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Recommendations for resumption of regular sports activity after COVID-19 pandemic

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1 **Recommendations for resumption of regular sports activity after COVID-** 2 **19 pandemic**

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60 **Background**

61 The COVID-19 pandemic and the restrictive measures adopted internationally in order to
62 contain the virus has led to a disruption of organised sport at all levels. During the
63 lockdown period, outdoor exercise was forbidden or partly restricted in some cases without
64 access to sports facilities including gyms or sports centres. As the number of infections and
65 hospitalisations decreased, the strict lockdown was gradually lifted. Team sports have
66 commenced reintroducing their training routines in groups, and the Bundesliga reactivated
67 the professional league behind closed doors on 16th May 2020 despite serious concerns
68 raised by some in the scientific community [1]. Additional sporting competitions such as
69 boxing, Ultimate Fighting Championship and Formula 1 are also scheduled to resume in
70 May-June 2020 [2]. It is worth noting that social distancing is possible in some sports (e.g.,
71 tennis, swimming, athletics and golf) whereas this is not always possible in other cases (e.g.
72 football, rugby, basketball, cycling and boxing), and careful measures of hygiene and
73 control are especially needed for these more at risk sports to regulate the safety of sport
74 resumption and to avoid possible infections. For more thorough information about the risk
75 factors and symptoms to be considered to make the return to sport as safely as possible,
76 consult Carmody et al. [3] and Niess et al. [4]. The present editorial provides practical and
77 medical recommendations on the resumption to sport process.

78

79 **Group identification**

80 During the resumption to sport process, the following groups must be distinguished
81 (individuals below refer to both leisure time and professional athletes or persons starting
82 new with regular physical activities):

- 83 1. Individuals without symptoms and signs.
- 84 2. Individuals with a positive SARS-CoV-2 test without any Covid-19-disease

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3 85 symptoms.

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5 86 3. Individuals who experienced Covid-19-disease with mild symptoms, only needing
6
7 87 outpatient treatment and quarantine for 14 days.

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9 88 4. Individuals with moderate symptoms but had inpatient treatment due to an increased
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11 89 risk derived from pre-existing conditions (e.g., asthma, diabetes).

12
13 90 5. Individuals with severe symptoms, inpatient treatment, including intensive care
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15 91 without artificial respiration.

16
17 92 6. Individuals with severe symptoms, inpatient treatment in intensive care and on
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19 93 artificial respiration.

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23 95 It is imperative that a medical examination is performed in cooperation with a respiratory
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25 96 physician and/or cardiologist.

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29 98 **Recommendations for individual groups**

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33 100 **Group 1:** Before resuming sport without any past medical history evidence, risk
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35 101 stratification has to be evaluated through questionnaires compiling data related to history,
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37 102 close contact with people with positive SARS-CoV 2 test, or contact with people of high
38
39 103 risk, or in so called hotspots. The individual has to confirm being free of any symptoms and
40
41 104 this must be documented. Exercise testing is likely to be necessary in some sports due to
42
43 105 the expected detraining after lockdown, and exercise testing must be performed according
44
45 106 to the latest Covid-19-disease / SARS-CoV-2 health and safety regulations.

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49 108 **Group 2:** Resumption after 14 days quarantine. Examinations ought to include history,
50
51 109 physical examination, 12-channel electrocardiogram (ECG), lung function assessment (if
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3 110 necessary), and both cardiac echo and stress test (if necessary) [5].
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5 111 **Group 3:** Resumption after a quarantine period of two weeks and strict social distancing
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7 112 for another two weeks.
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12 114 A medical examination by a sport and exercise medicine physician with history, physical
13
14 115 examination, blood test focused on critical markers (e.g., C-Reactive Protein, high
15
16 116 sensitivity troponin-I, natriuretic peptides) if necessary, and resting ECG (e.g., changes of
17
18 117 Q-wave, ST-stretch, T-wave). Additional lung function assessment and stress test with
19
20 118 ECG, blood gas analysis and spiroergometry are recommended if symptoms have involved
21
22 119 respiratory impairment. Medical surveillance for six months after return to sport if any
23
24 120 symptoms are present but not limiting return to sport.
25
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30 122 **Group 4:** Same procedure as for group 3 but including compulsory ergometry with blood
31
32 123 gas analysis and/or spiroergometry. Chest X-ray examination and depending on the
33
34 124 findings obtained during the inpatient stay, high-resolution computed tomography of the
35
36 125 thorax in the most severe cases always in consultation with a lung specialist. Cardiac
37
38 126 examinations depending on history, symptoms and signs, cardio-magnetic resonance
39
40 127 imaging (MRI) after consultation with a cardiologist.
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46 129 **Groups 5 and 6:** A complete pulmonary and cardiological examination is necessary
47
48 130 (“cardiac markers” such as high sensitivity troponin-I or natriuretic peptides) including
49
50 131 resting ECG, lung function, echocardiography (if necessary), stress test with ECG and
51
52 132 blood gas analysis.
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58 134 Depending on previous findings in heart rate, computed tomography of the thorax and
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3 135 cardiac MRI examination in consultation with a respiratory physician and cardiologist,
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5 136 hospital discharge can take place. A final medical check and sports statement is mandatory.

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10 138 Resumption of sport can occur in uncomplicated cases 10 days after recovery from
11
12 139 infection. In patients with more severe organ involvement, pneumonia, myocarditis or
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14 140 neurological signs an individualized plan is necessary^{4,5}. Testing for SARS CoV-2 can be
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17 141 carried out to support a return to play decision but is not essential unless stipulated (e.g.,
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19 142 National/International Sports Federation, Government).

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23 24 144 **Conclusions**

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26 145 An adequate assessment of the resumption of sporting activity is based on a case-by-case
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28 146 decision that must consider the individual situation of the athlete including pre-existing
29
30 147 conditions, the type of sport and the risk of infection from other athletes (e.g., increased
31
32 148 risk in contact/team-sports). The recommendation to return to play will be based on the
33
34 149 results of the examination and individual assessment in consultation with the sport and
35
36 150 exercise medicine physician, specialists in pulmonary medicine and sport cardiology (or
37
38 151 extended multidisciplinary team), coaches and training specialists. After a contact ban, an
39
40 152 athlete should be provided with recommendations on sports resumption that are in
41
42 153 accordance with national and regional guidelines. After a longer period of interruption in
43
44 154 sport caused by more severe health issues, increases in training should be gradual and
45
46 155 individualised by monitoring signs and symptoms of the health issue.

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