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COVID 19 Challenges and Return to Training CEU Quiz

1. COVID-19 can last up to _____ on surfaces not properly disinfected.
    a. 1 day
    b. 9 days
    c. 15 days

2. A greater accumulation in training load may lead to a _____.
    a. decreases in injury
    b. decrease in anxiety
    c. decrease in immunity

3. It is essential for athletes to stay physically active to _____.
    a. decrease the magnitude of detraining
    b. increase immune system functioning
    c. decrease rate of weight gain

4. Emotional concerns of at home confinement can be reduced by _____.
    a. incorporating intense exercise
    b. including relaxation techniques
    c. increasing sedentary behaviors

5. Which of the following dietary habits is recommended for athletes during confinement?
    a. adopt restrictive diets
    b. avoid carbohydrates
    c. decrease portion sizes

6. Possible return to training outcomes for athletes include which of the following?
    a. adverse weight loss or weight gain
    b. lowered risk of overtraining
    c. traditional pre-season schedules

7. In order to minimize risk associated with COVID-19, fresh air circulation and a relative humidity of ____ should be emphasized in the training facility.
    a. <50%
    b. <60%
    c. <70%

8. With return to training, initial weight room training schedules should include no more than _____.
    a. 3 training sessions per week
    b. 3 rest days per week
    c. 3 recovery days between sessions

9. How long should the dynamic warm up be to reduce the likelihood of DOMS?
    a. 3-5 minutes
    b. 10-20 minutes
    c. 25-30 minutes

10. Following a period of inactivity, mental toughness and physically exhaustive drills should be _____.
    a. limited
    b. avoided
    c. increased

Challenges to Athletes During the Home Confinement Caused by the COVID-19 Pandemic

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ABSTRACT

The world is currently facing a serious coronavirus pandemic (COVID-19). This novel coronavirus is a new virus for which effective drugs and vaccines have not yet been developed. Amateur and professional athletic events around the world have been stopped, and teams and athletes have had to adopt social withdrawal measures, interrupting their training and preparation routines for competitions. Given this alarming scenario, this article aims to alert athletes to the importance of maintaining a conditioning routine during this confinement period.

BACKGROUND

The world is currently facing a serious coronavirus pandemic known as COVID-19. Effective drugs and vaccines have not yet been developed which increases the contamination and mortality rates. As of April 15, 2020 there were 2,544,792 confirmed cases and 175,694 deaths caused by COVID-19 globally (47). In addition to this high number, the virus curve continues to grow, with 73,657 confirmed cases and 6,689 deaths in only one day (based on reporting day #94) (47). These rates are being updated daily by the World Health Organization (see: www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/). However, actual figures may be higher because many infected people do not show symptoms, and there are insufficient detection kits to test all patients with mild symptoms, and those who die.

The COVID-19 virus can be transmitted by close contact through respiratory droplets (such as coughing) and by fomites (any inanimate object or substance capable of absorbing, retaining, and transporting contagious or infectious organisms) (27,34,46), and COVID-19 can persist on inanimate surfaces such as metal, glass, or plastic for up to 9 days if there is no inactivation by surface disinfection procedures (23,45). Given this alarming scenario, a strategy to effectively combat COVID-19 is to maintain physical distance from other people, a term commonly referred to as social distancing. Aside from containing the outbreak to prevent further spread of the infection, which would result in more deaths, recommended interventions include increasing the volume of tests performed on individuals suspected of having the disease, canceling events that generate agglomerations (mass gatherings), and restricting human mobility, the so-called sanitary cordon (2,25). In this sense, authorities around the world have adopted different strategies, such as lockdowns, home confinement, and other restrictive measures, meaning a large number of people are required to remain at home.

The stoppage of amateur and professional athletic events around the world, including sports such as basketball, football, soccer, rugby, baseball, tennis, and recently the Olympic Games, illustrates that the sport world is also an important part in this scenario and has a fundamental role in the containment of this pandemic. As a result, those directly and indirectly involved with these events have been impacted. For example, sports managers must consider new dates for competitions; sports journalists and TV programs do not have events to broadcast; and stadiums are closed to fans. In this context, the training routines of a significant number of athletes around the world have been abruptly interrupted. This change causes serious damage to the quality and quantity of training, with further distancing of the athlete from the reality of their daily training in the traditional preparation sites and uncertainties about the future. Physical, technical, and

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psychological damage is inevitable. To the athlete, significantly reducing training and losing their physical performance capacity can mean loss of competitiveness in the return to competition. Thus, sports science professionals and scientists are challenged to help athletes deal with some of these relevant aspects during this period. This article aims to alert athletes to the need to maintain a conditioning routine during this period.

