



Return to Sport Post COVID-19 Infection: Implications for Physiotherapists

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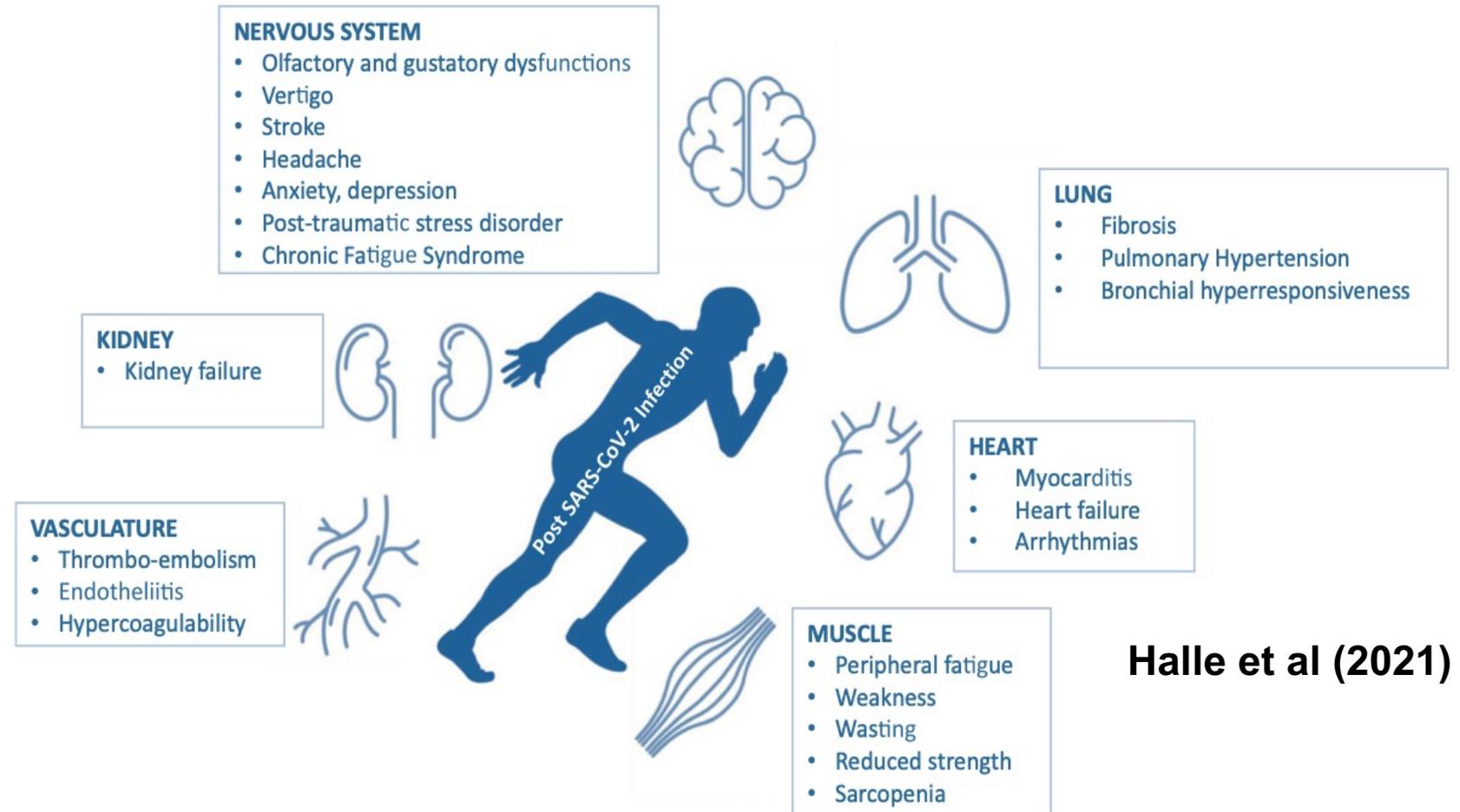
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University of Queensland 2022

