

# Return-to-Play Recommendations After COVID-19 Diagnosis in High School Athletes

Kathryn Michele Calpino, DPT, ATC, SCS, CSCS\*;  
Jaclyn D. Morrisette, PhD, ATC†

\*Medford Public Schools, MA; †William Paterson University, Wayne, NJ

The COVID-19 pandemic has drastically changed everyday life across the world and dramatically affected how athletics operate. Since the return of high school sports, high school athletic trainers are now responsible for ensuring the safe return of athletes previously diagnosed with COVID-19 to sports. Due to the relatively recent identification of this novel virus, very little is understood about the long-term effects of COVID-19 infection on the cardiac and respiratory systems. Unfortunately, due to the

rapid return of athletics, limited research is available regarding how athletes respond to COVID-19 and how it may affect their ability to return to play. Therefore, high school athletes previously diagnosed with COVID-19 should undergo a comprehensive medical evaluation with their physician and complete a graduated, medically supervised return-to-play protocol.

**Key Words:** coronavirus, cardiology

## Key Points

- High school athletes with a previous diagnosis of COVID-19 should undergo a medical evaluation with their primary care physician and obtain written physician clearance.
- High school athletic programs should adopt a graduated return-to-play protocol for athletes previously diagnosed with COVID-19.

In the wake of the COVID-19 pandemic, athletic trainers are charged with a new challenge—facilitating athletes' safe return to high levels of physical activity after a COVID-19 diagnosis. The COVID-19 pandemic has affected people across the age continuum, including high school athletes. As high school athletes recover from COVID-19, their goals will likely parallel those of any patient recovering from COVID-19: the desire to return to everyday activities. For the high school athlete, this includes the ability to participate in high levels of physical activity that put stress and strain on their cardiovascular and respiratory systems. It is our job, as high school athletic trainers (ATs), to ensure that these athletes can safely resume their normal activities in the same way we would an athlete who sustained an ankle sprain, a concussion, or a muscle strain. The National Athletic Trainers' Association's Code of Ethics tasks athletic trainers with providing competent care to athletes using "professional statements and best practices."<sup>1(p1)</sup> Due to the rapid progress of the pandemic and our collective desire to return to sports as quickly as possible, the best available evidence to date is limited to expert opinion. However, in the words of Tufts Medical Center cardiologist James E. Udelson, MD, "expert opinion is far better than no opinion."<sup>2(p137)</sup>

## SCOPE OF THE DISEASE

An acute viral infection, COVID-19 is known to affect both the respiratory and cardiovascular systems of infected patients. Cardiovascular problems, including myocarditis,

are a concern for athletes returning to play after any acute viral syndrome<sup>3</sup> (Strength of Recommendation [SOR] Taxonomy: C; Centre for Evidence-Based Medicine rating [CEBM]: 1). However, when compared with other acute viral conditions, COVID-19 is unique in that hospitalized patients have shown a 22% to 28% incidence of acute cardiac injury versus just 1% of patients hospitalized for other acute viral infections.<sup>4,5</sup> The incidence of cardiac conditions, which may remain silent long after symptom resolution, among nonhospitalized patients with COVID-19 remains unknown.<sup>4,6</sup> Individuals with no or mild symptoms, who represent most patients and athletes with COVID-19, rarely undergo cardiac testing.<sup>6</sup> In a small study of collegiate athletes returning to sport post-COVID-19 diagnosis, 15% had silent myocardial inflammation.<sup>7</sup> Yet, the authors<sup>8–10</sup> of larger, more recent studies indicated that the incidence of inflammatory heart disease in collegiate athletes recovering from COVID-19 was as low as 0.6%. Research specifically on high school student athletes is currently limited, and the differences between a mature, elite collegiate athlete and a young, developing, novice athlete should not be ignored. Unrecognized cardiac complications after COVID-19 infection have the potential to drastically affect an athlete's ability to safely return to play with possible life-threatening consequences.<sup>11,12</sup> Although cardiac magnetic resonance imaging or bloodwork may not be warranted, less invasive clinical cardiac auscultation and symptom evaluation should be considered. The data pertaining to the incidence of sudden cardiac death (SCD) in athletes are limited to pre-COVID-19

athletics. However, in Italy during the pandemic, out-of-hospital sudden cardiac deaths increased nearly 60%.<sup>6</sup> For these reasons, it is recommended that athletes have a thorough cardiovascular evaluation before returning to play after a COVID-19 diagnosis<sup>11</sup> (SOR: C; CEB: 4). The extent of that evaluation remains up for debate among cardiologists and other physicians and should be determined on an individual basis by the athlete's primary care physician (PCP).