CONDITIONING TRAINING

At this time, maintenance of a training routine is important for physical health (4,14). Regular exercise helps to boost and maintain immunity (42), which is essential to reduce the risk of a viral infection. In this regard, maintenance of the specifics of each sport is recommended, respecting the technical and metabolic characteristics. It is not possible to create a single training routine to be applied to all sports. Thus, strength and conditioning professionals, within the current possibilities, should develop a training routine for their athletes. For example, weightlifters should try to maintain their training routine by performing competition and training moves (snatch, and clean and jerk), and powerlifters should try to maintain squat, bench press, and deadlift exercises. This is not always possible, and adaptations are required compatible with the reality of each athlete.

For nonathletes, it is suggested that activities of moderate intensity be prioritized (4). However, adopting this type of conduct for athletes of different modalities is not feasible because it does not respect the principle of specificity. There is an ongoing discussion about the impact of acute physical exercise on the immune system. Some evidence indicates that acute high-intensity activities can cause postexercise immunosuppression (exacerbated responses for redox status and white blood cell count, with some of these variables still elevated 24 hours after exercise) (21). Other evidence questions this postexercise immunosuppression and the "open window" hypothesis, indicating that there is limited reliable evidence to support the idea that vigorous exercise increases the risk of opportunistic infections. In addition, changes to mucosal immunity after exercise do not indicate a period of immunosuppression. The sharp reductions in lymphocyte numbers and function after exercise reflect a transient and time-dependent redistribution of immune cells to peripheral tissues, which results in a heightened state of immune surveillance and immune regulation, and not an immunosuppression status (11). On the other hand, some evidence indicates that acute moderate-intensity exercise is immune-enhancing (e.g., enhances in neutrophil chemotaxis, spontaneous neutrophil degranulation, and neutrophil oxidative burst) (42).

Despite the ongoing discussion about the effects of the intensity of acute exercise, this pandemic period requires caution and a warning of the need for attention regarding the total intensity and total volume of the training sessions, so that the accumulation of training load does not generate disturbances in the immune system and/or signs of excess training load (e.g., skin irritation, sore throat, discharge of nasal mucus, and sleep disturbances) (8,12,20,42). Although it is likely that athletes will train less during the pandemic, some of them may increase the number of daily sessions to try to get around the stress of confinement. In addition, changes in routine, diet, and increased stress and anxiety can be factors that aggravate the recovery of athletes.

Another reason for staying physically active is to minimize the effects of detraining and to facilitate the return to a normal routine after the home confinement. In this pandemic period, competitions and sporting events are suspended, and the return date for many of these competitions is uncertain. Considering the negative economic impact of the pandemic, there is a chance that these events will resume a short period after the end of the home confinement. Therefore, it is important that the athlete does not have a sharp decline in physical fitness. In this sense, several studies have shown that periods without training induce reductions in aerobic fitness, muscle strength, muscle power, sprint performance, flexibility, and physiological adaptions in athletes from different sports (18,22,24,32,33,35,36). Therefore, it is essential that athletes remain active to decrease the magnitude and speed of detraining, which should occur due to changes in training routines. In addition, attention should also be steered toward athletic fitness. Thus, it is important that athletes try to perform the technical movements of their sport, although this is limited in many cases (e.g., dependence on the opponent, such as team sports, need for equipment, or practice location, such as swimming).

Considering the possibility of a quick return to competition, strength and conditioning professionals and athletes need to pay attention in this period to an exercise routine, which will prevent injury after return to the normal sport calendar. A complete strategy for injury prevention at home should include mobility and flexibility, body weight exercises, core stabilization, balance, and proprioception (26,28). These functional training routines require simple equipment and not much space. Another option is follow the Fédération Internationale de Football Association (FIFA) 11+ prevention program adapted for the home environment. This protocol includes running, plyometric, strength, and balance exercises (41).

Another point to consider is that the detraining period can induce an increase in both body mass and body fat mass (24,35). Thus, this should be considered, since in addition to body fat having a negative association with physical performance (1,10); in many modalities, the athletes are divided into categories related to body mass (e.g., combat sports and powerlifting). Therefore, a sharp increase in body mass during home confinement may require athletes to drastically reduce their body mass before competing.