COVID-19: Rapidly Evolving

- Respiratory Illness
- Significant Global Impact
- Sporting World Impact

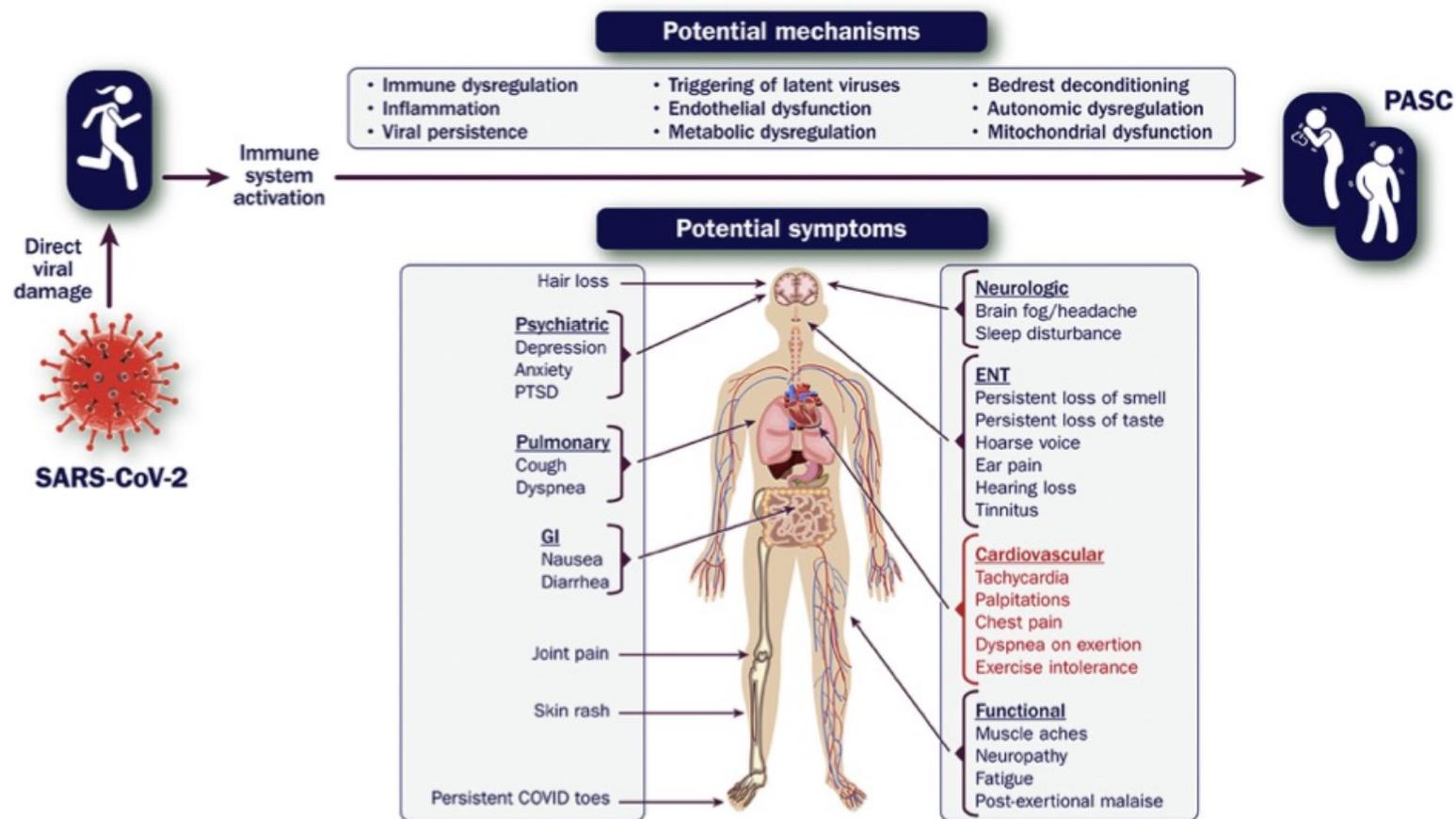
But

- Is it just a respiratory disease?
- What then are the implications?



