

Nautilus
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Articles

Responses to Exercise

If you are interested in exercise for any purpose, study the two charts on the following page... and read the following very carefully. You need this information, and there is only one source.

Some people respond to exercise in a very distinctive manner, and some people respond in a totally different way. During the 1980s, we have discovered a total of four new physiological factors... factors of enormous importance. Factors of such importance that they must be understood and applied in a manner by anybody involved in exercise for any purpose.

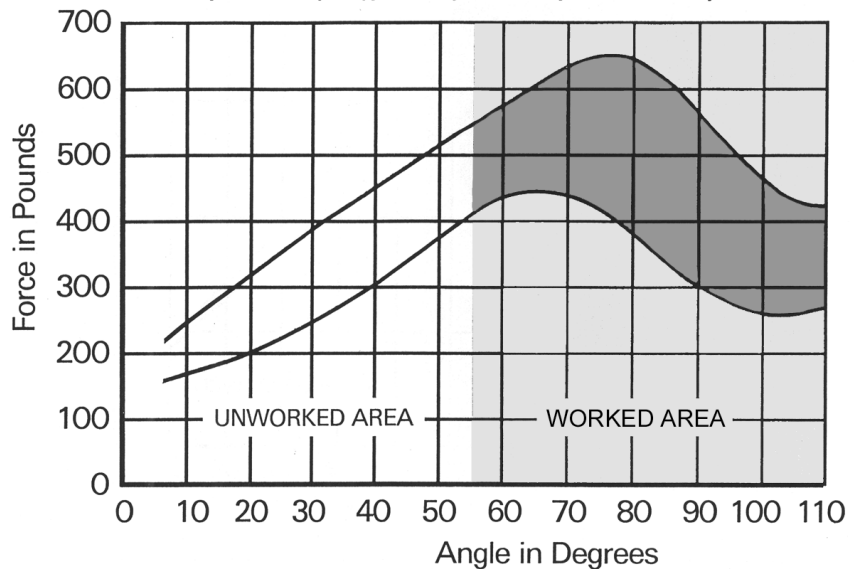
The two charts shown to the right provide clear examples of one of these four newly discovered factors... chart A shows the results produced by a Type G subject over a period of 91 days... chart B shows a totally different response to exercise, the results produced by a Type S subject over a period of 131 days.

A Type G subject will produce results over a full range of movement... even from limited-range exercise. In contrast, a Type S subject will not. Since most forms of exercise are not full-range movements, it follows that Type S subjects will produce only limited-range results. While producing little or nothing in the way of benefits in the unworked range of movement.

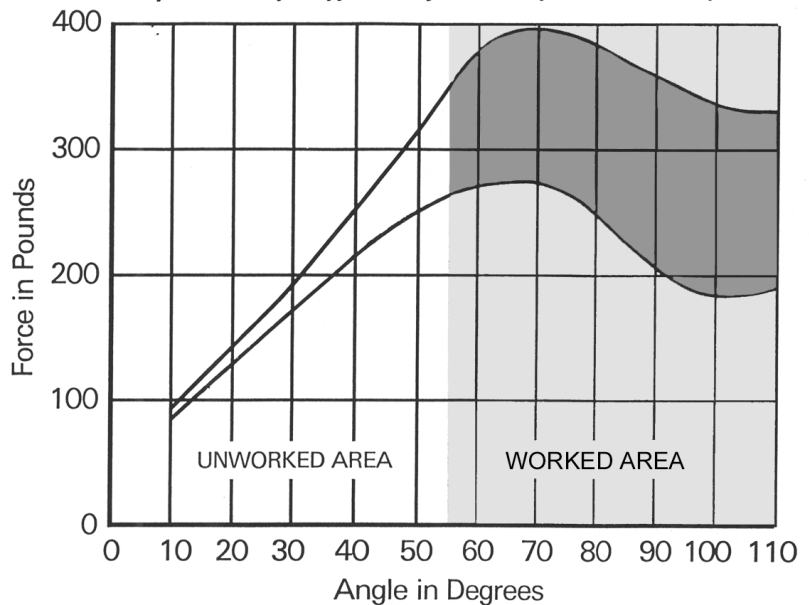
Both of these charts show the full-range strength increases produced by limited-range exercise. The Type G subject gained throughout the full range of movement... the Type S subject did not.

Type G for "general"... Type S for "specific"... Type G subjects respond to exercise in a general manner, showing meaningful, although not proportionate, increases in strength even in areas where no exercise is performed... Type S subjects respond differently, in a specific manner, showing results only in the worked area, and little or nothing in the way of results in the unworked area.

Results produced by a Type G subject over a period of 91 days.



Results produced by a Type S subject over a period of 131 days.



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These two subjects were exercised in a limited-range manner, performing only the first part of the movement. The exercise machine was blocked in such a manner that the last part of the movement could not be performed. But do not assume that we are in favor of such limited-range exercise... quite the contrary; the exercises were performed in this manner only for research purposes, in order to demonstrate just exactly what does happen in response to limited-range exercise.

The benefits of full-range exercise have been clearly established for many years... full-range exercise produces full-range results. But in this case we were interested in determining the results of limited-range exercise. And, just as we expected, we found that limited-range exercise produces only limited-range results... at least in the case of Type S subjects.

But, much to our surprise, we also discovered that some people respond in a totally different manner... Type G subjects do produce results throughout a full range of possible movement, even from limited-range work... increases in strength in the worked area are far better than those in the unworked area, even with a Type G subject, but at least a very meaningful degree of results will be produced in the unworked area.

