

## Interventions for long COVID treatments

Prepared for the OUTPOST APT, HEAL COVID and ALCAP MRFF-funded projects

November 2024 (search performed on the 4<sup>th</sup> of December 2024)

The Bond and ALEC teams have completed full text screening of all studies published up to the end of November and have included a total of 129 RCTs. These trials were identified through a comprehensive systematic search on PubMed, Cochrane and Embase, plus pre-print servers. The search is also supplemented with updates from long COVID reviews that are being conducted by EPPI-Centre and Epistemonikos.

In November, 6 new RCTs on long COVID were published. These studies focused on; physical Activity and physical therapy (n=1), therapeutic procedures (n=2), diet and dietary supplements (n=2), and other pharmaceutical (bovhyaluronidase azoximer) (n=1) (see Table 1).

Table 1: List of RCTs included in the November update

Reference	Taxonomy category
<a href="#">Ramírez-Vélez R, Oteiza J, Legarra-Gorgoñon G, Oscoz-Ochandorena S, García-Alonso N, García-Alonso Y, et al. Exercise training in long COVID: the EXER-COVID trial. 2024 Nov 22.</a>	Physical activity
<a href="#">Gagnon C, Vincent T, Bherer L, Gayda M, Cloutier S, Nozza A, et al. Oxygen supplementation and cognitive function in long-COVID. 2024. Contract No.: 11.</a>	Therapeutic
<a href="#">Zulbaran-Rojas A, Bara R, Lee M, Bargas-Ochoa M, Phan T, Pacheco M, et al. Transcutaneous electrical nerve stimulation for fibromyalgia-like syndrome in patients with Long-COVID: a pilot randomized clinical trial. 2024. Contract No.: 1.</a>	Therapeutic
<a href="#">Ranisavljev M, Stajer V, Todorovic N, Ostojic J, Cvejic JH, Steinert RE, et al. The effects of 3-month supplementation with synbiotic on patient-reported outcomes, exercise tolerance, and brain and muscle metabolism in adult patients with post-COVID-19 chronic fatigue syndrome (STOP-FATIGUE): a randomized Placebo-controlled clinical trial. 2024 Nov 26.</a>	Diet/dietary
<a href="#">Calvani R, Giampaoli O, Marini F, Del Chierico F, De Rosa M, Conta G, et al. Beetroot juice intake positively influenced gut microbiota and inflammation but failed to improve functional outcomes in adults with long COVID: a pilot randomized controlled trial. 2024. Contract No.: 12.</a>	Diet/Dietary
<a href="#">Avdeev S, Ignatova G, Drapkina O, Popova V, Melnikova E, Chudinovskikh T, et al. Bovhyaluronidase azoximer for long-term pulmonary sequelae of COVID-19: a randomized, double-blind, placebo-controlled trial. 2024.</a>	Other pharmaceutical

In the absence of substantial high-quality trial evidence for interventions of interest (e.g. antivirals), the Living Evidence Group has commenced a systematic review for low dose naltrexone in long COVID. As there are no published RCTs on this drug to date, the Living Evidence Group will identify and review research literature from pre-post studies of low dose naltrexone in long COVID. This review is underway and the results will be reported to the project team shortly.

The table below lists all the trials and systematic reviews that have been identified since the beginning of the search. Please refer to Appendix A for a full reference list of RCTs that have been included to date.

Table 2. Updated summary of RCTs for long COVID treatments (Most recent search conducted on 4<sup>th</sup> December 2024)

Taxonomy categories	Systematic reviews	Registered clinical trials	RCTs						
			Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Total
<b>Pharmacological interventions</b>			19	1	0	1	0	1	22
Acetylcholinesterase inhibitor			0						0
Antidepressant		3	2			1			3
Antifibrotic		1	1						1
Antihistamine		1	0						0
Antivirals	1	7	0	1					1
Beta Blockers			1						1
Corticosteroids	5		0						0
Enzyme Therapeutics			0						0
Mood stabilizer			0						0

