



ASPIRE Sports Institute

**Return to Sport Guidelines
Following COVID-19**

May 2020



Babe Ruth at-bat in the 1918 World Series during the Spanish Flu Pandemic, when athletes were required to wear face masks as part of the return to sport.

“Those who cannot learn from history are doomed to repeat it.”

- George Santayana, philosopher & author, 1905

*“A knowledgeable community is a
protected community.”*

- Dr. Deborah Birx, White House Response
Coordinator, 2020



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OVERVIEW

In the coming weeks and months, our communities will face the unprecedented challenge of returning to normal life functions amidst the COVID-19 pandemic. The sports industry, which consists of many levels of play across a multitude of sports, will be significantly affected during this transition. Professional, collegiate, and high school level athletic governing bodies have access to highly-capable medical teams that are each addressing return to play for their specific groups. However, in most cases, clubs, travel ball, and Parks & Recreation programs are not directly considered by these organizations. As a result, coaches are likely to rely on drop-down information. Furthermore, coaches may lack the resources or medical knowledge to navigate this challenge safely. Thus, we seek to answer the following question:

How do we safely guide club and recreational athletes in their return to sport?

This question consists of three parts: **safety, training, and implementation.**

- 1) **Safety** – The safety of all athletes, parents, fans, and administrators must be addressed. How can current recommendations (handwashing, hand sanitization, testing, questionnaires, PPE, social distancing, cleaning, etc.) be implemented within sports facilities? Additionally, emergency action plans, including automated external defibrillator (AED) placement, must be reviewed.
- 2) **Training** – To return to practice and competition, training preparedness must be assessed in both physical *and* mental components. Likely, athletes have not had access to their usual level of conditioning, and this needs to be considered. Organizations like the National Athletic Trainers' Association (NATA) and the National Strength and Conditioning Association (NSCA) are currently working on recommendations to avoid an increase in injury incidence upon return.
- 3) **Implementation** – One of the challenges we face is properly monitoring return to sport. When available, Certified Athletic Trainers (ATCs) are a great resource to handle this responsibility. However, the volume of this task requires additional support. Thus, we will also work to encourage utilizing emergency medical technicians (EMTs)/Paramedics to help monitor and implement guidelines. These healthcare workers have been on the front lines and have the first-hand experience in working safely amidst the COVID-19 pandemic.

In response, we have compiled available knowledge from various governing bodies and sports organizations to produce a **set of guidelines** specific to clubs/travel teams, and Parks & Recreation athletes and programs. These guidelines and supporting references are displayed in a **concise, workable document** targeted towards coaches, parents, athletes, and administrators involved in club and Parks & Recreation sports.

INTRODUCTION

A Living and Learning Document

The purpose of this document is to provide guidelines for youth athletes to return to sport safely. These recommendations align with national, state, and city-level government phased programming. To accomplish this important task, we must understand the **landscape** and the information being developed in this space. Once workable guidelines are in place, the real challenge unfolds.

The Landscape of Sports

Our current landscape consists of a multitude of sports played across many levels, creating a multi-dimensional issue when considering a return to sport following COVID-19.

International Sports	The World Health Organization (WHO) addresses this group.
Professional Sports in the United States	Each league has an advanced medical team who are working collaboratively with the other leagues to formulate guidelines.
Collegiate Sports	The NCAA has a very capable medical team, led by Dr. Brian Hainline, working on guidelines for their athletes.
High School Sports	The National Federation of State High School Associations (NFHS) - Sports Medicine Advisory Committee advises, but each state makes their own rules/recommendations.
National Sports Organizations Guidelines	Examples include US Lacrosse and US Baseball
Parks and Recreation	Each program obtains advice from within their own group, but the information varies due to a lack of protocols and guidelines.
Clubs/Travel Ball	Most clubs and Parks & Recreation organizations rely on DROP-DOWN information from all of the above and from other sources.

Thus, this document will focus on providing guidelines and recommendations for youth club and travel athletes that can be adapted to a wide variety of sports and venues. These guidelines will be broken down into three essential areas: **Safety, Training, and Implementation.**

GUIDELINES

Section One: Safety

To promote safety among athletes, implementation of COVID-19 guidelines to prevent viral infections and the spread of disease is necessary. Guidelines include testing, screening, cleaning of facilities and equipment, sanitizers, personal protective equipment (PPE), and social distancing practices for spectators and support staff. Furthermore, although the feasibility of wearing a mask widely differs across sports, local recommendations regarding mask-wearing should be considered for all individuals. In addition to following these measures, athlete participation in questionnaires, screenings, and other safety protocols is expected.

Research has shown that cardiac problems are a complication of COVID-19; any athlete that has been infected is at higher risk of facing cardiac issues.^{1,27} Thus, a review of existing emergency action plans (EAPs) and Automated External Defibrillator (AED) placement must be performed before training. Additionally, emphasis should be placed on vulnerable populations, especially for coaches, parents, and spectators, to identify those with co-morbidities. Precautionary measures can then be incorporated accordingly.

With an increase in mental health concerns during this time, it is critical to monitor the mental health of athletes. For additional information on this topic, please review [ASPIRE's Mental Health for the Athlete During This Pandemic](#).

General Safety Guidelines

Adapted from [NCAA Core Principles of Resocialization of Collegiate Sport \(Appendix A\)](#):

1. There must not be directives at the national level that preclude resocialization.
2. State and local authorities must have in place a plan for resocialization.
3. In keeping with the federal guidelines, guidance should be provided to employers to develop and implement appropriate policies regarding the following:
 - a. Social distancing and protective equipment
 - b. Temperature checks
 - c. Testing and isolating
 - d. Sanitation
 - e. Use and disinfection of common and high-traffic areas
 - f. Travel
 - g. Monitoring of the athlete for indicative symptoms and preventing symptomatic people from physically returning to play until cleared by a medical provider

4. There must be a plan in place for resocialization of athletes. In keeping with the federal guidelines, all athletes, coaches, and athletics personnel should practice good hygiene and should stay home if feeling sick.
5. There must be adequate personal protective equipment for athletes and sanitizers to manage infection control in all shared athletics space.
6. There must be access to reliable, rapid diagnostic testing on any individual who is suspected of having COVID-19 symptoms.
7. A surveillance system must be in place so newly identified cases can be identified promptly and isolated, and their close contacts must be managed appropriately.