For the conditioning routine during home confinement, athletes can include exercises within their possibilities of physical space and available equipment (e.g., barbells, weight plates, dumbbells, kettlebells, and bands). In this case, if there is another family member using the same equipment, the cleaning of used

equipment, followed by disinfection using chemicals to kill the virus on the surfaces is an essential practice for the prevention of COVID-19 in households (13). Individuals tasked with cleaning and disinfection of equipment should be familiar with manufacturer recommendations (including virus kill times) for the products used. For those who do not have equipment, exercise routines without equipment (e.g., jogging, squats, burpees, push-ups, sit-ups, and stretching) may be good options. However, athletes should be aware of the intensity of the sessions and the state of recovery to avoid immunosuppression, which can be facilitated by mental stress. In addition, it is important to avoid prolonged periods of sedentary behaviors, such as sitting or lying time, and screen time (e.g., TV, cell phone, computer, and video games) during this home confinement.

Finally, athletes can take this period by studying the tactical aspects of the sport, the opponents, and themselves. After this home confinement, the interactions and specific tactical behaviors of the players may have decreased the autonomous stage learning (17). Therefore, in this period, athletes could improve their declarative tactical knowledge, such as match and performance analysis of their own team or opponents, besides visual search cues strategies (30,44).

MENTAL HEALTH

Daily conditioning training may also help to reduce tension and stress from home confinement as a negative life event affects the mental health of elite athletes (37,43). The abrupt change in their daily routine, the adopted home confinement measures, and uncertainty about the date for the return to activities can lead athletes to experience conditions that affect their mental health; such as external sources of distress, including financial problems, bad daily news, and internal sources of distress, such as worry about their performance when they return, and tension due to the routine change. This period can lead to negative feelings such as anxiety, depression, adverse behaviors, such as alcohol use and smoking, as well as eating and sleep disorders (5,6,9,19,31,39). In this sense, to deal with these possible emotional concerns during the home confinement, coaches, strength and conditioning coaches, and athletes should pay attention to identifying and managing these experiences and seeking help and social support when necessary (16,43). Relaxation techniques, such as meditation, mindfulness, body scan, and deep breathing, are also recommended (7,29).

NUTRITION

Attention to the dietary habits of athletes during home confinement is of comparable importance to exercise. This period may represent a sedentary moment for athletes, leading to consumption of high calorie foods due to impulse or anxiety (37). In this sense, athletes should reduce caloric consumption. We recommend measures such as, if possible, reduction in macronutrient portion sizes; reduction, or even discontinuation, of the use of dietary supplements; prioritization of foods that can benefit the immune system (38); and avoiding ultraprocessed foods (40). In this sense, meals with an adequate protein intake, like meat or egg, sources of iron, zinc, and vitamin B12, with fruit and vegetables, sources of antioxidants, and vitamin C are recommended (35). Finally, athletes do not need to adopt restrictive diets during this period. In the case of uncontrolled food consumption, all efforts in the training area can be quickly lost, in addition to associations with poor diet and an increased risk of weight gain, injuries, and gastrointestinal problems (3,15,40).

CONCLUSION

A conditioning routine can help athletes to boost and maintain immunity, minimize the effects of detraining, and facilitate the return to a normal routine, as well as improving tactical knowledge. In addition, attention to the mental health and dietary habits of athletes is needed in this period of home confinement. Strength and conditioning professionals, teams, and athletes who are able to adopt these measures will experience less difficulty when returning to their normal training and competition routines.

It is essential for sports science professionals to keep in mind the short- and medium-term challenges, with the possibility of extended confinement times in several countries, with longer lasting restrictions on social contact, and negative repercussions for athletes and coaches. All scientific and technical efforts to minimize damage and provide safe guidance are important.

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REFERENCES

1. Abe T, Kawamoto K, Dankel SJ, et al. Longitudinal associations between changes in body composition and changes in sprint performance in elite female

sprinters. *Eur J Sport Sci* 20: 100–1105, 2020.