Targeted drugs			2						2
Multiple	2		0						0
NSAIDs (*anti-inflammatory)		5	0						0
Olfactory function/anosmia			11						11
Other (BrainMax, AXA1125)			2					1	3
<b>Non-pharmacological</b>			<b>83</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>8</b>	<b>6</b>	<b>102</b>
Physical Activity and physical therapy	31		37	1		1	5	1	45
Therapeutic procedures	6		17	1	2	1		2	23
Complementary and Alternative medicine	5		6			1	1		8
Behavioural, psychological, educational	2		6	1			1		8
Diet and dietary supplements	2		17	3			1	2	23
Other non-drug			0						0
Both drug and non-drug interventions	2		0						0
<b>Full texts included</b>	<b>56</b>	<b>20</b>	<b>102</b>	<b>7</b>	<b>2</b>	<b>4</b>	<b>8</b>	<b>6</b>	<b>129</b>

\*bovhyaluronidase azoximer (longidase), #Targeted drugs- includes both Leronlimab-CCR5-, and RNase

Appendix A: Reference list of all studies included to date

**Pharmacological interventions n=22**

<a href="#">Abdelazim MH, Abdelazim AH. Effect of Sodium Gluconate on Decreasing Elevated Nasal Calcium and Improving Olfactory Function Post COVID-19 Infection. Am J Rhinol Allergy. 2022;36(6):841-8.</a>	pre July 2024
<a href="#">Abdelazim MH, Abdelazim AH, Moneir W. The effect of intra-nasal tetra sodium pyrophosphate on decreasing elevated nasal calcium and improving olfactory function post COVID-19: a randomized controlled trial. Allergy Asthma Clin Immunol. 2022;18(1):67.</a>	pre July 2024
<a href="#">Abdelazim MH, Mandour Z, Abdelazim AH, Ismaiel WF, Gamal M, Abourehab MAS, et al. Intra Nasal Use of Ethylene Diamine Tetra Acetic Acid for Improving Olfactory Dysfunction Post COVID-19. Am J Rhinol Allergy. 2023;37(6):630-7.</a>	pre July 2024
<a href="#">Altemani A, Alanazi M, Altemani A, Alharbi A, Alsahali S, Alotaib N, et al. The Efficacy of Sodium Phytate as a Natural Chelating Agent in Reducing Elevated Calcium Levels in Nasal Mucus Among Individuals Experiencing Olfactory Dysfunction Following COVID-19: A Prospective Randomized Double-Controlled Clinical Trial. American journal of rhinology &amp; allergy. 2023;38:116-22.</a>	pre July 2024
<a href="#">Andrews JS, Boonyaratanakornkit JB, Krusinska E, Allen S, Posada JA. Assessment of the Impact of RNase in Patients With Severe Fatigue Related to Post-Acute Sequelae of SARS-CoV-2 Infection (PASC): A Randomized Phase 2 Trial of RSLV-132. Clin Infect Dis. 2024.</a>	pre July 2024
<a href="#">Avdeev S, Ignatova G, Drapkina O, Popova V, Melnikova E, Chudinovskikh T, et al. Bovhyaluronidase azoximer for long-term pulmonary sequelae of COVID-19: a randomized, double-blind, placebo-controlled trial. 2024</a>	Nov 2024
<a href="#">Dal Negro R, Turco P, Povero M. Nebivolol: an effective option against long-lasting dyspnoea following COVID-19 pneumonia - a pivotal double-blind, cross-over controlled study. Multidisciplinary respiratory medicine. 2022;17:886.</a>	pre July 2024
<a href="#">Gaylis NB, Ritter A, Kelly SA, Pourhassan NZ, Tiwary M, Sacha JB, et al. Reduced Cell Surface Levels of C-C Chemokine Receptor 5 and Immunosuppression in Long Coronavirus Disease 2019 Syndrome. Clin Infect Dis. 2022;75(7):1232-4.</a>	pre July 2024
<a href="#">Geng LN, Bonilla H, Hedlin H, Jacobson KB, Tian L, Jagannathan P, et al. Nirmatrelvir-Ritonavir and Symptoms in Adults With Postacute Sequelae of SARS-CoV-2 Infection: The STOP-PASC Randomized Clinical Trial. JAMA Intern Med. 2024.</a>	July 2024

