

My First Half-Century in the Iron Game

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Can you believe anything that you read? Not much.

Case in point: published in the Vertical Club Magazine, the Summer issue of 1994, a comparison of the features of several types of exercise machines used in that club made the following statement . . . “In a study done at the University of Florida about six or seven years ago, Cybex was pitted against other leading machines. It was proven that Cybex increased more strength (poor grammar quoted from the original) in the lower back of a healthy, untrained individual than any other brand.”

Bullshit; pure, unadulterated bullshit. Such a study was in fact conducted by the School of Medicine of the University of Florida, Gainesville, directed by Dr. Michael Pollock; a study that compared MedX Lumbar-extension machines to both Nautilus Lower-back machines and Cybex Lower-back machines; but the results were exactly opposite to those stated in that magazine article.

All three groups, MedX, Nautilus and Cybex, increased the resistance that they could use in the exercise, but only the MedX group increased the strength of their lower-back muscles. Strength increases produced by both the Nautilus and Cybex groups were limited to increases in strength of the hip and thigh muscles, with, in fact, slight losses in lower-back strength in both cases.

The first exercise machine designed for the purpose of increasing the strength of the lower-back muscles was the so-called, but misnamed Nautilus Lower-back machine, invented by me and with the patent issued in my name; that machine was misnamed because, in fact, it will do literally nothing in the way of increasing lower-back strength, ZILCH, NADA, ZIP. The benefits of that machine are limited to increasing strength of the gluteal and hamstring muscles. But, when that machine was invented and named, we were not aware of its limitations; so it was simply one more in a long list of my mistakes.

Initially, and for several years afterwards, we were not aware of the fact that the machine could not live up to our expectations; were not aware because there was then no possible way to measure lower-back strength. All of the testing procedures then available unavoidably involved muscles of the hips and thighs as well as lower-back muscles, so it was impossible to determine just how much, if literally any, of the tested strength actually was a product of lower-back muscles. And, as it later turned out, such test results were produced entirely by hip and thigh muscles, with no contribution from lower-back muscles.

The Cybex Lower-back machine, a poor copy of my earlier machine, also fails to produce any results for lower-back muscles. Will not, in fact, even prevent progressive atrophy of lower-back muscles.

In October of 1987, at a medical seminar in New York City, we tested the isolated lower-back strength of a man named Gary Reinl. The results of these tests, a series of three tests over a period of four hours, clearly established several points: ONE, his lower-back strength was below average; TWO, he had an abnormal strength curve, indicating some sort of lower-back problem; THREE, he had a very high percentage of fast-twitch fibers in his lumbar muscles; FOUR, his recovery ability was very poor.

Starting immediately after that series of tests in 1987, Reinl trained regularly, three times each week, for a period of four years on a Cybex Lower-back machine; and he became very strong on the machine; that is, he could perform ten repetitions with a high level of resistance.

Whereupon he visited us in Florida, convinced that his lower back was much stronger and that his abnormal strength curve had been corrected. But, when we retested him, it turned out that his lower-back muscles were then 22 percent weaker than they were four years earlier, and he still had the same abnormal strength curve. His Cybex exercise not only did not increase his lower-back strength but did not even prevent continued atrophy.

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So then, for a year, he switched to a Nautilus Lower-back machine; but when tested again, a year later, his lower-back strength was unchanged.

Then, for a third time, he switched horses, devoted his next year of training to a so-called Second Generation Nautilus Lower-back machine; but, again, when retested, his lower-back strength was even lower than it had ever been previously.

The Nautilus and Cybex machines do not isolate the lower back, do not anchor the pelvis in order to prevent involvement of hip and thigh muscles, and thus do nothing for lower-back muscles. The lower-back muscles simply go along for the ride since they are connected to the moving pelvis, but get no benefits from the exercise.

A very similar situation exists in your arm muscles: your upper-arm muscles move your forearm around the axis of the elbow joint, while your forearm muscles move your hand around the axis of the wrist joint, and since the resistance in a curling or triceps exercise is imposed against the hand, that is to say, beyond the wrist joint, it might appear that exercise for upper-arm muscles would also develop the forearm muscles, but in fact this does not happen.

Why not? Because the wrist joint has an enormous mechanical advantage when compared to the elbow joint. When you perform a curl with a barbell you lift the weight about two feet (24 inches), but a wrist curl lifts the weight only about two inches; which means that the wrist has an advantage of about 12 to 1 when compared to the elbow. The result being that a maximum level of resistance for upper-arm muscles is not high enough to even be noticed by the forearm muscles because of the mechanical advantage of the wrists. A very similar situation exists in the joints of the lumbar spine compared to the hip joints. But the results are the same in both cases: both lumbar muscles and forearm muscles can be strengthened only with isolated exercise.

