My First Half-Century in the Iron Game

ArthurJonesExercise.com

34

One of the few things that I can say with no slightest reservation is the fact that meaningful communication of ideas is perhaps the most difficult thing you will ever attempt. And it matters very little just how simple the idea may be; things that should be obvious to a goat, and probably are obvious to a cat, still leave many people in a state of hopeless confusion. You can make many people “believe” almost any damned thing, no matter how ridiculous it may be, but making them “understand” it is another matter entirely.

It is particularly difficult to communicate by writing; primarily, I believe, because you get no “feedback” from your audience, it is never possible to determine just what their reaction actually was. Just what, if anything, did they really understand?

Explaining things usually involves the use of examples, but that leads to problems because your readers are not always familiar with the examples that you choose to use. One possible solution is to use several different examples to illustrate one idea, but that also leads to problems because many people become confused when more than one example is used; a lot of people simply refuse to even try to understand something that appears to them to be complicated.

In several of the articles that I have published earlier in this series I have at least mentioned the subject of muscular friction, but I have not previously attempted to actually explain it, or even to prove that it even exists; and, by and large, insofar as the scientific community is concerned it does not exist, is merely a figment of my diseased mind. Well, my mind may or may not be diseased, (after all, just how can we judge our own sanity), but muscular friction is a fact regardless of any contrary opinions by anybody.

Muscular friction is not only a fact but is a very important fact; is so important that it is literally impossible to understand muscular functions if you ignore the effects of muscular friction. Which is one of several reasons why the current crop of supposed experts in this field are so confused, why you hear so many conflicting theories.

Everything in the universe that has both mass and motion also has friction, and since a muscle has both mass and motion it unavoidably follows that muscles have friction.

And the effects of friction are exactly the same wherever it is found: it tends to reduce positive function while increasing negative function. Without friction, once a car started to accelerate it would continue to increase its speed until it eventually reached the speed of light; but friction prevents that from happening. Instead, a car will accelerate until its speed is such that the force pushing it is equal to the force of friction that is holding it back. A higher speed can then be produced only in one of two ways, by increasing the pushing force or by reducing the friction. Acceleration is a “positive” function, and it is inhibited by friction; but stopping a car is a “negative” function, and it is helped by friction. Without friction, once moving it would be impossible to stop a car unless you chose to run it into some solid object that was strong enough to resist the resulting impact force. Which solution leaves a great deal to be desired. So a car needs friction, literally “requires” it, could not function without it.

One of the very few things that function better, if at all, without friction is a rocket; in that case friction is not required for function, and in fact the rocket functions best in a total vacuum where there is no friction. But a muscle does not function in a vacuum, is influenced by friction.

Some things, though perfectly true, when stated in simple terms appear to be ridiculous, seem to defy common sense. For example: how much force is required to lift a weight of 100 pounds at a constant speed of upwards movement, any constant speed of movement? The answer is 100 pounds of force.

And how can we prove that? Quite easily as it happens. Think about it for a moment: if the weight was 100 pounds and the upwards force was more than 100 pounds then the speed would not remain constant; instead, the speed would increase. So the fact that the weight does not accelerate, that the speed of upwards movement remains constant, means that the lifting force is not more than 100 pounds.

And, of course, if the lifting force was less than 100 pounds, then the upwards movement would slow down, would eventually stop, and then the weight would start to accelerate downwards. So we thus know that the required force is not less than 100 pounds.

And what is the only force that is neither more nor less than 100 pounds? 100 pounds of force, no more and no less.

It does not require a genius level IQ to understand the few sentences above, and anybody who fails to understand them is probably a near idiot.

But now think about this. If it requires 100 pounds of force to lift a 100 pound weight at a constant speed, as it certainly does, then how much force is required to lower a 100 pound weight at a constant speed?

And, again, the same rules apply. It requires 100 pounds of force to lower a 100 pound weight at a constant speed. If the force was less than 100, then the downwards speed would increase; but if the force was more than 100, then the downwards speed would be reduced until all downwards movement was stopped, whereupon the weight would then accelerate upwards.

So it takes just as much force to lower a weight at a constant speed as it does to lift the same weight at a constant speed.