<a href="#">Gupta S, Lee JJ, Perrin A, Khan A, Smith HJ, Farrell N, et al. Efficacy and Safety of Saline Nasal Irrigation Plus Theophylline for Treatment of COVID-19-Related Olfactory Dysfunction: The SCENT2 Phase 2 Randomized Clinical Trial. JAMA Otolaryngol Head Neck Surg. 2022;148(9):830-7.</a>	pre July 2024
<a href="#">Guttuso T, Jr., Zhu J, Wilding GE. Lithium Aspartate for Long COVID Fatigue and Cognitive Dysfunction: A Randomized Clinical Trial. JAMA Netw Open. 2024;7(10):e2436874.</a>	September 2024
<a href="#">Hamed S, Ahmed M. The effectiveness of cerebrolysin, a multi-modal neurotrophic factor, for treatment of post-covid-19 persistent olfactory, gustatory and trigeminal chemosensory dysfunctions: a randomized clinical trial. Expert review of clinical pharmacology. 2023;16:1261-76.</a>	pre July 2024
<a href="#">Hintschich CA, Dietz M, Haehner A, Hummel T. Topical Administration of Mometasone Is Not Helpful in Post-COVID-19 Olfactory Dysfunction. Life (Basel). 2022;12(10).</a>	pre July 2024
<a href="#">Imam MS, Abdelazim MH, Abdelazim AH, Ismaiel WF, Gamal M, Abourehab MAS, et al. Efficacy of pentasodium diethylenetriamine pentaacetate in ameliorating anosmia post COVID-19. Am J Otolaryngol. 2023;44(4):103871.</a>	pre July 2024
<a href="#">Kerget B, Çil G, Araz Ö, Alper F, Akgün M. Comparison of two antifibrotic treatments for lung fibrosis in post-COVID-19 syndrome: A randomized, prospective study. Medicina clinica (English ed). 2023;160:525-30.</a>	pre July 2024
<a href="#">Kwan ATH, Guo Z, Ceban F, Le GH, Wong S, Teopiz KM, et al. Assessing the Effects of Metabolic Disruption, Body Mass Index and Inflammation on Depressive Symptoms in Post-COVID-19 Condition: A Randomized Controlled Trial on Vortioxetine. Adv Ther. 2024;41(5):1983-94.</a>	pre July 2024
<a href="#">Lasheen H, Abou-Zeid M. Olfactory mucosa steroid injection in treatment of post-COVID-19 olfactory dysfunction: a randomized control trial. The Egyptian Journal of Otolaryngology. 2023;39.</a>	pre July 2024
<a href="#">Mahadev A, Hentati F, Miller B, Bao J, Perrin A, Kallogjeri D, et al. Efficacy of Gabapentin For Post-COVID-19 Olfactory Dysfunction: The GRACE Randomized Clinical Trial. JAMA otolaryngology-- head &amp; neck surgery. 2023;149:1111-.</a>	pre July 2024
<a href="#">McIntyre RS, Phan L, Kwan ATH, Mansur RB, Rosenblat JD, Guo Z, et al. Vortioxetine for the treatment of post-COVID-19 condition: a randomized controlled trial. Brain. 2024;147(3):849-57.</a>	pre July 2024

<a href="#">Schmidt F, Azar C, Goektas O. Treatment of Olfactory Disorders After SARS - CoViD 2 Virus Infection. Ear, nose, &amp; throat journal. 2023;1455613231168487-014556132311684.</a>	pre July 2024
<a href="#">Tanashyan M, Morozova S, Raskurazhev A, Kuznetsova P. A prospective randomized, double-blind placebo-controlled study to evaluate the effectiveness of neuroprotective therapy using functional brain MRI in patients with post-covid chronic fatigue syndrome. Biomed Pharmacother. 2023;168:115723.</a>	pre July 2024
<a href="#">Tanashyan MM, Raskurazhev AA, Kuznetsova PI, Bely PA, Zaslavskaya KI. [Prospects and possibilities for the treatment of patients with long COVID-19 syndrome]. Ter Arkh. 2022;94(11):1285-93.</a>	pre July 2024

## Non-pharmacological interventions = 102

### *Physical activity and physical therapy n=45*

<a href="#">Ahmad AM, Mohamed Awad Allah SA, Abd Elhaseeb GA, Elsharawy DE, Ahmed HS, Mohamed Abdelwahab MA. Effects of conventional versus virtual reality-simulated treadmill exercise on fatigue, cognitive function, and participant satisfaction in post-COVID-19 subjects. A randomized trial. J Exerc Sci Fit. 2024;22(4):316-21.</a>	pre July 2024
<a href="#">Alsharidah A, Kamel F, Alanazi A, Alhawsah E, Alharbi H, Alrshedi Z, et al. A Pulmonary Telerehabilitation Program Improves Exercise Capacity and Quality of Life in Young Females Post-COVID-19 Patients. Annals of rehabilitation medicine. 2023;47:502-10.</a>	pre July 2024
<a href="#">Berenguel Senén A, Gadella Fernández A, Godoy López J, Borrego Rodríguez J, Gallango Brejano M, Cepas Guillén P, et al. Functional rehabilitation based on therapeutic exercise training in patients with postacute COVID syndrome (RECOVER). Revista española de cardiología (English ed). 2023;77:167-75.</a>	pre July 2024

