The Future of Exercise
(1997 and Beyond)

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The Basic Considerations for Proper Rehabilitative Exercise

Altogether, there are only nine points that need to be understood in order to provide the knowledge required for performing safe, proper, productive exercise for purposes of the rehabilitation of weakened muscles.

ONE. Things to avoid . . . do no harm

Never perform so-called explosive movements. Sudden movement in any form of exercise greatly increases the chances of injury. Fast exercise does not build fast muscles, but it may create crippled subjects. As an exercise it is worthless, and it is extremely dangerous.

If in doubt about proper speed of movement, then move slower; it is probably impossible to move too slow during exercise, but easily possible to move too fast . . . remember, you are merely trying to cause the muscle to produce a known level of force while moving through a full range of movement, in order to induce a certain degree of muscular fatigue.

Producing maximum possible levels of muscular force for strength testing purposes is necessary, but must be done in a carefully controlled manner and with a slow rate of initial muscular contraction, never suddenly . . . but during exercise, you should never produce a maximum level of force with a fresh muscle.

If you are capable of exerting 100 pounds of force with a fresh muscle, and if you perform an exercise with 70 pounds of resistance, then you will never be exposed to a force that is much in excess of 70 pounds, if you do the exercise properly . . . by the time you have performed eight or ten repetitions, after the muscle starts to lose strength from fatigue, then that 70 pounds may feel like a ton. But that is merely an impression; the weight has certainly not increased, your strength has just been reduced to the point that you are barely capable of producing 70 pounds of force, and since the resistance is also 70 pounds, this means that you will then be working as hard as momentarily possible . . . but it also means that you are not being exposed to a high level of force.

You will never hurt a muscle, or any part related to a muscle, by working the muscle hard . . . provided that you do not work it hard until you have reduced the momentary level of strength of the muscle by performing several repetitions that were not hard, that were quite easy at first, were easy when your muscle was fresh and strong.

Hard is a relative term . . . 100 pounds is impossibly hard if your strength is only 90, or even 99; but it easy if your strength is 200, fairly easy if your strength is even 120.

For meaningful results from exercise performed for the purpose of increasing muscular strength, you must work the muscles at least fairly hard . . . but reduce the starting strength level of the muscle by what will seem like fairly easy movements before you start to work it hard. If you can perform ten repetitions with a given level of resistance, then the first two or three repetitions will feel fairly easy, the next three or four will feel somewhat harder, and only the last two or three will fell hard.

But the actual load on the body will be the same during each repetitions; if you were going to hurt yourself, you were far more likely to do so during the first repetition . . . the structural integrity of a muscle is not reduced by fatigue, only its ability to produce force is reduced by fatigue.

What does happen is that people start changing the style of the exercise as it starts to feel hard, they quit moving slowly and start jerking in an attempt to lift a weight that can no longer be moved by the remaining strength of their fatigued muscles . . . such jerking produces high levels of force that can cause an injury.

Properly performed, the speed of movement should be slow during the first few repetitions of an exercise, and should be even slower during the last few repetitions; when you are moving so slow that you finally come to a halt, then stop the exercise, you have done all that is required, and all that is safe.

TWO. Anaerobic versus aerobic exercise

The title of this section is not intended to imply any contest between anaerobic exercise, which is generally performed in an effort to increase muscular strength, and aerobic exercise, which is performed for a different purpose, for the purpose of improving cardiovascular condition. There should be no such contest, they are intended for the production of different types of results.

But it is essential that you have a clear understanding of some of the differences, particularly the different styles of performance that are involved.

Anaerobic exercise, performed for the purpose of increasing muscular strength, requires a level of resistance that is at least high enough to prevent you from continuing with the exercise beyond some reasonable number of repetitions. Which simply means that you are inducing fatigue in the muscle faster than the muscle can compensate, so that eventually your momentarily-existing level of remaining strength, having been reduced from its starting level by fatigue, will no longer be enough to permit you to continue against that level of resistance.

If, for example, your starting level of strength is 100 pounds, and if you select 80 pounds of resistance, then you will be forced to stop the exercise when fatigue reduces your remaining strength to any point below 80 pounds. That is anaerobic exercise.

But if, instead, you select 5 pounds of resistance, then you might be able to continue the exercise for literally hundreds of repetitions; that would be aerobic exercise.

Sprinting is anaerobic, jogging is aerobic. Sprinting will build strength, jogging will improve cardiovascular ability.

Exercise performed for the purpose of increasing the strength of the lumbar muscles must be anaerobic in nature . . . which does not mean that it must be dangerous, nor does it mean that it should involve a fast speed of movement. Quite the contrary, it must not, must never, be performed with a fast speed of movement; moving fast will greatly reduce the value of the exercise, while enormously increasing the danger.

