The Future of Exercise
(1997 and Beyond)

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Nearly sixty years of trial and error taught me what I now know about exercise; but I also believe that my willingness to admit my mistakes was a critical factor in my education. And I learned a lot from the mistakes of other people, who, in general, were never willing to admit their own mistakes. Members of the scientific community usually accept as proven fact anything that is published in a supposedly-reliable scientific journal; so-called "peer review" is intended to assure that anything that is published has been established beyond any shadow of a lingering doubt. While, in fact, the very term "peer review" is an oxymoron; if an idea is actually new, then the existence of any "peers," people qualified to evaluate the idea, is obviously impossible. The unavoidable result being that new ideas are usually rejected, will seldom be published in a scientific journal because they tend to demonstrate that many of the existing opinions are wrong.

The willingness of the scientific community to accept any new idea is usually determined by "source" rather than "substance;" that is, who said it is considered to be far more important than what was actually said. Which attitude, to me, comes very close to outright insanity.

I have nothing apart from the greatest respect and admiration for the "scientific method," but many years of experience with most of the people who claim to have performed truly scientific research in the field of exercise physiology filled me with disgust. Such people have taught me nothing, and they can teach you nothing; I promise you, if you follow their advice you will, at best, be wasting your time and at worst may injure yourself.

At a time when Dr. Kenneth Cooper was still preaching that "more is better," a friend of mine commented . . . "Instead of going down in history as the man who saved people's hearts, he is far more likely to be remembered as the man who destroyed their knees." Now, years later, as mentioned in an earlier chapter, he appears to be coming to his senses; but, if so, he is the exception, not the rule. Once widely accepted, myths and superstitions are all but impossible to eradicate.

More than thirty years ago, a friend of mine in South Africa, John Geddes-Page, who was then the director of the Natal Parks Board, told me . . . :"Science is the new religion, and the scientists are the priests of the new religion; but almost without exception they are more misguided than the priests of the older religions, who were, at least, sincere in their error." I should have followed his advice, but failed to do so; a mistake that cost me millions of dollars and got some other people killed.

Geddes-Page had then been trying to work with scientists for many years, but even though he was supposed to be their boss he had learned, the hard way, that meaningful communication with them was simply impossible; so the advice he gave me was intended to prevent me from making a terrible mistake. But, as he had already learned from bitter experience, I was forced to learn about scientists from my own bitter experiences with them. Yes, there are certainly a few exceptions to that general rule, a few scientists who will at least consider an idea that is new to them, but such people do not come in bunches like grapes.

Science is supposed to be a search for the truth, an attempt to gain knowledge that will help us avoid the mistakes of the past; but that is the theory, a theory that usually has little or nothing to do with what occurs in practice. During the last sixty years I have heard, or read, literally hundreds, perhaps thousands, of theories related to exercise; but very few of these theories had anything at all in common with the facts of the matter being discussed, and the few that did usually produced nothing apart from faulty conclusions.

I have observed many things that I did not understand, but could not deny, and a few things that I found it difficult to believe even after they had been clearly demonstrated, and even after sixty years of experience I still cannot explain all of these things; but at least I am aware of them, realize that they can occur. But, with very few exceptions, scientists interested in exercise physiology remain ignorant of such things; primarily, I believe, because they have never observed them. Or perhaps they did observe them but never really noticed them; failing to understand them, they simply ignored them.

Having been guilty of making similar mistakes, I can easily understand how they can happen. My most recent mistake along those lines that I am now aware of was related to nonmuscluar torque produced by stored energy, a factor that must be understood and considered in order to conduct a meaningful test of strength; yet, today, to the best of my knowledge, the very existence of stored energy is not even suspected by many, if any, of the scientists who are conducting research in attempts to determine the best type of exercise for the purpose of increasing muscular strength.

During the last century, thousands of people have attempted to measure human muscular strength, with widely varying results. But, until about eleven years ago, all of the hundreds-of-thousands of strength tests that were conducted were exercises in futility at best, and the theories based upon these test results were simply wrong. The ability to lift a barbell of a certain weight is not a test of strength, for several reasons: ONE, lifting a barbell requires skill as well as strength, so an improvement in your skill will permit you to lift a heavier weight even with no increase in strength; TWO, how fast you lift influences how much you can lift; THREE, individual differences in the leverage provided by your bones can give you either an advantage or a disadvantage; making it appear that you are very weak or very strong, regardless of your actual muscular strength.

True muscular strength can be meaningfully tested in only one way: ONE, you must measure the level of torque produced by the force of muscular contraction; TWO, the muscle being tested must be totally isolated, so that force of contraction from other muscles does not influence the test results; THREE, you must determine the exact position in which a strength test was conducted, because even a slight change in position will either increase or decrease the output of torque; FOUR, you must remove the influence of nonmascular torque that results from gravity acting upon the mass of the involved body parts; FIVE, you must avoid the influence of nonmascular torque produced by muscular friction; SIX, you must measure the level of nonmascular torque produced by stored energy, a very significant level of torque that would be produced even if you were trying to test the strength of a dead man; and having measured it, this level of nonmascular torque must be added to or subtracted from the measured level of total torque.

