In brief

Exercise and long COVID

15 July 2022

Question(s)

- Is exercise helpful in individuals with long COVID?
- Is post-exertional symptom exacerbation a risk in long COVID?

Summary

- Studies evaluating pulmonary rehabilitation and exercise programs show that exercise is beneficial to improving functional outcomes such as movement, muscle strength and quality of life in people with long COVID.[1, 2] They do not typically mention post-exertional symptom exacerbation as a complication in their participants.
- There is a need for high quality research into long COVID rehabilitation, including the role of exercise, particularly in the context of the Omicron variant.
- Available clinical guidelines recommend a gradual increase in exercise based on symptoms and on an individual basis.[3-6]
- Some people with long COVID appear to be at risk of post-exertional fatigue or malaise. There is little research on this to date.
    - Researchers have noted that post-exertional symptom exacerbation in long COVID is similar to the fatigue observed in other post-viral conditions.[7, 8]
    - A study based on self-reported symptoms reported that post-exertional symptom exacerbation occurred in nearly half (46.9%) of participants with self-reported long COVID, based on symptom criteria designed for the study. Of the participants with long COVID, 58.7% met the scoring thresholds used to identify post-exertional symptom exacerbation in people with chronic fatigue / myalgic encephalomyelitis.[7]
    - No other studies were identified on the risk of developing post-exertional symptom exacerbation after COVID-19 infection.
- Overall, evidence is weak[9] with inadequate research designs, inconsistent definition of long COVID, and changing context in terms of variants and vaccination. A meta-analysis (pre-print) noted that studies can be overrepresented by patients with greater severity of acute COVID-19, comorbidities or lower baseline fitness.[10]

Background

Exercise (often within the context of a more comprehensive pulmonary rehabilitation program) is commonly prescribed for recovery after intensive care stays[11] and for management of chronic respiratory conditions.[12] It is unclear if exercise is helpful for people with long COVID, or if it may be associated with post-exertional symptom exacerbation, as occurs in chronic fatigue / myalgic encephalomyelitis.[13]

Synthesised literature

Peer-reviewed literature

- In a randomised control trial for individuals with ongoing dyspnoea after COVID-19, exercise in the context of a pulmonary rehabilitation group was shown to improve: ability to walk six metres, lower limb muscle strength physical health-related quality of life. The study had transparent reporting around adverse events and dropout rates and demonstrated no concerns associated with post-exertional fatigue.[1]
- In a conference abstract (not yet available as an article), exercise in the context of a pulmonary rehabilitation group was also associated with decreases in fatigue compared to a control group for post-acute COVID-19 patients (not specifically those with long COVID).[14]
- Remaining studies discuss results associated with exercise in COVID-19 patients, however, often do not:
    - directly measure fatigue as an outcome
    - mention post-exertional fatigue or malaise, dropout rate or adverse events
    - have a control (and act instead as pilot studies and commentaries on feasibility[15-17])
    - pertain specifically to long COVID but only to post-acute COVID exercise.[18]
- A narrative review discusses that in the absence of high-quality evidence on post-exertional symptoms in long COVID, the principles established for the management of post-exertional symptoms in chronic fatigue syndrome / myalgic encephalomyelitis could instead be adopted.[8] The review highlights that in those better-studies populations, understanding triggers, onset latency, and the time course of post-exertional fatigue can help clinicians to construct rehabilitative programs that avoid worsening symptoms.

Grey literature

- There are several clinical management guidelines for patients with COVID-19 and long COVID. In the absence of high-quality evidence, such guidelines are predominantly developed based on clinical expertise, consensus approaches and by reiterating recommendations from other similar populations or situations, e.g. previous outbreaks of viral pneumonias, post ICU recovery principles and chronic fatigue.
- The World Health Organization has suggested (November 2021) that a gradual increase in exercise should be based on symptoms, and that the training principles of comprehensive pulmonary rehabilitation programmes apply for COVID-19 patients with persistent fatigue, reduced exercise capacity and breathlessness.[4]
- The Canadian Thoracic Society has suggested (November 2021) beginning at lower intensities for aerobic exercise, conservative progression, monitoring of symptoms to prevent post-exertional malaise, and gradual introduction of strengthening exercises and modifying education modules to consider the specific challenges related to COVID-19.[3]
- The Centres for Disease Prevention and Control has suggested (June 2021) that a gradual return to exercise as tolerated could be helpful for most patients. It also suggested that a conservative physical rehabilitation plan might be indicated for some patients (e.g., people with post-exertional malaise) as well as consultation with physiatry for cautious initiation of exercise and that recommendations about pacing may be useful.[5]

- The British Thoracic Society (September 2020) highlighted the lack of evidence for the specific topic and suggested that the principles of exercise prescription remain as described for non-COVID individuals who have significant deconditioning and breathlessness. Survivors of COVID-19 who report fatigue may benefit from an exercise programme prescribed using the principles of graded exercise therapy. Support may be required from experts in the management of chronic fatigue syndrome / post viral fatigue syndrome.[6]
- The Stanford Hall consensus statement (May 2020), designed for very active individuals (e.g. military personnel or athletes), suggested that:[19]
    - Low intensity exercise should be considered initially, particularly for patients who required oxygen therapy, while concurrently monitoring vital signs. Gradual increase in exercise should be based on symptoms.
    - With very mild symptoms, which may or may not be due to COVID-19, consider limiting activity to light activity but limit sedentary periods. Increase rest periods if symptoms deteriorate. Prolonged exhaustive or high-intensity training should be avoided.
    - On return from mild/moderate COVID-19 illness to exercise, one1 week of low-level stretching and light muscle strengthening activity should be trialled prior to targeted cardiovascular sessions.
- Most of these guidelines include additional caveats for individuals affected by myocarditis, blood clots, including pulmonary embolism, or other complications.

