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Functional Training Revisited

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MANY TRAINING IDEAS ARE IN-evitably turned into fads, cults, and organizations in the strength and conditioning world. One of the most recent is the so-called “functional training.” Although this topic has been addressed and taught for many years in sports training and rehabilitation, it is only now that some coaches appear to consider that this form of training is a unique discovery that will automatically change the sporting performances of all who implement it.

Consequently, this “functional” fad now seems to have joined the ranks of the ball specialists, the core conditioning crowd, the muscle isolationists, and the “slow is safe” and “aerobics is best” cults. It has become such a hot item that its proponents are creating the impression that all other approaches to sports training are wrong, unproductive, spurious, or ineffectual.

In the 1980s at the National Strength and Conditioning Association and at other strength-oriented conferences, I discussed the role of proprioceptive neuromuscular facilitation (PNF) as a com-

prehensive system of “functional conditioning” and not as simply another method of “stretching” (13, 14), but it was hard to anticipate then that functional training would become such a misunderstood concept. Unfortunately, far too many people since then have created a veritable fitness cult out of misapplication or personal reinterpretation of the term “functional” training or rehabilitation, which has been used in the therapeutic setting for many years.

To go back even further, the terms “structure” (or “form”) and “function” have long been used in scientific and therapeutic circles, with the former referring to the phenomenon of growth of the substance forming the organism and the latter referring to the way in which the organism operates (e.g., read the book by McNeill Alexander [11] on this topic). So, if we apply these time-worn original definitions to the world of sports training, structural training would be directed at enhancing maintenance and growth of the various systems of the body, whereas functional training would refer to the way in which these systems

operate and produce motor output. Out of this classical work emerged the finding that form or structure follows function, a principle that one still finds in PNF and other forms of therapy (4, 5).

■ Matters of Definition

A plethora of sporting and fitness professionals are now confusing “sport-specific” training with “functional” training, very commonly on the basis that machines are not being used or that exercises are being performed in multidimensional space—or even that balancing tricks are being carried out on balls, foam rollers, and wobble boards. This is not how function or functional processes were ever defined, nor is this an accurate description of training processes that are intended to enhance sports, motor, or metabolic specificity.

Thus, various exercises and training regimes are often being classified in the world of strength and conditioning as either “functional” or “nonfunctional,” thereby distorting what functional conditioning originally meant. It is very rare to open a strength or fitness

magazine or to attend a fitness convention without functional training being featured very prominently.

In this regard, is it really appropriate and correct to dogmatically classify certain activities as nonfunctional because they are not the same as or similar to those encountered in a given sport? Can we dogmatically maintain that walking, swimming, bicep curls, stair climbing, karate, fencing, and so forth are entirely nonfunctional for an athlete in a sport such as football, power lifting, wrestling, or soccer? We can state that these activities may not be the most productive for enhancing some component of physical fitness, but we cannot strictly classify such activities as being entirely nonfunctional and, hence, redundant. If a given exercise regime enhances soft tissue and skeletal hypertrophy more than neuromuscular competence, we cannot categorically state that an optimal level of structural hypertrophy does not to some degree enhance motor function. It is apparent that many people are confusing general and sport-specific exercises, as well as single and multiple joint methods of training, when they refer to “functionality” and “nonfunctionality.”

■ **Functionality**

Functionality depends not only on the exercise itself but on many other factors, such as the pattern of execution, the characteristics of the athlete, reps, and sets, the manner of execution, the phase of training, interaction with other training, the current physical and mental state of the athlete, the overall training program, and several other variables. An exercise that is highly sport specific and functional at one time might be equally nonfunctional at another

time or under different conditions (such as fatigue or mild injury).

Let us assume now that most of the individuals actually mean “neuromuscular functionality” when they refer to functional training. Then, let us examine the accuracy of the contention that sit-ups or the “Olympic” lifts, for example, are not functional. Firstly, all functionality is context dependent, so that one has to examine every exercise in terms of the neuromuscular and metabolic functions that it is intended to improve. If we are to take this concept of functionality to its logical end, only then is the exercise itself completely functional because this is the only action that is identical in terms of muscles, joints, and motor patterns implicated in the conditioning process.

So, if we are to consider sit-ups and the Olympic lifts as nonfunctional with respect to virtually any complex sporting action, then we also have to regard crunches, cable crunches, back-extended ball crunches, transversus abdominis exercises, hanging leg raises, and every other popular gym exercise as being similarly nonfunctional. In other words, as stated earlier, there is no such entity as a truly functional exercise, except for the actual sporting or daily movement that we are trying to enhance by training.

