COVID-19 Issues in Sports

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University of Kansas School of Medicine - Wichita
Sports Medicine Fellowship & Family Medicine Residency at
Ascension Via Christi
KAOM Mid Year CME Conference
November 12, 2021
Objectives

- Explain the cardiopulmonary concerns for COVID-19 in sports.
- List the most common causes of sudden cardiac death in sports.
- Properly risk stratify your patients for return to play after COVID-19.

- Be able to access and follow the KSHSAA return to play progression after COVID-19 for Kansas High School athletes.
SARS-CoV-2

- Novel coronavirus that causes COVID-19
- Highly infectious
  - Vast majority of young people that contract coronavirus have mild symptoms or have no symptoms
  - Health issues need to be considered in student-athletes prior to a return to sports and exercise
  - Infection can cause direct injury or inflammation to the heart and lungs, especially in hospitalized patients
SARS-CoV-2

• 2020
  • Cardiopulmonary concerns from COVID-19 arise from data in severely ill adult patients, where approximately 1 in 5 hospitalized patients suffers from cardiac or thromboembolic (clotting) complications
    • Development of COVID-19-related acute myocardial injury is possible
    • Myocardial edema, fibrosis, & impaired function have been documented following recovery from infection
SARS-CoV-2

• Evidence on the prevalence & risks of cardiopulmonary complications in younger patients (college aged & adolescents) & in individuals who have had a milder form of the illness was limited in 2020

• Degrees of lethality based on age & underlying medical conditions

• People with asymptomatic or mild clinical COVID-19

• Unrecognized cardiac complications following COVID-19 infection have the potential to impact the safe resumption of sports & exercise

• TBD in 2020
  • Will gather a lot of data
  • Personal experience
  • 2021 = We have 1+ year of data
Penn State doctor says 30-35% of Big Ten athletes positive for COVID-19 had myocarditis symptoms

Paul Myerberg  USA TODAY
Published 1:32 p.m. ET Sep. 3, 2020 | Updated 2:36 p.m. ET Sep. 3, 2020

WHAT TO EXPECT FROM COLLEGE FOOTBALL THIS YEAR

PSU Clarifies Doctor's Comments on Big Ten and COVID-19-Related Heart Condition

TIMOTHY RAPP  SEPTEMBER 3, 2020
Big Ten cancels college football season for fall 2020, hopes to play in spring 2021

Big Ten presidents met to discuss the fate of the 2020 season on Tuesday morning.

By Dennis Dodd & Adam Silverstein Aug 11, 2020 at 3:25 pm ET • 4 min read

Pac-12 Conference cancels fall football season, all sports through end of 2020

BY LAUREN KIRSCHMAN
AUGUST 11, 2020 12:55 PM, UPDATED AUGUST 11, 2020 06:01 PM

Fall sports have been canceled in the PAC-12 for the 2020-21 season.

The PAC-12 canceled the 2020-21 fall sports season. The conference hopes to play some of the sports in the spring.
2021 Sports

Big Ten Cancels Fall Football Season, Will Explore Playing in Spring

SCOTT POLACEK
AUGUST 8, 2020

Ohio State football plans to play national championship Monday despite potential COVID-19 issues

Updated: Jan. 05, 2021, 9:33 p.m. | Published: Jan. 05, 2021, 4:28 p.m.

Big Ten Football Season to Resume October 23-24, 2020

8:25 AM - Sep 16, 2020
Sports 2021

- Fall 2021
  - High School & College Sports are on-going & are not canceled
Athletes Unlikely to Develop Cardiac Complications from COVID, Study Shows

While the lasting impact of COVID-19 on hospitalized patients in the general population is common and associated with adverse cardiac outcomes, evaluations of cardiac involvement of more than 3,000 college-aged, competitive athletes revealed no adverse cardiac events following COVID-19 infections and indicate a safe return-to-play for asymptomatic and mildly symptomatic athletes without additional cardiac testing, according to a study published today in the American Heart Association’s flagship journal Circulation.

• Prospective, multicenter, observational cohort study with data collected from September 1 to December 31, 2020, from 42 colleges and universities in the U.S.

