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Articles

# The Missing Link in Athletic Performance

Human performance is a result of six factors, all of which are important... some of which are subject to improvement, while some are not.

These factors are in no particular order... one, cardiovascular ability... two, flexibility... three, skill... four, muscular strength... five, bodily proportions... and, six, neurological ability. All of the first four factors certainly can be improved by proper training... some form of exercise is being required to improve cardiovascular ability, flexibility and muscular strength... while skill is improved in only one way, by the proper application of skill training, by performance of the activity itself, with total specificity.

Exercise is one thing... while skill training is an entirely different matter; exercise is utterly worthless unless it involves an overload of some kind... but skill training literally must not involve an overload. Exercise must be hard, as hard as possible if good results are your goal... but skill training must not be hard, must not be continued to the point that it becomes exhausting.

So don't confuse the two entirely different types of training... and don't be misled into believing that any exercise is specific to a particular sport. Strength is general, flexibility is general, cardiovascular ability is general... and all three of these important factors can and should be improved by the correct application of proper exercise... but skill is utterly specific and can be improved in only one way.

The fifth factor, bodily proportions cannot be improved... so you are stuck with what you have, good or bad. Proportions that are ideal for one sport may be utterly wrong for another activity... great height and long arms are certainly an advantage in basketball, but the same proportions would certainly ruin a gymnast. A particular athlete can obviously do nothing about his own bodily proportions... but a coach, by being aware of the importance of this factor, can and should recruit athletes with the proper bodily proportions for a given sport; and, to a large degree, this is already being done.

Which brings us to the last factor, neurological ability... a factor of great importance, but one that is not at all well known... the existence of which is not even suspected by most coaches and athletes. Not even suspected in spite of the fact that this one important factor can easily be the only difference between a world champion athlete and a complete failure... everything else being equal. Neurological ability has largely been ignored for at least three reasons... first, for the simple reason that most coaches, athletes, doctors and even exercise physiologists have never even heard of it... secondly, because most of the neurologists and neurosurgeons who were aware of this factor have assumed that it was an entirely genetic factor that was not subject to improvement; and thus, they tend to ignore a factor that can't be helped... and, finally, because there was no practical manner in which neurological ability could be measured.

Which immediately raises several interesting questions... one, just what is neurological ability?... two, how do we know it can't be improved?... and, three, how do we prove its very existence if we can't even measure it?

ONE... neurological ability is your ability to stimulate muscular contraction. Muscular contraction is stimulated by your nerves, but it is utterly impossible to stimulate the contraction of all of the fibers in any muscle at the same time. If a muscle is rested, then all of the fibers could be contracted simultaneously if the nervous stimulation to the muscle were strong enough, which it is not.

The only possible way to stimulate simultaneous contraction of all of the fibers in a muscle is by electrocution. So, in effect, and in fact, you can only use a small part of any muscle at any given time... even when you are straining in an all-out, maximum, do or die attempt, you are still only using a rather small part of your muscles, while most of your muscular fibers remain totally relaxed, contributing absolutely nothing of the work. But it does not follow that all people are equal in this regard. On the contrary, some people can obviously use a much larger than average percentage of their muscular fibers during a maximum effort. Such people are much stronger than average, for no apparent reason... such people have superior neurological ability.

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TWO... it has been generally assumed that neurological ability was determined entirely by genetics; and if so, then obviously it cannot be improved... like bodily proportions, you are stuck with what you are born with, good or bad. But... until very recently, it has been impossible to measure neurological ability; so, we really have had no means of determining whether it could be improved or not. At this time (April, 1977), I still have no opinion on this matter. In plain English, I simply don't know whether neurological ability can be improved or not; but I do know that we now have a means of finding out for sure... because, finally, we do have a method for measuring neurological ability.

THREE... proving the very existence of variations in neurological ability was, until recently, a hit or miss proposition at best because we couldn't measure it. Yet such variations were obvious even if they couldn't be measured.

When all of the other factors were carefully considered, some people were far stronger than average, for no apparent reason... and when the same factors were considered in other cases, some people were much weaker than average. And when a stronger than average man was compared to a weaker than average man, it was immediately obvious that some unknown factor was responsible for the great difference in strength... the only possible solution to this undeniable situation was that the stronger man was using a higher percentage of his muscle fibers; he was neurologically superior to the weaker man. His muscles were in no way better, his bodily proportions were in no way better, and since a true test of raw strength does not involve skill, it was also obvious that his skill was no responsible for the difference; so, the only difference rested on the fact that he was simply able to use a greater number of muscle fibers simultaneously.