## HIGH SCHOOL ATHLETIC PROTOCOL DEVELOPMENT

Many state high school athletic associations have begun to identify athletes with prior COVID-19 infections returning to play as an emerging concern that needs to be addressed. However, states and state high school sport associations vary in their guidance to member schools from providing specific guidelines for medical evaluation and return-to-play expectations to leaving the decisions and protocols completely up to the member schools. High schools have different structures for protocol development with varying degrees of involvement by the AT. In the most ideal circumstances, ATs at the state level aid in creating statewide expectations for high school athletes' return to play after COVID-19. In other cases, ATs still fight for a seat at the table where high school athletic medicine protocols are determined for their own schools. In these instances, ATs need support from our own profession to help protect the safety of the student-athletes we serve. Without a clear and concise recommendation for high school athletes from the athletic training community, these ATs are left to gather, present, and defend information from an increasing number of sources, which may dilute their message to stakeholders. As an athletic training community, we owe it to our high school AT colleagues to support them and the athletes they serve as new policies and procedures are adopted for the return to play of athletes after COVID-19 infection.

## RETURN-TO-PLAY CONSIDERATIONS

High school ATs should refer athletes previously diagnosed with COVID-19 to their PCP.<sup>13</sup> The athlete's PCP should have knowledge of the athlete from the preparticipation physical examination and should therefore be familiar with the athlete's cardiac, respiratory, and family history. For example, during a regular preseason physical examination, a physician may hear a slight heart murmur on cardiac auscultation. The physician may rule out any cardiac condition at the time and clear the athlete for full participation without indicating any cardiac concerns on the school physical form. However, if that physician is then notified that the athlete was diagnosed with COVID-19 and is looking to return to play, the physician may be inclined to further investigate the heart murmur previously considered benign. The PCP should perform a comprehensive physical evaluation with an emphasis on the cardiovascular and respiratory systems<sup>12,14</sup> (SOR: C; CEB: 1). The findings of the physical evaluation and a detailed history may indicate the need for evaluation beyond the scope of primary care. If further evaluation is warranted, the athlete should be referred to the appropriate specialist. Because COVID-19 presents primarily with

cardiovascular concerns, this referral will most likely be to a cardiologist for a 12-lead electrocardiogram, cardiac magnetic resonance imaging, 24-hour Holter monitor, echocardiogram, computed tomography scan, cardiopulmonary exercise test, or blood biomarker testing<sup>2-6,12,14</sup> (SOR: C; CEB: 1). In the example given, the athlete was referred directly to a pediatric cardiologist by her PCP for return-to-play clearance. Some athletes may warrant referral to additional specialists. For example, those with a history of asthma may benefit from pulmonary function testing to ensure complete respiratory recovery. Athletes who develop a rash during their COVID-19 course may benefit from a dermatologic evaluation. In another instance, an athlete who had been vaccinated against COVID-19 tested positive for the virus. This athlete's PCP expressed concern and the need for further evaluation. We do not yet have a full picture of how vaccination status may affect athletes diagnosed with COVID-19. The athlete's PCP is best positioned to perform a broad and comprehensive physical evaluation and determine the need for further evaluation of any body system by a specialist. If additional assessment is not needed, the athlete may be referred directly back to the AT. The physician should provide written clearance for the athlete to return to play.<sup>13</sup>

After a medical evaluation, the task of safely returning an athlete to a high level of physical activity from relative inactivity falls to the AT. It is widely accepted that, after a period of inactivity resulting from serious illness, training should increase gradually<sup>12</sup> (SOR: C; CEB: 5). During this ramp-up period, athletes should be monitored for associated symptoms that may indicate the need for further medical evaluation. For example, during return-to-play protocols for concussion, athletes are monitored for cognitive, physical, and emotional symptoms that are hallmarks of an incomplete recovery. In this same fashion, athletes returning to activity after COVID-19 diagnosis should be monitored for cardiac and respiratory symptoms that may reflect the need for further evaluation<sup>2,12</sup> (SOR: C; CEB: 5). Expert opinion is clear that athletes returning to sport after a COVID-19 infection of any severity should undergo a gradual return-to-play protocol with medical supervision<sup>3,4,6,12,14-16</sup> (SOR: C; CEB: 5). The level of medical supervision ranges from cardiologist to PCP to AT.<sup>3,4,12,14,15</sup> Although some authors provided a specific length of time for a gradual return to play, others did not. The only current consensus is that return to play be gradual and supervised. To date, only 1 group has published a specific COVID-19 return-to-play protocol. Elliot et al<sup>17</sup> developed a 6-stage return-to-play progression with specific expectations with respect to time, duration, cardiac effort, and symptom monitoring. They also clearly stated that this protocol should be completed only under medical supervision (Table; SOR: C; CEB: 5).