• Assessed the prevalence, clinical characteristics and outcomes of SARS-CoV-2 cardiac involvement among collegiate athletes using the Outcomes Registry for Cardiac Conditions in Athletes.

• Collaborative data registry will aid research on COVID-19, and, long-term, develop a deep knowledge base on cardiac disease in athletes beyond the pandemic.
>19,000 athletes tested for SARS-CoV-2 infection

- 3,018 tested positive & underwent cardiac evaluation
- 2,820 athletes underwent at least one element of cardiac testing
  - ECG, Transthoracic Echocardiography, followed by Cardiac Magnetic Resonance Imaging if indicated
- 198 athletes underwent primary screening Cardiac Magnetic Resonance Imaging
Prevalence of probable or definite cardiac involvement from SARS-CoV-2 infection was 0.4%-1.5%

Diagnostic yield for probable or definite cardiac involvement was 6.7 times higher for a CMR obtained for clinical reasons (10.1%) versus a primary screening CMR (1.5%).

Odds of having cardiac involvement was also 3.1 times higher in athletes with cardiopulmonary symptoms.

“Most athletes with no symptoms or mild illness from SARS-CoV-2 can return to sports safely without additional cardiac testing as long as they feel good on return to exercise and don’t have cardiopulmonary symptoms like chest pain.”
CONCLUSIONS: SARS-CoV-2 infection among young competitive athletes is associated with a low prevalence of cardiac involvement and a low risk of clinical events in short-term follow-up.
SARS-CoV-2 Cardiac Involvement in Young Competitive Athletes

Editorial, see p 267

Nathaniel Moulson, MD, Bradley J. Petek, MD, Jonathan A. Drezner, MD, Kimberly G. Harmon, MD, Stephanie A. Kliethermes, PhD, Manesh R. Patel, MD, Aaron L. Baggish, MD, for the Outcomes Registry for Cardiac Conditions in Athletes Investigators, Irfan M. Asif, James Borchers, Katherine M. Edenfield, Michael S. Emery, Kyle Goerl, Brian Hainline, Jonathan H. Kim, William E. Kraus, Rachel Lampert, Matthew Leiszler, Benjamin D. Levine, Matthew W. Martinez, Francis G. O'Connor, Dermot Phelan, Lawrence D. Rink, Herman A. Taylor, Carl Ade, Aryan Aiyer, Jarrah Alfadhli, Chloe Amaradio, Scott Anderson, Stephanie Arlis-Mayor, Jonathan S. Aubry, Andrea Austin, Timothy Beaver, Nicolas Benitez, Brant Berkstresser, Thomas M. Best, Tiffany Bohon, Jonathan P. Bonnet, Elizabeth Boyington, James Bray, Jenna Bryant, Sean Carnahan, Rachel Chamberlain, Samantha Charters, Timothy W. Churchill, Douglas Comeau, Laura E. Cook, Deanna Corey, Amy Costa, Marshall Crowther, Tarun Dalia, Craig Davidson, Kaitlin Davitt, Annabelle De St Maurice, Peter N. Dean, Katelyn DeZenko, Courtney Dimitris, Jeanne Doperak, Calvin Duffaut, Craig Fafara, Katherine Fahy, Jason Ferderber, Megan Finn, Angelo Galante, Todd Gerit, Amy Gest, Carla Gilson, Jeffrey Goldberg, Joshua Goldman, Erich Groezinger, Jonathan R. Guin, Heather Halseth, Joshua Hare, Beth Harness, Nicolas Hatamiya, Julie Haylett, Neal Hazen, Yeun Hiroi, Amy Hockenbrock, Amanda Honsvall, Jennifer Hopp, Julia Howard, Samantha Huba, Mustafa Husaini, Lindsay Huston, Calvin Hwang, Laura Irvin, Val Gene Iven, Robert Jones, Donald Joyce, Kristine Karlson, Christian Klein, Chris Klenck, Michele Kirk, Jordan Knight, Laura Knippla, Madeleine Knutson, Louis E. Kovacs, Yumi Kuscher, Andrea Kussman, Chrissy Landreth, Amy Leu, Dylan Lothian, Maureen Lowery, Andrew Lukjanczuk, John M. MacKnight, Lawrence M. Magee, Marja-Liisa Magnuson, Aaron V. Marco, Anne Marquez, Grant McKinley, Megan Meier, Christopher...
Cardiac Testing as part of all Post COVID testing?