Having provided all of the requirements listed above, then you can conduct a test of the true level of muscular strength, "Net Muscular Strength," NMT, torque produced only by the force of muscular contraction and unbiased by any source of nonmuscular torque.

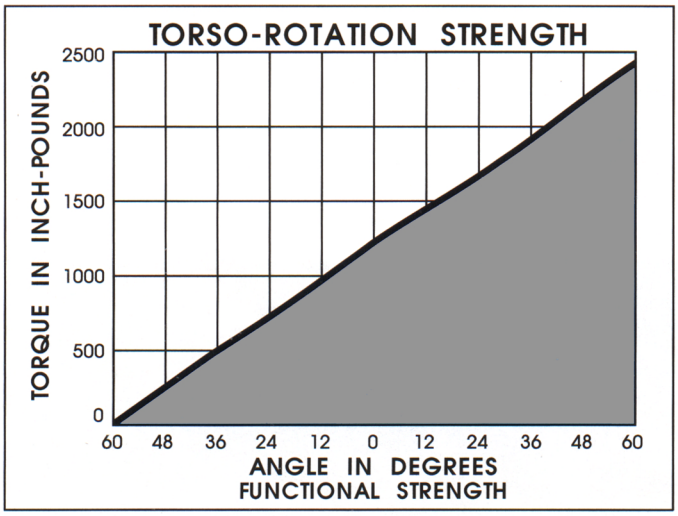
Until the introduction of MedX strength-testing machines that did provide all of the requirement for accurate and meaningful measurements of muscular strength, all of the tools that were used for strength tests were worse than worthless, worse because the test results produced by such tools were misleading. But even with the MedX machines, it is still not possible to accurately test the strength of all of your muscles, primarily because it is impossible to isolate all of your muscles. Currently, we can test the strength of the muscles that extend your lumbar spine, rotate your torso, extend your neck, rotate your neck, extend your legs and flex your legs. Fortunately, the muscles that we can test are the most critical muscles in your body, the muscles that are most likely to be involved in musculoskeletal injuries. Increasing the strength of these critical muscles will go a long way in the direction of both preventing and rehabilitating injuries.

Torque, a force acting around an axis of rotation, was, until recently, expressed in foot-pounds, or inch-pounds, and those terms were used by everybody who had an interest in measuring torque, and are still being used by most people; but, now, those terms are no longer satisfactory to many scientists, some of whom now prefer the term "Newton Meters." While I seriously doubt that even one person out of an average thousand people understands the meaning of "foot-pound," I suspect that less than one person out of an average million people are even aware of the term "Newton Meter," and even those few people who are aware of it usually do not actually understand what it means.

But, for the benefit of those people who insist upon using such terminology, MedX machines can measure torque and then record it in units of either foot-pounds or Newton Meters. MedX machines used for testing the strength of neck muscles record the test results in units of inch-pounds, because your neck muscles are much weaker than most of your other muscles.

The following illustration clearly shows the importance of both determining the exact position in which a strength test was conducted and the influence of nonmuscular torque produced by stored energy.

fig. 1



Tested for the level of his strength throughout a full range of possible movement while rotating his torso, the "total torque" produced by this male subject varied from a high of 302 foot-pounds to a low of ZERO. And since ZERO will go into any finite number an infinite number of times, it follows that his strength appeared to vary, from his strongest to his weakest position, to an infinite degree. It should also be obvious that even a slight change in the tested position would produce an enormous change in the level of torque that was produced.

During an identical test of torso-rotation strength with another male subject, his strength in his strongest position was 2,424 inch-pounds, while it was only one inch-pound in his weakest position; which means that his strength varied an average of more than 2,000 percent per degree of movement throughout the full range of 120 degrees (figure 1). But that was a test of "total torque," which was produced by both the force of muscular contraction and by stored energy. When the torque from stored energy was measured and factored into the test results by the computer, we then had a test of his true level of muscular strength; lower in his strongest position and much higher in his weakest position.

Instead of varying by an average of 2,000 percent per degree of movement, his true variation in strength turned out to be an average of only six percent per degree of movement.

Nonmuscular torque produced by stored energy is a result of the fact that any movement, in any direction, away from a neutral (relaxed) position compresses the soft tissues on one side of the involved joint while stretching the soft tissues on the opposite side of the joint; compression and stretching that produce stored energy, and this stored energy will then produce torque that will tend to move the involved body parts back towards the neutral position. In some positions this nonmuscular torque from stored energy will overstate the true level of strength, and in other positions will understate the true level of strength.

In a test of the strength of the muscles that rotate your torso, the effects of stored energy are relatively minor, though still very important, but in a test of the strength of the muscles that extend your lumbar spine the effects of stored energy are literally dramatic. In one case we tested a man who produced more than 350 foot-pounds of torque from stored energy when in the flexed position of the lumbar spine; and, given the fact that an average but previously untrained man will produce only 340 foot-pounds of total torque in that position, that man would have appeared to be stronger than average even if we had tested his dead body.

So, until and unless the scientists who are now attempting to measure strength become aware of and start to provide the actual requirements for meaningful strength tests, you should simply ignore any of their statements. And just how many of these actual requirements for meaningful strength tests were discovered, or even suspected, by scientists? NONE.