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COACHING STRATEGIES for **Fitness Testing**

By Brent Heidorn and Kevin Huet

Sport coaches often train their athletes to increase their knowledge, skill, and fitness development immediately before or during a given sport season. Many programs emphasize, even focus on, year-round training, hoping to maintain a certain level of fitness throughout the calendar year (off-season). Based on this trend, it makes sense for sport professionals in K–12 schools to assist student-athletes in the most effective manner, achieving optimal results in the time available for training. Additionally, facilitating this conditioning in a safe, results-oriented manner is also an important component.

To achieve this year-round fitness conditioning, knowledge-based and/or skill/fitness-related assessments are appropriate in order to track development in these results-oriented pathways toward athletic success. Therefore, the purpose of this article is to highlight a few principles from exercise science, focusing on fitness testing and athletic development, with specific attention on the components of health-related fitness (HRF).

Coaches seeking to monitor the fitness levels of their athletes, while ensuring that too much time is not lost for testing, can use the information provided for efficient

Table 1. Considerations When Testing Health-Related Fitness Components

• Body composition (Body fat %)
◦ Gold standard: DXA, underwater weighing
◦ Field-based: Skinfold testing, bioelectrical impedance analysis
• Flexibility (Range of motion)
◦ Field-based for hamstring/low back: Sit-and-reach/straight-leg raise
◦ Field-based for joint ROM: Goniometry
• Muscular strength (1-repetition max)
◦ Upper body: Standing or seated chest press
◦ Lower body: Leg press or leg extensions (Faigenbaum, Milliken, & Westcott, 2003)
• Muscular endurance (Repetitions to exhaustion)
◦ Upper body: Push-ups
◦ Lower body: Squats (Kević, Šiljeg, Mrgan, & Sporiš, 2013)
• Aerobic capacity (VO ₂ max)
◦ Field-based: Cooper 12-minute run/walk test, 20-m shuttle run test (Mayorga-Vega, Aguilar-Soto, & Viciano, 2015)

DXA = Dual-energy X-ray absorptiometry; ROM = Range of Motion.

and effective training programs. The concepts highlighted throughout the article are not all-inclusive but offer a few strategies for effective fitness testing and development. Sport coaches can use this information as they seek to improve the health, fitness and performance of their athletes.

Testing Concepts and Considerations

Assessing athletes' fitness levels can be a daunting task. However, fitness testing may also yield valuable metrics. Most sport coaches are cognizant of their time, yet also want to obtain data that are accurate. However, it may be inconvenient, invalid and unreliable to perform tests that require too much technique or learning while attempting to conduct assessments that inevitably do not produce results relevant to their sport. With this in mind, a strategic and appropriate fitness test can be considered a beneficial tool for coaches seeking to assess their athletes' performance.

It is recommended that fitness testing occurs pre- and post-competition season and, if applicable, in-season, to appropriately gauge the athletes' progression (Svensson & Drust, 2005). The same tests should be conducted to ensure proper test reliability. In addition, coaches should consider tests that are specific to the performance tasks associated with their sport. For example, a flexibility test would not necessarily be a valid assessment for a soccer team, as that component of fitness does not directly translate to success in the sport. Instead, testing soccer players on their agility

and aerobic power would be more appropriate (Turner et al., 2011). Coaches should keep the health-related fitness components in mind (cardiovascular endurance/aerobic capacity, muscular strength and endurance, flexibility, body composition) and how they specifically relate to the sport.

There are a few pre-exercise test considerations to keep in mind, helping to ensure athletes are well prepared (Riebe, 2017). These include the following:

- Refrain from ingesting food, alcohol or caffeine within three hours of testing;
- Drink ample fluids 24 hours prior to testing to ensure euhydration;
- Wear clothing that allows for freedom of movement; and
- Arrive for testing rested and avoid significant exertion or exercise on the day of assessment.

Athletes should have the opportunity to practice the protocol, be reminded of the scheduled testing date(s), and do their best to adhere to the above considerations. Test administrators should also work diligently to appropriately monitor test quality (i.e., validity, reliability and objectivity).

For decades, researchers and practitioners have developed testing protocols unique to individual needs, leaving much debate over which tests are preferred for various outcome measures. There is a fine line between tests best conducted in the field and those tests best conducted in a laboratory setting. The coaching staff should consider the importance of convenience since accuracy is often sacrificed through ease of testing multiple athletes quickly. Table 1 includes an outline of a few options for the coaching staff to consider when testing for the various health-related fitness components (Gibson, Wagner, & Heyward, 2019).

Test Organization and Order

Coaches should consider the time needed for testing, the number of programs and athletes seeking fitness-based testing opportunities at different points throughout the pre- and post-season, and the need for game-like practice situations and skill development opportunities during the season. Therefore, when testing athletes on a one-time session using a complete bat-

Table 2. Recommended Order When Assessing Athletes on Multiple Test Measures

1. Non-fatiguing tests (i.e., resting heart rate/blood pressure, anthropometric measurements)
2. Agility tests
3. Maximum power and strength tests
4. Sprint tests
5. Muscular endurance tests
6. Fatiguing anaerobic tests
7. Aerobic capacity tests

tery of physical fitness tests focused on the HRF components, coaches should ultimately seek to minimize the effect of a prior completed test within the test battery. The following is a sample HRF testing order: 1) resting blood pressure and heart rate, 2) body composition and balance, 3) cardiorespiratory endurance, 4) muscular fitness, and 5) flexibility (Gibson et al., 2019). For a more sport-centered focus, coaches should consider the order recommendations from the National Strength and Conditioning Association (Haff & Triplett, 2016) (see Table 2).

Conclusion

Coaching athletes is a great privilege, an important responsibility, and an enjoyable opportunity. Therefore, coaches should do what they can to provide a quality learning environment, engaging practice sessions, and evidence of growth and increases in performance. This evidence often comes in the form of fitness testing, and hopefully, performance improvement. Helping athletes to 1) fully understand their current level of fitness, 2) recognize the need for specific levels of fitness in the sport(s), and 3) appreciate the strength (or fitness) improvements they have made as a direct result of training can be great ways to increase the athletes' confidence and commitment. Naturally, appropriate fitness testing is beneficial in this way. Coaches can encourage athletes to view the fitness testing as an opportunity to more effectively diagnose their needs and more specifically identify their improvements over time (e.g., one season, one year, multiple years). Failure to conduct quality fitness testing among athletes can result in poor program design, less than optimal performance, and increased potential for injury. Coaches who desire to help athletes both on and off the field can use the fitness testing concepts described to ensure a more enjoyable, productive experience.

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Submissions Welcome!

Readers are encouraged to send "Theory into Practice" submissions to column editor Anthony Parish at aparish@georgia.southern.edu.

The purpose of the *Strategies* Theory into Practice column is to distill high-quality research into understandable and succinct information and to identify key resources to help teachers and coaches improve professional practice and provide high-quality programs. Each column (1,000–1,300 words or roughly four typed, double-spaced pages) summarizes research findings about a timely topic of interest to the readership to enable practitioners to apply research, knowledge and evidence-based practice in physical education and sports.

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