THREE. The proper intensity of exercise

Intensity is a relative term, and a term that is frequently misunderstood, particularly in the field of exercise.

Intensity, as it is related to exercise, simply means the percentage of your momentary ability . . . and the highest possible level of intensity is provided only when a muscle is working as hard as momentarily possible; which might, at first glance, appear to be dangerous . . . and it can be dangerous to work a fresh muscle in that manner.

But a high level of intensity is not at all dangerous when it is applied properly in exercise . . . you can work as hard as momentarily possible, while working in a very safe manner.

When a submaximal level of resistance is involved, which should always be the case, then the first repetition, performed with a fresh, strong muscle is not an intense effort . . . quite the contrary, the first repetition should actually feel quite easy, and it will be easy, and it will be safe because the muscle is producing far less force that it is capable of producing, and thus is being exposed to a far lower level of force than the level that would be required to move against a maximum level of resistance.

Yes, some people might say, but you haven't warmed-up the muscle, and you may hurt yourself.

You don't need to warm-up the muscle, because you are not asking that muscle to work hard; the first repetition will actually be a relatively light effort as far as the muscle is concerned, requiring far less force than the muscle is easily capable of producing . . . thus, in effect, the first few repetitions provide any required degree of warm-up.

But as you continue with the exercise then the later repetitions will start to feel harder . . . not because the muscle is producing more force, it isn't, it is continuing to produce the same level of force in each repetition if the exercise is performed properly and with the same speed of movement.

Then, as you near the end of the exercise, as the momentary level of strength of the muscles continues to drop as a result of fatigue, the last few repetitions will feel quite hard . . . because, by that point, your remaining strength is so low that almost all of it is required to move the resistance.

If you continue to a point where you fail, where you are literally not strong enough to perform another repetition in good form, then only one repetition in the entire exercise actually involved high intensity . . . the last repetition; only during that last repetition were you using all of your strength . . . and by that point in the exercise your remaining strength was quite low compared to your starting level of strength.

FOUR. The proper amount of exercise

There is probably more disagreement and confusion over this point than any other factor in exercise.

If it is properly performed, then very little exercise is required in order to produce the fastest possible rate of increase in muscular strength, and in order to produce the highest possible level of strength. In exercise at least, more is certainly not better, and is usually worse; the most common mistake in exercise is almost certainly the widespread belief that if a little is good then more is better. Which is quite the opposite of the truth.

The need for exercise certainly varies on an individual basis, not only on an individual basis but on an individual muscle basis; meaning that some of your muscles may need quite a bit of exercise, while some of your muscles may require only a small amount of exercise, and perhaps cannot tolerate a large amount of exercise.

Tests for determination of fiber type in a particular muscle, as outlined in an earlier chapter, can help you to outline a proper exercise program for a particular muscle . . . meaning, you might have to use high repetition exercise, low repetition exercise, or medium repetition exercise for a particular muscle.

Such tests, together with tests of your recovery ability, will also tell you how often you should exercise a particular muscle; meaning, should you exercise that muscle three times a week, twice a week, or only once a week.

You must exercise hard enough to stimulate muscular growth, but you must not exercise so much or so often that your muscles remain in a continues state of overtraining, barely having time to recover from one exercise by the time you exercise again.

Carried beyond that point, when a muscle is exercised so much or so frequently that it does not have time to totally recover between exercise sessions, then losses in strength will be produced rather than gains . . . nothing else is even possible.

When in doubt about the amount of exercise that is required, the first thing to be tried is doing less . . . not more, less.

FIVE. The proper frequency of exercise

This factor is obviously related to the previous factor, since you can increase the amount of exercise by increasing the number of exercise sessions per week; but there is not a direct relationship in all ways.

Thus, you would probably be better off performing 100 units of exercise in a given week if you performed only two sessions that each involved 50 units of work . . . rather than five sessions that each involved only 20 units of work; the weekly amount of exercise would be the same in either case, but the results would almost certainly be better in the first case.

SIX. The proper speed of movement during exercise

It is easily possible to move too fast during exercise, but probably impossible to move too slowly; that says it all, everything that needs to be said.

SEVEN. Negative-only exercise

By now you should have at least some idea of just what is involved in the negative-only part of exercise; lifting is positive, lowering is negative. A contracting muscle is positive, a lengthening muscle is negative. Up is positive, down is negative. Pushing a barbell away from your chest in a bench-press is positive, lowering it back down to your chest is negative.

Negative-only exercise means a form of exercise where only the negative part of the work is performed . . . meaning, of course, that the positive part of the work is totally avoided.

And is such a form of exercise productive?

For the purpose of increasing strength, which is the primary purpose of most rehabilitative exercise, the negative part of exercise is probably the most important part of exercise . . . and when you remove the negative part of exercise, you have very little of value left.