Method

To inform this brief, PubMed and Google searches were conducted using terms related to long COVID, exercise and pulmonary rehabilitation on 16 June 2022.

References

1. Li Ja, Xia W, Zhan C, et al. A telerehabilitation programme in post-discharge COVID-19 patients (TERECO): a randomised controlled trial. Thorax. 2021:thoraxjnl-2021-217382. DOI: 10.1136/thoraxjnl-2021-217382
2. Critical Intelligence Unit. Breathlessness post COVID-19 [Internet]. Sydney: Agency for Clinical Innovation; 2022 May 04 [cited 2022 Jun 29]. Available from: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0004/723613/Evidence-Check-Breathlessness-post-COVID-19.pdf
3. Beauchamp MK, Janaudis-Ferreira T, Wald J, et al. Canadian Thoracic Society position statement on rehabilitation for COVID-19 and implications for pulmonary rehabilitation. Can J Respir Crit Care Sleep Med. 2022 2022/01/02;6(1):9-13. DOI: 10.1080/24745332.2021.1992939
4. World Health Organization. Clinical management of COVID-19 patients: living guidelines. [Internet]. World Health Organization; 2021 [cited 2022 June 22]. Available from: https://app.magicapp.org/#/guideline/j1WBYn/section/j9mKNj
5. Centers for Disease Control and Prevention. Management of Post-COVID Conditions. Evaluating and Caring for Patients with Post-COVID Conditions: Interim Guidance [Internet]. United States: Centers for Disease Control and Prevention; 2021 [cited 2022 June 22]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-management.html
6. Singh S, Bolton C, Nolan C, et al. Delivering rehabilitation to patients surviving COVID-19 using an adapted pulmonary rehabilitation approach – BTS guidance [Internet]. United Kingdom:

British Thoracic Society; 2020 [cited 2022 June 22]. Available from: https://www.brit-thoracic.org.uk/covid-19/covid-19-information-for-the-respiratory-community/

7. Twomey R, DeMars J, Franklin K, et al. Chronic Fatigue and Postexertional Malaise in People Living With Long COVID: An Observational Study. Physical Therapy. 2022;102(4). DOI: 10.1093/ptj/pzac005
8. Davenport T, Stevens S, Stevens J, et al. Lessons from Myalgic Encephalomyelitis/Chronic Fatigue Syndrome for Long COVID: Postexertional Symptom Exacerbation is an Abnormal Response to Exercise/Activity. J Orthop Sports Phys Ther. 2022;Online. DOI: 10.2519/jospt.blog.20220202
9. Cha C, Baek G. Symptoms and management of long COVID: A scoping review. J Clin Nurs. 2021 Dec 15. DOI: 10.1111/jocn.16150
10. Durstenfeld MS, Sun K, Tahir PM, et al. Cardiopulmonary exercise testing to evaluate post-acute sequelae of COVID-19 ("Long COVID"): a systematic review and meta-analysis. medRxiv. 2022:2022.06.15.22276458. DOI: 10.1101/2022.06.15.22276458
11. Connolly B, Salisbury L, O'Neill B, et al. Exercise rehabilitation following intensive care unit discharge for recovery from critical illness: executive summary of a Cochrane Collaboration systematic review. J Cachexia Sarcopenia Muscle. 2016 Dec;7(5):520-6. DOI: 10.1002/jcsm.12146
12. Bolton CE, Bevan-Smith EF, Blakey JD, et al. British Thoracic Society guideline on pulmonary rehabilitation in adults: accredited by NICE. Thorax. 2013;68(Suppl 2):ii1-ii30. DOI: 10.1136/thoraxjnl-2013-203808
13. Mateo LJ, Chu L, Stevens S, et al. Post-exertional symptoms distinguish Myalgic Encephalomyelitis/Chronic Fatigue Syndrome subjects from healthy controls. Work. 2020;66:265-75. DOI: 10.3233/WOR-203168
14. De Souza Y, Macedo J, Nascimento R, et al., editors. Low-Intensity Pulmonary Rehabilitation Through Videoconference for Post-Acute COVID-19 Patients. American Thoracic Society International Conference; 2021: American Journal of Respiratory and Critical Care Medicine.
15. Barbara C, Clavario P, De Marzo V, et al. Effects of exercise rehabilitation in patients with long coronavirus disease 2019. Eur J Prev Cardiol. 2022;29(7):e258-e60. DOI: 10.1093/eurjpc/zwac019
16. Gloeckl R, Leitl D, Jarosch I, et al. Pulmonary rehabilitation in long COVID: more than just natural recovery!? ERJ Open Res. 2021 Jul;7(3). DOI: 10.1183/23120541.00454-2021
17. Nopp S, Moik F, Klok FA, et al. Outpatient Pulmonary Rehabilitation in Patients with Long COVID Improves Exercise Capacity, Functional Status, Dyspnea, Fatigue, and Quality of Life. Respiration. 2022;101(6):593-601. DOI: 10.1159/000522118
18. Dun Y, Liu C, Ripley-Gonzalez JW, et al. Six-month outcomes and effect of pulmonary rehabilitation among patients hospitalized with COVID-19: a retrospective cohort study. Ann Med. 2021 Dec;53(1):2099-109. DOI: 10.1080/07853890.2021.2001043
19. Barker-Davies RM, O'Sullivan O, Senaratne KPP, et al. The Stanford Hall consensus statement for post-COVID-19 rehabilitation. Br J Sports Med. 2020;54(16):949-59. DOI: 10.1136/bjsports-2020-102596

Evidence checks are archived a year after the date of publication

SHPN: (ACI) 220589 | TRIM: ACI/D22/51-24 | Edition 1