The exercise used in this research was the leg-extension movement, for the quadriceps muscles of the frontal thighs. Both of the subjects performed only the first part of the movement... working through a range of movement of approximately 55 degrees. The exercise was started with the legs bent approximately 110 degrees, and was stopped with the legs still bent approximately 55 degrees. Only the first half of the full movement was performed.

The right-hand side of the charts shows the worked area... the left-hand side of the charts shows the unworked area.

The lower curve in each chart displays an accurate strength curve of the subject, the subject's starting strength level... the upper curve in each chart displays the subject's strength curve after a period of several weeks. The vertical distance between these two curves is a graphic display of the results produced.

A careful study of these charts makes it obvious that these two subjects respond to exercise in entirely different manners. The Type G subject increased his strength an average of 62.17 percent in the worked area, and an average of 50.28 percent in the unworked area... a very significant difference, but nothing close to the response shown by the Type S subject.

In stark contrast, the Type S subject increased his strength an average of 60.48 percent in the worked area... but only 12.60 percent in the unworked area.

But there are other differences as well. For example, when we compared the peak strength to the strength in the weakest position, we find that the Type G subject changed his ratio very little... while the Type S subject changed his ratio dramatically.

At the start, the Type G had a ratio of 2.65 to 1... meaning that he was 265 percent as strong in his strongest position as he was in his weakest position. Thirteen weeks later, his ratio was changed only slightly, although his strength had increased by an average of more than 58 percent; his ending ratio was 2.74 to 1. A change of only 3.39 percent.

In contrast, at the start, the Type S subject had a ratio of 3.16 to 1, and at the end his ratio was 4.27 to 1. A change of 35.12 percent. His ratio changed more than 10 times as much as the other subject's did.

Also... note the fact that the position of peak strength changed by 11 degrees in the case of the Type G subject, moving from a position of 66 degrees to one of 77 degrees. While the position of peak strength remained unchanged with the Type S subject.

It is also interesting to note that the strength increases varied a great deal from one position to another, with both subjects... but not equally with both subjects.

For example, the Type S subject had a strength increase of 84.81 percent in one position, and only 6.89 percent in another position. While the Type G subject showed far less difference from one position to another, a maximum of 85.61 percent in one position and a minimum of 35.87 percent in another position.

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And, speaking of strength increases... just how do you determine the real change? The Type G subject, for example, increased his strength an average of 58.80 percent "overall"... but, if you look at his increase in the position where he showed a peak of starting strength, then his increase was only 35.87 percent... and if you look at his increase by comparing his starting peak to his ending peak, then he increased by 46.65 percent... and if you look at his increase by comparing his position of peak strength at the end to the same position at the start, then he increased by 59.51 percent.

So... just how much did his strength increase? His average overall of 58.80 percent? Or one of the three greatly different percentages produced by comparing his results at various peak points, 35.87 percent, 46.65 percent, and 59.51 percent?

The ability to lift a certain amount of weight tells you little or nothing about your strength... and, until we develop these new tools that provide the first meaningful method of measuring strength, it was simply impossible to determine just what was actually happening to a muscle as a result of exercise. But now we can tell you exactly how much your strength has increased... and where it has increased.

If you are a Type G subject, then you can and probably will produce at least some results even from limited-range exercises; but you will produce better results from full-range exercises.

However, if you are a Type S subject, then you must perform full-range exercises in order to produce full-range results.

And, speaking of results... do not overlook the almost spectacular degree of results produced by both of these subjects.

The Type G subject performed a total of only twenty-three exercises in a period of thirteen weeks... his average strength increase for that period works out to an increase of more than 2.7 percent for each exercise session.

During each session he performed only one set of one exercise, the limited-range leg-extension exercise described earlier.

Within the first five weeks of his program, he performed a total of nine exercises... an average of only 1.8 exercises per week; yet, during that period he increased his strength an average of 35.97 percent. Which works out to an average strength increase of almost 4 percent per exercise.

And, since he performed a grand total of only seventy repetitions during those five weeks and nine exercises, he increased his strength an average of more than five-tenths of one percent per repetition; the actual number being 0.51 of one percent.

The Type S subject didn't do so badly either, at least in the worked area... he increased his strength in the worked area by an average of 60.48 percent, from only seventeen exercises performed over a period of more than eighteen weeks. An average of less than one exercise per week, while increasing his strength an average of 3.55 percent per exercise.

For the information of the curious... the Type S subject involved in this comparison was an untrained subject with no previous exercise experience. But the Type G subject had been training steadily for more than fifteen years and was already very strong at the start. Now, at the end, he is the single strongest subject that we have ever measured in this movement... and he is still going, and still getting stronger. Producing 654 pounds of force with your quadriceps is not an average performance, believe me.

I am sure that there are some stronger ones out there, but we have not encountered them yet... and this subject is not finished yet either.

The Type S subject, on the other hand, may already have topped-out, may have reached his potential strength level.

After the strength increases outlined earlier, produced over a period of eighteen weeks and five days, we increased his exercise schedule to twice a week.. in an attempt to determine if more exercise would help. But, quite the contrary, it may have hurt... and it certainly did not help.

During the next four weeks he exercised twice each week, for a total of eight exercises... and his progress ceased. Overall, there was no meaningful change... slight losses in some areas and slight gains in other areas. Average changes almost zero.