<a href="#">Bileviciute-Ljungar I, Norrefalk J, Borg K. Improved Functioning and Activity According to the International Classification of Functioning and Disability after Multidisciplinary Telerehabilitation for Post-COVID-19 Condition-A Randomized Control Study. Journal of clinical medicine. 2024;13:970-.</a>	pre July 2024
<a href="#">Calvo-Paniagua J, Díaz-Arribas MJ, Valera-Calero JA, Ramos-Sánchez M, Fernández-de-Las-Peñas C, Navarro-Santana MJ, et al. An Educational, Exercise and Occupational Therapy-Based Telerehabilitation Program versus 'Wait-and-See' for Improving Self-Perceived Exertion in Patients with post-COVID Fatigue and Dyspnea: A Randomized Clinical Trial. Am J Phys Med Rehabil. 2024.</a>	pre July 2024
<a href="#">Çelik Z, Kafa N, Güzel NA, Köktürk N. The effects of physical activity tele-counseling intervention on physical activity, functional performance, and quality of life in post-COVID-19 conditions: a randomized controlled trial. Expert Rev Respir Med. 2024.</a>	pre July 2024
<a href="#">Del Corral T, Fabero-Garrido R, Plaza-Manzano G, Fernández-de-Las-Peñas C, Navarro-Santana M, López-de-Uralde-Villanueva I. Home-based respiratory muscle training on quality of life and exercise tolerance in long-term post-COVID-19: Randomized controlled trial. Ann Phys Rehabil Med. 2023;66(1):101709.</a>	pre July 2024
<a href="#">Espinoza-Bravo C, Arnal-Gómez A, Martínez-Arnau FM, Núñez-Cortés R, Hernández-Guillén D, Flor-Rufino C, et al. Effectiveness of Functional or Aerobic Exercise Combined With Breathing Techniques in Telerehabilitation for Patients With Long COVID: A Randomized Controlled Trial. Phys Ther. 2023;103(11).</a>	pre July 2024
<a href="#">Lai CY, Lin CH, Chao TC, Chang CC, Huang CY, Chiang SL. Effectiveness of a 12-week telerehabilitation training in people with long COVID: A randomized controlled trial. Ann Phys Rehabil Med. 2024;67(5):101853.</a>	pre July 2024
<a href="#">M K, A B, L D, P G, B D, P dT, et al. Feasibility of a Group-Based Telerehabilitation Intervention for Long COVID Management. ResearchSquare. 2022.</a>	pre July 2024
<a href="#">McGregor G, Sandhu H, Bruce J, Sheehan B, McWilliams D, Yeung J, et al. Clinical effectiveness of an online supervised group physical and mental health rehabilitation programme for adults with post-covid-19 condition (REGAIN study): multicentre randomised controlled trial. Bmj. 2024;384:e076506.</a>	pre July 2024