****Follow Phase One through Phase Four in accordance with federal guidelines, as in NCAA guidelines.***

Additional Guidelines

Adapted from the [Junior Volleyball Association \(JVA\)](#)

- Provide club-specific protocols for gym, equipment, and staff. Post signs and share updates via email in advance of activities.
- Hold pre-opening webinars with staff, athletes, and parents to describe changes and precautions.
- Maintain single and controlled entry into the facility and each gym/field entrance.
- Stagger training group start times to allow time for equipment cleaning between groups, with no overlap in sessions (i.e., group 1 leaves, cleaning takes place, group 2 enters).
- Limit people, movement/contact to move within the space (i.e., narrow hallways/corridors; crossing one court/field to get to another).
- Consider closing off areas of congregation (break rooms, locker rooms, etc.).
- Remove bleachers and other seating to limit contact surfaces and cleaning responsibilities.
- Limit restroom access for control and cleaning.
- Keep a cleaning log for the gym, equipment, and any surfaces.
- Restrict parent/guest entry into the gym; specify that it is for athletes and coaches only.
- Instruct athletes to bring a full water bottle to the gym and minimize gatherings for water breaks.
- Direct athletes to bring a change of clothes for the end of practice.

Section Two: Training

Training preparedness must be assessed in both physical *and* mental components. The following guidelines ensure athletes' physical and mental health as they return to practice and competition. NFL Lockout studies^{22,24} from 2011 clearly demonstrate the dangers of returning to sport without a proper transition period. The NATA and NSCA-CSCC are working on recommendations to facilitate this transition phase and minimize injury incidence upon return. Outlined below are ASPIRE's guidelines regarding ***metabolic conditioning, sports performance training, recovery, and nutrition.***

Metabolic Conditioning (*Appendix B*)

A diverse mix of research exists surrounding return to sport and return to play protocols after de-training. It includes various modes of exercise and training protocols following a period of decreased exercise. However, metabolic training, otherwise considered as high-intensity functional training (HIFT), has been equally shown to be safe, comprehensive, and useful to improve aerobic and anaerobic performance. The primary reason for implementation and the goal behind HIFT is for athletes to become reconditioned in a safe environment designed to reduce the risk of re-injury, improve nervous system efficiency, and gain the capacity for safe return to competitive play via positive physiological adaptation(s).

Key Points

1. Although the physiologic structure and metabolic response(s) of athletes may differ, many show a broadly similar dose-response to metabolic conditioning from young adults through adulthood. This considers frequency, intensity, and duration to elicit a training response.
2. There is clear evidence that HIFT/Metabolic conditioning programs are not contraindicated at any given stage of growth and maturation.
3. A long-term perspective is required when approaching metabolic conditioning. In general, cross-training modes should be employed to a higher degree to prevent overuse injury or re-injury.
4. The method of which metabolic conditioning is delivered should reflect the age and stage of development--specifically, rest intervals employed and overall training volume (daily and weekly).
5. Training sessions should focus in a highly responsive manner to maintain sensitivity to short term fluctuations in performance capacity.

Five Week Return to Sport Performance Program - D1 Training *(Appendix C)*

This Return to Sport program is geared toward progressing athletes from limited training exposure and those returning from a de-trained state toward a full return to sport participation. Testing within **Week 0** allows for a thorough baseline assessment for specific training interventions where appropriate. **Weeks 1-3** outline a training protocol geared toward improving soft tissue viability through progressively loading core athletic movements (manipulating volume and intensity). **Week 4** is the final week: athletes are reassessed to ensure the improvement of baseline numbers, safety, and adequate preparedness levels for the next progressive step toward full sports participation.

Program Focal Points

1. Prevent the rate of catastrophic soft tissue injury.
2. Reestablish an appropriate cardiovascular and muscular conditioning base for all sport demands.
3. Reestablish appropriate strength and power base for sport demands.

Recovery for Youth Athletes following COVID-19 *(Appendix D)*

The concept of recovery for the youth athlete is an often-neglected topic. The truth is that youth athletes need time to recover from athletic performance, strength, and conditioning just as adults do. “Recovery” is a broad term that encompasses multiple different aspects. These include, but are not limited to, complete rest from activity, active recovery (stretching, mobilization, and soft tissue work), proper hydration and nutrition, and adequate sleep. After an extended period of de-training or break from athletic activity, it is more important than ever to be mindful of recovering between bouts of exercise. Recovery is a vital part of successful athletic performance and can assist in injury prevention best if accompanied by clear directives.

Nutrition as a Component of Return to Sport *(Appendix E)*

By addressing eating habits with nourishment and safety in mind, we can safeguard our health both on and off the field. Thankfully, organizations like Choose My Plate of the U.S. Department of Agriculture offer information on food planning and safety precautions amidst the current coronavirus pandemic. Building and maintaining immune system strength via diet requires nutrient density, hydration, and overall balance while maintaining best-practice food safety.

Section Three: Implementation

One of the most significant challenges of return to sport involves the implementation of the designated safety and training guidelines. This responsibility includes **disseminating information, facilitating protocols, and monitoring compliance** while maintaining a collaborative effort between athletics administrators, coaches, sports medicine staff, strength and conditioning coaches, athletes, and parents.

DISSEMINATION → How is this information disseminated to the appropriate people? Necessary information should be shared on all community and team pages available. An email blast to your club team database, webinars, meetings utilizing platforms such as Zoom®, and posting onto Facebook, Instagram, and other social media sites can assist in this process. Unlike most medical issues in sports, awareness of COVID-19 is not a problem. However, there is a tendency for people to become complacent. Reminders should be sent out regularly for continued awareness and updates on the situation.