- Different Discussion than ECG’s as part of PPE
ECG as part of Screening in PPE’s?
ECG ROUTINE SCREENING

- IOC/ESC (European Society of Cardiology) recommends EKG on all athletes (2004)
  - largely related to Italian data (Corrado) of death rate 1/28,000 in 1981 to 1/250,000 in 2004 (79% reduction)
ECG ROUTINE SCREENING

- AHA – response was that ECG is not recommended in the US

- Different population (less ARVD/more HCM) – 1/100,000-300,000 in U.S. (discrepancy as no national registry)
  - $330,000 per life saved (2 billion overall) due to many false-positives (40% of trained athletes have EKG abnormalities) & follow-up in addition to screening cost
  - Too many athletes in US & not enough trained physicians to read the EKG’s (Italy screens 3-5 million annually age 12-35 & 5-10.5 million in U.S.)
  - Will not identify all conditions that cause sudden death – Marfan’s, anomalous coronaries, catecholamine-induced VT
  - Lack of randomized studies – fear that screening may actually increase death rate from treatment-related procedural failures
ROUTINE SCREENING

• ECG proponents
  • 134 sudden deaths – H & P only raised a suspicion in 3% & an accurate diagnosis was only made in <1%.
  • More is being done for the college/pro athlete (double-standard)
  • H & P being done by many inexperienced providers
ROUTINE SCREENING

• ECG Proponents
  • 60% - 70% of athletes with cardiac disease can be found by EKG
    • HCM
    • ARVD (inverted T-waves in leads V1-V3 with epsilon wave at ST segment)
    • Short or long QT
    • WPW (pre-excitation)
    • Dilated cardiomyopathy
    • Brugada Syndrome (RBBB & coved ST elevation in V1/V2)
    • Myocarditis
    • Congenital heart block
    • Rarely MVP
ROUTINE SCREENING

• ECG Proponents
  • Those at most risk (young black males) are the least likely to be able to get screened unless mandatory system
  • Should be extended to all adolescents as many die during sleep (long QT & Brugada)
MEDICOLEGAL ISSUES

• The appropriate H & P is the current standard of care despite a low sensitivity & specificity for detecting CV abnormalities

• A physician who clears an athlete to play is not necessarily liable for an injury or death caused by an undiscovered cardiovascular condition unless they have deviated from the established standard of care in examining or working up the athlete
SCA

- SCA during sport due to underlying heart disease is well-recognized & screening for the commonly responsible genetic and congenital diseases is widely recommended

- Differing opinions about how best to perform preparticipation cardiovascular screening
  - I gave talk at KAOM in 2018 on this topic
Sudden Cardiac Death

- Sudden Cardiac Death (SCD)
- Leading medical cause of death in young athletes
- New research suggests incidence
  - 1 in 50,000 athlete-years in college athletes
  - 1 in 80,000 athlete-years in high school athletes
- Males & African Americans are at higher risk
  - Men’s basketball: 1 in 9,000 athlete-years
Sudden Cardiac Death

- Some data suggests that athletes may be at higher risk to experience SCD because of their increased level of physical activity that can lead to arrhythmias.
- Other data suggests SCD is more common in young non-athletes vs young athletes.
SCD

- SCD is the presenting symptom of underlying cardiovascular pathology in 50-90% of athletes
  - Significantly limits usefulness of history-based screen
SCD

• Warning symptoms
  • Exertional chest pain
  • Exertional syncope
  • Exertional near-syncope
  • Dyspnea or fatigue disproportionate to level of exertion
  • Palpitations
  • Irregular heart beats
• Family History of sudden un-explained death or SCD < 50 y/o
• Family history of cardiac disease known to cause SCD
SCD

