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

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Abstract
COVID-19 has drastically changed everyday life across the world and has dramatically impacted 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. Due to the rapid return of athletics, there is unfortunately limited research available regarding how athletes respond to COVID-19 and how it may affect their ability to return to play. Therefore, it is recommended that high school athletes previously diagnosed with COVID-19 undergo a comprehensive medical evaluation with their physician and complete a graduated medically supervised return to play protocol.

Key Words
Coronavirus, COVID-19, High School, Return to Play, Cardiology

Key Points
1. 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.
2. High school athletic programs should adopt a graduated return to play protocol for athletes previously diagnosed with COVID-19.
Background

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 COVID-19 diagnosis. COVID-19 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 their 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, to ensure that these athletes are able to 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 (NATA) Code of Ethics tasks athletic trainers with providing competent care to athletes using “professional statements and best practices.”¹ 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, “expert opinion is far better than no opinion.”²

Scope of the Disease

COVID-19, an acute viral infection, is known to affect both the respiratory and cardiovascular systems of infected patients. Cardiovascular issues, including myocarditis, is a concern for athletes returning to play after any acute viral syndrome³ (Strength of Recommendation [SOR] Taxonomy: C; Centre for Evidence-Based...
Medicine [CEBM] rating: 1). However, COVID-19 is unique when compared to other acute viral conditions in that hospitalized patients with COVID-19 have shown a 22-28% incidence of acute cardiac injury, in comparison to just 1% of patients hospitalized for other acute viral infections.\(^4,5\) The incidence of cardiac pathologies, which may remain silent long after symptom resolution, among non-hospitalized patients with COVID-19 remains unknown.\(^4,6\) Patients with no or mild symptoms, representing the majority of patients and athletes with COVID-19, very rarely undergo cardiac testing.\(^6\) In a small study of collegiate athletes returning to sport post-COVID-19 diagnosis, 15% were found to have silent myocardial inflammation.\(^7\) However, larger, more recent studies indicate that the incidence of inflammatory heart disease in collegiate athletes recovering from COVID-19 is as low as 1.4% or .6%.\(^8-10\) 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 impact an athlete’s ability to safely return to play with potentially life threatening consequences if left unevaluated.\(^11,12\) Although cardiac MRI 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 is limited to pre-COVID-19 athletics. However, in Italy during the course of the pandemic, out of hospital SCD increased nearly 60%.\(^6\) For these reasons, it is recommended that athletes have a thorough cardiovascular evaluation prior to return to play after COVID-19 diagnosis\(^11\) (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.

High School Athletic Protocol Development

Many state high school athletic associations have begun to identify athletes with prior COVID-19 infection returning to play as an emerging issue 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 various structures for protocol development with varying degrees of involvement by the athletic trainer. In the most ideal circumstances, athletic trainers are involved at the state level to aide in creating statewide expectations for COVID-19 return to play for high school athletes. However, in other cases athletic trainers still fight for a seat at the table where high school athletic medicine protocols are decided in their own schools. In these instances, athletic trainers need the support from their own profession to help protect the safety of the student athletes they serve. Without a clear and concise recommendation for high school sports from the athletic training community, these athletic trainers are left to gather, present and defend information from and increasing number of sources which may dilute their message to stakeholders. We, as an athletic training community, owe it to our high school athletic trainers 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 athletic trainers should refer athletes previously diagnosed with COVID-19 to their primary care physician (PCP). The athlete’s PCP should have previous knowledge of the athlete from their pre-participation physical examination and should therefore be familiar with the athlete’s cardiac, respiratory, and family history. For example, during a regular pre-season physical examination, a physician may hear a slight heart murmur on cardiac auscultation. The physician may rule out any pathology at the time and clear the athlete for full athletic participation without indicating any cardiac concerns on the school physical form. However, if that physician is then notified that that 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 (SOR: C; CEB: 1). The findings of the physical evaluation and a detailed history may indicate the need for further evaluation beyond the scope of primary care. If further evaluation is warranted, the athlete should be referred to the appropriate specialist. Since COVID-19 presents primarily with cardiovascular concerns, this referral will most likely be to a cardiologist for a 12-lead ECG, cardiac MRI, 24-hour Holter monitor, echocardiogram, CT Scan, cardiopulmonary exercise test or blood biomarker testing (SOR: C; CEB: 1). In the example provided above, this athlete was referred directly to a pediatric cardiologist by her primary care physician 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 that develop a rash during their COVID-19 course may benefit from a dermatologic evaluation. In another example, an athlete who was previously 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 to further evaluation of any of the body systems by a specialist. In the event there is no need for further evaluation, the athlete may be referred directly back to the athletic trainer. It is recommended that the physician provide written clearance for the athlete to return to play.13

