LONG COVID WEB

LONG COVID ECHO
SESSION SUMMARY from 10 Oct 2025

(i) KEY PRESENTATION: Energy-System First Aid - Wearables and Heart Rate-Guided Rehabilitation by Professor Todd Davenport PT, DPT, PhD, MPH (slide deck attached)

The presentation focused on energy systems first aid for long COVID patients dealing with post-exertional malaise (PEM). About a quarter of people with long COVID experience PEM, which causes severe physical and mental fatigue after exertion, often with recovery taking weeks or even months (Pouliopoulou et al, 2025).

Traditional graded exercise therapy has mixed results and can sometimes make things worse for these patients (Davenport et al, 2010; ME Association, 2025; Black and McCully, 2005).

The idea of "energy systems first aid" was described, using the acronym **CHECK, CALL, and CARE** — **checking** for PEM through evidence-based assessment, **calling** on multidisciplinary teams, and **caring** for or protecting the body's dysfunctional energy systems while helping patients safely use their functional ones (Davenport et al, 2022).

People with PEM often have chronotropic incompetence, which means their heart rate doesn't rise normally with exercise, and that this tends to get worse as the illness progresses (Davenport et al, 2019).

Heart rate monitoring can give instant feedback on exertion levels, while heart rate variability (HRV) helps track overall autonomic balance over time. Three heart rate thresholds were recommended:

- The gold standard — heart rate at ventilatory anaerobic threshold from a two-day cardiopulmonary exercise test,
- About 55% of age-predicted max heart rate for stable patients (Van Campen, 2020), and
- Resting heart rate plus 15 beats for those currently "crashing."

Clinicians can interpret an HRV using a traffic light system:

- **Red** means high resting heart rate and low variability (a crash state),
- **Green** means low resting heart rate and high variability (good functioning), and
- **Yellow** shows transitional states.

Wearable devices aren't perfect — their proprietary algorithms and potential measurement errors can affect accuracy (Steere, 2025). It is recommended that clinicians focus on trends over time instead of single readings and keeping symptom logs for better interpretation.

References, listed chronologically by citation:

Pouliopoulou DV, Hawthorne M, MacDermid JC, et al. Prevalence and impact of postexertional malaise on recovery in adults with post-covid-19 condition: a systematic review with meta-analysis. *Arch Phys Med Rehabil*. Feb 5 2025;doi:10.1016/j.apmr.2025.01.471

Davenport TE, Stevens SR, VanNess MJ, Snell CR, Little T. Conceptual model for physical therapist management of chronic fatigue syndrome/myalgic encephalomyelitis. *Phys Ther*. Apr 2010;90(4):602-14. doi:10.2522/ptj.20090047
ME Association. No decisions about me without me. ME Association. Accessed October 9, 2025. https://meassociation.org.uk/wp-content/uploads/2015-ME-Association-Illness-Management-Report-No-decisions-about-me-without-me-30.05.15.pdf

Black CD, McCully KK. Time course of exercise induced alterations in daily activity in chronic fatigue syndrome. Dyn Med. 2005;4:10. Published 2005 Oct 28. doi:10.1186/1476-5918-4-10

Davenport TE, Stevens SR, Stevens J, Snell CR, Van Ness JM. Lessons from Myalgic Encephalomyelitis/Chronic Fatigue Syndrome for Long COVID Part 3: "Energy System First Aid" for People With Postexertional Symptom Exacerbation. *JOSPT Blog* blog. April 8, 2022. https://www.jospt.org/do/10.2519/jospt.blog.20220216/full/

Davenport TE, Lehnen M, Stevens SR, VanNess JM, Stevens J, Snell CR. Chronotropic Intolerance: An Overlooked Determinant of Symptoms and Activity Limitation in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome?. Front Pediatr. 2019;7:82. Published 2019 Mar 22. doi:10.3389/fped.2019.00082

Van Campen, F. C. (2020). Validity of 2-Day Cardiopulmonary Exercise Testing in Male Patients with Myalgic Encephalomyelitis/Chronic Fatigue Syndrome. Advances in Physical Education, 10, 68-80.
https://doi.org/10.4236/ape.2020.101007

Steere, K. Evidence-based clinical utility of heart rate variability across populations, including Long COVID. Cardiopulmonary Physical Therapy Journal. 2025; 36(1):p 58-69.

(ii) CASE PRESENTATION:

A young retail computer store manager who developed long COVID after contracting COVID-19 in 2021 at a family funeral. The patient was university-trained, previously active and healthy, living independently with roommates.

Initial COVID Illness. The patient had one prior vaccination and experienced 8 days of acute illness with fatigue, cough, headache, loss of taste and smell, and body aches. However, 14 days after recovery, persistent symptoms began.

Long COVID Symptoms. When the clinician saw the patient in 2022, symptoms included:

- Slower speech and comprehension
- Hypersensitivity to noise, light, and sound
- New motion sickness and car sickness
- Difficulty learning new technology (previously easy for the patient)
- Computer screen scrolling causing eye strain and motion sickness
- Reduced short-term memory
- Severe fatigue affecting daily functioning
- Post-exertional crashes when attempting additional activities

Clinical Assessment: Physical examination was normal. Laboratory tests showed low vitamin D and B12 levels (which were supplemented). CT chest, pulmonary function tests, and brain MRI were all normal.

Treatment Approach: The clinician recommended short-term work leave, occupational therapy referral, vitamin supplementation, lifestyle modifications focusing on nutrition and sleep, basic energy management education, and optometry consultation for vision issues.

Questions posed for open discussion:

- Would brain imaging be recommended? If so, what would CT angiogram be adequate?
- How could the tracking and visual issues be addressed?
- If funding or funds available, when should neurocognitive assessment be completed? Would retesting be of benefit?
- How do we determine if the cognitive changes are permanent, acquired brain injury vs an energy issue?

The ECHO community members and hub members discussed the following ideas:

- The hub/faculty advised that a CT angiogram in this particular scenario is not warranted at this time.
- Testing fasting insulin and blood glucose levels; track dietary patterns to identify links between high carbohydrate intake and worsening symptoms like brain fog.
- Ketosis as a potential way to improve cognitive function in patients with brain hypometabolism.
- Use neuroplasticity retraining programs (e.g., eye yoga, Primal Trust) to address visual and neurological symptoms; some patients report symptom remission.
- Screen for neurodiversity (e.g., ADHD) and hypermobility, particularly in athletic individuals, as these may relate to underlying long COVID mechanisms.
- Screen for POTS and dysautonomia, which are treatable and can improve fatigue and brain fog.
- Check for binocular vision issues and consider specialized lenses, as used in MS or post-concussion care, to help with headaches and eye symptoms.
- Follow Post-COVID Care (PCC) guidelines, focusing on symptom-guided interventions rather than routine imaging, since neurocognitive changes are often invisible on MRI.
- Consider potential causes like post-hypoxic encephalopathy or thromboinflammation, but avoid unnecessary imaging without new findings.
- Understand the connection between physical exertion and cognitive dysfunction, supporting an energy-based approach to managing long COVID symptoms.

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Submit your de-identified cases (PROJECT ECHO) to: Christine.chan@uhn.ca
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