But, you might say, if that is true, as it is, then why can you lower a heavier weight than you can lift? Why is your negative strength greater than your positive strength? Because of muscular friction, which reduces your output of force while you are lifting a weight but increases it while you are lowering a weight. Generally, with a fresh muscle, your negative strength is about 40 percent higher than your positive strength.

Remember, exactly the same thing happens with a car: the friction limits your rate of acceleration and top speed but helps you to stop.

And what about holding a weight motionless? Again, the same rules apply: if the force was more than the weight then it would move upwards, and if force was less than the weight then it would move downwards. So a lack of movement proves that force and weight are equal and opposite.

Thus it requires exactly the same level of force to lift a weight, lower the same weight, or hold it motionless. Which, at first glance, may sound stupid, but which you should by now understand.

But, again, if that is true, as it is, then why can you hold more weight than you can lift? And again the answer is the same: friction. When there is no movement there is no friction.

A muscular force of 120 pounds can lift only about 100 pounds of weight because while lifting about 20 pounds of muscular force is wasted by friction. In order to lift a weight you must have a force equal to the weight, but must also overcome the internal muscular friction.

Thus at any given moment we have three distinct levels of strength: if positive (lifting) strength is 100, then holding (static) strength will be about 120, and negative (lowering) strength will be about 140. These ratios of strength, however, apply only to a fresh muscle, and only when the dynamic tests are conducted at a relatively slow speed of movement.

A fatigued muscle has far more friction, and a faster speed of muscular contraction also greatly increases the friction.

One result of this situation is the unavoidable fact that any dynamic (moving) strength test is thus rendered utterly meaningless. During a dynamic test of positive strength the test result will always be too low, and during a test of negative dynamic strength the test result will always be too high. Strength can be meaningfully tested only with a static (isometric) modality of testing.

So how do our competitors attempt to test strength? With dynamic (moving) tests, what else? Which, at least, is consistent, since everything they do is wrong, utterly stupid, and worse than worthless because it is misleading.

Anybody dumb enough to attempt to perform meaningful strength tests with Cybex machines or any of their clones needs to go back to Kindergarten and start over with their education, since they obviously learned little or nothing the first time around. Yet, in fact, many of these are the same people who now consider themselves “experts.”

The Cybex people call their modality of testing “Isokinetic,” which is supposed to mean that the speed of movement is constant throughout a full range of movement; which it certainly is not. But, even if it was, it would still be meaningless because the speed of muscular contraction does not remain constant even when the speed of the moving body part does remain constant. If, for example, you start with a fully-extended (straight) arm, and then bend it 90 degrees around the axis of the elbow joint, bend it at a perfectly constant speed of angular movement, then the speed of muscular contraction varies by about 800 percent.

And remember: a faster speed of movement produces a higher level of friction, thus the friction of the muscle is much greater in some positions than it is in other positions.

Thus during a positive dynamic test of strength conducted at a constant speed of angular movement of the related body part, friction might reduce your true level of strength by only about 17 percent in one position while reducing it by 50 percent or more in another position of the same movement.

This example is intended to illustrate the effects of friction.

If you were seated at one end of a table, as illustrated above, and if you were holding on to a handle that was attached to a rope, a rope that extended to the far edge of the table, passed over the edge , and then supported a 100 pound weight that was hanging from the far end of the rope, how much force would be required from you to cause the weight to rise?

Well, if we assume that the rope rubbing against the edge of the table produces 20 pounds of friction, then you would have to exert 120 pounds of force to lift the weight, 100 for the weight and 20 for the friction.

But if you were lowering the weight then only 80 pounds of force would be required, because in that case the friction would help you instead of hurting you.

You can easily prove this by inserting two pull-type scales in the rope, one scale between the edge of the table and the handle, and one scale below the edge of the table but above the weight. The scale between the edge of the table and the weight will always record 100 pounds if the speed of movement is constant, will record the same level while both lifting and lowering the weight. But the scale above the table will show a force of 120 pounds while you are lifting but only 80 while you are lowering the weight.

Which, I believe, is enough for this chapter; in next chapter article I will continue this discussion in an attempt to show you some very practical applications of this important information. Will try to show you just how you can use muscular friction to your advantage, while avoiding some of the problems produced by it.