

Icarus and Sports After COVID 19

Too Close to the Sun?

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Daedalus, the mythologic master craftsman, gave his son Icarus a pair of wings built from feathers and wax. Along with the privilege to fly, he gave his son strict instructions to neither fly too high, to avoid being burnt by the sun, nor to fly too low, to risk drowning in the ocean. Icarus, overcome with the feeling of freedom, could not contain his hubris and soared toward the sun only to find that his melting wings left him plummeting into the sea. This classic Greek myth espouses the notion that both overly aggressive and prohibitively conservative approaches to life's challenges may come with inherent complications.

This analogy is particularly apt in the context of a world dominated by the coronavirus disease 2019 (COVID-19; named for the similarity between the virus and the corona of the sun) pandemic that has altered human existence. Among the many changes brought on by COVID-19 was the abrupt cessation of organized athletics. Professional sports, mass participation endurance events, school/community-based youth athletics—the entire global sports community came to a grinding halt. As the acute phase of the COVID-19 pandemic begins to slow, there is a growing clamor to resume normal living, including the reemergence of sport. The immediate positive impacts of return to the fields of play on athletes, spectators, and the global sporting industry are clear. The implications with respect to cardiovascular health and wellness are less clear and deserve careful consideration.

COVID-19 has proven to be a highly infectious lethal disease that impacts the cardiovascular system. The development of COVID-19–related acute myocardial injury represents diagnostic and therapeutic challenges that have dragged cardiovascular specialists back into the medical intensive care unit. Additionally, persistent myocardial edema, fibrosis, and impaired function have recently been documented after recovery from infection.¹ However, the virtual absence of cardiovascular testing among people with asymptomatic or mild clinical COVID-19 leaves uncertain the frequency that these patients, representing the majority of COVID-affected individuals, will experience cardiac involvement. Unrecognized cardiac complications after COVID-19 infection have the real potential to impact the safe resumption of competitive sports and exercise.

Occult myocarditis may be underappreciated as a cause of sudden cardiac arrest (SCA) in young athletes before the COVID-19 pandemic. For example, US military data suggest that myocarditis is the leading killer of recruits in basic training.² Moreover, analyses of SCA among collegiate athletes suggest autopsy-negative death is a more common cause of death than inherited cardiomyopathies, and it is unlikely that undetected inherited arrhythmia syndromes are causal as mandatory ECG screening in Italy did not reduce SCA from these causes.³ Perhaps most worrisome, recent data suggest that out-of-hospital SCA increased nearly 60% in Italy during the COVID-19 epidemic compared with the previous 1-year period.⁴ Although the majority of these deaths were in older people, the data raise

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the disturbing possibility that SCA during athletics will spike during recovery from this pandemic, and novel approaches to screening, surveilling, and managing athletes deserve consideration.

Protecting the health of the athlete is not a new topic. SCA during sport attributable to underlying heart disease is well recognized, and screening for the commonly responsible genetic and congenital diseases is widely recommended. Owing to the absence of longitudinal outcome data, there are differing opinions about how best to perform preparticipation cardiovascular screening. The 2 authors of this essay have studied and debated the utility of various screening techniques for years, and we continue to share some differences on this topic, especially regarding the roles of 12-lead electrocardiography and medical history for SCA prevention. However, we collectively believe that the COVID-19 pandemic should change the nature of the discussion regarding preparticipation screening.

The resumption of organized athletics at every level will involve some form of medical clearance. We propose that all screening efforts should define and manage the cardiac footprints of COVID-19 infection. This should include ascertainment of the likelihood of COVID-19 infection, as documented by a prior positive antigen test, exposure to a known carrier, or symptoms compatible with disease. Among athletes with definite or possible previous infection, the use of adjunctive

testing including electrocardiography, cardiac biomarkers, noninvasive imaging, and exercise testing represent appropriate options for more definitive risk stratification. There will be no “one size fits all” approach to this process, and we encourage sports medicine and cardiology practitioners to dictate testing choices based on available resources and expertise. The authors, along with other sports cardiology experts, have proposed an algorithm for this process (Figure).⁵ In addition, strategies that ensure the safe return of spectators to sporting venues including physical distancing and virtual attendance, and perhaps antigen and antibody testing are warranted.

In parallel with strategies to identify potentially high-risk complications of previous COVID-19 infection, this is a critical time for focused and collaborative scientific inquiry. If COVID-19 leads to residual cardiovascular pathology, it is possible that the superimposition of high-intensity/high-volume exercise will increase the risk of adverse outcomes including SCA. Concerted efforts to document outcomes and to rigorously compare prevention and therapeutic strategies represent a scientific imperative. This will best be accomplished through the creation of a national registry of SCA that incorporates the clinical, pathological, and socioeconomic information required to test intervention strategies. This database should be developed as part of a coordinated national effort to define the comprehensive consequences of the COVID 19 pandemic.