FACILITATION → Before reintroducing athletes to practice and competition, established protocols must be in place to ensure their safety. However, if these protocols are not appropriately fulfilled and the proper supplies to do so are not available, these guidelines will have minimal influence on preparedness. As we have witnessed in the COVID-19 Pandemic, specific health and safety supplies have become scarce. That said, preparation is paramount when reviewing plans to execute a safe return to sport.

MONITORING AND COMPLIANCE → Designating specific roles and responsibilities will be the greatest challenge in ensuring a safe return to sport, so it is crucial to remember our best resources and personnel. Athletic Trainers (ATCs), along with other staff, will manage this for professional, collegiate, and many high school programs. Unfortunately, there are not enough ATCs available to handle this task at all levels, so we need to explore other options to reinforce a safe athletic environment. For example, trained EMTs/Paramedics can help with this responsibility due to their extensive background, knowledge base, and presence on the front lines of the COVID-19 pandemic.

Conclusion

COVID-19 has had devastating effects on communities locally and around the world; however, much of its impact remains unknown. Specifically, the sports industry has faced a multitude of changes tied to the social, economic, and psychological well-being of our society. Thus, resocialization of sport has the potential to produce a sense of normalcy amidst the COVID-19 pandemic. Nonetheless, promoting the safety of athletes, coaches, support staff, and the general public requires sports organizations to take a cautious, systematic approach to the return to sport. The guidelines produced in this document aim to provide sports communities with up-to-date, evidence-based material to aid in the complex decision-making that will occur with the return to sport. The research regarding COVID-19, particularly for specialized groups such as children, adolescents, and athletes, is ever-changing. Therefore, these guidelines will be updated to reflect research as it becomes more readily available. As an organization, we strongly believe in the care and attentiveness of those within the athletic community. The ASPIRE family looks forward to assisting our community in any way that we can for safe resocialization and return to sport.

*“We have never seen an unknown enemy like this in our lifetime, as we all desire to return to our normal way of life. These guidelines can help our young athletes return to sport safely. However, please keep in mind the serious nature of COVID-19 and that new information is available every day in this time of uncertainty. It is important that everyone must remain conscious of a sudden increase of cases or updated information that becomes available. You must recognize and adjust with a pause or a reversal of plans. When and if this occurs, have the **COURAGE** to adjust.”*

- Dr. Lawrence Lemak, MD, Founder and Chairman – ASPIRE Sports Institute



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APPENDICES

Appendix A

NCAA Core Principles of Resocialization of Collegiate Sport

1. There must not be directives at the national level that preclude resocialization.
2. State and local authorities must have in place a plan for resocialization.
 - a. In accordance with the federal guidelines, such a plan assumes the following state/local **GATING CRITERIA** have been satisfied:
 - i. A downward trajectory of influenza-like illnesses reported within a 14-day period **and** a downward trajectory of COVID-like syndromic cases reported within a 14-day period.
 - ii. A downward trajectory of documented cases of COVID-19 within a 14-day period **or** a downward trajectory of positive tests as a percentage of total tests within a 14-day period.
 - iii. Hospitals can treat all patients without crisis care **and** there is a robust testing program in place for at-risk health care workers, including emerging antibody testing.
3. There should be a plan in place at the university/college level for resocialization of students. In keeping with the federal guidelines, universities should consider guidance provided to employers to develop and implement appropriate policies regarding the following:
 - a. Social distancing and protective equipment.
 - b. Temperature checks.
 - c. Testing and isolating.
 - d. Sanitation.
 - e. Use and disinfection of common and high-traffic areas.
 - f. School business travel.
 - g. Monitoring of the workforce for indicative symptoms and preventing symptomatic people from physically returning to work until cleared by a medical provider.
 - h. Workforce contact tracing after an employee's positive test for COVID-19.

4. There must be a plan in place at the university/college level for resocialization of student-athletes within athletics. In keeping with the federal guidelines, athletic departments should practice the following:
 - a. All student-athletes, athletics health care providers, coaches and athletics personnel should practice good hygiene.
 - b. All student-athletes, athletics health care providers, coaches and athletics personnel should stay home if they feel sick.
 - c. Guidance noted above for university employees should be in place within athletics.
5. There must be adequate personal protective equipment for athletics health care providers, and there must be sanitizers to manage infection control in all shared athletics space.
6. There must be the ability to assess immunity to COVID-19 at a regional and local level. This could include immunity at the college campus, plus a more focused assessment of herd immunity for athletics teams.
7. There must be access to reliable, rapid diagnostic testing on any individual who is suspected of having COVID-19 symptoms.
8. There must be in place a local surveillance system so that newly identified cases can be identified promptly and isolated, and their close contacts must be managed appropriately.
9. There must be clearly identified and transparent risk analyses in place. Such risk analyses consider issues such as economics, education, restoration of society, and medical risk of sport participation, including COVID-19 infection and possible death.

PHASE ONE

In accordance with the federal guidelines, resocialization of sport for Phase One assumes the following:

1. Gating criteria have been satisfied for a minimum of 14 days.
2. Vulnerable student-athletes, athletics health care providers, coaches and athletics personnel should continue to shelter in place. Vulnerable populations include individuals with serious underlying health conditions such as high blood pressure, chronic lung disease, diabetes, obesity and asthma, and those whose immune system is compromised, such as by chemotherapy.

3. Those living in dorms and other residences where vulnerable individuals reside should be aware that by returning to work or other environments where distancing is not practical, they could carry the virus back home, and appropriate isolating precautions should be taken.
4. Physical distancing should continue.
5. Gatherings of more than 10 people should be avoided unless precautionary measures of physical distancing and sanitization are in place.
6. Gyms and common areas where student-athletes and staff are likely to congregate and interact, should remain closed unless strict distancing and sanitation protocols can be implemented.
7. Virtual meetings should be encouraged whenever possible and feasible.
8. Nonessential travel should be minimized, and Centers for Disease Control and Prevention guidelines regarding isolation after travel should be implemented.

