

Nautilus Bulletin #1

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Inducing Growth Stimulation

Maximum degrees of growth stimulation can be – and should be – induced by "the minimum-possible amount of exercise"; the minimum amount required to produce certain effects – and once these effects have been produced, then additional amounts of exercise will actually reduce the production of increases in strength and/or muscular size.

At the start of a barbell curl, for example, the arms are in a straight position and the bending muscles of the arms are in extended positions – in that position, the strength of the muscles involved in performing a curl is extremely low; the individual muscle fibers are extended and the muscles as a whole are also extended. Secondly, in that position, it is IMPOSSIBLE to involve more than a very low percentile of the total number of available muscle fibers in the work of starting the curl.

Muscle fibers perform work by contracting, by reducing their length – and in order to contract, they must move; and while it is perfectly true that a certain amount of "slack" exists in muscular structures, and in their attachments, it is nevertheless also true that no significant amount of power can be produced by a muscle without movement. Thus, in effect, as a muscle fiber performs work it contracts (reduces its length), and in so doing it exerts a pulling force – and movement of the related body-part is produced; without such movement of the related body-part, then no significant amount of power can be produced.

If all of the fibers in a particular muscle were contracted at the same time, then obviously the muscle as a whole would be reduced to its shortest possible length; but this cannot happen unless the related body-part is moved into its position of full contraction as well. If a muscle did contract fully, and if the related body part did not move into its position of full contraction, then the muscle would be torn loose from its attachments; NOTHING ELSE IS EVEN POSSIBLE.

Thus, as should also be obvious, it is impossible to involve all of the fibers of the bending muscles of the arms in the performance of curls in any position except a position of full body-part contraction – which, in the case of the curl, means that the arms must be fully bent, fully supinated, and slightly raised.

With a barbell, it is impossible to perform a curl in such a manner that all of the muscular fibers of the bending muscles will be involved in the exercise; but if all of the related factors are clearly understood, and if exercises are performed in a proper manner (which they seldom are, even by very experienced trainees), then you can at least involve a far higher percentage of the total number of available fibers than you otherwise would.

At the start of the first repetition of a set of ten repetitions of the barbell curl, your muscles are fresh and strong – but in that starting position, you can involve only a very few of the actual number of fibers, simply because most of the fibers cannot perform work in that position; and, secondly, "only the actual number of fibers that are required will be involved in any case" – because, individual muscle fibers perform on an all-or-nothing basis.

You COULD increase the percentile of fibers that are involved, by performing the movement as fast as possible; but this is neither necessary nor desirable – because fast movements performed at a time when the muscles are fresh are extremely dangerous, there is great danger of tearing the muscle attachments loose. And secondly, with fast movement, there is always a tendency to "swing" the weight by overall bodily motion rather than moving it by purely muscular action on the part of the muscles that you are attempting to exercise.

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So the first repetition should be performed as rapidly as possible in perfect form; and if any doubt regarding form exists, then the first repetition should be done at a pace somewhat slower than that which would be possible under the circumstances.

But in any case, regardless of how you perform the first repetition, you will involve only a very small percentage of the total number of muscle fibers available; this is true for several reasons – at the start of the first repetition, it is impossible to involve more than a relatively very few of the total number of fibers, because most of the fibers cannot work in that position – secondly, since all of the fibers are fresh and strong, only a few will be required to move the weight, the number actually needed will be involved, and not one more – and thirdly, at the point in the exercise where it is possible to involve a high percentage of the total number of available fibers, there is no resistance available, and without resistance no exercise is possible.

If you are using a weight with which you can perform ten repetitions of the barbell curl, then a properly performed first repetition may involve only four or five percent of the total number of available fibers – the other ninety-odd percent of available fibers are in no way involved in the exercise.

During an immediately following second repetition, the situation is a bit better; by that point, the previously worked fibers are no longer as fresh and strong as they were during the first repetition, their momentarily-existing strength level has been reduced, and they will not again be capable of raising the weight without the assistance of other fibers – and such assistance will be provided, but only to the degree that is actually required.

Thus, repetition by repetition the percentage of involved fibers becomes greater; until, finally, by the tenth repetition, you may be using as many as fifteen percent of the total number of available fibers – at which point, the exercise will seem quite hard, and at which point most trainees will call a halt to their efforts.

But at that point in the exercise, very little – or actually nothing – in the way of muscle growth stimulation has been induced; the muscles are already capable of performing at the level being demanded – as was clearly demonstrated by the fact that you could perform ten repetitions, and did – and thus the muscles are not being forced to work inside their momentarily-existing levels of reserve strength. In effect, the muscles can perform the work being demanded of them – and they can do so without exhausting their reserve; therefore there is no need for them to grow – and under such circumstances, they won't grow, or will do so only very slowly at best.

But if – instead of stopping at the tenth repetition – if you had continued with the exercise, forcing the muscles to work much harder than normal, requiring them to work well inside their reserves of strength, then muscle-growth stimulation would have resulted.

How many more repetitions should be done?

As many as possible, regardless of the actual number this may prove to be; the set should be terminated only when it is impossible to move the weight in any position, when the bar literally drops out of your exhausted hands.

Even then – with a barbell – you still won't be involving ALL of the available fibers; but you will, at least, be involving as high a percentage as it is possible to do with conventional forms of exercise – and you will be inducing as much in the way of muscle-growth stimulation as it is possible to do with a barbell, or any other type of conventional training equipment.

And if you are training in that manner, then only two such sets are required – three times weekly – in most cases, and never more than three such sets in any case; doing a larger number of lighter sets WILL NOT produce the same degree of results – and doing a larger number of properly-performed sets would exhaust your recovery ability so much that losses would be produced instead of gains.

Watching a man working out properly is almost frightening – and it is frightening to some people; the intensity of effort is so great that the subject's entire body is shaking, his face will turn dark red – or even purple – and both breathing and heart action will be increased at least one-hundred percent, and frequently far more than that.

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Most people are simply not aware that such effort is even possible, and many that are aware of the possibility are totally unwilling to exert such effort; but, for maximum growth stimulation, that is exactly what is required. Left to their own devices, most trainees will make very little progress – because they probably won't work hard enough to induce much in the way of growth stimulation; so, for best results, workouts must be carefully supervised – and it is highly desirable to give a demonstration of the proper intensity of work, in order that new trainees can be made aware of the very possibility of such levels of effort.

Psychological considerations are extremely important as well; if at all possible, the trainee should be able to see the weight that is being moved – and if this movement produces a reasonable level of sound, so much the better. Likewise, the trainee should be fully aware of the actual amount of resistance being moved – and it is important that the poundage figures be as high as reasonably possible.

In designing some of the new exercise machines, it would have been easily possible to vary the leverage to such a degree that ten pounds of actual weight would have taxed the strength of a very strong man; but instead we have employed an almost exact one-to-one leverage ratio, in order that the weight being moved will almost be exactly the same weight that would have been used in similar barbell exercise – thus the trainee feels that he is doing something worthwhile, and his progress will be in meaningful jumps.

Such considerations far outweigh the small advantage that would have resulted by employing different leverage – such as the lowered requirement for barbell plates or other form of resistance. Under different leverage conditions, ten pounds may "feel" as heavy as two-hundred pounds – and it will – but the trainee will show much more willingness to work at the necessary level of intensity if he is forced to move two-hundred pounds instead of ten pounds.