The notion of sport-specific training is by no means new. Many in the field of strength and conditioning have taken this idea beyond the simple application of identifying the specific movement analysis and bioenergetics pathways to explore new and innovative ways of training athletes. Given that the vast majority of elite athletes are separated by seemingly insignificant variables, it becomes relevant to bridge science and application to enable each athlete to perform to their highest possible potential. This entails a further examination of kinesiological subdisciplines such as neuromechanics and exercise endocrinology. This article argues that strength and conditioning coaches should investigate the subdisciplines of kinesiology as an approach to strength and conditioning for primarily anaerobic sports such as football and volleyball.

The field of exercise endocrinology has seen very little applied research as it pertains to athletics. In fact, in regards to conducting needs analyses for sport, most discussions stop with the recognition of identifying a sport as either anaerobic or aerobic and the metabolic substrate responsible for the generation of adenosine triphosphate. While the importance of this cannot be understated, further examination of underlying mechanisms warrant continued research. Some would even argue that popular and current training methods are counterproductive and may even detract from recent advances in the field.

An example of a potentially counterproductive method would be conducting strength and conditioning sessions in the early morning hours. While it is a commonly accepted fact that testosterone levels are highest in the morning hours, so too are cortisol levels (3). This antagonistic relationship may actually lead to diminished gains with regards to strength and explosive power. The same can be said for the interruption of much-needed sleep among college-aged athletes. It has been suggested that a better philosophy would be to conduct strength and conditioning sessions in either the afternoon hours (when the hypothalamic-pituitary-gonadal axis is likely to be more responsive) or when coinciding with performance times (3).

Similarly, when examining studies that compare creatine kinase (CK) and lactate dehydrogenase (LDH) (the enzyme that catalyzes the conversion of lactate to pyruvate, and back), it has been shown that both CK and LDH are more readily prevalent following intense anaerobic activity (5). While CK is most active in the phosphagen bioenergetics system to create adenosine triphosphate, LDH is most active in the conversion of pyruvate to lactate (7). The practice of conditioning these “enzymatic pathways,” may be an approach worthy of consideration for conditioning for the sports that are predominately “first energy systems.” Studies have shown an increase in CK activity following isokinetic strength training and interval sprint training using 15-s and 30-s maximal exercise bouts (2,6). An example of this approach can be seen while conditioning volleyball athletes in drills longer than 15 s in length. Kunstlinger et al. readily demonstrated that low concentrations of lactate indicate that the energy supplied while the ball is in play comes from a breakdown...
of creatine phosphate (4). The energy needed for this period of play (approximately 9 s) is then replenished via aerobic pathways while the ball is not in play (approximately 12 s) (4).

In closing, it is suggested that those individuals involved in the design and implementation of strength and conditioning programs for sport look beyond the most readily obvious training methods to advanced means of ensuring success in their athletes. This involves examining subdisciplines of kinesiology in an effort to best ensure athletic success by more than simply addressing the muscular or neuromechanical needs of the sport.

REFERENCES


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