2. Adegboye OA, Adekunle AI, Pak A, et al. Change in outbreak epicenter and its impact on the importation risks of COVID-19 progression: A modelling study. *MedRxiv* 2020. [E-pub ahead of print].
3. American College of Cardiology/American Heart Association Task Force on Practice Guidelines, Obesity Expert Panel, 2013. Executive summary: Guidelines (2013) for the management of overweight and obesity in adults: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Obesity Society published by the Obesity Society and American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Based on a systematic review from the the Obesity Expert Panel, 2013. *Obesity (Silver Spring)* 22(Suppl 2): S5–S39, 2014.
4. American College of Sports Medicine (ACSM). *Staying Active during the Coronavirus Pandemic*. Available at: http://www.acsm.org/read-research/newsroom/news-releases/news-detail/2020/03/16/staying-physically-active-during-covid-19-pandemic. Accessed: March 28, 2020.
5. Andrade A, Bevilacqua G, Casagrande P, Brandt R, Coimbra D. Sleep quality associated with mood in elite athletes. *Phys Sportsmed* 47: 312–317, 2019.
6. Andrade A, Bevilacqua GG, Coimbra DR, Pereira FS, Brandt R. Sleep quality, mood and performance: A study of elite Brazilian volleyball athletes. *J Sports Sci Med* 15: 601–605, 2016.
7. Birrer D, Morgan G. Psychological skills training as a way to enhance an athlete's performance in high-intensity sports. *Scand J Med Sci Sports* 20: 78–87, 2010.
8. Branco BHM, Andreato LV, Mendes AA, et al. Effects of a Brazilian jiu-jitsu training session on physiological, biochemical, hormonal and perceptive responses. *Arch Budo Sci Martial Arts* 12: 145–154, 2016.
9. Brandt R, Liz CM, Crocetta TB, et al. Mental health and associated factors in athletes during the open games of Santa Catarina. *Rev Bras Med Esporte* 20: 276–280, 2014.
10. Brocherie F, Girard O, Forchino F, et al. Relationships between anthropometric measures and athletic performance, with special reference to repeated-sprint ability, in the Qatar national soccer team. *J Sports Sci* 32: 1243–1254, 2014.
11. Campbell JP, Turner JE. Debunking the myth of exercise-induced immune suppression: Redefining the impact of exercise on immunological health across the lifespan. *Front Immunol* 9: 648, 2018.
12. Campos F, Correa JCM, Canevari VCM, et al. Monitoring internal training load, stress-recovery responses, and immune-endocrine parameters in Brazilian jiu-jitsu training. *J Strength Cond Res* 2020. [E-pub ahead of print].
13. Center for Diseases Control and Prevention (CDC). *Cleaning and Disinfection for Households*. Available at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html. Accessed April 11, 2020.
14. Chen P, Mao L, Nassis GP, et al. Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. *J Sport Health Sci* 9: 103–104, 2020.
15. Close GL, Sale C, Baar K, Bermon S. Nutrition for the prevention and treatment of injuries in track and field athletes. *Int J Sport Nutr Exerc Metab* 29: 189–197, 2019.
16. Cormier ML, Zizzi SJ. Athletic trainers' skills in identifying and managing athletes experiencing psychological distress. *J Athl Train* 50: 1267–1276, 2015.
17. Courel-Ibáñez J, McRobert AP, Toro EO, Vélez DC. Collective behaviour in basketball: A systematic review. *Int J Perf Anal Spor* 17: 44–64, 2017.
18. García-Pallarés J, Sánchez-Medina L, Pérez CE, et al. Physiological effects of tapering and detraining in world-class kayakers. *Med Sci Sports Exerc* 42: 1209–1214, 2010.
19. Gouttebarge V, Aoki H, Kerkhoffs GM. Prevalence and determinants of symptoms related to mental disorders in retired male professional footballers. *J Sports Med Phys Fitness* 56: 648–654, 2016.
20. Greenham G, Buckley JD, Garrett J, Eston R, Norton K. Biomarkers of physiological responses to periods of intensified, non-resistance-based exercise training in well-trained male athletes: A systematic review and meta-analysis. *Sports Med* 48: 2517–2548, 2018.
21. Jamurtas AZ, Fatouros IG, Deli CK, et al. The effects of acute low-volume HIIT and aerobic exercise on leukocyte count and redox status. *J Sports Sci Med* 17: 501–508, 2018.
22. Joo CH. The effects of short term detraining and retraining on physical fitness in elite soccer players. *PLoS One* 13: e0196212, 2018.
23. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect* 104: 246–251, 2020.
24. Koundourakis NE, Androulakis NE, Malliaraki N, et al. Discrepancy between exercise performance, body composition, and sex steroid response after a six-week detraining period in professional soccer players. *PLoS One* 9: e87803, 2014.
25. Kraemer MUG, Yang CH, Gutierrez B; Open COVID-19 Data Working Group, et al. The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science* 2020. [E-pub ahead of print].
26. Leppänen M, Aaltonen S, Parkkari J, Heinonen A, Kujala UM. Interventions to prevent sports related injuries: A systematic review and meta-analysis of randomised controlled trials. *Sports Med* 44: 473–486, 2014.
27. Li Q, Guan X, Wu P, et al. Early Transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 382: 1199–1207, 2020.
28. Meurer MC, Silva MF, Baroni BM. Strategies for injury prevention in Brazilian football: Perceptions of physiotherapists and practices of premier league teams. *Phys Ther Sport* 28: 1–8, 2017.
29. Moore EWG, Gearity BT. Guest editorial for psychology of strength and conditioning special issue. *Strength Cond J* 41: 1–2, 2019.
30. Moreno A, Del Villar F, García-González L, Gil A, Moreno MP. Intervention in decision-making in volleyball players' formative stage. *Rev Psicol Deporte* 20: 785–800, 2011.
31. Muir IL, Munroe-Chandler KJ. Using infographics to promote athletes' mental health: Recommendations for sport psychology consultants. *J Sport Psychol Action* 2020. [E-pub ahead of print].
32. Mujika I, Padilla S. Detraining: Loss of training-induced physiological and performance adaptations. Part I: Short term insufficient training stimulus. *Sports Med* 30: 79–87, 2000.
33. Mujika I, Padilla S. Detraining: Loss of training-induced physiological and performance adaptations. Part II: Long term insufficient training stimulus. *Sports Med* 30: 145–154, 2000.
34. Ong SWX, Tan YK, Chia PY, et al. Air, Surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient. *JAMA*, 2020. [E-pub ahead of print].

