My First Half-Century in the Iron Game

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In the field of aviation, English is supposedly the international language of choice: regardless of just where in the world you are flying, the air traffic control people are supposed to speak English fluently. Sure. In fact, they frequently do not; which sometimes makes it impossible to communicate with an airport control tower where you want to land.

In the scientific community, worldwide, all terminology is supposed to be in Latin: the stated purpose being to prevent confusion. Which might be a good idea is they did not keep changing the terms, or if they could all agree upon just which of several terms everybody would use.

In the field of engineering, supposedly a so-called "hard" science, in contrast to a "soft" science like many of our current social studies, torque has, until recently, been expressed in units of foot-pounds; but, recently, somebody in the scientific community decided that it would sound more "scientific" if torque was expressed in units of "Newton Meters."

Well, in fact, not one person in an average thousand has any idea just what the term "foot-pound" is supposed to mean; which was bad enough, but now we have a situation where not one person in a million understands what a "Newton Meter" is, or how to measure it.

Likewise, there have been two distinct terms describing work for many years; when you are lifting a weight, that has been called both "positive" work and "concentric" work, while lowering a weight has been called both "negative" work and "eccentric" work. Both terms have been used in many supposedly scientific papers that have been published in various journals.

A lot of additional confusion has been added by the fact that many of the terms that have been used to describe mechanical work are utterly meaningless when applied to muscular work: the very term "work," for example, implies movement, moving against resistance of some sort; when you lift 100 pounds a vertical distance of one foot you have performed 100 foot-pounds of mechanical work, positive or concentric mechanical work. Without movement, there is no mechanical work; a car is performing no work if it is not moving.

The term "power" refers to the rate of work, just how much work is being performed within what period of time; one "horsepower" requires lifting 550 pounds a vertical distance of one foot within a period of one second. Again, in order to produce power you must have movement; no movement, no power.

Which, for an engine, is all well and good, but which is meaningless when the term is applied to a muscle; because a muscle can perform "static" work, work without any movement. In which case you have neither work nor power in mechanical terms. A muscle "works" by producing force, but it does not follow that either mechanical work or power are produced. Mechanical work, and power, will be produced only if the resistance is low enough to permit upwards movement; if not, if the upwards force from the muscles is equal to the downwards force from the resistance, then no movement can be initiated. The "start of movement" can be produced only if the muscular force is greater than the resistance.

However, once upwards movement has been initiated, then continued upwards movement at any constant speed requires only muscular force that is exactly equal to the resistance. If the muscular force exceeds the level of resistance, then the speed of upwards movement will not remain constant, will increase, will accelerate to a faster speed. Thus we know that when we are lifting a weight at any constant upwards speed the muscular force and the resistance are exactly equal.

At first glance the following statement may not appear to make any sense, nevertheless it is perfectly true: it takes exactly the same level of force to lower a weight that it does to either lift or support a weight, provided that the speed of movement is always constant, any constant speed.

Yet we know that we can "hold" (support) a weight that we cannot lift, and that we can "lower" a weight that we cannot hold. In general if you can lift only 100 pounds, then you can hold 120 pounds and lower 140 pounds. So your positive strength is lowest, your negative strength is highest, and your static strength is exactly midway between the positive and negative levels.

At any given moment you have three levels of strength: FIGURE ONE shows a clear example of these three levels of strength that resulted from measurement of quadriceps strength (leg extension). The lowest curve on this chart shows fresh "positive" strength, the highest curve shows fresh "negative" strength, while the bar graphs show fresh "static" strength. If positive strength is 100, then static strength is 120 and negative strength will be 140.