The hypothesis of functional training relies heavily on the assumption that the same external movement pattern is always produced by identical, very specific muscle actions that recent research has shown to be incorrect. For example, it has been demonstrated that a muscle that is capable of carrying out several different joint actions does not necessarily do so in every movement (1, 2). For instance, gluteus maximus,

which can extend and abduct the hip, will not necessarily accelerate the hip simultaneously into extension and abduction, but its extensor torque may even accelerate the hip into adduction (7). Gastrocnemius, which is generally recognized solely as a flexor of the knee and an extensor of the ankle, has actually been shown by Zajac and Gordon (17) to contribute to the following complex tasks: (a) flex the knee and extend the ankle, (b) flex the knee and flex the ankle, and (c) extend the knee and extend the ankle.

Some sports, fitness, and therapeutic professionals maintain that functional exercises are always “multidimensional” and that nonfunctional exercises are usually limited to training in a single plane. However, we know that strength and power are very sport specific, so that functionality depends not only on multidimensionality, integration (all movements are neurally integrated), and force variation, but also on the context in which the motor activity takes place (the sport, the conditions in a given event, the fatigue level, the mental factors, the injury history, and so on). It has to be stressed that functionality is context dependent and cannot be generally defined to cover all scenarios without clear delineation of its scope and limitations.

Functionality is not independent of the context and the individual, so it is a very misused term at present. But we know that the fitness, sports, and health markets rapidly appropriate words and ideas that sell services and commodities, so we are once again being faced with the dubious and misleading use of a term that some fitness clients, therapists, and athletes believe to be novel and unique.

■ Functionality and Balancing Drills

Of interest with regard to functionality is the finding that different processes in the brain and the nervous system in general occur during rapid, slow, simple, and complex movements, and also if different emotional states are involved in producing the actions (3). This is one reason why the use of a certain type of (often slower, limited range) squatting, ball balancing, or machine usage may not transfer very well to functional sporting movements.

The popular use of balance drills on balls, wobble boards, and other relatively unstable surfaces may not serve as suitable functional activities because they implicate very different change-in-support and compensatory strategies compared with those involved in real sporting situations. These change-in-support strategies involving stepping or grasping movements of the limbs are common reactions to instability and seem to play a more important functional role in maintaining a stable upright stance than has generally been appreciated (6, 9, 10).

Contrary to what is sometimes claimed, these are not simply last-resort strategies but are often initiated well before the center of mass approaches the stability limits of the base of support. Furthermore, it appears that subjects, when given the option, will select these reactions in preference to the fixed-support "hip strategy," which has been regarded to be of such functional importance in ball and other balancing situations. Compensatory stepping reactions often lack the anticipatory control elements that are invariably present in noncompensatory stepping actions such as initiation of walking or running.

Even when present, these anticipatory adjustments appear to have little functional value during rapid compensatory movements. Furthermore, lateral destabilization complicates the control of compensatory stepping (6, 9, 10).

Moreover, the stiffness and nature of the surface involved in ball and other compliant balancing regimes involve motor responses that do not relate functionally to sporting movements, despite claims to the contrary. Stepping reactions evoked by unpredictable platform translation have been studied in forward, backward, and lateral directions, and the findings obtained suggest 3 specific direction- and phase-dependent roles for the plantar cutaneous afferents (12):

- (a) Sensing posterior stability limits during initiation of backward steps.
- (b) Sensing and controlling heel contact and subsequent weight transfer during termination of forward steps.
- (c) Maintaining stability during the prolonged swing phase of lateral crossover steps.

■ Functional Training and Periodization

Admittedly, the use of the term "functional training" may increase the awareness of promoting specificity in training among those who have not encountered the importance of "holistic" training, but along with this benefit, come a series of training misconceptions and incompleteness. Here, a major problem is that the current promoters of the latter-day functional hypothesis often fail to distinguish between 2 distinct forms of functional training:

1. Any training methods that re-

sult in improved functional or sport-specific performance.

2. Training methods that are close in function to the actual movements, motor qualities, and metabolic processes required in a given sport.