35. Ormsbee MJ, Arciero PJ. Detraining increases body fat and weight and decreases VO2peak and metabolic rate. *J Strength Cond Res* 26: 2087–2095, 2012.
36. Pritchard H, Keogh J, Barnes M, McGuigan M. Effects and mechanisms of tapering in maximizing muscular strength. *Strength Cond J* 37: 72–83, 2015.
37. Rice SM, Purcell R, Silva S, et al. The mental health of elite athletes: A narrative systematic review. *Sports Med* 46: 1333–1353, 2016.
38. Rossi SJ, Buford TW, McMillan J, Kovacs MS, Marshall AE. Nutritional strategies and immune function. *Strength Cond J* 32: 65–70, 2010.
39. Schinke RJ, Stambulova NB, Si G, Moore Z. International society of sport psychology position stand: Athletes' mental health, performance, and development. *Int J Sport Exerc Psychol* 16: 622–639, 2018.
40. Schnabel L, Buscail C, Sabate JM, et al. Association between ultra-processed food consumption and functional gastrointestinal disorders: Results from the French NutriNet-Santé cohort. *Am J Gastroenterol* 113: 1217–1228, 2018.
41. Silvers-Granelli H, Mandelbaum B, Adeniji O, et al. Efficacy of the FIFA 11+ injury prevention program in the collegiate male soccer player. *Am J Sports Med* 43: 2628–2637, 2015.
42. Simpson RJ, Kunz H, Agha N, Graff R. Exercise and the regulation of immune functions. *Prog Mol Biol Transl Sci* 135: 355–380, 2015.
43. Souter G, Lewis R, Serrant L. Men, mental health and elite sport: A narrative review. *Sports Med Open* 4: 57, 2018.
44. Vaeyens R, Lenoir M, Williams AM, Mazyn L, Phillippartes RM. The effect of task constraints on visual search behavior and decision making in youth soccer players. *J Sport Exerc Psychol* 29: 147–169, 2007.
45. van Doremalen N, Bushmaker T, Morris DH, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *N Engl J Med* 382: 1564–1567, 2020.
46. World Health Organization (WHO). *Coronavirus Disease (COVID-2019) Situation Reports: Situation Report–66*. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/. Accessed March 27, 2020.
47. World Health Organization (WHO). *Coronavirus Disease (COVID-2019) Situation Reports: Situation Report–94*. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/. Accessed April 23, 2020.