<a href="#">Okan F, Okan S, Duran Yücesoy F. Evaluating the Efficiency of Breathing Exercises via Telemedicine in Post-Covid-19 Patients: Randomized Controlled Study. Clin Nurs Res. 2022;31(5):771-81.</a>	pre July 2024
<a href="#">Pleguezuelos E, Del Carmen A, Moreno E, Miravittles M, Serra M, Garnacho-Castaño M. Effects of a telerehabilitation program and detraining on cardiorespiratory fitness in patients with post-COVID-19 sequelae: A randomized controlled trial. Scandinavian journal of medicine &amp; science in sports. 2023;34:e14543.</a>	pre July 2024
<a href="#">Pleguezuelos E, Del Carmen A, Moreno E, Serra-Prat M, Serra-Payá N, Garnacho-Castaño MV. Telerehabilitation improves cardiorespiratory and muscular fitness and body composition in older people with post-COVID-19 syndrome. J Cachexia Sarcopenia Muscle. 2024.</a>	pre July 2024
<a href="#">Samper-Pardo M, León-Herrera S, Oliván-Blázquez B, Méndez-López F, Domínguez-García M, Sánchez-Recio R. Effectiveness of a telerehabilitation intervention using ReCOVerry APP of long COVID patients: a randomized, 3-month follow-up clinical trial. Scientific reports. 2023;13:7943.</a>	pre July 2024
<a href="#">Samper-Pardo M, Oliván-Blázquez B, León-Herrera S, Sánchez-Arizcuren R, Casado-Vicente V, Sánchez-Recio R. Effectiveness of ReCOVerry APP to improve the quality of life of Long COVID patients: a 6-month follow-up randomized clinical trial. 2023.</a>	pre July 2024
<a href="#">Sarmiento A, Adodo R, Hodges G, Webber S, Sanchez-Ramirez D. Virtual pulmonary rehabilitation approaches in patients with post COVID syndrome: a pilot study. BMC pulmonary medicine. 2024;24:139.</a>	pre July 2024
<a href="#">Stöltzing A, Schröder D, Müllenmeister C, Behrens GMN, Klawitter S, Klawonn F, et al. Improvement in quality of life and cognitive function in Post Covid Syndrome after online occupational therapy: results from a randomized controlled pilot study. medRxiv. 2024.</a>	pre July 2024
<a href="#">Vallier JM, Simon C, Bronstein A, Dumont M, Jobic A, Paleiron N, et al. Randomized controlled trial of home-based vs. hospital-based pulmonary rehabilitation in post COVID-19 patients. Eur J Phys Rehabil Med. 2023;59(1):103-10.</a>	pre July 2024



<a href="#">Abo Elyazed TI, Abd El-Hakim AAE, Saleh OI, Sonbol MMF, Eid HA, Moazen E, et al. Diaphragmatic strengthening exercises for patients with post COVID-19 condition after mild-to-moderate acute COVID-19 infection: a randomized controlled study. J Rehabil Med. 2024;56:jrm25491.</a>	pre July 2024
<a href="#">Bai B, Xu M, Zhou H, et al. Effects of aerobic training on cardiopulmonary fitness in patients with long COVID-19: a randomized controlled trial. Vol. 25. 2024:649.</a>	October 2024
<a href="#">Besnier F, Malo J, Mohammadi H, Clavet S, Klai C, Martin N, et al. Effects of Cardiopulmonary Rehabilitation on Cardiorespiratory Fitness and Clinical Symptom Burden in Long COVID: Results from the COVID-Rehab Randomized Controlled Trial. Am J Phys Med Rehabil. 2024.</a>	pre July 2024
<a href="#">Cunha ACR, Silva JC, Garcês CP, et al. Online and Face-to-Face Mat Pilates Training for Long COVID-19 Patients: A Randomized Controlled Trial on Health Outcomes. Vol. 21. International journal of environmental research and public health. 2024 Oct 19.</a>	October 2024
<a href="#">Dwiputra B, Ambari A, Triangto K, et al. The home-based breathing and chest mobility exercise improves cardiorespiratory functional capacity in long COVID with cardiovascular comorbidities: a randomized study. Vol. 24. 2024:574.</a>	October 2024
<a href="#">Gaudreau-Majeau F, Gagnon C, Djedaa S, Bérubé B, Malo J, Iglesias-Grau J, et al. Cardiopulmonary rehabilitation's influence on cognitive functions, psychological state, and sleep quality in long COVID-19 patients: A randomized controlled trial. Neuropsychological rehabilitation. 2024:1-17.</a>	pre July 2024
<a href="#">Gomes Dos Santos EG, Vieira da Costa K, Cordeiro de Souza IT, Victor Dos Santos Felix J, Furtado Brandão CB, Michelle de Souza Fernandes V, et al. Effects of a cardiopulmonary rehabilitation protocol on functional capacity, dyspnea, fatigue, and body composition in individuals with post-COVID-19 syndrome: A randomized controlled trial. Physiother Res Int. 2024;29(2):e2086.</a>	pre July 2024
<a href="#">Jimeno-Almazán A, Buendía-Romero Á, Martínez-Cava A, Franco-López F, Sánchez-Alcaraz BJ, Courel-Ibáñez J, et al. Effects of a concurrent training, respiratory muscle exercise, and self-management recommendations on recovery from post-COVID-19 conditions: the RECOVE trial. J Appl Physiol (1985). 2023;134(1):95-104.</a>	pre July 2024