• SCD in athletes < 35 Y/O
  • In most cases, structural heart disease was present
  • Hypertrophic Cardiomyopathy (HCM), anomalous origin of a coronary artery, arrhythmogenic right ventricular cardiomyopathy (ARVC), myocarditis, & coronary atherosclerosis
  • Similar findings in US, UK, and US Military
    • Maron BJ. Circulation 2007; 115:1643
    • Eckert RE. Ann Intern Med 2004; 141:829
    • Finocchiaro G. J Am Coll Cardiol 2016; 67;2108

• SCD in athletes < 35 Y/O in Northern Italy
  • ARVC was the most common abnormality, then coronary atherosclerosis and 3rd most common cause was anomalous origin of a coronary artery
  • Northern Italy has a known higher prevalence of ARVC
SCD

- SCD during athletics also occurs in the absence of structural heart disease known as primary electrical disease
  - Long QT Syndrome
  - Short QT Syndrome
  - Brugada Syndrome
  - Catecholaminergic polymorphic ventricular tachycardia
  - Wolf-Parkinson-White Syndrome (WPW)

- SCD precipitated from trauma
  - Commotio cordis

- SCD in athletes >35 Y/O
  - **Coronary artery disease** is the most common cause of SCD during exercise
Table 1. Causes of Sudden Death in 387 Young Athletes*

<table>
<thead>
<tr>
<th>Cause</th>
<th>No. of Athletes</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertrophic cardiomyopathy</td>
<td>102</td>
<td>26.4</td>
</tr>
<tr>
<td>Commotio cordis</td>
<td>77</td>
<td>19.9</td>
</tr>
<tr>
<td>Coronary artery anomalies</td>
<td>53</td>
<td>13.7</td>
</tr>
<tr>
<td>Left ventricular hypertrophy of indeterminate causation†</td>
<td>29</td>
<td>7.5</td>
</tr>
<tr>
<td>Myocarditis</td>
<td>20</td>
<td>5.2</td>
</tr>
<tr>
<td>Ruptured aortic aneurysm (Marfan syndrome)</td>
<td>12</td>
<td>3.1</td>
</tr>
<tr>
<td>Arrhythmogenic right ventricular cardiomyopathy</td>
<td>11</td>
<td>2.8</td>
</tr>
<tr>
<td>Tunneled (bridged) coronary artery‡</td>
<td>11</td>
<td>2.8</td>
</tr>
<tr>
<td>Aortic valve stenosis</td>
<td>10</td>
<td>2.6</td>
</tr>
<tr>
<td>Atherosclerotic coronary artery disease</td>
<td>10</td>
<td>2.6</td>
</tr>
<tr>
<td>Dilated cardiomyopathy</td>
<td>9</td>
<td>2.3</td>
</tr>
<tr>
<td>Myxomatous mitral valve degeneration</td>
<td>9</td>
<td>2.3</td>
</tr>
<tr>
<td>Asthma (or other pulmonary condition)</td>
<td>8</td>
<td>2.1</td>
</tr>
<tr>
<td>Heat stroke</td>
<td>6</td>
<td>1.6</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td>Other cardiovascular cause</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td>Long QT syndrome§</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>Cardiac sarcoidosis</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>Trauma causing structural cardiac injury</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>Ruptured cerebral artery</td>
<td>3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Data are from the registry of the Minneapolis Heart Institute Foundation (3). †Findings at autopsy were suggestive of HCM but were insufficient to be diagnostic. ‡Tunneled coronary artery was deemed the cause of death in the absence of any other cardiac abnormality. §The long QT syndrome was documented on clinical evaluation. Source: Reproduced from Maron B.J. (3) with permission of the Massachusetts Medical Society.
Hypertrophic Cardiomyopathy (HCM)

- Most common cause of Sudden Cardiac Death < 35 y/o
- Prevalence of 1 in 500 in general population
- Reported to cause 2-36% of SCD in athletes
  - Different studies report different rates of SCD
  - Corrado 2003 (Italy): 2%
  - Maron 2007 (USA): 36%
  - Harmon 2011 (USA): 3%
Return To Play Post COVID-19 Recommendations