All too often it may be tempting to suggest that the latter type of training is the only one that can enhance functional or sport-specific performance, a belief that can be very misleading and restrictive. Such an approach would indicate that general methods of the so-called "nonfunctional" training do not produce any meaningful improvement in sporting performance. Thus, general bodybuilding methods, high-intensity training, swimming, yoga, elastic band training, Tai Chi, and so on might ostensibly be regarded as entirely unsuitable or redundant as a means of sports training during any phase or period of the overall conditioning process. Many sports professionals and sports scientists consider that such methods may not necessarily be the most productive for offering the most effective way of enhancing any stage of the training process, but this does not mean that they cannot play any possible role in addressing certain general conditioning needs, such as muscle hypertrophy, restoration, flexibility, local muscle strengthening, agility, and rehabilitation. Indeed, their use may not be the most efficient in such applications, but this does not categorically exclude their use by some athletes, especially if they help to promote individual or group compliance and motivation (15).

The point that one might miss here is that the overall training process classically includes a general physical preparation (GPP)

phase and a special physical preparation (SPP) phase, in other words, a combination of specific and nonspecific methods intelligently used sequentially or concurrently to suit a given athlete at a given time in the preparation period. This is the very essence of all training organization and periodization.

In this regard, however, it is important to appreciate that the classical Matveyev model (8) of periodization does not mean that it should be applied too simplistically and incorrectly to maintain that the GPP and SPP are always distinct from each other and never overlap or contain elements of each other. Even Matveyev, whose classical periodization model has been used and abused by so many coaches from the West, did not state this but remarked that general methods may sometimes play a role during the SPP and, conversely, that specific methods may play a role in the GPP (12, 15). Moreover, the proportions of general and specific physical preparation relative to one another depend on the level of qualification of the athlete (15). This is a major reason why several different models of periodization have been devised (15, 16).

Any training period may include elements of both GPP and SPP, depending on the training goals at the time. It is well understood that GPP activities, although not directly enhancing functional motor skills, either lay the foundation for SPP actions or address certain overall bodily needs such as musculoskeletal hypertrophy, stabilization, and metabolic (bioenergetic) function. They are never intended to replace SPP-type actions but merely serve to augment them wherever necessary. The final decision to imple-

ment any activity is based on sporting economics and efficiency—if too much time is spent on supplementary activities, which do not significantly enhance training and competitive progress, then a given exercise should be removed from the training regimen.

■ Conclusions

The lesson here is that functional training is not the “only show in town” and that, although vital in all sporting preparation, it is but one aspect of the overall process. Its value lies in knowing why, when, how, and how much it should be used in the training process and not in its sole use to the exclusion of all other methods. If it were that important, it would bring us back to the point that some coaches raise, namely that the most specific and functional form of training for any sport is the sport itself, so that all supplementary training is redundant. Of course, that would have a profound effect on the entire profession of strength coaching because it exists entirely on the basis that strength training can play an effective and safe role in the overall conditioning of all athletes.

Some proponents of “functional training” maintain that the use of methods that move the limbs in only 1 or 2 dimensions will not enhance any aspect of human performance and may even corrupt the existing patterns of efficiency. Although a major absence of sport-specific training and the overuse of such methods may indeed cause such problems in motor learning, it is misleading and incorrect to claim that this is necessarily the case in all situations.

Are we to seriously believe that uniplanar sit-ups, crunches, pull-ups, bench presses, deadlifts,

squats, or dips are not going to offer the athlete any benefit at all or that they may even be profoundly detrimental in sports training? The skill in using any form of training, be it termed functional or nonfunctional, lies in one's ability to judge and test whether or not any given approach to training is being optimally productive at a given time and to remove or add any other methods that might improve the situation.

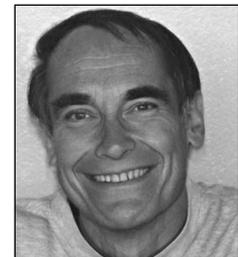
It would probably be preferable not to refer to any specific exercises as “functional” but instead to refer to exercises that enhance “functional” competence in a given sport, task, or context. Thus, the tools or the process involved may be any training means whatsoever (functional, nonfunctional, restorative, recreational, or whatever) may be desired at any given time—the important issue is whether the particular exercise program that you have devised has a functional objective and produces an *outcome* that is “functional” (i.e., provably enhances performance in a given motor action or sport). Functionality is not necessarily determined by the *input* (e.g., specific exercises) but by the *output* (performance) resulting from the use of an entire conditioning regime involving both general and specific methods of training.

Thus, although we can argue incessantly without reaching a consensus about what exactly constitutes a “functional” exercise or “functional strength,” there can be little doubt that the *outcome* or output as measured by a change in the athlete's performance will accurately reflect any functional improvement. In short, it would be preferable if we define functionality in terms of the outcome rather

than accept the current contentious, inaccurate, commercialized, and subjective views on exactly what sort of individual exercises can be deemed to be “functional.” ▲

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