<a href="#">Jimeno-Almazán A, Franco-López F, Buendía-Romero Á, Martínez-Cava A, Sánchez-Agar JA, Sánchez-Alcaraz Martínez BJ, et al. Rehabilitation for post-COVID-19 condition through a supervised exercise intervention: A randomized controlled trial. Scand J Med Sci Sports. 2022;32(12):1791-801.</a>	pre July 2024
<a href="#">Kaczmarczyk K, Matharu Y, Bobowik P, Gajewski J, Maciejewska-Skrendo A, Kulig K. Resistance Exercise Program Is Feasible and Effective in Improving Functional Strength in Post-COVID Survivors. Journal of clinical medicine. 2024;13:1712-.</a>	pre July 2024
<a href="#">Kaddoussi R, Rejeb H, Kalai A, et al. Effects of a cardiopulmonary rehabilitation programme on submaximal exercise in Tunisian patients with long-COVID19: a randomized clinical trial. Vol. 41. 2024:197-217.</a>	October 2024
<a href="#">Kerling A, Beyer S, Dirks M, Scharbau M, Hennemann A, Dopfer-Jablonka A, et al. Effects of a randomized-controlled and online-supported physical activity intervention on exercise capacity, fatigue and health related quality of life in patients with post-COVID-19 syndrome. BMC sports science, medicine &amp; rehabilitation. 2024;16:33.</a>	pre July 2024
<a href="#">Kogel A, Machatschek M, Scharschmidt R, Wollny C, Lordick F, Ghanem M, et al. Physical exercise as a treatment for persisting symptoms post-COVID infection: review of ongoing studies and prospective randomized controlled training study. Clin Res Cardiol. 2023;112(11):1699-709.</a>	pre July 2024
<a href="#">Leon-Herrera S, Olivan-Blazquez B, Sanchez-Recio R, Mendez-Lopez F, Magallon-Botaya R, Sanchez-Arzcuren R. Effectiveness of an online multimodal rehabilitation program in long COVID patients: a randomized clinical trial. Arch Public Health. 2024;82(1):159.</a>	September 2024
<a href="#">Maritescu A, Crisan AF, Pescaru CC, Stoicescu ER, Oancea C, Iacob D. Effectiveness of Combined Pulmonary Rehabilitation and Progressive Muscle Relaxation in Treating Long-Term COVID-19 Symptoms: A Randomized Controlled Trial. Vol. 13. Journal of clinical medicine. 2024 Oct 18.</a>	October 2024
<a href="#">McNarry MA, Berg RMG, Shelley J, Hudson J, Saynor ZL, Duckers J, et al. Inspiratory muscle training enhances recovery post-COVID-19: a randomised controlled trial. Eur Respir J. 2022;60(4).</a>	pre July 2024

<p><a href="#">Mooren J, Garbsch R, Schäfer H, Kotewitsch M, Waranski M, Teschler M, et al. Medical Rehabilitation of Patients with Post-COVID-19 Syndrome-A Comparison of Aerobic Interval and Continuous Training. Journal of clinical medicine. 2023;12:6739-.</a></p>	pre July 2024
<p><a href="#">Palau P, Domínguez E, Gonzalez C, Bondía E, Albiach C, Sastre C, et al. Effect of a home-based inspiratory muscle training programme on functional capacity in postdischarged patients with long COVID: the InsCOVID trial. BMJ Open Respir Res. 2022;9(1).</a></p>	pre July 2024
<p><a href="#">Pietranis KA, Izdebska WM, Kuryliszyn-Moskal A, Dakowicz A, Ciotkiewicz M, Kaniewska K, et al. Effects of Pulmonary Rehabilitation on Respiratory Function and Thickness of the Diaphragm in Patients with Post-COVID-19 Syndrome: A Randomized Clinical Trial. J Clin Med. 2024;13(2).</a></p>	pre July 2024
<p><a href="#">Ramírez-Vélez R, Oteiza J, Legarra-Gorgoñon G, Oscoz-Ochandorena S, García-Alonso N, García-Alonso Y, et al. Exercise training in long COVID: the EXER-COVID trial. 2024 Nov 22.</a></p>	Nov 2024
<p><a href="#">Romanet C, Wormser J, Fels A, Lucas P, Prudat C, Sacco E, et al. Effectiveness of exercise training on the dyspnoea of individuals with long COVID: A randomised controlled multicentre trial. Ann Phys Rehabil Med. 2023;66(5):101765.</a></p>	pre July 2024
<p><a href="#">Sánchez Milá Z, Rodríguez Sanz D, Martín Nieto A, Jiménez Lobo A, Ramos Hernández M, Campón Chekroun A, et al. Effects of a respiratory and neurological rehabilitation treatment plan in post Covid-19 affected university students. Randomized clinical study. Chronic Respiratory Disease. 2024;21.</a></p>	pre July 2024
<p><a href="#">Sánchez-Milá Z, Abuín-Porras V, Romero-Morales C, Almazán-Polo J, Velázquez Saornil J. Effectiveness of a respiratory rehabilitation program including an inspiration training device versus traditional respiratory rehabilitation: a randomized controlled trial. PeerJ. 2023;11:e16360-e.</a></p>	pre July 2024
<p><a href="#">Spiesshoefer J, Regmi B, Senol M, Jörn B, Gorol O, Elfeturi M, et al. Potential Diaphragm Muscle Weakness-related Dyspnea Persists Two Years after COVID-19 and Could Be Improved by Inspiratory Muscle Training: Results of an Observational and an Interventional Trial. Am J Respir Crit Care Med. 2024.</a></p>	pre July 2024