- College
Cardiac Considerations for College Student-Athletes during the COVID-19 Pandemic

*Recommendations for cardiac testing are based on expert consensus and informed by current evidence

**Confirmed New Infection**
- Isolate and contact tracing per public health guidelines

**Asymptomatic or Mild illness**
(common cold-like symptoms [without fever], GI symptoms, or loss of taste/smell)
- Medical evaluation before a return to exercise progression
  - No specific cardiac testing; additional cardiac testing based on clinical concern or institutional requirements
  - No exercise for at least 3 days from symptom onset or positive test; timeline of exercise progression should be individualized
- Return to Play
  - Monitor for new symptoms with exercise*

**Moderate illness or Initial Cardiopulmonary Symptoms**
(≥2 days of fever, chills, or flu-like symptoms; or chest pain, SOB, or palpitations)
- Medical evaluation and consider ECG, Echo, and Troponin before a return to exercise progression
  - No exercise for at least 5 days from symptom onset; fever, flu-like and cardiopulmonary symptoms should be resolved before starting an exercise progression
- Normal testing
- Return to Play
  - Monitor for new symptoms with exercise*

**Severe illness or Hospitalization**
- A comprehensive medical evaluation and cardiology consultation is recommended
  - Consider ECG, Echo, and Troponin
- Cardiology consultation and consider Cardiac MRI before a return to exercise progression

**Cardiopulmonary Symptoms with Return to Exercise**
(chest pain, excessive SOB, palpitations, or unexplained exercise intolerance)
- Medical evaluation and consider ECG, Echo, and Troponin

- ECG should be compared to previous when available
- Troponin testing (hs-cTnl or cTnl) should be performed after 48 hours without exercise
- Confirmed myocarditis, pulmonary embolism, or other cardiopulmonary disorder should be managed per medical guidelines

*Considerations were developed by an expert panel with members from the American Medical Society for Sports Medicine and the American College of Cardiology*
Return To Play Post COVID-19 Recommendations

• High School
KSHSAA STUDENT-ATHLETE PRE-PARTICIPATION COVID-19 QUESTIONNAIRE

Based on awareness of potential cardiopulmonary issues in adolescents who have had or been exposed to COVID-19, the American Medical Society for Sports Medicine, the National Federation of High School Associations and the KSHSAA Sports Medicine Advisory Committee recommend a preseason screening of students prior to participating in athletics.

This questionnaire is to be completed and turned in to the school prior to the student’s first sports practice (including Spirit) of the 2020-21 school year. It is recommended students/parents complete this form 1-2 weeks prior to the start of the season in case follow-up evaluation is necessary. If timing allows it should be done in conjunction with the student’s pre-participation physical exam. This form is NOT intended to replace the recommended daily screening procedures for all students participating in activities.

Student Name: ______________________ Date: ______________________

Please check **Yes** or **No** for each question and symptom listed below.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you been diagnosed with or tested positive for a COVID-19 infection?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you had any of the following symptoms in the past two weeks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fever</td>
<td></td>
<td></td>
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<tr>
<td>- Cough</td>
<td></td>
<td></td>
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<tr>
<td>- Shortness of breath or difficulty breathing</td>
<td></td>
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<td>- Shaking chills</td>
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<td>- Chest pain, pressure, or tightness with exercise</td>
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<td>- Racing heart rate</td>
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<td>- Unusual dizziness</td>
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<tr>
<td>- Loss of taste or smell</td>
<td></td>
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<tr>
<td>- Sore throat</td>
<td></td>
<td></td>
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<tr>
<td>- Nausea, vomiting, or diarrhea</td>
<td></td>
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<tr>
<td>- Unusual rash or painful discoloration of fingers or toes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days, have you been exposed to a family member or household member with current or past COVID-19?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Any student-athlete marking any of the above questions or symptoms “YES” should be evaluated by a healthcare provider and submit written clearance from their healthcare provider to the school before being permitted to participate in sports (including Spirit activities).