COVID-19: Physical Sequelae

NB: PASC = Post acute sequelae of covid infection



COVID-19: Physical Sequelae Incidence

Clinical patterns, recovery time and prolonged impact of COVID-19 illness in international athletes: the UK experience

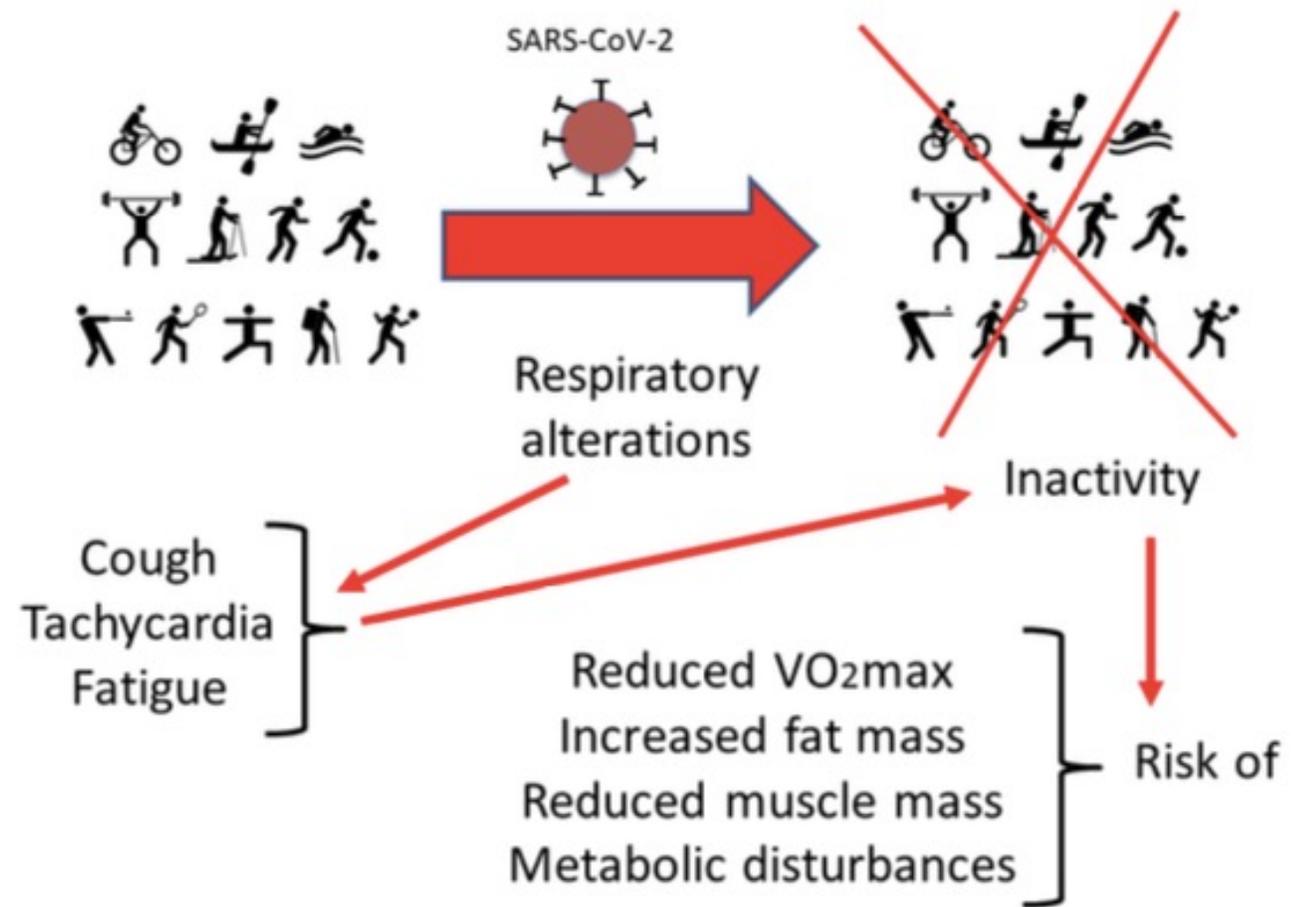
James H Hull ,^{1,2,3} Moses Wootten,⁴ Moiz Moghal,² Neil Heron ,⁵
Rhodri Martin,⁶ Emil S Walsted,⁷ Anita Biswas,⁸ Mike Loosemore ,²
Niall Elliott ,⁹ Craig Ranson ²

Hull et al (2021)