<a href="#">Stavrou VT, Vavougiou GD, Astara K, Mysiris DS, Tsirimonas G, Papayianni E, et al. The Impact of Different Exercise Modes in Fitness and Cognitive Indicators: Hybrid versus Tele-Exercise in Patients with Long Post-COVID-19 Syndrome. Brain Sci. 2024;14(7).</a>	July 2024
<a href="#">Tryfonos A, Pourhamidi K, Jörnåker G, Engvall M, Eriksson L, Elhallas S, et al. Functional Limitations and Exercise Intolerance in Patients With Post-COVID Condition: A Randomized Crossover Clinical Trial. JAMA Netw Open. 2024;7(4):e244386.</a>	pre July 2024

### ***Therapeutic procedures n=23***

<a href="#">Abo El Naga H, El Zaiat R, Hamdan A. The potential therapeutic effect of platelet-rich plasma in the treatment of post-COVID-19 parosmia. The Egyptian Journal of Otolaryngology. 2022;38.</a>	pre July 2024
<a href="#">Amorim NTS, Cavalcanti FCB, Moura E, Sobral Filho D, Leitão CCS, Almeida MM, et al. Does whole-body vibration improve risk of falls, balance, and heart rate variability in post-COVID-19 patients? A randomized clinical trial. J Bodyw Mov Ther. 2024;39:518-24.</a>	pre July 2024
<a href="#">Badran B, Huffman S, Dancy M, Austelle C, Bikson M, Kautz S, et al. A pilot randomized controlled trial of supervised, at-home, self-administered transcutaneous auricular vagus nerve stimulation (taVNS) to manage long COVID symptoms. Bioelectronic medicine. 2022;8:13.</a>	pre July 2024
<a href="#">Bowen R, Arany P. Use of either transcranial or whole-body photobiomodulation treatments improves COVID-19 brain fog. Journal of biophotonics. 2023;16:e202200391.</a>	pre July 2024
<a href="#">Cardoso Soares P, de Freitas P, Eduardo C, Azevedo L. Photobiomodulation, Transmucosal Laser Irradiation of Blood, or B complex as alternatives to treat Covid-19 Related Long-Term Taste Impairment: double-blind randomized clinical trial. Lasers in medical science. 2023;38:261.</a>	pre July 2024

<a href="#">Catalogna M, Sasson E, Hadanny A, Parag Y, Zilberman-Itskovich S, Efrati S. Effects of hyperbaric oxygen therapy on functional and structural connectivity in post-COVID-19 condition patients: A randomized, sham-controlled trial. NeuroImage Clinical. 2022;36:103218-.</a>	pre July 2024
<a href="#">Duffy A, Naimi B, Garvey E, Hunter S, Kumar A, Kahn C, et al. Topical platelet-rich plasma as a possible treatment for olfactory dysfunction—A randomized controlled trial. International Forum of Allergy &amp; Rhinology. 2024.</a>	pre July 2024
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