts

For more information, talk to your doctor or condition-specific support organisation (See Contacts pg 7).

* Reproduced with permission from the BrainLink (2006) Carer's Guide (*For Those Who Care: A Practical Guide for Families of People with Neurological Conditions or Acquired Brain Injury*).

Appendix A

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* The recommendations in this document are those of the Ontario Neurotrauma Foundation, identified by the guideline development team and expert consensus group members, and do not necessarily represent agreement of or endorsement by the Centers for Disease Control and Prevention.

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Appendix B

Other Links/References for Resources to Consider

Section 11: Persistent Fatigue

Fatigue Severity Scale (FSS)
A 9-item self-report questionnaire designed to assess disabling fatigue in all individuals. The scale was designed to look at fatigue/function measures; that is the connection between fatigue intensity and functional disability.

Krupp LB, LaRocca NG, Muir-Nash J, Steinberg AD. The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematosus. *Archives of Neurology*. 1989 Oct;46(10):1121-1123.