## RECOMMENDATIONS

Until a registry of athletes previously diagnosed with COVID-19 who have returned to activity is available, it is essential that health care providers work collaboratively and act in the best interest of the athletes they care for to provide a safe return to play.<sup>6,15</sup> Athletic trainers are "obligated to place the wellbeing and long-term wellbeing of their patient above other groups and their own self-

**Table. Graduated Return-to-Activity Protocol<sup>a</sup>**

Recommended daily monitoring: subjective symptoms, Injury-Psychological Readiness to Return to Sport (I-PRRS) scale, resting heart rate, rate of perceived exertion

Stage	Length	Description
1	Minimum 10 d	<ul style="list-style-type: none"> <li>• Rest</li> <li>• Activities of daily living</li> </ul>
2	Minimum 2 d	<ul style="list-style-type: none"> <li>• Light activity: stationary bike, walking</li> <li>• Duration: <math>\leq 15</math> min</li> <li>• Intensity: <math>&lt; 70\%</math> age-predicted maximum heart rate</li> <li>• No resistance training</li> </ul>
3	Minimum 1 d	<ul style="list-style-type: none"> <li>• Moderate activity: addition of simple movements (running drills)</li> <li>• Duration: <math>\leq 30</math> min</li> <li>• Intensity: <math>&lt; 80\%</math> age-predicted maximum heart rate</li> <li>• No resistance training</li> </ul>
4	Minimum 1 d	<ul style="list-style-type: none"> <li>• Complex cardiovascular training: cutting, pivoting, change of direction, incorporating ball or equipment</li> <li>• Duration: <math>\leq 45</math> min</li> <li>• Intensity: <math>&lt; 80\%</math> age-predicted maximum heart rate</li> <li>• Add light resistance training</li> </ul>
5	Minimum 2 d	<ul style="list-style-type: none"> <li>• Normal training activity</li> <li>• Duration: <math>\leq 60</math> min</li> <li>• Intensity: <math>&lt; 80\%</math> age-predicted maximum heart rate</li> </ul>
6	17 d from onset at the earliest	Resumption of normal training

<sup>a</sup> Adapted from Elliot N, Martin R, Heron N, Elliott J, Grimstead D, Biswas A. Infographic. Graduated return to play guidance following COVID-19 infection. *Br J Sports Med*. 2020;54(19):1174–1175. This is an open-access document distributed under the terms of the CC BY-NC license.

interest” and do so with the best available evidence.<sup>1(p1)</sup> We must work within our scope of practice while communicating, collaborating, and referring to other health care professionals as needed. As a health care community, we must recognize that the care of an athlete with a previous COVID-19 diagnosis cannot be managed by a single discipline. Athletic trainers at every level must work collaboratively with primary care providers, strength and conditioning staff, sports medicine physicians, cardiologists, respiratory therapists, and other medical professionals involved in the care and recovery of athletes convalescing from COVID-19. At the high school level, the primary link between ATs and the larger health care system is the athlete’s PCP. Therefore, all high school athletes returning to play after a COVID-19 diagnosis are advised to undergo a medical evaluation by their PCP and complete a medically supervised graduated return-to-play program as described by Elliot et al.<sup>17</sup>

High school ATs are responsible for the health and safety of the athletes in their care. In the wake of the COVID-19 pandemic, this now includes safely returning these athletes to the field, court, or rink. The effects of COVID-19 on the high school athlete’s cardiovascular system remain largely unknown. Hence, after a COVID-19 diagnosis, athletes should be evaluated by their PCP to determine the potential need for further cardiac evaluation and subsequently

monitored by the AT as they complete a graduated return-to-play protocol.

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*Address correspondence to Kathryn Michele Calpino, DPT, ATC, SCS, CSCS, Medford Public Schools, 489 Winthrop Street, Medford, MA 02155. Address email to kcalpino@gmail.com.*