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COVID-19 RETURN TO TRAINING

Guidance on Safe Return to Training For Athletes

National Strength and Conditioning Association (NSCA)
COVID-19 Return to Training Taskforce

COVID-19: TRAINING LANDSCAPE AND CHALLENGES

The world is currently experiencing a global pandemic known as COVID-19. According to the Centers for Disease Control and Prevention (CDC), COVID-19 is a viral illness that can spread from person to person with close physical contact, coming into contact with surfaces with the virus on it, and from respiratory droplets when an infected person coughs, sneezes, or talks (1). Youth, academic and professional sport institutions in the U.S. have suspended play, as well as structured in-season and off-season training for all sports, resulting in an uncertain future landscape as it relates to the training practices for strength and conditioning coaches. Possible return to training outcomes for coaches and athletes include:

- Modified and/or condensed pre-season schedules
- Extreme deconditioning; Or mixed levels of preparation among teammates following extended time off
- Increased risks of injury and overtraining
- Adverse weight gain, weight loss, and changes to body composition
- Slowed or interrupted progress with individual rehabilitation programs
- Facility and program challenges related to ongoing fears and social distancing

The purpose of this document is to compile and summarize pertinent information to support safe and appropriate training practices with teams, athletes and clients during the expected transition period back to full training activity. The information included is to be applied in accordance with institutional policies, as well as the latest local, state, and federal guidelines related to the containment and prevention of COVID-19. It is also important to note that the overall risks for athletes following periods of inactivity extend beyond the scope of preventative measures against the spread of COVID-19. This document includes both COVID-19 prevention and inactivity related guidelines and resources for strength and conditioning coaches upon returning to partial or full training activity.

MINIMIZING RISK: MANAGING SCHEDULES AND TEAMS TRAINING SESSIONS

In response to COVID-19, strength and conditioning coaches should adjust normal weight room schedules to avoid training large groups, and allow for extra time in between training sessions for the cleaning of surfaces and equipment. Due to the possibility of athletes and coaches returning from high-risk areas, or who have been previously infected, extra precautions are necessary to prevent the asymptomatic transmission of the virus. Group size counts for training sessions must include all athletes and staff, and strictly adhere to social gathering and distancing policies at your institution, according to local, state, and federal authorities. Special considerations should be made for transitional periods between training groups when overlap and crowding is more likely to occur. Dependent upon the specific timing and withdrawal of local COVID-19 restrictions, strength and conditioning coaches should be prepared to adhere to six-foot social distancing measures, as defined by the CDC (1).

FACILITY & EQUIPMENT: CLEANING & SANITATION PROCEDURES

Safety and function are top priorities in managing a weight room facility. All weight room surfaces and equipment should be cleaned regularly with germicidal (i.e. anti-fungal, anti-bacterial, and anti-viral) cleaner to prevent the growth of microbes which can increase the spread of disease. At minimum, strength and conditioning coaches should adhere to specific cleaning schedules, which are outlined in the *NSCA's Safety Checklist for Exercise Facility and Equipment Maintenance* (2).

Appropriate cleaning and sanitation supplies should be kept on-hand in the weight room, including: disinfectant (germicide), hand sanitizer (≥60% alcohol), specialty cleaners (e.g. wood, walls, upholstery, and glass), paper towels, disinfectant wipes, spray bottles, cloth towels and rags, sponges, brooms and dust pans, vacuum cleaner, and mop supplies. If cloth towels and rags are being used, they should not be shared. Special attention should be taken to store and launder cloth towels and rags using sanitary measures (e.g. Sanitizing cycle, washing with hot water, and using separate hampers for clean and dirty).

Non-essential equipment should be removed from the training floor and stored to minimize cleaning surfaces. Cleaning and sanitation procedures should also be extended to restrooms, locker rooms, carpet and flooring, exercise mats, water fountains, athlete nutrition "Fueling" stations, and commonly shared pieces of equipment—e.g. Medicine balls, dumbbells, kettlebells, weight belts, bars and plates.

Fresh air circulation, ventilation, and sunlight (if possible) should be emphasized, as this shortens the time for respiratory droplets to be removed from the air. To prevent bacterial and microbial growth, the relative humidity should not exceed 60% (2,3).

TRAINING SAFETY: RISK FACTORS FOLLOWING PERIODS OF INACTIVITY

After periods of inactivity athletes are especially vulnerable to exertional injuries (4,5). Due to the shelter-in-place restrictions during the COVID-19 pandemic, most training by athletes has been interrupted or limited. This section shares two key resources for strength and conditioning coaches to support early training decisions with athletes.