Symptoms	Fatigue	84 (57%)
	Dry cough	73 (50%)
	Headache	68 (46%)
	Fever	60 (41%)
	Sore throat	43 (29%)
	Myalgia/arthralgia	42 (29%)
	Anosmia/dysgeusia	34 (23%)
	Dyspnoea	26 (18%)
	Diarrhoea	6 (4%)
	Nausea	6 (4%)
	Chest pain	5 (3%)
	Dizziness	4 (3%)
	Abdominal pain	3 (2%)
Phenotype	Upper respiratory focus	54 (37%)
	Cough	37 (25%)
	Non-specific	27 (18%)
	Lower respiratory focus	26 (18%)
	Gastrointestinal	3 (2%)

COVID-19: Impact on Physical Performance

- Cardiovascular endurance deficits (Parpa et al, 2022)
- Strength reductions in general population (Tanriverdi et al, 2022)
- Minimal strength impact in athletes (Wagemans et al, 2021)
- Balance deficits (Jascur-Nowicki et al, 2022)
- Neuromuscular control reductions (De Sire et al, 2022)
- Negative effect on psychological state (Lima et al, 2021)



Cordova-Martinez et al (2022)

COVID-19: Impact on Injury Risk

Association between SARS-COV-2 infection and muscle strain injury occurrence in elite male football players: a prospective study of 29 weeks including three teams from the Belgian professional football league

Evi Wezenbeek ¹, Sander Denolf,¹ Tine Marieke Willems,¹ Dries Pieters,¹ Jan G Bourgois,^{2,3} Renaat M Philippaerts,⁴ Bram De Winne,⁵ Matthias Wieme,¹ Robbe Van Hecke,¹ Laurence Markey,¹ Joke Schuermans ¹, Erik Witvrouw,¹ Steven Verstockt⁶

Table 2 Crosstab of players with a muscle strain injury and SARS-CoV-2 infection

		Muscle strain injury		Total
		No	Yes	
SARS-CoV-2 infection	No	55	7	62
	Yes	15	7	22
Total		70	14	84

Wezenbeek et al (2022)