Following a medical evaluation, the task of safely returning an athlete to high levels of physical activity from relative inactivity falls to the athletic trainer. It is widely accepted that after a period of inactivity resulting from serious illness that training should increase gradually12 (SOR: C; CEB: 5). During this ramp-up period, athletes should be monitored for associated symptoms that may be indicative of 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 athlete who may not be fully recovered from their injury. In this same fashion, it is suggested that athletes returning to activity after COVID-19 diagnosis be monitored for cardiac and respiratory symptoms that may be indicative of the need for further evaluation2,12 (SOR: C; CEB: 5). Expert opinion is clear that athletes returning to sport following any severity of COVID-19 infection should undergo a gradual return to play protocol with medical supervision3,4,6,12,14-16 (SOR: C; CEB: 5). The level of medical
supervision ranges from cardiologist to primary care provider to athletic trainer.\textsuperscript{3,4,12,14,15}

Although some authors specify a specific length of time for a gradual return to play, others do not. The only consensus remains that return to play be gradual and supervised. To date there has been only one group to publish a COVID-19 specific return to play protocol. Elliot et al. published a six stage return to play progression with specific expectations for time, duration, cardiac effort, and symptom monitoring. It is also clearly stated that this protocol be completed only under medical supervision (Table 1)\textsuperscript{17} (SOR: C; CEB: 5).

Recommendations

Until a registry is available of athletes previously diagnosed with COVID-19 who have returned to activity, it is essential that healthcare providers work collaboratively and act in the best interest of the athletes they care for in order to provide a safe return to play.\textsuperscript{6,15} As athletic trainers are “obligated to place the well-being and long-term well-being of their patient above other groups and their own self-interest” and do so with best available evidence.\textsuperscript{1} Athletic trainers must work within our own scope of practice while communicating, collaborating, and referring to other health care professionals as needed. We, as a healthcare community, 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 recovering from COVID-19. At the high school level, the primary link between athletic trainers and
the larger health care system is the athlete’s primary care physician. Therefore, it is
recommended that all high school athletes returning to play after a COVID-19 diagnosis
undergo a medical evaluation by their primary care physician and complete a medically
supervised graduated return to play program as described by Elliot et al.
High school athletic trainers are responsible for the health and safety of the
athletes they care for. In the wake of the COVID-19 pandemic, this now includes
returning these athletes to the field, court, or rink safely. The effects of COVID-19 on the
high school athletes’ cardiovascular systems remain largely unknown. Therefore, after a
COVID-19 diagnosis, athletes should be evaluated by their primary care physician to
determine the potential need for further cardiac evaluation and subsequently be
monitored by the athletic trainer as they complete a graduated return to play protocol.
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Table 1

Graduated Return to Activity Protocol

| Stage | Length         | Description                                                                 |
|-------|----------------|-----------------------------------------------------------------------------|
| 1     | Minimum 10 days| • Rest<br>• Activities of daily living                                      |
| 2     | Minimum of 2 days| • Light activity: stationary bike, walking<br>• Duration: 15 minutes or less<br>• Intensity: <70% age predicted maximum heart rate<br>• No resistance training |
| 3     | Minimum 1 day  | • Moderate activity: addition of simple movements (running drills)<br>• Duration: 30 minutes or less<br>• Intensity: <80% age predicted maximum heart rate<br>• No resistance training |
| 4     | Minimum 1 day  | • Complex cardiovascular training: cutting, pivoting, change of direction, incorporation of ball/equipment<br>• Duration: 45 Minutes or less<br>• Intensity: <80% age predicted maximum heart rate<br>• Add light resistance training |
| 5     | Minimum 2 days | • Normal training activity<br>• Duration: 60 minutes or less<br>• Intensity: <80% age predicted maximum heart rate |
| 6     | 17 days from onset at the earliest | Resumption of normal training |

*Adapted from Elliot N. et al. Infographic. Graduated return to play guidance following COVID-19 infection. British Journal of Sports Medicine, 2020*