In exercise performed for the purpose of rehabilitation, particularly with very weak subjects, sometimes negative-only exercise is the only available form of exercise for the simple reason that the subject is literally too weak to perform positive movement.

But even in such cases there are several points on the subject if negative work that you must clearly understand . . . the most important point being the fact that muscular friction helps you during negative work, the result being that it is thus possible to perform much more exercise than you realize, not only more than you need but more than you can tolerate.

Given the help of internal muscular friction it is possible to work even a healthy, strong muscle down to such a low point that the remaining level of positive strength is literally zero . . . even though your remaining level of negative strength is nearly as high as it was at the start; because when fatigue induced by such work has reduced your positive strength to zero, then your remaining level of negative strength will still be more than eighty percent of what it was at the start . . . which can fool you into believing that you should continue to exercise, even though you have already gone too far, have made demands upon your muscles that may require a week or more for them to recover from.

Exercise carried to that point is counterproductive, will cause losses in strength instead of gains.

With positive exercise instead of both positive and negative work as it occurs in most exercises, such a level of fatigue cannot be reached without your awareness; because, once your positive strength drops even slightly below the level of resistance, you are forced to stop the exercise.

Which does not mean, in any sense of the word, that negative exercise is bad; quite the contrary, it is very valuable, but it does mean that you need to understand exactly what is happening during negative-only exercise and that a very little of such exercise goes a long way.

EIGHT. The double-progressive system of exercise

This being the whole basis of exercise performed for the purpose of increasing muscular strength . . . but also being a point that is not generally understood.

Select a level of resistance that will permit you to perform, say, eight repetitions in good form . . . then perform as many repetitions as you can, in good form, in each following exercise session . . . then when you are able to perform twelve repetitions in good form, increase the resistance about five percent, with which increased resistance you probably can perform only nine or ten repetitions in good form . . . then, later, when you can perform twelve repetitions in good form with this increased level of resistance, increase the resistance by another five percent, and so on. Making a continuing effort to increase either the level of resistance or the number of repetitions, or both.

With one, two or at most three weekly exercise sessions performed in that manner, your strength should steadily increase.

NINE. The proper style of performance for safe, productive exercise

Which point has been mentioned several times already, but bears repetition; since form, or style of performance, is frequently the only difference between very good results from exercise and no results at all, or worse, since poor form in exercise is unavoidably dangerous.

Again . . . the purpose of exercise intended to increase strength is to fatigue a muscle throughout its full range of possible movement; to fatigue it to a certain level but not much if any beyond that level . . . because exercise that does not produce enough fatigue will not stimulate growth, and exercise that produces too much fatigue will not permit growth, or may even produce losses in both muscular size and strength.

Thus exercise must be maintained between certain limits, neither too much nor too little, neither too easy nor too hard, neither too seldom nor too frequent. But it does not matter how fast the speed of movement is during exercise, or, at least, not how slow it is . . . since you will fatigue the muscle in exactly the same way and to exactly the same extent in either case; but it certainly does matter how high the levels of force are that you impose on yourself during exercise, and fast movement in exercise increases these forces enormously. And, with a barbell, a weight machine using steel plates for resistance, or when using your body weight for resistance as you do when performing chins (pull-ups) or dips on parallel bars, or even push-ups on the floor, if you move fast enough the resistance will jerk your muscles violently at the start of the movement and then the resistance will literally float upwards throughout most of the range of movement as a result of kinetic energy, providing no resistance along the way and thus providing no exercise throughout most of the movement. Violent jerks at the start, and no resistance for the rest of the movement.

While lifting an actual weight, you can, and you should, apply the initial force from your muscles slowly and gradually, and when the level of force reaches a point even slightly above the level of resistance then movement will start; after which start of movement you should attempt to maintain a slow and steady speed until nearing the end of the movement . . . then slow gradually to a stop and maintain that position, supporting the resistance for a brief period; if you cannot stop and hold the resistance in that position then that is clear proof that you did not lift it in the first place, instead it coasted into that top position as a consequence of the kinetic energy that was produced by too fast a speed of movement.

The weight should pause at the top with no slightest bounce; if not, you were moving too fast.

After a very brief pause at the top, a second or less, just long enough to assure that you can pause and support the weight in that top position, then reduce your muscular force very slightly, only enough to let the weight start back down. When a downwards movement is occurring at a slow speed, then maintain a level of muscular force that is required to prevent an increase in the speed of the weight.

When you are back in the bottom position, increase the muscular force only enough to start the weight moving back up again; do not start the upwards movement with a jerk . . . and if you cannot start it without a jerk then the resistance is too heavy.

Continue in that fashion until you are unable to complete a full repetition without jerking . . . but do not try to continue by jerking.

Exercise performed in that fashion is the most productive form of exercise for increasing muscular strength, with the one exception being negative-only exercise, and it is also by far the safest style of exercise.