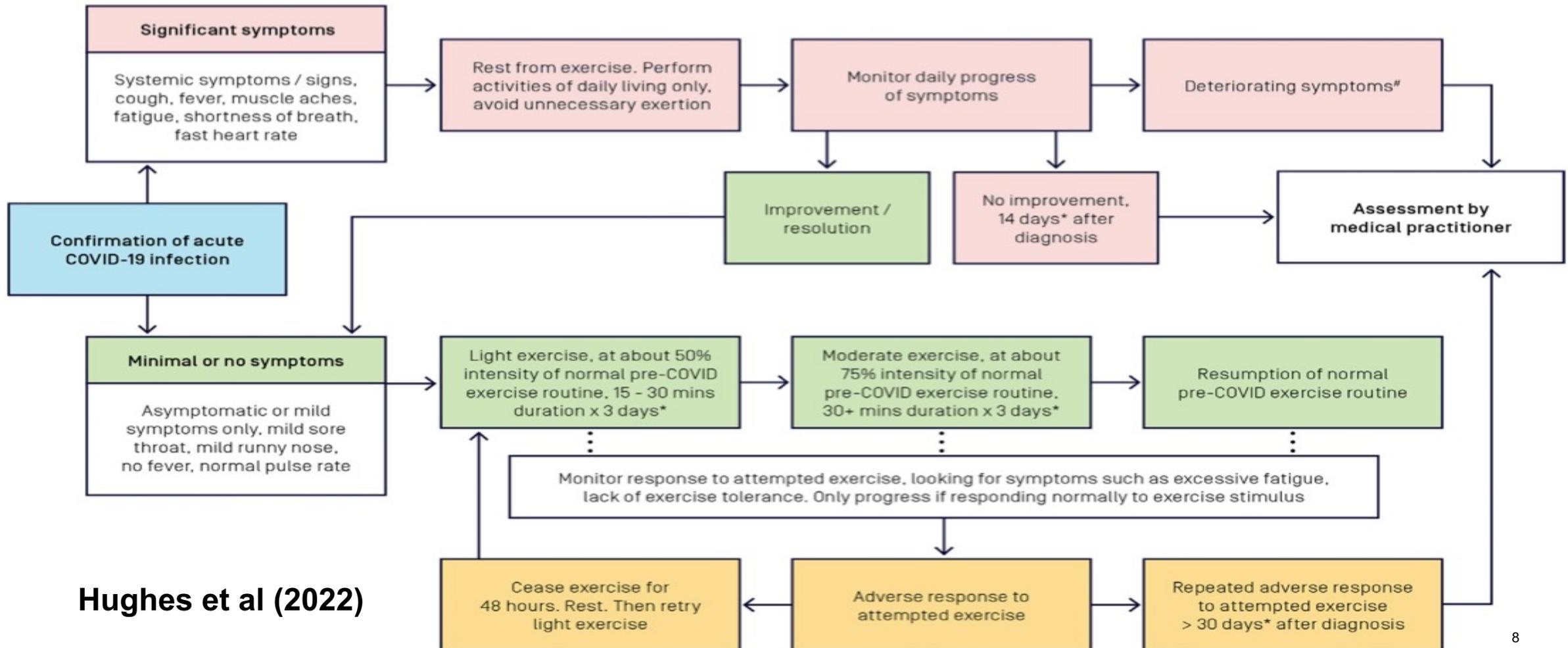
COVID-19: Impact on Injury Risk

Injury Incidence Increases after COVID-19 Infection: A Case Study with a Male Professional Football Team

Antonio Maestro ^{1,2}, David Varillas-Delgado ^{3,*} , Esther Morencos ³, Jorge Gutiérrez-Hellín ³ , Millán Aguilar-Navarro ³ , Gonzalo Revuelta ⁴ and Juan Del Coso ⁵ 

Injury Type	Whole Season				Pre- vs. Post-COVID-19		
	Whole Team (%)	COVID-19 (%)	Controls (%)	<i>p</i> Value	Pre (%)	Post (%)	<i>p</i> Value
Fracture and bone stress	0	0	0	0.723	0	0	0.621
Joint and ligaments	7 (29.2)	4 (28.6)	3 (30.0)		1 (33.3)	3 (27.3)	
Muscle and tendons	16 (66.7)	9 (64.3)	7 (70.0)		2 (66.7)	7 (63.6)	
Contusions/skin lesions and lacerations	0	0	0		0	0	
Nervous system	1 (4.2)	1 (7.1)	0		0	1 (9.1)	
Other injuries	0	0	0		0	0	

COVID-19: Return to Exercise



Hughes et al (2022)

COVID-19: Return to Exercise

Return to sports after persistent COVID.

Degree of Symptoms	Level of Exercise
Recovery from mild symptoms	1 wk of flexibility/mobility before beginning graduated return to exercise
Persistent mild symptoms	Start with low intensity exercise such as walking, allow symptoms to guide duration, avoid high intensity exercise Once able to complete 20 min of walking without increase of symptoms may progress activity.
Persistent symptoms	Limit activity to mild to moderate (60% of max) until 2 to 3 wk after symptoms resolve then may progress activity
Patients with severe symptoms that required oxygen or cardiac evaluation	Need respiratory and/or cardiac clearance before beginning stage 1 exercise

Giusto and Asplund (2022)

COVID-19: Severe Cases

Effects of continuous aerobic training associated with resistance training on maximal and submaximal exercise tolerance, fatigue, and quality of life of patients post-COVID-19

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Maria Inês Remígio de Aguiar²  | Viviane W. Mastroianni¹  |
Juliana A. F. de Souza¹  | Juliana Fernandes³  | Shirley Lima Campos¹  |
Daniella Cunha Brandão¹  | Armele Dornelas de Andrade¹ 

Araújo et al (2022)

