

SPECIFICITY OF TRAINING

By

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Specificity of training is a topic in the strength and conditioning industry that has gained much publicity in the past 10-15 years with the introduction of “functional training” to mainstream media. In the constant changing world of athletic preparation and performance enhancement, athletes are now instructed to train movements rather than isolated muscles, but to what extent does this need apply? Adding a 4 lb ring to a baseball bat, pitchers throwing a 2 lb medicine ball, hockey players attaching bands to their stick while practicing slapshots can be considered training a movement, but one also needs to look at how detrimental these and other methods are to athletic performance. Athletes and coaches alike are implementing unnecessary props and gimmicks with hopes of creating an environment of training, which is more specific to sport, as well fun and exciting. Balance training tools, overspeed resistance devices, cones, hurdles and countless other props are popping up at SAQ centers all over the country, taking the place of proven methods such as increasing ones strength in the squat and deadlift, increasing rate of force development through properly performed Plyometrics and Olympic Lifts, and other exercises deemed “unsafe” by so called experts. “Only muscles used in a specific movement pattern gain strength. This principal, specific adaptation to imposed demands, should direct the choice of lifts toward movement patterns related to the sport or activity which the pattern might be used (1).” To dramatically increase the speed of a car, would a driver put on better tires, add another exhaust, and place a fin on the back, or would the driver simply increase the amount of horsepower the motor can generate. Increasing the horsepower is the obvious choice, just as increasing ones strength and power are the obvious choice for increasing athletic speed, assuming that proper intramuscular coordination and sprinting mechanics already exist. In this simple answer lies the fundamental rationale behind specificity or transfer of training.



Standing on an a swiss ball performing barbell squats does not constitute a sport specific movement, but walk into a local gym and you may see a football player being taught this highly dangerous “circus act” by the in house trainer. This exercise may have taken the place of basic barbell squats with weight accomodation for this football player, as the trainer deemed the swiss ball version more specific to sport because of the greater balance and stabilization requirement. The only thing more specific to sport about this “act” is the risk of injury if the athlete falls off the ball. If one were to chart this exercise on the force/velocity curve and compare it to football movements, it would be on the opposite end of the spectrum. Coaches and trainers seeking specificity have implemented exercises such as this and other “balance” based exercises to replace properly performed strength

movements such as single leg squats, Bulgarian split squats, and other unilateral exercises. This lack of understanding has reached the point where on field performance may suffer due to the lack of coaching or athlete knowledge with regards to specificity.



In his book *Science and Practice of Strength Training*, Zatsiorsky states “Because of accommodation, it is inefficient to use standard exercises or a standard training load over a long period of time. Training loads must vary. At the same time, because of the specificity of training adaptations, the training exercises should be as close as possible to the main sport exercise in muscular coordination and physiological demand (2).” He termed this Transfer of Training. To achieve a higher transfer of training, certain training criteria must be met. First one must look at the objective of the training to determine what criteria need to be met. Specificity not in terms of actual sporting movements, but in energy systems used, speed of movement, muscle activation patterns, joint angles, frequency of performance, and rest intervals. Once the needs analysis has been created, a training model can be designed accordingly. The model should begin with injury rehabilitation and movement/postural correction prior to any loading activity. Once corrected, a progression through specific load bearing exercises and power generation movements can occur.

“While training should be relevant to the goal at hand in terms of selecting exercises with roughly similar movement patterns that develop the muscles used in the sport, it is neither necessary nor desirable to exactly mimic a sport skill in the weight room (3).” Take for example the young baseball pitcher whom decides to increase his velocity by throwing a 2 pound baseball. Thinking this is sport specific, the athlete throws upward of 50 pitches 2 times per week, because this mimics what he does with his pitching coach while throwing baseballs. Besides high risk of injury, this athlete may actually detract from his pitching performance. “The similarity in motor pattern between the weighted and non-weighted movement can induce interference in skill execution. Adding mass to a precisely weighted implement changes the execution of the skill, due to different movement velocities, muscle recruitment patterns, perceptual sensations, and implement trajectories. This essentially develops two or more motor pathways, where only one is useful (4).” The better educated coaches and athletes become with regard to specificity of training, the less this and many other performance deterrents may occur.

Studies with regard to specificity of training can be traced back to as far as the 19th century. Though more recent studies are much more complex, the findings are very similar. In a study performed by Maglischo et al on swimmers sprinting in the butterfly, the researchers had the athletes swim under 3 conditions, normally, partially tethered by a swim belt, and sprint assisted with a tethered belt. The study theorized what happens when an athlete adds resistance and how it interferes with skill execution. “The resisted swimming resulted in shorter and slower strokes, and the sprint assisted training increased stroke rate, but shortened the stroke length (5).” In both cases the

swim mechanics were altered, developing an unnecessary motor pathway, which could eventually lead to deterioration in performance. A second study of interest was performed by Young, McDowell, and Scarlett, testing the Specificity of Sprint and Agility Training Methods. “The study had one group perform linear speed for 6 weeks while the other group performed agility exercises for 6 weeks. The linear athletes showed no improvements in agility, while the agility group showed no improvements in linear speed (6).” Further proving the body will adapt according to the stimulus placed upon it.

In the field of athletic performance enhancement, the principle of specificity or transfer of training is of utmost importance. All too often one hears of coaches requiring power athletes run distances 5 times greater to any they will run the field. These athletes and coaches believe this is building condition and mental toughness. While we can agree with both theories, it is not building condition specific to the sport. With regard to energy systems, athletes and coaches need to be educated on all three and how they transfer to on field results. Running multiple “gasser” sprints will not make a lineman quicker off the line. Building total body explosive power will. Properly executed Olympic lifts, 5-10 yard burst sprints from a down or pushup position, depth jump or depth drops, or jump/accommodated resistance squats will increase the athletes power specific to the sport.



Two other very important factors are speed of movement and muscle recruitment patterns with regards to specificity of training. “If an athlete wants to become fast, not only does that athlete need to increase his/her “horsepower (7)”, but they also need to generate as much force in as short a time and distance as possible. “In the sporting world, the make it or break it point is typically found at the transitions- shift between contraction phases (plyometric to isometric to miometric) – with the greatest development of static-spring effect being associated with the supreme competitor (8).” With this statement in mind, training needs to be specifically tailored to accommodate those specific needs. If your body is recruiting the correct muscles and properly coordinating the firing patterns, while generating great amounts of force, the end result may be greater speed, acceleration, and power. For most non-endurance based athletic events, these are the specific characteristics that separate equally skilled athletes from each other.

“To finish first, preparation cannot come second.” With factors on the line such as scholarships, contracts, signing bonuses, or just making the team, athletes are now taking their off and pre-season preparation more serious than ever before. With these factors creating a greater level of competition, the principle of specificity and its criteria must be a top priority for coaches and trainers involved in the field of athletic preparation.

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