PHASE TWO

In accordance with the federal guidelines, if Phase One has been implemented successfully, with no evidence of a rebound, and gating criteria have been satisfied for a minimum of 14 days since the implementation of Phase One:

1. Vulnerable individuals should continue to shelter in place.
2. Awareness and proper isolating practices related to vulnerable individuals in residences should continue.
3. Physical distancing should continue.
4. Gatherings of more than 50 people should be avoided unless precautionary measures of physical distancing and sanitization are in place.
5. Gyms and common areas where student-athletes and staff are likely to congregate and interact should remain closed, or appropriate distancing and sanitation protocols should be implemented.
6. Virtual meetings should continue to be encouraged whenever possible and feasible.
7. Nonessential travel may resume.

PHASE THREE

In accordance with the federal guidelines, if Phase Two has been implemented successfully, with no evidence of a rebound, and gating criteria have been satisfied for a minimum of 14 days since the implementation of Phase Two:

1. Vulnerable student-athletes, athletics health care providers, coaches and athletics personnel can resume in-person interactions, but should practice physical distancing, minimizing exposure to settings where such distancing is not practical.
2. Gyms and common areas where student-athletes and staff are likely to congregate and interact can reopen if appropriate sanitation protocols are implemented, but even low-risk populations should consider minimizing time spent in crowded environments.
3. Unrestricted staffing may resume.

The transition from the above core principles to a relaxation of these principles can occur when COVID-19 can be managed in a manner like less virulent influenza strains. COVID-19 has essentially shut down society because it is highly contagious and has an unacceptably high death rate. More common strains of influenza do not close society because society has learned to adapt to and develop acceptable management strategies for influenza. For COVID-19, future phases are dependent on the successful development of widely available treatment, including prophylactic immunotherapy, coupled with widespread, effective vaccination.

Appendix B

Metabolic Conditioning

By: Dr. Garrett R. Trummer, PT, DPT, CSCS, CISSN and Dr. Mackenzie A. Schneider, PT, DPT, MSc, CSCS, CISSN

A diverse mix of research exists surrounding return to sport and return to play protocols after de-training that include various modes of exercises and training protocols following a period of decreased exercise. However, metabolic training otherwise considered as high intensity functional training (HIFT) has been equally shown to be safe, comprehensive, and movement functional to improve aerobic and anaerobic performance. The primary reason for implementation and the goal behind HIFT is for athletes to become re-conditioned in a safe environment that is designed to reduce the risk of re-injury, improve nervous system efficiency, and gain the capacity for safe return to competitive play via positive physiological adaptation(s).

DEFINITION

Metabolic Training refers to conditioning exercises intended to increase the storage and delivery of energy for any activity. Three distinct energy pathways supplying human physiology exist:

1. Phosphagen: Greatest supply of energy in <10 seconds when intensity is high, but duration is low.
2. Glycolytic (Fast and Slow): Greatest supply of energy within 25 seconds to over several minutes when intensity and duration are moderate.
3. Oxidative: Greatest supply of energy when exercise exceeds >3 minutes when intensity is low, but duration is high.

Metabolic training can increase the physiological stress response and provide favorable adaptations based on the stimulus provided to improve that efficiency of energy supplementation.

CURRENT LITERATURE

Prior to puberty, young athletes respond positively (specifically sport performance, endurance, V02 Max, max power output) to high intensity anaerobic interval training protocols. A range of different formats for conditioning exercises are effective in producing significant gains in endurance in pre-pubescent individuals extending through maturation.

Therefore, a mixed approach featuring a range of training formats may be employed with young athletes including continued bouts, long aerobic intervals, high intensity anaerobic intervals and repeated sprints.

IMPLEMENTATION

- Metabolic conditioning/HIFT classes offered by Strength and Conditioning professionals who understand the different demands of sport.
- Classes offered 3-6x/week with each class focusing on different modes and energy systems with proper dynamic warm up, focus on form, and proper education/instruction from coaches.
- Supervision and hands-on training so each athlete gets proper attention and benefit.

Training Modes	Training Format	Intensity/Recovery	Volume/Frequency
CONDITIONING (OXIDATIVE STRESS)	Long aerobic intervals (90's to 6, or 3-6 minutes)	<ul style="list-style-type: none"> ▪ High intensity ▪ Moderate recovery (1 min rest) 	<ul style="list-style-type: none"> ▪ 4-5x / week ▪ Moderate/high (alternate between moderate & longer session duration)
SKILL BASED CONDITIONING DRILLS (PHOSPHAGEN STRESS)	Short aerobic work intervals (10-30's work bouts)	<ul style="list-style-type: none"> ▪ Vo2 max intensity ▪ Brief recovery (20's rest) 	<div style="border: 1px solid black; padding: 5px;"> <p><i>*The goal of this conditioning is to stress each system MAXIMALLY without preventing positive adaptation from occurring due to overreaching into other systems. Rest intervals are incredibly important here.</i></p> </div>
RUNNING BASED CONDITIONING (GLYCOLYTIC STRESS) & SPRINT INTERVAL TRAINING	Aerobic/anaerobic intervals (20's work, 10's rest) up to 1-3 minutes with 45-60's rest intervals	<ul style="list-style-type: none"> ▪ Supramaximal intensity (above VO₂ max) ▪ Recovery 45's to 5 minutes 	
CROSS-TRAINING (MIXTURE OF ALL THREE)	Anaerobic repeated sprint intervals (5-30's) for multiple bouts (i.e. must stress all systems in cross training maximally)	<ul style="list-style-type: none"> ▪ Maximal, all out efforts ▪ Recovery 1-4 min depending on work bout duration 	

KEY POINTS

1. Although physiologic structure and metabolic response(s) of athletes may differ, many show a broadly similar dose-response to metabolic conditioning from young adults through adulthood. This considers frequency, intensity and duration to elicit a training response.
2. Clear evidence HIFT/Metabolic conditioning programs is not contraindicated at any given stage of growth and maturation.
3. A long-term perspective is required when approaching metabolic conditioning. In general, cross training modes should be employed to a greater degree to prevent overuse injury or re-injury.
4. The method of which metabolic conditioning is delivered should reflect age and stage of development. Specifically, rest intervals employed and overall training volume (daily and weekly).
5. Training sessions should focus in a highly responsive manner to maintain sensitivity to short term fluctuations in performance capacity.

