



On the Role of "Functional Training" in Gymnastics and Sports

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On 22 January 2003, Dr. Mel Siff made the following statement on his listserv "Supertraining." Dr. Siff is both a friend and an extraordinary scientist of human performance. His book *Supertraining* (18) should be required reading for all coaches. Here is what Dr. Siff wrote:

"Similarly, "functional training" with specific supplementary drills enhances skills with those drills and not necessarily those of the sport itself. We ought not to forget that so-called "functional training" happens to be rather mythical in nature and that sport specific training does not rely primarily on the use of exercises which [sic] appear to be very similar to one's sporting movements. Instead, "functional training" ("sport specific training") needs to enhance the motor qualities (such as maximum strength, speed-strength and speed-endurance) and rely far more on special sports skill training to integrate those qualities into each relevant sport. "

"Functional Training" has become somewhat of a "garbage-can" term that commonly finds its way into the everyday language of personal trainers, coaches, physical therapists, and strength coaches (1;2;6). The basic idea is that exercises should mimic sport activities as closely as possible in order to enhance or transfer to sport performance. While I am oversimplifying "functional training" here, I would like to discuss more fully the idea of specificity because the two concepts are related. The statement by Siff above was made in the context of using mirrors and other devices and methods as simultaneous feedback for the development of sport skills, much in the way that dancers have used mirrors for decades. The studies being discussed in this context showed mixed results, but a number of studies showed that at least with novice learners, the use of such simultaneous feedback was detrimental to learning and that using drills that too closely mimicked the sport skill actually resulted in reduced performance later on (8;14;15;20).

This kind of problem is well known in motor learning and control circles and is called "negative transfer" (4;5;7;13;17;21;22). A common example of negative transfer is what happens in the near simultaneous instruction of both water skiing and snow skiing, or in badminton and tennis. Practicing one skill actually impedes the learning of a subsequent skill because the techniques are too similar resulting in interference of learning. We commonly see this in gymnastics, particularly when instructing in cartwheels and roundoffs, twisting somersaults, and whipbacks. We know that these skills can be more or less interfered with by some prior learning and instruction. What we commonly refer to as "bad habits" or "lousy technique" is simply what we observe after a gymnast has been instructed previously in some skill or drill that later interferes with the new target skill or drill.

The concept of sport specificity is one of the most powerful, profound, and far reaching concepts in all of athlete training (9-12;16;19). Sadly, specificity is also one of the most



misunderstood concepts. According to the tenets of specificity, the best way to train for a sport is simply to do the sport itself. Obviously, there is no more specific performance of a sport skill than the skill itself. However, we know that this idea does not result in optimal or maximal performance. Often the athlete is simply too weak, stiff, or lacks the stamina to perform the skill techniques adequately, and by "trying" to perform the finished skill without the requisite strength, power, flexibility, etc., the athlete develops bad habits that plague the athlete for the rest of his/her performances of that skill. Moreover, in events such as running we know that a miler should not simply go out and run a mile everyday at race-pace. The athlete's performance on subsequent race-pace miles will deteriorate rapidly after the first attempt and further performance enhancement declines rapidly. This is why such methods as "interval training" evolved (3). Coaches found that by performing shorter distances at similar and faster times allowed the athlete to perform more total work and the greater total work was responsible for improved performances.

Marathon runners are good examples of athletes who use non-specific training. How successful would a marathoner be if he/she ran 26.2 miles in every training session?

By analogy in gymnastics, in order to follow the specificity principle to its logical conclusion, we should simply have gymnasts begin by performing their competitive routine. Obviously, this simply doesn't work. Gymnastics requires careful, thorough, and consistent training in all the subtle nuances of performance technique in order to achieve superior performance. The principle of progression intrudes on the principle of specificity. A balance between progression and specificity must be achieved.

So where does this leave us? Should we train specifically? The answer is yes, up to a point. The muscles, movements, and physiological demands between the exercise or drill and the target skill should be quite similar. However, the movements should not be too similar because, short of actually doing the skill itself, we will always fall short of perfect similarity and thus risk negative interference and a paradoxical decline in performance. So what is the answer? Gymnasts, in fact all skilled athletes, should concentrate their training on increasing the strength, power, flexibility, and stamina for their sport and then allow the sport-specific skill training to direct their enhanced "motor qualities" toward the actual sport skills. This places the burden of increasing performance squarely on increasing motor qualities such as strength, power, and so forth.

In closing, where does specificity really come into play? The answer lies in testing sport performance. In order to really understand sport performance from a testing standpoint - the tests should be as utterly sport specific as possible. This often requires very clever adaptations of existing testing methods in order to properly reflect the subtle nuances of performance. General tests of athlete performance (e.g., vertical jumps, push ups, sit ups, etc.) provide general indications of fitness, but do not correlate well with high-level performance. In conclusion, train similarly but test specifically. Postscript: Before someone uses the statement above to criticize TOPs, keep in mind that the TOPs testing mostly determines the "trainability" of the gymnast by selecting for those who can accomplish the highest levels of fitness in the tested movements. The selection of TOPs tests cannot be completely sport specific since many of these young gymnasts cannot yet perform truly sport specific tests/skills - otherwise these athletes would already be competing at a high level and future prediction of ability via TOPs testing would be unnecessary.

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