fig. 1

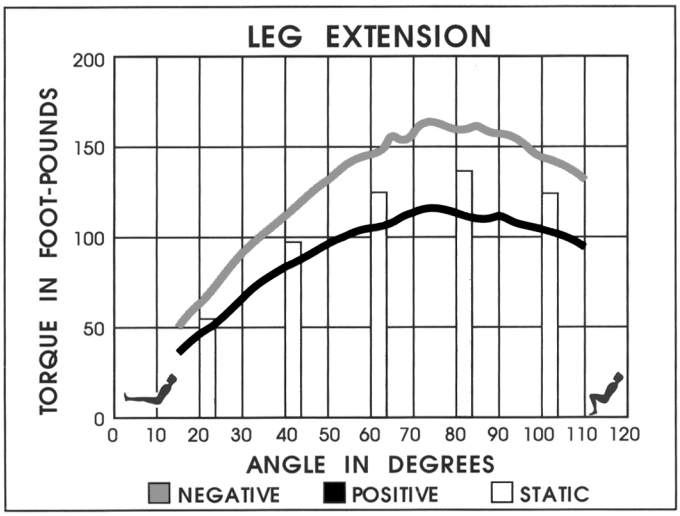
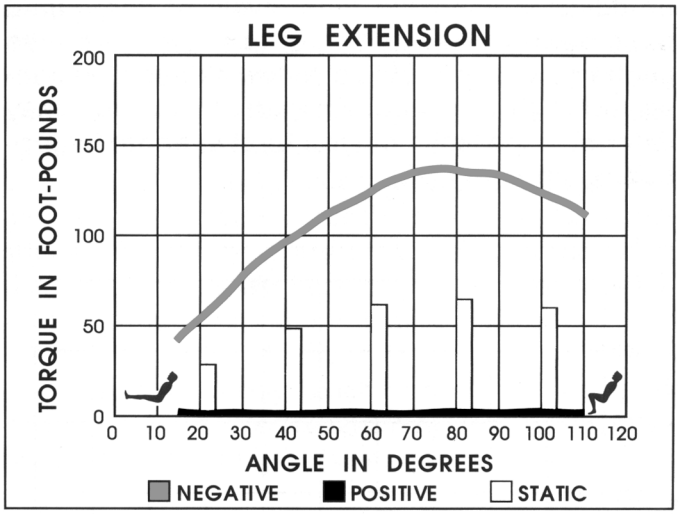


fig. 2



At least some people, although not many of them, in the scientific community have been aware of this situation for many years; but, in general, most of them have simply continued to ignore it while a very few have tried to explain it with a wide variety of stupid theories. The factor which is responsible for this situation is, of course, muscular friction; friction which reduces positive strength, increases negative strength, but has no effect upon static strength. But, apparently, not a single member of the scientific community ever had enough common sense to recognize this situation for just what it is, and most will try to ridicule you if you attempt to explain it to them.

Everything in this universe that has both mass and motion also has friction, and since muscles have both mass and motion it naturally follows that they have friction. And friction has exactly the same effect upon anything with both mass and motion: it reduces positive work while increasing negative work. Friction limits the top speed of your car (positive work) while helping you to stop (negative work). In a typical car, about 75 percent of the energy produced by the engine is wasted by friction; but a muscle is far more effective since only about 17 percent of the force produced by a fresh muscle during positive work is wasted by friction. If a fresh muscle produces 120 pounds of force then the measured output during positive work will be only about 100 pounds. But during negative work the same level of muscular force will produce 140 pounds.

In both cases, positive and negative, the muscle is doing exactly the same thing, but the results are different; are different because the muscular friction reduces the output while performing positive work and increases it during negative work.

But the muscular friction does not remain constant, is influenced by two different factors: faster movement produces a higher level of friction and fatigue increases the level of friction.

FIGURE ONE demonstrates the three simultaneously-coexisting levels of fresh strength, while FIGURE TWO shows the three levels of existing strength with a muscle following a very hard exercise, an exercise that was continued to a point where continued positive movement was momentarily impossible even when no resistance was encountered. Positive strength was then ZERO, while negative strength was 120, nearly as high as it was when fresh, and static strength was 60, exactly half of what it was when fresh.