METABOLIC CONDITIONING REFERENCES

1. Bompa, T., & Carrera, M. (2015). *Conditioning Young Athletes* (First ed.). Champaign, IL: Human Kinetics, Inc.
2. Feito, Y., Heinrich, K. M., Butcher, S. J., & Poston, W. (2018). High-Intensity Functional Training (HIFT): Definition and Research Implications for Improved Fitness. *Sports (Basel, Switzerland)*, 6(3), 76.
<https://doi.org/10.3390/sports6030076>
3. Haff, G. G., & Triplett, N. T. (2015). *Essentials of Strength Training and Conditioning 4th Edition* (4th ed.). Champaign, IL: Human Kinetics.
4. Lloyd, R. S., & Oliver, J. L. (2020). *Strength and Conditioning for Young Athletes*. London: Routledge,
<https://doi.org/10.4324/9781351115346>

Appendix C

D1 Training – Return to Sport Program Outline

Program/Athlete: Return to Sport (RTS)
Cycle/Season: Off-Season
Dates: 5 Weeks (0-4)

Program Focal Points

1. Prevent the rate of catastrophic soft tissue injury.
2. Reestablish appropriate cardiovascular and muscular conditioning base for all sport demands.
3. Reestablish appropriate strength and power base for sport demands.

Training Volume Prescription → The workout volumes are in line with the National Strength and Conditioning Association (NSCA) and the American College of Sports Medicine (ACSM) guidelines for athletes with a low training age, those returning to activity from limited training exposure, and those returning from a detrained conditioned state.

Training Intensity Prescription → The workout intensities are in line with the National Strength and Conditioning Association (NSCA) and the American College of Sports Medicine (ACSM) guidelines for athletes with a low training age, those returning to activity from limited training exposure, and those returning from a detrained conditioned state.

Main Lifts/Movements: Performance and Strength Progressions → The movements selected are base level core movements in which all athletes should possess proficiency to ensure safer sport participation. The Squat, Hinge, Press, and Pull make up the movement menu.

SUMMARY

This [Return to Sport program](#) is geared toward progressing athletes from limited training exposure and those returning from a detrained state toward full return to sport participation. Testing within **Week 0** allows for a thorough baseline assessment for specific training interventions where appropriate. **Weeks 1 – 3** outline a training protocol geared toward improving soft tissue viability through progressively loading core athletic movements (manipulating volume and intensity). **Week 4** is the final week: Athletes are reassessed to ensure improvement of baseline numbers and adequate readiness and preparedness levels for the next progressive step toward safe full sport participation.

Appendix D

Recovery for Youth Athletes following COVID-19

By: Susanna Shivers, ATC, LAT

The concept of recovery for the youth athlete is an often-neglected topic. The truth is that youth athletes need time to recover from athletic performance, strength, and conditioning just as adults do. “Recovery” is a broad term that encompasses multiple different aspects. These include, but are not limited to, complete rest from activity, active recovery (stretching, mobilization, and soft tissue work), proper hydration and nutrition, and adequate sleep. After an extended period of de-training or break from athletic activity, it is more important than ever to be mindful of recovering between bouts of exercise. Recovery is a vital part of successful athletic performance and can assist in injury prevention best if accompanied by clear directives.

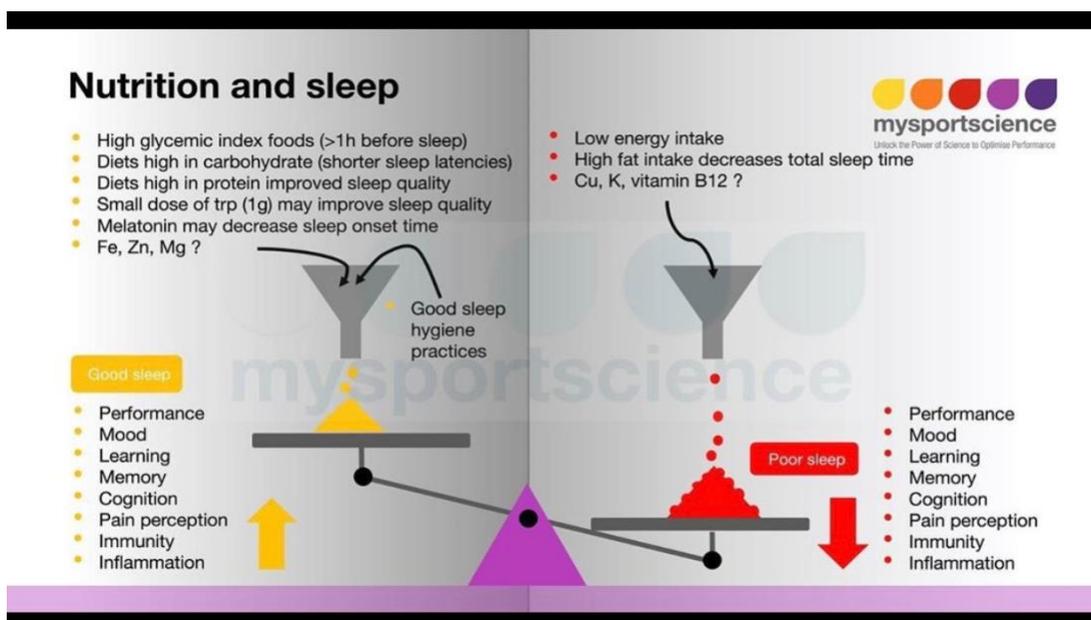
Listed below are common signs that a youth athlete is not fully recovered or may be overtrained.

- Lack of excitement for their sport
- Athletic performance is stressful for them
- Frequent injuries or feeling “sore”
- Irregular sleep patterns
- Frequent sugar cravings
- A plateau in performance
- Frequent sickness

As youth athletes return to the sports that they love, it is important to be aware of these common signs associated with a lack of recovery. Being proactive in combating these issues will contribute to the overall health and wellness of the athlete. More is not always better, especially when returning to sport after an extended period of inactivity - the METCON model (as previously outlined within these guidelines) for reconditioning is a way to prevent overtraining and provide adequate recovery. Additionally, it is a superior method of training athletes aerobically, especially those who may have been infected with COVID-19, as the disease can compromise cardiovascular health.