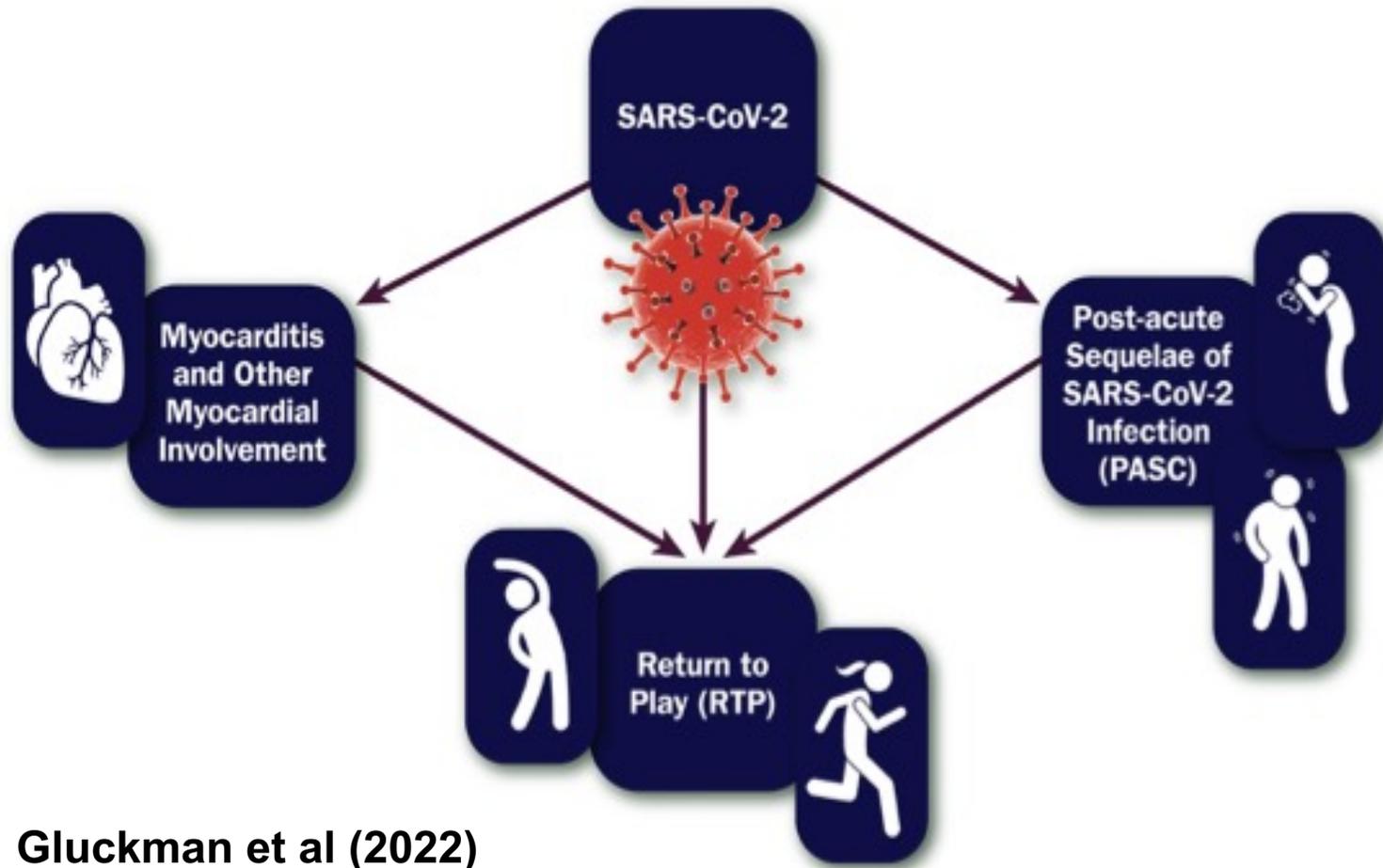
Measures Investigated:

- Maximal & Submaximal Exercise Tolerance
- Lung Function
- Respiratory Muscle Strength
- Fatigue
- Quality of Life

Results:

- Combination of resistance and cardiorespiratory training improved all measures

COVID-19: Cardiac Screening & Monitoring



Gluckman et al (2022)

To screen or not to screen?

- 2020/early 2021 = Yes (Halle et al, 2021)
- Hughes et al (2022) = not routinely
- Gluckman et al (2022) recommends if cardiopulmonary symptoms present
- Cardiac abnormalities in 0.7-1% of athletes (Hedon et al, 2022)

Recommendations for Physiotherapists

- Graded return to exercise: progress as guided by symptom response to exercise loads & monitor for cardiac
- If no resolution of symptoms at 30 days, consider medical referral
- If baseline performance data is available:
 - * If symptoms are minimal → Use Hughes et al (2022) framework
 - * Conduct individualised assessments of athletes to consider their specific picture
 - * Test aspects that may relate to injury risk (Muscle length, strength, proprioception)
 - * Consider cardiovascular fitness testing and monitoring game time on return to sport
 - * Assess athlete for psychological readiness for RTS
 - * Gradual progression to return to full pre-injury loads to mitigate higher risk period
- In the case of ongoing symptoms after 14 days consider medical clearance prior to return to exercise, at this point gradual aerobic and resistance training could be commenced