- The *CSCCa and NSCA Joint Consensus Guidelines for Transition Periods: Safe Return to Training Following Inactivity* was published in 2019 to with the goal of protecting athletes during specific high-risk periods. Despite strong engagement efforts by many proactive coaches, COVID-19 represents a return to training following inactivity, which will vary by sport, team, athlete, and institution. Strength and conditioning coaches should specifically refer to the Joint Consensus Guidelines as it relates to the incidence of injuries and deaths from exertional heat illness, exertional rhabdomyolysis, and cardiorespiratory failure among athletic populations. The paper recommends safe upper limits on training volumes, intensities, and work-to-rest ratios for the first 2-4 weeks of training (4).
- In further support of safe return to training practices, the latest *NCAA Sport Science Institute Interassociation Recommendations: Preventing Catastrophic Injury and Death in Collegiate Athletics*, published in 2019, includes portions on acclimatization and conditioning, transition and high-

risk periods for college athletes, and specific roles and responsibilities of strength and conditioning coaches to protect athletes (5).

Strength and conditioning coaches should always consider the training level of each athlete, as well as environmental and external factors in determining the appropriate course for training after COVID-19. While it is common to start beginners with an introductory training phase, intermediate and advanced lifters who possess the ability to train near failure on every set should be discouraged from doing so to avoid contributing to an overtrained state (6). Considering all the preparatory and logistical factors related to the return to training following COVID-19, initial weight room training splits should include no more than three training sessions per week, with one to two days of recovery between sessions (6). Strength and conditioning coaches should use their best evidence-based and consensus-based judgement if employing other weekly programming strategies favoring shorter, more frequent training sessions, while managing for recovery and readiness.

Advanced knowledge that following any prolonged period of inactivity increases the likelihood of delayed onset muscle soreness (DOMS), as well as losses in mobility and flexibility, should be considered in progressing athletes back into eccentric and plyometric exercises. An initial focus on reestablishing dynamic movement patterns required for sport can be accomplished with a targeted and structured daily warm-up prior to activity. During COVID-19, many athletes have been training in small at-home spaces. A systematic and progressive dynamic warm-up, lasting 10-20 minutes in length, is well suited for drilling sprint mechanics, improving mobility and range of motion, and reestablishing a cardiovascular base while preparing the body for athletic activity and reducing the likelihood of injury.

OTHER IMPORTANT FACTORS

Strength and conditioning coaches are impactful in the lives of athletes and will play a vital role in helping their teams adjust back into training and competition. However, before considering training, supporting the primary needs of athletes is most important. This includes helping athletes get back on a regular schedule, especially sleep habits, waking-up, meals, commuting, and academic responsibilities.

Most coaches and athletes have never experienced this level of uncertainty towards their sport and whether their upcoming seasons will occur. Recognizing that COVID-19 has been a stressful and uncertain time for many individuals and families is an important perspective. As strength and conditioning coaches working to ensure the utmost precautions for athlete safety, the health and wellness of all coaches and staff must also be made a priority.

REFERENCES

1. Centers for Disease Control and Prevention. Coronavirus Disease (2019) COVID-19: How to Protect Yourself & Others. Available at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html. Accessed April 13, 2020.

2. Hudy, A. Facility Design, Layout, and Organization. In: *NSCA's Essentials of Strength Training and Conditioning*. Haff, GG, and Triplett, NT, eds. Champaign, IL: Human Kinetics, 626-639, 2016.

3. Sanders, M. Health/Fitness Facility Design and Construction. In: *ACSM's Health/Fitness Facility Standards and Guidelines*. 5th ed. Champaign, IL: Human Kinetics, 84-86, 2019.

4. Caterisano, A, Decker, D, Snyder, B, Feigenbaum, M, Glass, R, House, P, Sharp, C, Waller, M, and Witherspoon, Z. 2019. CSCCa and NSCA Joint Consensus Guidelines for Transition Periods. *Strength and Conditioning Journal*, 41(3), 1-23.

5. NCAA's Interassociation Recommendations: Preventing Catastrophic Injury and Death in Collegiate Athletics. July 2019. Available at: https://ncaaorg.s3.amazonaws.com/ssi/injury_prev/SSI_PreventingCatastrophicInjuryBooklet.pdf. Accessed April 13, 2020.