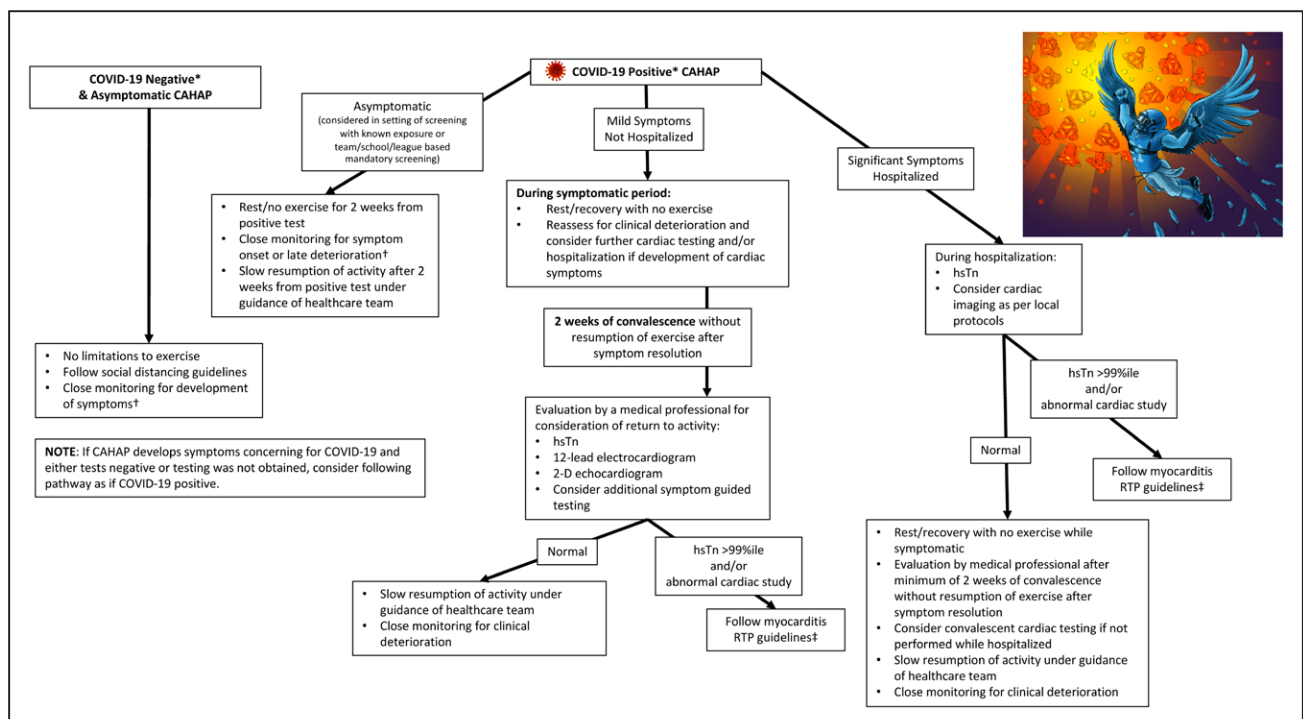


Figure. Coronavirus disease 2019 return-to-play algorithm for competitive athlete and highly active people.

*Typical testing obtained via a nasopharyngeal swab. All athletes with positive testing should be isolated for 2 weeks regardless of symptoms. [†]If clinical or cardiac symptoms develop, follow appropriate clinical pathway. [‡]Given lack of clear pathophysiology, we recommend the American College of Cardiology/American Heart Association Athlete myocarditis guidelines. CAHAP indicates competitive athlete or highly-active person; COVID-19, coronavirus disease 2019; hsTn, high-sensitivity troponin-I; and RTP, return-to-play. Reproduced with Permission from *JAMA Cardiology*.⁵ Copyright©2020. American Medical Association. All rights reserved.

Finally, it is prudent to follow a scientifically guided, stepwise approach to the resumption of sports corresponding with availability of accurate antigen and antibody testing, and ultimately vaccination. An incremental strategy will maximize health and safety of athletes, spectators, and the economic industry that binds them, and each will require different approaches. An overly tentative return to sport will delay the numerous benefits that come from competitive athletics. Conversely, an overly aggressive return could result in unexpected adverse outcomes in athletes and re-emergence of infection as a result of social crowding during sporting events. Emerging signs of the resolution of the COVID-19 pandemic are stimulating powerful urges to resume normal life, including sport. But like Icarus, we must remember that new-found freedom comes with responsibility and that timing and strategy will be everything.

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Disclosures

None.

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