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Thank you

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Reference List

- Araújo, B., Barros, A., Nunes, D., Remígio de Aguiar, M. I., Mastroianni, V. W., de Souza, J., Fernandes, J., Campos, S. L., Brandão, D. C., & Dornelas de Andrade, A. (2022). Effects of continuous aerobic training associated with resistance training on maximal and submaximal exercise tolerance, fatigue, and quality of life of patients post-COVID-19. *Physiotherapy research international : the journal for researchers and clinicians in physical therapy*, e1972. Advance online publication. <https://doi.org/10.1002/pri.1972>
- Cordova-Martinez, Alfredo, Alberto Caballero-Garcia, Enrique Roche, Daniel Perez-Valdecantos, and David C. Noriega. "Effects and Causes of Detraining in Athletes Due to COVID-19: A Review." *International Journal of Environmental Research and Public Health* 19, no. 9 (2022): 5400. <https://doi.org/10.3390/ijerph19095400>.
- De Sire, Andrea Demeco, Nicola Marotta, Riccardo Spanò, Claudio Curci, Giacomo Fari, Francesco Fortunato, et al. "Neuromuscular Impairment of Knee Stabilizer Muscles in a COVID-19 Cluster of Female Volleyball Players: Which Role for Rehabilitation in the Post-COVID-19 Return-to-Play?" *Applied Sciences* 12, no. 2 (2022): 557. <https://doi.org/10.3390/app12020557>.
- Giusto, E., & Asplund, C. A. (2022). Persistent COVID and a Return to Sport. *Current Sports Medicine Reports*, 21(3), 100–104. <https://doi.org/10.1249/JSR.0000000000000943>
- Gluckman TJ, Bhavne NM, Allen LA, Chung EH, Spatz ES, Ammirati E, Baggish AL, Bozkurt B, Cornwell WK 3rd, Harmon KG, Kim JH, Lala A, Levine BD, Martinez MW, Onuma O, Phelan D, Puntmann VO, Rajpal S, Taub PR, Verma AK. 2022 ACC Expert Consensus Decision Pathway on Cardiovascular Sequelae of COVID-19 in Adults: Myocarditis and Other Myocardial Involvement, Post-Acute Sequelae of SARS-CoV-2 Infection, and Return to Play: A Report of the American College of Cardiology Solution Set Oversight Committee. *J Am Coll Cardiol*. 2022 May 3;79(17):1717-1756. doi: 10.1016/j.jacc.2022.02.003. Epub 2022 Mar 16. PMID: 35307156; PMCID: PMC8926109.
- Halle, Martin, Wilhelm Bloch, Andreas M. Niess, Hans-Georg Predel, Claus Reinsberger, Jürgen Scharhag, Jürgen Steinacker, Bernd Wolfarth, Johannes Scherr, and Josef Niebauer. "Exercise and Sports after COVID-19—Guidance from a Clinical Perspective." *Translational Sports Medicine* 4, no. 3 (2021): 310–18. <https://doi.org/10.1002/tsm2.247>.
- Hédon, C., Schnell, F., Sosner, P., Chagué, F., Schuster, I., Julia, M., Duparc, A., Guy, J. M., Molinari, N., Michaux, L., Cransac, F., & Cade, S. (2022). Cardiac screening before returning to elite sport after SARS-CoV-2 infection. *Archives of cardiovascular diseases*, S1875-2136(22)00173-5. Advance online publication. <https://doi.org/10.1016/j.acvd.2022.06.005>
- Hull, J. H., Wootten, M., Moghal, M., Heron, N., Martin, R., Walsted, E. S., Biswas, A., Loosemore, M., Elliott, N., & Ranson, C. (2021). Clinical patterns, recovery time and prolonged impact of COVID-19 illness in international athletes: the UK experience. *British Journal of Sports Medicine*, 56(1), 4–11. <https://doi.org/10.1136/bjsports-2021-104392>
- Hughes, D. C., Orchard, J. W., Partridge, E. M., La Gerche, A., & Broderick, C. (2022). Return to exercise post-COVID-19 infection: A pragmatic approach in mid-2022. *Journal of science and medicine in sport*, 25(7), 544–547. <https://doi.org/10.1016/j.jsams.2022.06.001>