In the flexed position of the lumbar spine your muscles, the spinal extensors, have a mechanical advantage of about two to one; meaning that a muscular force of contraction of one pound will produce an output of torque of about two pounds. In contrast, the quadriceps muscles have a mechanical disadvantage of about fourteen to one; meaning that fourteen pounds of force from the quadriceps muscles will produce an output of only about one pound of torque. Which is why your quadriceps muscles are so large: they have to be large to make up for a very poor joint, the knee joint. In the knee you have huge, powerful muscles linked to a very poor joint, but in the lower back you have relatively small and weak muscles linked to a very good joint.

The graph on page 569 shows two full-range strength tests of the totally isolated muscles that extend the lumbar spine: the lowest curve on this chart shows the results of the first such test ever conducted; prior to the date of that test such tests were impossible, were previously impossible because no meaningful testing procedure then existed. All earlier attempts to test the strength of these muscles were utterly meaningless; were meaningless because the testing tools that were used provided none of the requirements for accurate testing.

Initially, having seen the results of that first meaningful test, we literally did not believe the test results; did not believe them because it appeared to be impossible for the relatively small muscles of the lumbar spine to record the high levels of torque that were measured. "Just how," we asked ourselves, "could the small muscles of the lower spine produce so much torque?" But, when we calibrated the testing machine by using known levels of torque we discovered that the torque measurements were in fact accurate, even if, as they were, they were much higher than we had expected. Then, when we were finally forced to admit that the subject was actually as strong as he was, we rationalized his surprisingly high level of strength on the grounds that he had been training steadily for about eight years on a Nautilus Lower-back machine. Which earlier exercise apparently explained his surprising level of lower-back strength.

BUT, PLEASE NOTE: since this was literally the first such test ever conducted, we had no standard for comparison, no previous test results to compare it to. "High" is a relative term; high compared to what? Initially, we made the mistake of comparing it to his quadriceps strength: this subject, as we knew, could produce a peak torque of about 400 foot-pounds with both quadriceps working together, so a peak torque of 340 foot-pounds from the smaller muscles of the lower back appeared to be impossible.

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Only later, after having tested the isolated lower-back strength of hundreds of other subjects, and after having established “average strength” of these muscles in an untrained man of his size and age, did we learn that his initial test results were far from being high, were in fact below average for an untrained man. Rather than being surprisingly strong, he was in fact suffering weakness from advanced atrophy of these muscles; his years of exercise on the Nautilus Lower-back machine had made him very strong in his hip and thigh muscles while doing absolutely nothing for his lower-back muscles.

Now look at the higher strength curve shown on the chart, which shows his level of isolated lower-back strength after five months and eight days of exercise on a MedX Lumbar-extension machine, a machine that does isolate the muscles of the lower back by anchoring the pelvis in such a manner that the hip and thigh muscles are not involved in the exercise. While eight years of exercise on the Nautilus machines did not even bring his strength up to an average level for an untrained man, five months of isolated MedX exercise increased his lower-back strength to a very high level. In his initially strongest position, shown on the right side of this chart, his strength increased by 103 percent (or so it appeared at the time), while in his initially weakest position, shown on the left side of the chart, his strength increased by 450 percent.

Which gains, as it turned out, were actually an understatement; his actual gains were much higher than we at first believed. That initial error was due to the fact that we were then unaware of the effects of nonmuscular torque produced by stored energy; but, later, when we did become aware of the effects of stored energy, it turned out that his actual strength increase in his initially strongest position was more than 200 percent.

The gray area between the two curves shows the gains in strength that were produced by the isolated exercise. Frequency of exercise during that period of explosive increase in strength? One brief exercise each 14 days, an average of less than one minute of isolated exercise every week.

An unusual subject who produced such unexpected results? No, quite the contrary; in fact, every other subject in our first group of test subjects, with only one exception, did better than this subject. The one exception was exercised for only ten weeks, once each week during that period, and his lower-back strength increased by 180 percent.

Our best subject in that first group increased his initial strength in his weakest position by 7,300 percent; his output of torque in his weakest position increased from 4 foot-pounds to 296 foot-pounds. And this subject had also been training on a Nautilus machine for years.