

My First Half-Century in the Iron Game

Testing Strength: Part Nine

A large part of the presently-existing confusion and controversy in the field of exercise physiology is a result of the general tendency to try to apply the same terms to both mechanical work, as it is produced by an engine, and physiological work as it is produced by a muscle. The terms “work” and “power” are both meaningless when applied to muscular function. By its very definition, work requires movement, but a muscle can work without movement, can, at least, produce static force, which an engine cannot do. And, since the term power is intended to mean the rate of work, speed of work, it follows that without work, as defined in mechanical terms, there is no production of power.

One horsepower, probably the most commonly used term for expressing units of power, is defined as the lifting of 550 pounds of weight a vertical distance of one foot in a period of one second, or lifting 33,000 pounds of weight a vertical distance of one foot in one minute. If the same weight was lifted the same distance, but in only half the time, that would mean that two horsepower was being produced, and so on.

How fast you can lift a given weight is determined by the relationship of two factors, the level of upwards force you can produce and the amount of weight you are lifting. The heavier the weight, the slower the speed of upwards movement. If, for example, you can lift 400 pounds a distance of one foot in one second, you would probably find that you could lift 40 pounds in less than one tenth of a second; and if so, then you would be producing more power while lifting 40 pounds than you were when lifting 400 pounds.

Muscles are designed and intended to produce force, nothing more nor less, and whether or not that muscular force will produce movement, together with the speed of any such movement, depends upon how much resistance must be overcome in order to move. The lower the level of resistance, the faster the resulting speed of movement will be, and vice versa. All of which is so simple and so basic that it should be understood by almost everybody, but, in fact, does not appear to be understood by many scientists now involved in the field of exercise physiology; most of whom have been wasting their efforts for the last thirty years trying to do something that is utterly impossible, attempting to measure human muscular strength while using a dynamic, moving, testing modality. So-called “isokinetic” exercise, when it was first introduced by Cybex nearly thirty years ago, was supposed to provide a “perfect” form of exercise; then, later, the same type of machines were used in attempts to measure muscular strength. But those were the claims, which had nothing in common with the facts.

A rather lengthy list of people who were, and are, members of the scientific community and who were interested in exercise physiology, a medical doctor named Alex Sapega and a physical therapist named Jules Rothstein among others, published papers in scientific journals that spelled-out some of the shortcomings and problems of isokinetic testing procedures; but even these two highly educated and very intelligent men, both of whom I have known for years, both of whom have visited me in Florida repeatedly, did not even notice several serious problems that are unavoidably involved in any and all isokinetic testing procedures. Both of the above named two men apparently believed, as I believed for several years, that the problems involved in isokinetic procedures could be solved, that testing machines could be designed and built that would not be influenced by the shortcomings of the isokinetic machines marketed by Cybex and others.

During the last several years that I owned and directed Nautilus, I employed a man named Lester Organ, who was both a medical doctor and an electrical engineer; then, for a period of several years, Dr. Organ directed the efforts of a group of highly qualified engineers and computer experts who devoted all of their time, and several millions of dollars of my money, towards the development of an isokinetic testing machine that actually could provide all of its intended functions. Unfortunately, at that time, none of us were even aware of several serious problems with isokinetic machines. Problems that became obvious to us only after we had solved at least some of the problems found in Cybex machines: Cybex machines supposedly provided an absolutely constant speed of movement, but in fact did not do so, instead provided a speed of movement that varied from far below the selected speed to far above it; that problem we solved by building a

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servo-powered machine that did provide a perfectly constant speed of movement. Secondly, Cybex machines provided resistance only during positive movements, with no resistance against negative movements; in contrast, our machines provided both positive and negative resistance for both exercise and testing.

But even our isokinetic machines, which were, beyond any shadow of a doubt, by far the best isokinetic machines ever built, were, as the English say . . . “The best of a bad lot.” Having devoted a lot of both time and money to designing and building them, we then used them during careful research with thousands of subjects over a period of about three years, but we never put them on the market. Did not offer them for sale because it was obvious to us that there were still a lot of problems with them, and that, additionally, they were unavoidably dangerous.

Using these machines with thousands of research subjects taught us a great deal about them, but primarily taught us that they simply could not perform their intended functions, that they were not capable of producing meaningful and accurate tests of human muscular strength. But while we continued to refuse to market tools that did not work, several other companies rushed into the market with isokinetic machines that were far worse than ours were. Cybex, when other companies first started selling servo-powered isokinetic machines, published lengthy advertisements that violently attacked these competing machines, calling them worthless and dangerous, which may be the only true statement ever published by Cybex; but, a bit later, when it became obvious that a lot of people were buying these servo-powered isokinetic machines, then Cybex started building and selling them. Their machines, of course, being, according to Cybex, the only good ones on the market, the others all being worthless junk; well, in fact, all of them were worthless junk, including those made by Cybex, and many of them were as dangerous as hell.

For the better part of twenty years the people promoting Cybex machines were violently opposed to any sort of negative resistance during either exercise or testing procedures, were opposed to it for only one reason: because their machines did not provide negative resistance. But, later, they started selling servo-powered machines that did provide negative resistance; so, then, naturally, negative resistance suddenly became an advantage rather than something to be avoided.

But the violent opposition to negative resistance so loudly proclaimed by Cybex for so long had a very bad result: thousands of people were dumb enough to believe them, and many of these people still avoid any sort of negative work like the plague, wrongly convinced that it is somehow bad, even evil. And, once established, this myth about negative work, like most other superstitions, became almost impossible to remove from the weak minds of the many who were dumb enough to believe it in the first place. These people are, I suspect, the same ones who believe lawyers and politicians and vote for people like Slick Willie. Apparently they will believe anything except the truth, the truth being rejected because it

might require them to attempt to think. Or, worse still, might force them to admit that they had been wrong about something. Unfortunately, the vast majority of today’s self-proclaimed “experts” are solidly entrenched in this group, and are now publishing pure bullshit in the guise of scientific theories. Bullshit that a lot of other poor fools frequently believe.

I have never claimed, nor believed, that I know “everything” about exercise or muscular function, but I do at least know “something” about both, which puts me a few light-years ahead of almost all of the scientists now involved in these fields. Unfortunately, for all of us, the scientists have been so successful at bullshitting the rest of the population that they, the scientists, are generally looked upon as all-knowing gods who will lead us by the hand to paradise if we will simply listen to them and follow their advise; in effect, and in fact, they are doing exactly the same thing that Hitler did to the German people. “Trust me, I’m from the government, and I’m here to help you.” Sure.