Signatures Required

Student ______________________ Date ______________________

Parent/Guardian ______________________ Date ______________________

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KSHSAA STUDENT-ATHLETE PRE-PARTICIPATION COVID-19 QUESTIONNAIRE

THIS PAGE ONLY NEEDS COMPLETED IF A “YES” ANSWER WAS PROVIDED ON ANY OF THE ITEMS ON PAGE 1.

Healthcare Provider Release Section:
(Must be completed by MD, DO, DC, PA-C, APRN)

Student Name: ____________________________________________

I have examined the student named on this form and reviewed the student’s previous history of COVID-19 illness and/or exposure.

☐ Student is medically eligible for all sports without restriction
☐ Student is not medically eligible for any sports at this time

Recommendations: ________________________________________
________________________________________________________________________
________________________________________________________________________

Date: ____________________________

Name of healthcare provider: ________________________________

Signature of healthcare provider: ____________________________

MD, DO, DC, PA-C, APRN

Address: ________________________________________________

Phone: _________________________________________________
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COVID-19 GRADUATED RETURN TO PLAY FOR PERFORMANCE ATHLETES: GUIDANCE FOR MEDICAL PROFESSIONALS

INDICATORS OF COVID-19 INFECTION

- Shortness of Breath
- New, Persistent Dry Cough
- Fever
- GI Symptoms such as diarrhoea & nausea
- Loss of taste and smell

THIS GUIDANCE IS AIMED AT ATHLETES WITH MILD TO moderate SYMPTOMS OF COVID-19. ATHLETES SHOULD FOLLOW LOCAL GOVERNMENT GUIDELINES OF COUNTRY OF RESIDENCE FOR MANAGEMENT OF SYMPTOMS INCLUDING ISOLATION AND TESTING PROCESSES. ATHLETES WHO HAVE MORE COMPLICATED INFECTIONS, OR REQUIRED HOSPITAL SUPPORT SHOULD HAVE A MEDICAL ASSESSMENT BEFORE COMMENCING GRTP. ASSESSMENT MAY INCLUDE:

- Blood testing for markers of inflammation (hs-CRP, ferritin, CRP, coagulation, renal & haematology monitoring)
- Cardiac monitoring (ECG, echo,FFR, cardiac MRI)
- Respiratory function assessment (spirometry)

AT-LEAST

10 DAYS

&

7 DAYS

REST FROM ONSET

&

SYMPTOM FREE

OFF ALL TREATMENT, E.G. PARACETAMOL

GRTP

GRADUATED RETURN TO PLAY PROTOCOL

GRADUATED RETURN TO PLAY PROTOCOL

UNDER MEDICAL SUPERVISION

ACRONYMS: I-RRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)

NOTE: THIS GUIDANCE IS SPECIFIC TO SPORTS WITH AN AEROBIC COMPONENT

INFOGRAPHIC CREATED BY UK HOME COUNTRIES INSTITUTES OF SPORT ELIOTTE N. ELLIOTT J. BISWAS A. MARTIN R. HERON N.
COVID-19 GRADUATED RETURN TO PLAY FOR PERFORMANCE ATHLETES: GUIDANCE FOR MEDICAL PROFESSIONALS

INDICATORS OF COVID-19 INFECTION

- Shortness of Breath
- New, Persistent Dry Cough
- Fever
- GI Symptoms such as Diarrhoea & Nausea
- Loss of Taste and Smell
### GRADUATED RETURN TO PLAY PROTOCOL