Recovery can be categorized into four areas: **rest from exercise, active recovery, adequate sleep, nutrition & hydration** (see reference):

- **Rest from exercise:** Pertains to rest periods between training sessions. The previous conditioning protocols outlined specific guidelines for acclimating to training intensity, with rest periods included. One good recommendation especially as it relates to heat considerations is to allow a 10-minute break for every 40 minutes of work.
- **Active recovery:** This includes stretching, mobilization, and soft tissue work. Prior to exercise, it is important to do a proper dynamic warm-up to activate muscles and blood flow. After exercise, static stretching (holding a stretch for a period of time) and foam rolling can be effective. Additional methods of active recovery include intermittent compression devices like the NormaTec unit, various forms of hydrotherapy, or massage. Integrating these techniques allows the body to perform at its best.
- **Sleep:** It can be easy to overlook sleep as a vital part of recovery, but without it, youth athletes can compromise performance, immunity, and overall health. Sleep is considered a part of active recovery since it contributes to an adolescent's energy, coordination, muscle growth, mental focus, stress, and overall performance. It is recommended for teens to get a minimum of eight hours of sleep a night, but active teens may need as much as ten hours per night to recover effectively. Below is a diagram connecting the importance of nutrition and sleep for recovery.



RECOVERY REFERENCES

1. Baggish, A., Drezner, J., Kim, J., Martinez, M., & Protein, J. (2020, April 24). The resurgence of sport in the wake of COVID-19: cardiac considerations in competitive athletes. Retrieved May 20, 2020, from <https://blogs.bmj.com/bjbm/2020/04/24/the-resurgence-of-sport-in-the-wake-of-covid-19-cardiac-considerations-in-competitive-athletes/>
2. Marcello, B. (2014, June 14) Recovery and Regeneration. Perform Better Functional Training Summit. Perform Better. Providence, Rhode Island, US.
3. Dionne, C. (2016, November 15). The Real and Present Danger of Overtraining Youth Athletes. Retrieved May 20, 2020, from <http://breakingmuscle.com/learn/the-real-and-present-danger-of-overtraining-youth-athletes>
4. Fioranelli, D. (2016, August 13). How to Create a Strength and Conditioning Program for Youth Athletes. Retrieved May 20, 2020, from <https://www.stack.com/a/how-to-create-a-strength-and-conditioning-program-for-youth-athletes>
5. Sitzler, B. (2016, July 14). Heat Illness Handout. Retrieved May 20, 2020, from <https://www.nata.org/blog/beths/heat-illness-handout>
6. Why Student Athletes Benefit from Getting More Sleep on a Regular Basis. (2018, September 25). Retrieved May 20, 2020, from <https://www.sleepfoundation.org/articles/do-student-athletes-need-extra-sleep>

Appendix E

Nutrition as a Component of Return to Sport Following COVID-19

By: Dr. Rachel Davis, PhD

By addressing eating habits with nourishment and safety in mind, we can safeguard our health both on and off the field. Thankfully, organizations like Choose My Plate of the U.S. Department of Agriculture offer information on food planning and safety precautions amidst the current coronavirus pandemic^{1,2}. Building and maintaining immune system strength via diet requires nutrient density, hydration, and overall balance while maintaining best-practice food safety.

NUTRIENT DENSITY

Micronutrients are the vitamins and minerals in food that allow us to utilize energy from what we eat. They are the regulators and facilitators of energy transfer. All systems of the body depend heavily on the foods we eat for proper nourishment and support, including the immune system. For example, vitamins like A, C, and E are antioxidant vitamins that provide support to the immune system and contain protective properties against various diseases^{3,4}. Consuming a diverse diet rich in fruits and vegetables is the best way to ensure adequate consumption of these vital nutrients. The following vitamins, minerals, and food sources play a crucial role in immune function^{3,5,6}.

- **Vitamin A** - carrots, broccoli, sweet potatoes, collard greens, spinach, red bell peppers, cantaloupe
- **Vitamin C** - citrus fruits, tomatoes, broccoli, apples
- **Vitamin E** - vegetable oils, sunflower seeds, leafy greens, almonds, fortified cereals and bread
- **Zinc** - cashews, fortified cereals, beef, chicken, milk, beans
- **Copper** - seeds, cashews, meats, mushrooms
- **Selenium** - Brazil nuts, seafood, meats, grains

HYDRATION

Water is the largest component of body composition, and a dehydration level of only 2% can result in strain on organ systems, impaired functioning, and a decline in exercise performance^{7,8}. Given the fundamental role of water in *all* aspects of health and wellness, it is essential to plan fluid

consumption beginning immediately upon awakening. *Consistent* fluid consumption and the following practices are the best insurance policy for maintaining hydration⁷⁻⁸.

- Begin hydrating in the morning and continue throughout the day with a refillable water bottle in hand.
- Drink 16-20oz of H₂O roughly 4 hours before exercise and an additional 8-12oz 15 minutes prior to the start.
- Continue with 3-8oz of H₂O every 10-15 minutes of activity.
- Add sports drink to the mix when exercising in the heat and for activities exceeding one hour.

BALANCE

Our daily food choices are critical to overall nutrition status and should include a blend of carbohydrates, fat, and protein. Furthermore, getting *enough* calories containing adequate macronutrient and micronutrient density is key. Achieving all three is essential to energy metabolism, recovery, and immune function¹²⁻¹⁴. Diversifying the diet, specifically with fruits and vegetables, is the best way to maintain this balance.