That much, at least, I was aware of as long as twenty years ago... but, until recently, it was knowledge of little or no practical value; since we had no reasonably accurate method of measuring neurological ability, we couldn't do much in a practical sense with the information that we did have... but now we can; now we can measure it, and now we can put this information to use in a very important and practical manner. Like most things, the answer when I finally hit upon it, was utterly simple; so obvious that I literally felt like a fool for not realizing it years earlier... "Neurological ability is in inverse proportion to your anaerobic muscular endurance." This statement, at first glance, is a bit of a tongue twister... as well as being somewhat difficult to grasp immediately. But the following explanation will, I believe, make it very easy to understand... and will, secondly, make it obvious that this information can indeed be used in a very practical manner in all sports.

As mentioned earlier, it is utterly impossible to contract all of the fibers of any given muscle simultaneously... the result being that you are using only a small part of any muscle even when you are working as hard as possible.

Thus it is obvious that a very large part of a muscle, literally most of the muscle, is resting even when you are working as hard as possible. This might lead us to assume that this unworking part of the muscle is of no value... when, in fact, this unworking portion of the muscle is absolutely essential; because, without it, our muscular endurance would be almost zero.

If we could (which we cannot) contract all of the fibers in a muscle simultaneously, then we would certainly be strong... would be almost unbelievably strong; but we would have almost nothing in the way of muscular endurance because, if all of our fibers were working at the same time, then they would become exhausted at the same time, and all would be required to rest at the same time. So we would be very strong indeed... for one brief effort, after which effort we would be literally helpless, unable to move. On the other hand, if we could use only one percent of a muscle even during a maximum effort, then our strength would be very low... but our muscular endurance would be almost infinite.

In my own case, I have known for more than thirty years that my strength and muscular endurance maintain a certain relationship... when my strength increases, then my muscular endurance also increases in exact proportion. Thus, when I can bench press 300 pounds once, I know that I can perform exactly ten repetitions with 250 pounds, and vice versa. When I can curl a 100 pound barbell ten times, then I know that I can curl a 120 pound barbell once, and vice versa. This ratio, for me, has remained absolutely constant for at least thirty years that I am aware of... I can perform one repetition with 20 percent more than I can use for ten repetitions. So, if I know my strength level, then I also know my level of muscular endurance... and, if I know my level of muscular endurance, then I know my strength level.

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This particular ratio of strength to muscular endurance is very common, but it certainly does not apply to everybody. I have seen many exceptions in both directions; but, until recently, I failed to appreciate the significance of these exceptions. If, for example, three apparently identical triplets were tested, and if all three of them could bench press exactly 300 pounds during a maximum effort... but if, during an endurance test with 250 pounds, one man performed ten repetitions, while a second man failed after only four repetitions, and the third was able to perform fifteen repetitions... then who is the better athlete, at least insofar as neurological ability is concerned? And why is he better?

Surprising as it may seem at first glance, the best man is the one who was able to perform the least number of repetitions. The man who failed after only four repetitions with 250 pounds has greater neurological ability than the man who did ten repetitions, and far greater ability than the man who performed fifteen repetitions.

The above example, for several reasons, is really not a valid test. To begin with, the bench press with a barbell involved far too much skill to be a valid test of pure strength... secondly, such a result would be impossible if the triplets really were identical, because the neurological superior man would be far stronger than the other two men if he had identical bodily proportions and muscular size.

So that example, while not perfectly valid, should be understood to be just what it is, an example intended to help make a point. If the triplets really were identical in every way except neurological ability, then the results would be somewhat as follows... the first man would bench press 400 pounds once, and then would perform ten repetitions with 250 pounds... the second man would bench press 450 pounds once, but would get only four repetitions with 375 pounds... while the third man would bench press only 200 pounds once, but would be able to get fifteen repetitions with 165 pounds.

In all three cases the men would be given approximately 83 percent of their best maximum lift. The man who got the least number of repetitions would be the better man, neurologically.

Why? Because, since he was using a higher than normal percentage of his total number of available muscle fibers, it obviously follows that his anaerobic muscular endurance would be lower. When the above information is fully digested, it then becomes possible to utilize this knowledge in a very valuable testing procedure with your athletes.