6. Sheppard, JM, and Triplett, NT. Program Design for Resistance Training. In: NSCA's Essentials of Strength Training and Conditioning. Haff, GG, and Triplett, NT, eds. Champaign, IL: Human Kinetics, 447-459, 2016.

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NSCA'S GUIDELINES CHECKLIST

FOR S&C COACHES RETURNING TO ACTIVITY WITH THEIR TEAMS

NSCA® NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

MINIMIZING RISK: MANAGING SCHEDULES & TEAM TRAINING SESSIONS

- ☐ Adhere to social gathering and distancing policies at your institution, according to local, state, and federal authorities
- ☐ Group size counts should include both athletes, staff, and account for transition periods between sessions
- ☐ Schedule mid- and post-workout cleaning periods, allowing a 10 – 15 minute buffer between teams or groups
- ☐ Limit or stagger training groups throughout workout blocks and/or alternate training days
- ☐ Favor efficient training methods, limiting workouts to 2 – 3 non-consecutive days per week
- ☐ Avoid person-to-person contact while spotting with use of bar catches and the two-spotter technique
- ☐ For programming purposes, consider grouping athletes based on conditioning status
- ☐ Create exercise pairings to limit weight room traffic; Or one-way traffic flow based on entrances and exits
- ☐ Maximize fresh air flow in the weight room, and a relative humidity ≤60%
- ☐ Use outdoor training spaces whenever possible
- ☐ Keep doors propped open and lights on throughout the day

FACILITY & EQUIPMENT: CLEANING & SANITATION PROCEDURES

- ☐ Clean all weight room surfaces with germicidal disinfectant
- ☐ Consider providing masks and/or gloves
- ☐ Educate on weight room upkeep expectations during onboarding meetings with new athletes
- ☐ Provide COVID-19 related updates to weight room rules for athletes already in the program
- ☐ Promote hand washing before and after workouts, and provide hand sanitizer
- ☐ Keep extra bottles of disinfectant for athletes to wipe down equipment after use
- ☐ Avoid the sharing of cloth towels or rags; Provide one for each athlete and staff member
- ☐ Remove and store extra loose equipment from the training floor to minimize cleaning surfaces
- ☐ Carry a personal water bottle instead of drinking directly from the community water fountain
- ☐ Delegate staff cleaning duties, especially towards commonly shared pieces of equipment, including: Medicine balls, dumbbells, kettlebells, weight belts, bars and plates
- ☐ Ensure that cleaning and sanitation procedures are extended to restrooms, locker rooms, carpet and flooring, exercise mats, water fountains, and athlete nutrition "Fueling" stations
- ☐ Also refer to the *NSCA's Safety Checklist for Exercise Facility and Equipment Maintenance*

TRAINING SAFETY: RISK FACTORS FOLLOWING PERIODS OF INACTIVITY

- ☐ In the first 2 – 4 weeks of training, apply CSCCa-NSCA Joint Consensus, and NCAA Sport Science Institute Guidelines on training volumes, intensity, and work-to-rest ratios as upper limits to protect against catastrophic injury
- ☐ Avoid high volume submaximal exercises to fatigue, or performed within in a limited time frame
- ☐ Emphasize a 10 – 20 minute daily dynamic warm-up for reestablishing sport-related movement patterns
- ☐ Consider that prolonged inactivity increases the likelihood of delayed onset muscle soreness (DOMS)
- ☐ Communicate regularly with the medical and coaching staffs about at-risk athletes, including those with cardiac abnormalities, sickle cell trait, history of exertional or nonexertional collapse, asthma, and diabetes
- ☐ Consider the use of pre-screening, readiness surveys and/or workload monitoring for tracking athlete status
- ☐ Plan and adjust workouts to match environmental factors, especially in cases of high heat and humidity
- ☐ Do not perform physically exhausting drills for the purpose of developing "mental toughness"

ABOUT THE NSCA

The **National Strength and Conditioning Association (NSCA)** is an international nonprofit professional association dedicated to advancing strength and conditioning and other sport science professions around the world.

The NSCA advances the profession by supporting strength and conditioning and sport science professionals devoted to helping others discover and maximize their strengths.

The organization disseminates research-based knowledge and its practical applications by offering industry-leading certifications, research journals, career development services, and continuing education opportunities. The NSCA community is composed of over 60,000 members and certified professionals who further the industry standards as researchers, educators, strength and conditioning coaches, personal trainers, tactical facilitators, and other roles in related fields.