- Carbohydrates (~45-65% of calories) - whole grains, fruits, vegetables
- Fat (~20-35% of calories) - nuts, seeds, olive oil, avocado, fish
- Protein (~10-25% of calories) - lean meats, nuts, beans, legumes, dairy, soy, whey protein

NUTRITION REFERENCES

1. Start Simple with MyPlate: Food Planning During the Coronavirus Pandemic | ChooseMyPlate. (n.d.). Retrieved May 20, 2020, from <https://www.choosemyplate.gov/coronavirus>
2. Food Safety | ChooseMyPlate. (n.d.). Retrieved May 20, 2020, from <https://www.choosemyplate.gov/resources/food-safety>
3. Maggini, S., Pierre, A., & Calder, P. C. (2018). Immune Function and Micronutrient Requirements Change over the Life Course. *Nutrients*, 10(10), 1531. <https://doi.org/10.3390/nu10101531>
4. Alwarawrah, Y., Kiernan, K., & MacIver, N. J. (2018). Changes in Nutritional Status Impact Immune Cell Metabolism and Function. *Frontiers in immunology*, 9, 1055. <https://doi.org/10.3389/fimmu.2018.01055>
5. Klemm, S. (2019, December 9). Support Your Health With Nutrition. Retrieved May 20, 2020, from <https://www.eatright.org/health/wellness/preventing-illness/support-your-health-with-nutrition>
6. Return-to-Play Harmon, R., & Ayesta, A. (n.d.). NUTRITIONAL SUPPORT FOR INJURY RECOVERY AND RETURN-TO-PLAY. Retrieved May 20, 2020, from <http://www.sportsrd.org/wp-content/uploads/2016/08/Nutrition-Support-for-Inury-Recovery-Return-to-Play.pdf>
7. Hydration HYDRATE EARLY AND OFTEN. (n.d.). Retrieved May 20, 2020, from <https://www.sportsrd.org/wp-content/uploads/2016/01/Hydration-Screen-Shot-.png>
8. Caselli, M., & Brummer, J. (2004, December). Recognizing And Preventing Dehydration In Athletes. Retrieved May 20, 2020, from <https://www.podiatrytoday.com/article/3331>

References & Resources

1. Baggish, A., Drezner, J., Kim, J., Martinez, M., & Protein, J. (2020, April 24). The resurgence of sport in the wake of COVID-19: cardiac considerations in competitive athletes. Retrieved May 20, 2020, from <https://blogs.bmj.com/bjasm/2020/04/24/the-resurgence-of-sport-in-the-wake-of-covid-19-cardiac-considerations-in-competitive-athletes/>
2. Binney, Z., Hammond, K., Klein, M., Goodman, M., & Janssens, A. (2018, May 4). NFL Injuries before and after the 2011 Collective Bargaining Agreement. Retrieved from <https://drive.google.com/file/d/1z46x-M0SzlBz38Pv518yovP9awq6Z8OH/view>
3. Bompa, T., & Carrera, M. (2015). *Conditioning Young Athletes* (First ed.). Champaign, IL: Human Kinetics, Inc.
4. Caselli, M., & Brummer, J. (2004, December). Recognizing And Preventing Dehydration In Athletes. Retrieved May 20, 2020, from <https://www.podiatrytoday.com/article/3331>
5. Caterisano, A., Decker, D., Snyder, B., Feigenbaum, M., Glass, R., House, P., Witherspoon, Z. (2019). CSCCa and NSCA Joint Consensus Guidelines for Transition Periods. *Strength and Conditioning Journal*, 41(3), 1–23. <https://doi.org/10.1519/ssc.0000000000000477>
6. Considerations for Return to Sport Following COVID 19. (2020, April 8). Retrieved from <https://drive.google.com/file/d/1GsZ0oTfI4MCtAMeMsqM7EEqB7cQ06jyd/view>
7. Considerations for sports federations/sports event organizers when planning mass gatherings in the context of COVID-19. (2020, April 14). Retrieved May 21, 2020, from https://drive.google.com/file/d/1IW0IIM6hpHR9uSgpBlznpepz4_A79jy7/view
8. Core Principles of Resocialization of Collegiate Sport. (2020, May 1). Retrieved from <http://www.ncaa.org/sport-science-institute/core-principles-resocialization-collegiate-sport>
9. Coronavirus and Youth Sports. (2020, May 19). Retrieved May 21, 2020, from <https://www.aspenprojectplay.org/coronavirus-and-youth-sports>
10. Dionne, C. (2016, November 15). The Real and Present Danger of Overtraining Youth Athletes. Retrieved May 20, 2020, from <http://breakingmuscle.com/learn/the-real-and-present-danger-of-overtraining-youth-athletes>
11. Eirale, C., Bisciotti, G., Corsini, A., Baudot, C., Saillant, G., & Chalabi, H. (2020). Medical recommendations for home-confined footballers' training during the COVID-19 pandemic: from evidence to practical application. *Biology of Sport*, 37(2), 203–207. <https://doi.org/10.5114/biolSport.2020.94348>
12. Fioranelli, D. (2016, August 13). How to Create a Strength and Conditioning Program for Youth Athletes. Retrieved May 20, 2020, from <https://www.stack.com/a/how-to-create-a-strength-and-conditioning-program-for-youth-athletes>
13. Food Safety | ChooseMyPlate. (n.d.). Retrieved May 20, 2020, from <https://www.choosemyplate.gov/resources/food-safety>
14. Haff, G. G., & Triplett, N. T. (2015). *Essentials of Strength Training and Conditioning 4th Edition*(4th ed.). Champaign, IL: Human Kinetics.

