



Guidelines for Skinfold Testing in Young Athletes

Kinanthropometry examines the link between anatomy (structure) and performance (function) (MacDougall et al., 1982). Specifically, the study of human size, shape, proportion, composition and maturation will help to understand an athlete's physical performance and normal growth and development. As a result, the measurements have relevant application to the development and monitoring of training programs and establishing and monitoring nutritional goals and practices.

Purpose of Skinfold Testing in Athletes

An accurate assessment of the athlete's body composition provides valuable insight into the weight that allows for optimal performance. Whereas height and weight measurements (i.e. BMI) act as an accurate tool for determining a healthy weight for the general population, standard height and weight measurements does not provide accurate estimates of an athlete's weight as these measures do not take body composition into account (Wilmore and Costill, 1994).

The ideal methods for determining body compositions include hydrostatic weighing, dual-energy x-ray absorptiometry, magnetic resonance imaging and bioelectrical impedance analysis. However, these methods are very expensive and as a result are seldom used outside of a research or medical protocol. Therefore, more simplified field-tests, such as skinfold testing, are routinely used to determine the body composition of athletes.

Skinfold Testing and Young Athletes

Skinfold measurements are useful in estimating body composition in children and adults (Heyward, 1998). Regardless of the site(s) selected, regression equations based on growth and development in children and adolescents must be used for accurate prediction of percent body fat. The standard errors of the estimate (SEE) for percent fat predicted from anthropometric measures in children and adolescent is between 3% and

4% (Lohman, 1989). Because of this error, many researchers suggest that skinfold measurements be used without statistical manipulation such as a sum of skinfolds. The measurement of skinfolds provides a relatively quick, convenient technique for the assessment of body composition that can be reliable and valid in children and adolescents when done by trained personnel and when the sum of skinfolds is used to avoid errors in the estimation of percent body fat (Marshall, 1995).

The Use of Skinfold Measurements

Skinfold measurements should not be used for comparison to a pre-determined "standard" but rather to determine optimal body composition for the individual athlete taking into account methodological error, genetic background, gender, the individual's goals and previous performances. The results can be used to measure change in body composition over time. There should not be any weight limit or body fat standard set by coaches, the technician, or other health professionals.

Skinfold results should be used in conjunction with other measures in assessing an athlete. For example, measuring height provides information about a young athlete's growth and development. The body composition results should also be used with other measures of performance such as girths, breadths, aerobic power and muscular endurance. All measures of athletic performance must include an educational component so the athlete understands the purpose of the tests as well as the meaning of the results.

Skinfold Testing as Related to Eating Disorders

There is no single etiology for eating disorders. The development of an eating disorder involves many factors including sociocultural factors, familial links, as well as psychological and biological forces. As with the general population, female athletes are typically at a higher risk than male athletes for developing an eating disorder. Certain sports have been identified as having a higher risk than others namely appearance sports (i.e. diving, figure skating, and gymnastics), endurance sports (i.e. distance running and swimming) and weight classification sports (i.e. wrestling and rowing).

The use of skinfold testing in conjunction with other measurements in young athletes can provide valuable information with minimal risk to the development of eating disorders if precautions are taken to ensure the information is used in a useful, positive manner. It has been reported that athletes may develop disordered eating patterns in an effort to meet an unrealistic predetermined weight based on body composition results. Therefore, strict weight limits and goals should not be the result of body composition assessment. The goal is to educate the athlete about realistic weights based on the individual, to provide information regarding healthy choices for changing body composition and the negative effects that dieting and other drastic measures can have on performance.

Summary

The following guidelines will be followed when using body composition measurements on young athletes:

- 1) The technician taking the skinfolds will be trained and have experience in measuring skinfolds in the youth/adolescent population.
- 2) Standardized testing procedures must be followed.
- 3) Results of the skinfold measurements will be kept as a sum of skinfolds to avoid errors involved in prediction equations for determining percentage body fat.
- 4) A standard weight or body composition value based on the athletes' sport will not be given to the athlete as a goal to achieve.
- 5) An education session must be included as part of the measurement process in order to give the athletes information about why the tests are administered, how to interpret the results, and information regarding healthy practices for changing body composition.
- 6) Skinfold testing will not be administered if there is suggestion that an athlete has an eating disorder. If there is concern regarding an eating disorder the proper referral should be made for assessment and possible treatment.

References

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