Reference List

- Jaszczur-Nowicki, J., Niznikowski, T., Makaruk, H., Mastalerz, A., Porter, J., Biegajlo, M., Niznikowska, E., Markwell, L., Nogal, M., Luba-Arnista, W., Arnista, P., & Romero-Ramos, O. (2022). Effect of Coronavirus 19 on Maintaining Balance in Skilled Athletes. *International Journal of Environmental Research and Public Health*, 19(17), 10470. <https://doi.org/10.3390/ijerph191710470>
- Kaulback, K., Pyne, D. B., Hull, J. H., Snyders, C., Sewry, N., & Schwellnus, M. (2022). The effects of acute respiratory illness on exercise and sports performance outcomes in athletes - A systematic review by a subgroup of the IOC consensus group on "Acute respiratory illness in the athlete" *European Journal of Sport Science*, ahead-of-print(ahead-of-print), 1–19. <https://doi.org/10.1080/17461391.2022.2089914>
- Lemes, I. R., Smaira, F. I., Ribeiro, W. J. D., Favero, N. K., Matos, L. D. N. J., Pinto, A. L. de S., Dolan, E., Gualano, B., Pinto, A. J., Loturco, I., Szarf, G., Campos Vieira, M. L., Ghorayeb, N., Araújo de Albuquerque, L. C., Bassaneze, B., Filho, M. P., Bougleux Alô, R. O., Garcia, T. G., Teixeira, M. F., ... Brito, G. M. (2022). Acute and post-acute COVID-19 presentations in athletes: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 56(16), 941–947. <https://doi.org/10.1136/bjsports-2022-105583>
- Lima, Yavuz, Nevzad Denerel, Nazli Deniz Öz, and Seckin Senisik. "The Psychological Impact of COVID-19 Infection on Athletes: Example of Professional Male Football Players." *Science and Medicine in Football* 5, no. 1 (2021): 53–61. <https://doi.org/10.1080/24733938.2021.1933156>.
- Maestro, A., Varillas-Delgado, D., Morencos, E., Gutierrez-Hellin, J., Aguilar-Navarro, M., Revuelta, G., & Del Coso, J. (2022). Injury Incidence Increases after COVID-19 Infection: A Case Study with a Male Professional Football Team. *International Journal of Environmental Research and Public Health*, 19(16), 10267. <https://doi.org/10.3390/ijerph191610267>.
- Parpa, Koulla, and Marcos Michaelides. "Aerobic Capacity of Professional Soccer Players before and after COVID-19 Infection." *Scientific Reports* 12, no. 1 (2022): 11850–11850. <https://doi.org/10.1038/s41598-022-16031-7>.
- Tanriverdi, Aylin, Sema Savci, Buse Ozcan Kahraman, and Ebru Ozpelit. "Extrapulmonary Features of Post-COVID-19 Patients: Muscle Function, Physical Activity, Mood, and Sleep Quality." *Irish Journal of Medical Science* 191, no. 3 (2022): 969–75. <https://doi.org/10.1007/s11845-021-02667-3>.
- Wagemans, J., Catteeuw, P., Vandenhouten, J., Jansen, J., De Corte, X., Ceusters, C., & Vissers, D. (2021). The impact of Covid-19 on physical performance and mental health—A retrospective case series of Belgian male professional football players. *Frontiers in sports and active living*, 3.
- Wezenbeek E, Denolf S, Willems TM, et al Association between SARS-COV-2 infection and muscle strain injury occurrence in elite male football players: a prospective study of 29 weeks including three teams from the Belgian professional football league *British Journal of Sports Medicine* 2022;56:818-823
- Willi, Sandra, Renata Lüthold, Adam Hunt, Nadescha Viviane Hänggi, Donikë Sejdiu, Camila Scaff, Nicole Bender, Kaspar Staub, and Patricia Schlagenhauf. "COVID-19 Sequelae in Adults Aged Less Than 50 Years: A Systematic Review." *Travel Medicine and Infectious Disease* 40 (2021): 101995–101995. <https://doi.org/10.1016/j.tmaid.2021.101995>.