When the muscle was fresh, friction reduced positive strength from a true level if 120 to a level of only 100 (friction then being 20), but with the exhausted muscle the friction was three times as high as it was in the fresh muscle; so a true level of 60 was then reduced by friction to ZERO, because friction was then also 60. 60 minus 60 equals ZERO. But during negative work, 60 plus 60 equals 120.

All of which is both so simple and so obvious that it should be obvious to a goat, and probably is obvious to a cat, but apparently still remains far above the mental level of most scientists.

During the later stages of a very hard exercise, an exercise continued to a point where your remaining strength is ZERO, the level of positive strength drops rapidly from repetition to repetition until any continued positive movement becomes impossible even if there is then no resistance; but, simultaneously, the level of negative strength will be rising from repetition to repetition. While positive strength is rapidly falling, negative strength will be rising. This occurs because the friction is increasing; friction that reduces positive strength while increasing negative strength.

Because of this help that friction gives you during negative work, it becomes possible to continue a negative-only exercise far past a point where you should have stopped: carried to that point, such exercise will produce a level of fatigue that you may not be able to recover from for a period of ten days or longer. Exercise that produces no fatigue is totally without benefit, but exercise that produces too much fatigue is counterproductive, will cause losses in strength rather than gains.

Which does NOT mean that negative exercise is “bad” in any sense of the word, but does mean that you can carry even a good thing much too far. The subject who performed the test illustrated by FIGURE TWO did not totally recover from that procedure for more than two weeks; eleven days after that test he could still walk only with great difficulty, so that is carrying a good thing much too far.

In my opinion, IRONMAN is by far the best magazine in this field, but it does not follow that I agree with everything published therein; a few months back some idiot published an article stating that negative exercise was “bad,” counterproductive, even dangerous. Bullshit: the negative part of exercise is by far the most important part, without which you have very little of value. But, like anything else, don’t overdo it. You need oxygen too, but too much oxygen will kill you.

Some years back it was popular to show pictures of starving African children with grossly protruding stomachs, and it was then stated that they were suffering from a shortage of protein; later it was discovered that the actual problem was produced by too much protein and not enough carbohydrates.

During the first part of the Second World War military installations and war plants had thousands of machines that dispensed salt tablets, the idea being that hard-working people required extra salt; but, later, they discovered that they were actually killing people from too much salt, so all of these salt machines disappeared. It is, in fact, damned near impossible to get too little salt if you are eating enough to stay alive, but easily possible to get too much salt. So long as your urine and sweat remains salty, then you are getting too much salt and the body is trying to get rid of it.

The same thing is true in regard to exercise: some is GOOD, perhaps essential, but it does not follow that more is better, and it is frequently worse, and too much will kill you.

As I have said before, and as somebody else said about fifty years ago, “Rather than trying to determine just how much exercise we can STAND, we should, instead, be trying to determine just how LITTLE exercise we actually REQUIRE.”

For many years I was stupid enough to perform three weekly workouts that took four hours each, doing four sets of each of twelve exercises, all sets being continued to a point of failure. On that program I reached a size and strength level that was far above average but still far below my actual potential, and then could not produce any additional gains.

But, eventually, when I cut that schedule in half, reduced it by 50 percent, I immediately started to produce additional gains and quickly reached levels of both size and strength that I had previously found impossible to produce.

Later yet, I reduced the program even more and then made even better gains. Knowledge that took me the better part of twenty years to learn the hard way; perhaps you can profit from my earlier mistakes and learn the easy way. But perhaps not, because if you are seeking goals that are beyond your true potential, then you will never be satisfied and will continue to do things of no value in vain attempts to produce impossible results, a level of size and strength that may be possible for somebody else as a result of genetic differences but is not possible for you.

Regardless of your goals, and regardless of your previous results, try doing LESS exercise before you try anything else; overtraining is probably the most common mistake in exercise.