**UNDER MEDICAL SUPERVISION**

<table>
<thead>
<tr>
<th>Stages</th>
<th>Activity Description</th>
<th>Exercise Allowed</th>
<th>% Heart Rate Max</th>
<th>Duration</th>
<th>Objective</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong></td>
<td>10 Days Minimum</td>
<td>Minimum rest period</td>
<td>Walking, activities of daily living</td>
<td>≤70%</td>
<td>10 Days</td>
<td>Allow recovery time; protect cardio-respiratory system</td>
</tr>
<tr>
<td><strong>Stage 2</strong></td>
<td>2 Days Minimum</td>
<td>Light activity</td>
<td>Walking, light jogging, stationary cycle, no resistance training</td>
<td>≤80%</td>
<td>≤15 Mins</td>
<td>Increase heart rate</td>
</tr>
<tr>
<td><strong>Stage 3A</strong></td>
<td>1 Day Minimum</td>
<td>Frequency of training increases</td>
<td>Simple movement activities e.g. running drills</td>
<td>≤80%</td>
<td>≤30 Mins</td>
<td>Increase load gradually; manage any post viral fatigue symptoms</td>
</tr>
<tr>
<td><strong>Stage 3B</strong></td>
<td>1 Day Minimum</td>
<td>Duration of training increases</td>
<td>Progression to more complex training activities</td>
<td>≤80%</td>
<td>≤45 Mins</td>
<td>Exercise, coordination and skills/tactics</td>
</tr>
<tr>
<td><strong>Stage 4</strong></td>
<td>2 Days Minimum</td>
<td>Intensity of training increases</td>
<td>Normal training activities</td>
<td>≤80%</td>
<td>≤60 Mins</td>
<td>Restore confidence and assess functional skills</td>
</tr>
<tr>
<td><strong>Stage 5</strong></td>
<td>Earliest Day 17</td>
<td>Resume normal training progressions</td>
<td>Resume normal training activities</td>
<td></td>
<td></td>
<td>Resume normal training progressions</td>
</tr>
<tr>
<td><strong>Stage 6</strong></td>
<td></td>
<td>Resume normal training progressions</td>
<td>Resume normal training activities</td>
<td></td>
<td></td>
<td>Resume normal training progressions</td>
</tr>
</tbody>
</table>

**RETURN TO COMPETITION**

**IN SPORT SPECIFIC TIMELINES**

**ACRONYMS:** I-PRRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)

**NOTE:** This guidance is specific to sports with an aerobic component.
<table>
<thead>
<tr>
<th>Stages</th>
<th>Activity Description</th>
<th>Exercise Allowed</th>
<th>% Heart Rate Max</th>
<th>Duration</th>
<th>Objective</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 (10 days minimum)</td>
<td>Minimum Rest Period</td>
<td>Walking, Activities of Daily Living</td>
<td>&lt;70%</td>
<td>&lt;15 mins</td>
<td>Allow Recovery Time, Protect Cardio-Respiratory System</td>
<td>Subjective Symptoms, Resting HR, I-PRRS, RPE</td>
</tr>
<tr>
<td>Stage 2 (2 days minimum)</td>
<td>Light Activity</td>
<td>Walking, Light Jogging, Stationary Cycle, No Resistance Training</td>
<td>&lt;80%</td>
<td>&lt;30 mins</td>
<td>Increase Heart Rate</td>
<td></td>
</tr>
<tr>
<td>Stage 3a (1 day minimum)</td>
<td>Frequency of Training Increases</td>
<td>Simple Movement Activities e.g. Running Drills</td>
<td></td>
<td></td>
<td>Increase Load Gradually, Manage Any Post Viral Fatigue Symptoms</td>
<td>Subjective Symptoms, Resting HR, I-PRRS, RPE</td>
</tr>
</tbody>
</table>

Acronyms: I-PRRS (Injury - Psychological Readiness to Return to Sport); RPE (Rated Perceived Exertion Scale)

Note: This guidance is specific to sports with an aerobic component.
ACRONYMS: I-PPRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)
NOTE: THIS GUIDANCE IS SPECIFIC TO SPORTS WITH AN AEROBIC COMPONENT
Emergency Action Plan

- Every school should have a well-rehearsed emergency action plan (EAP) to help with a response to SCA.
- On-site automated external defibrillator (AED) program that allows retrieval and use of an AED within 2-3 minutes of collapse at school athletic venues and buildings.
- First responders to SCA (Athletic Trainers, School Nurses, Coaches)
  - Trained in CPR
  - Trained in recognition of SCA
  - Trained in use of an AED
- EAP practice yearly.
Doctor discusses path to safe return for players, teams after pausing seasons due to COVID-19
QUESTIONS
THANK YOU
References