15. Hansen, D. (2020, April 27). When Sports Return: Will Great Performance or Injury Rule? Retrieved from <https://simplifaster.com/articles/sports-return-performance-vs-injury/>
16. Harmon, R., & Ayesta, A. (n.d.). NUTRITIONAL SUPPORT FOR INJURY RECOVERY AND RETURN-TO-PLAY. Retrieved May 20, 2020, from <http://www.sportsrd.org/wp-content/uploads/2016/08/Nutrition-Support-for-Injury-Recovery-Return-to-Play.pdf>
17. Hull, J. H., Loosemore, M., & Schwellnus, M. (2020). Respiratory health in athletes: facing the COVID-19 challenge. *The Lancet Respiratory Medicine*, 54, 216–220. [https://doi.org/10.1016/s2213-2600\(20\)30175-2](https://doi.org/10.1016/s2213-2600(20)30175-2)
18. HYDRATE EARLY AND OFTEN. (n.d.). Retrieved May 20, 2020, from <https://www.sportsrd.org/wp-content/uploads/2016/01/Hydration-Screen-Shot.png>
19. Kenyon, S. (2020, April 27). Regionals Announcement . Retrieved May 21, 2020, from https://drive.google.com/file/d/1R4DeM9S3D6BrTpgP_WLLp0bwhaoAn_fd/view
20. Klemm, S. (2019, December 9). Support Your Health With Nutrition. Retrieved May 20, 2020, from <https://www.eatright.org/health/wellness/preventing-illness/support-your-health-with-nutrition>
21. Lehman, E. (2020, May 6). COVID-19 Club Resources. Retrieved May 21, 2020, from <http://jvavolleyball.org/covid-19-club-resources/>
22. Meers, K. (2011, November 15). The Harvard Sports Analysis Collective - Nothing has changed about NFL injuries.pdf. Retrieved from https://drive.google.com/file/d/1sAL8hxT5Caz_H1NeGecFPJez6-wRdVUs/view
23. MLS to Begin Individual Player Workouts. (2020, May 1). Retrieved from <https://www.atlud.com/post/2020/05/01/mls-begin-individual-player-workouts>
24. Myer, G. D., Faigenbaum, A. D., Cherny, C. E., Heidt, R. S., Jr, & Hewett, T. E. (2011). Did the NFL Lockout Expose the Achilles Heel of Competitive Sports? *Journal of Orthopaedic & Sports Physical Therapy*, 41(10), 702–705. <https://doi.org/10.2519/jospt.2011.0107>
25. NATA ICSM Best Practices (1). (n.d.). Retrieved May 21, 2020, from https://drive.google.com/file/d/1a9bZ6JhE0JQdDKanO7wi6ABB_lctzpUx/view
26. Orlando City Soccer Club. (2020, April). OC April Training Protocol [Slides]. Retrieved from <https://drive.google.com/file/d/1PEVxSXmSY4I-tHpKUWNKJ4uN10VT9fE3/view>
27. Phelan, D., Kim, J. H., & Chung, E. H. (2020a). A Game Plan for the Resumption of Sport and Exercise After Coronavirus Disease 2019 (COVID-19) Infection. *JAMA Cardiology*, 1. <https://doi.org/10.1001/jamacardio.2020.2136>
28. Phelan, D., Kim, J. H., & Chung, E. H. (2020b). A Game Plan for the Resumption of Sport and Exercise After Coronavirus Disease 2019 (COVID-19) Infection. *JAMA Cardiology*, E1–E2. <https://doi.org/10.1001/jamacardio.2020.2136>
29. PREVENTING CATASTROPHIC INJURY AND DEATH IN COLLEGIATE ATHLETES. (2019, July). Retrieved May 21, 2020, from <https://drive.google.com/file/d/1baNIG9ZUNOHCfCDUjbOm8zzGgZQ-wzVH/view>
30. Reardon, C. (n.d.). ASPIRE Information on Mental Health for the Athlete During this Pandemic: Retrieved May 21, 2020, from <https://myemail.constantcontact.com/ASPIRE-Information-on-Mental-Health-for-the-Athlete-During-this-Pandemic-.html?soid=1011352390664&aid=Xw7L8aJJmXU>

31. Return to Play COVID-19 Risk Assessment. (n.d.). Retrieved from <https://www.aspenprojectplay.org/return-to-play>
32. Robinson, J. (2020, April 27). Bagged Lunches, Long Passes and No Showers: This German Soccer Team Is the Future of U.S. Sports. Retrieved May 21, 2020, from <https://www.wsj.com/articles/bagged-lunches-long-passes-and-no-showers-this-german-soccer-team-is-the-future-of-u-s-sports-11587978000>
33. Sitzler, B. (2016, July 14). Heat Illness Handout. Retrieved May 20, 2020, from <https://www.nata.org/blog/beths/heat-illness-handout>
34. Solomon, J. (2020, April 30). How will youth sports return to play? USOPC offers first glimpse. Retrieved May 21, 2020, from <https://www.aspenprojectplay.org/coronavirus-and-youth-sports/reports/2020/4/30/how-will-youth-sports-return-to-play-usopc-offers-first-glimpse>
35. Start Simple with MyPlate: Food Planning During the Coronavirus Pandemic | ChooseMyPlate. (n.d.). Retrieved May 20, 2020, from <https://www.choosemyplate.gov/coronavirus>
36. USAV Return to Play Guidelines Effective May 15 2020. (2020, May 15). Retrieved May 21, 2020, from https://drive.google.com/file/d/1aaZTbryycf5zQFbdszagidGA_Nd--2CK/view
37. USOPC Return to Training Considerations. (n.d.). Retrieved from <https://drive.google.com/file/d/13OfU53oGOHxyVKRn6E35pn5hK0XGdhlf/view>
38. USOPC Sports Event Planning Considerations. (n.d.). Retrieved from https://drive.google.com/file/d/1v_4iZVcraTXcpG2njE2978GQPpDjz-Mz/view
39. WHO Mass Gathering Decision Making Tree. (n.d.). Retrieved May 21, 2020, from https://drive.google.com/file/d/15ivovIA7RKuXBn_t4Wjl9SEddlCLSGuk/view
40. WHO Mass Gathering Risk Assessment COVID-19. (n.d.). Retrieved May 21, 2020, from https://drive.google.com/file/d/1kjlum7OhkV3lo2o_BfkvaLPYe5kyZn0_/view
41. Why Student Athletes Benefit from Getting More Sleep on a Regular Basis. (2018, September 25). Retrieved May 20, 2020, from <https://www.sleepfoundation.org/articles/do-student-athletes-need-extra-sleep>
42. Logistical Information and Guidance for Event Directors and Local Organizing Committees (2020, June 1), <https://www.usatf.org/covid19/logistical-information-and-guidance-for-event-directors-and-local-organizing-committees>