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The Truth on Fitness: **Are Cables Better Than Selectorized Machines?**

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Are Cables Better Than Selectorized Machines?

In today's functionally oriented fitness world, there is a growing sentiment, that amongst strength machines, selectorized training devices are inappropriate, while cable-based systems are the method of choice. The crux of this argument is rooted in the belief that strength, gained through movements which are defined by the machine, does not transfer to daily skills. User-defined movements, some have argued, will result in more "transferable" strength gains.

Cables certainly are effective training tools, and may offer a functional advantage, although there is limited scientific evidence suggesting that user-defined movements promote skills more effectively than fixed-path movements. Nevertheless, this is not the only perspective from which to compare the efficacy of cable and fixed path systems.

From another point of view, one might compare these devices for their ability to promote force generating capacity. Arguably, force is a necessary component of function. After all, one might execute an accurate movement, but without sufficient force, may fail to achieve their goal. But, are accuracy and force truly independent of one another? Worringham and Stelmach (1985) suggest that the central nervous system must take external loading into account, if one is to successfully perform accurate movements. This view is reflected by Brindle and colleagues (2006) and Suprak, et al. (2007), who discovered that position sense increases along with increasing external load. In other words, muscle loading is associated with movement accuracy, and devices which impart high loads on the muscles may have an advantage over those which evoke lower forces, because the higher loads contribute to improved sensory function.

Let's compare, as an example, a selectorized chest press to a standing cable chest press. There are obvious differences in the relative degree of core activation, but the question is, which device will produce the more functional strength gains at the shoulder? To deflect the argument that isolated joint function is less important to overall functioning than movement integration, we can turn to the work of Myers and Lephart (2000), who effectively demonstrated the critical importance of sensorimotor control at the shoulder in athletes. If the shoulder's not working properly, then overall performance will suffer, regardless of how much the abdominals are involved. Thus, back to our question, which device is more effective, a standing cable press, or a selectorized chest press?

To address this question, we can begin with a study conducted by Santana et al. (2007). Although the authors were focused on a different issue, they very effectively pointed out one of the limitations to standing cable chest presses. Using a computer algorithm, the authors deduced that the maximum load that could be employed during a standing cable chest press is roughly forty percent of the subject's body weight. The reason for this is simple, any more weight than that, and the performer will lose his balance. Thus, if one weighed 180 pounds, then the maximum load that could be pressed would be 72 pounds.

It would be difficult to contend that one is less capable of achieving greater workloads on selectorized machines. Actually, selectorized machines would permit users to work against vastly higher loads. Since the sensitivity of sensory mechanisms in the joint increases along with load (Suprak et al.), it could be argued that selectorized devices are more effective at stimulating the sensory mechanisms that control movement accuracy, not to mention the improvements to structures and connective tissues that would arise from increased joint loading.

Well, if not standing, then perhaps seated cable machines are more effective than selectorized devices, as they would provide the stability that would allow for increased workloads. True, perhaps, but then the outcome would depend on the machine's ability to apply torque to the joint. To illustrate this point, consider the steering wheel in your car. If you place your hand on top of the wheel and push down as hard as you can, the result will be, well, nothing. The wheel won't turn because the force you applied is directed through the axis of rotation. In other words, there is no torque with which to turn it. Now, place your hand at say, three o'clock on the wheel, and apply even a small amount of force, and the wheel turns readily. In this case, you have created a rotational force, or torque, which can be used to rotate the object.

Joints also respond to torque. In fact, Worringham and Stelmach avow that "torque sensation is an accessory source of information in limb positioning." The problem with cables, is that the very nature of the concept, user-defined motion, may result in positions or movements in which there is little to no torque created at the joint. The closer the cable passes to the joint center, the less torque there is to work against. Many unwitting users move the cables in such a way as to allow the cable to actually bisect the joint that they wish to train, effectively eliminating any torque loading at the joint. Since movements vary considerably with these devices, there may be some motions in which appropriate torques are created and others where there is really no torque at all. The exercise, therefore, becomes highly inconsistent, and questionably effective.

The result is an exercise that may actually fail to enhance the sensorimotor capabilities of the system. In fact, some cable devices are designed in such a way, that they impart too much torque on some joints, and insufficient rotational force on others, leading to a potential loss of coordination within the moving limb. Doesn't that run contrary to the very notion of cable-based training?

To be fair, the studies cited above address joint position sense while under load, and do not reflect changes that might arise as a consequence of a training program. Selectorized devices also don't permit unlimited freedom of movement; in fact, they restrict motion to one or two planes. But, selectorized devices do impart greater loads and more consistent torques through each and every repetition, thus providing a constant stimulus which may result in improved sensitivity of the sensory mechanisms that control joint motion. Thus, from a certain point of view, it could be argued that selectorized machines are actually better than their free-moving counterparts.

The purpose of this discussion, however, is not to make a case for abandoning cable systems in favor of selectorized equipment. To the contrary, it's a rationale for not eliminating selectorized equipment in favor of other methods. Sometimes, in our zeal to find the "right" training solution, we discard perfectly good methods that we perceive as having little effect. There are many different perspectives from which we can address performance. Let's not omit a device because it doesn't conform to the only perspective from which we are looking. Let's instead, be inclusive of as many perspectives as possible in order to create the best possible training solutions. The truth is that neither the cable-based, nor the selectorized machine, is absolutely superior. They are both important, and should both be given equal consideration in an overall program of performance enhancement.

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