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Articles

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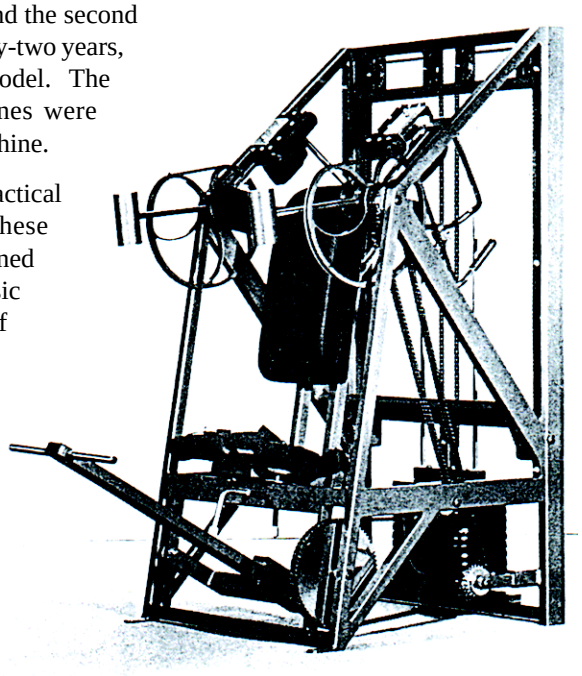
Exercise

The Present State of the Art

The Pullover Torso Machine was the first Nautilus machine, and the second and the third… its development extended over a period of twenty-two years, and the first machine delivered to a customer was the 27th model. The exclusive features now incorporated in all Nautilus machines were outgrowths of the long, slow development of the Pullover machine.



Certain basic features were required for the development of a practical airplane… lift, thrust, and three-axis control… and until these requirements were understood and provided, the airplane remained a dream. Today, all airplanes incorporate the same three basic features… as they must. The airplane is not the only means of transportation, but it certainly is the fastest.

A full-range exercise also has certain basic requirements… lacking any one of the required features, full-range exercise is simply impossible. Exercise can be provided in a number of ways… but full-range exercise can be provided in only one way. Nautilus and **MedX** machines are examples of providing the only source of full-range exercise, and the Pullover was the first Nautilus machine. Not the only source of exercise, but the only source of FULL-RANGE exercise, and certainly the fastest and most productive mode of exercise.

Early attempts to build an airplane failed because the builders did not understand the basic requirements of flight… today, many forms of exercise fail for much the same reason; because the designers of the equipment do not understand the basic requirements for productive exercise.

If an airplane fails to fly, its failure is immediately obvious… and the market for such an attempt at flight is zero, so our airports are not cluttered with thousands of unsuccessful airplanes, failures. And if the requirements for productive exercise are clearly understood, then it is just as easy to recognize an unsuccessful form of exercise… yet literally millions of worthless and near-worthless exercise devices are cluttering the homes and gyms in the USA alone. Because many people do not understand the basic requirements. Actually, there is only one requirement for increasing strength… "heavy resistance throughout a full range of possible movement."

Barbells provide the first practical source of heavy resistance for exercise… and the results of barbell exercises were (and are) far superior to any earlier form of exercise. But remember, HEAVY RESISTANCE alone is not enough… it must be provided throughout a FULL RANGE of possible movement.

And barbell exercises do not meet that requirement, for several reasons… 1) because barbells provide 'straight line' resistance while a rotary form of resistance is required… 2) because barbells provide an unchanging amount of resistance during the movement, while variable resistance is required… and 3) because barbells cannot provide resistance directly against the bodyparts that are moved by muscular contraction.

As a result of these failures, barbells provide exercise for only a small part of the involved muscles… full-range exercise is utterly impossible for a barbell.

In some barbell exercises, resistance is provided at the start of a movement… OR, at the finish of a movement… but never at both ends of the movement. And in most barbell exercises, there is no resistance at either end of the movement.

If you can "lock out" and hold the weight in the finishing position of an exercise, then it is obvious that no resistance is provided in that position. Such lock-outs occur in most barbell exercises… in squats, leg presses, bench presses, standing presses, curls and many other exercises.

A lock-out occurs because the effective resistance has been removed from the muscles and is supported by the bones… a straight-bone support. When such a position is reached, the muscles can relax without dropping the weight. And since no resistance is available, no exercise is provided for the muscles.

"Sticking points" are another sign of failure in an exercise… clear proof that the resistance is too heavy in some areas of movement, and too light in all other areas of movement. Such sticking points are encountered in almost all barbell exercises.

The result being that you are limited to an amount of resistance that you can handle at the sticking point… not enough resistance during the rest of the exercise. A small part of the muscle is worked heavily, but most of the muscle is exercised only lightly… and some of the muscle is not worked at all.

Thus a barbell provides proper exercise for only part of the muscular structure… and yet barbell exercises are certainly capable of increasing strength and muscular development eventually.

Several decades ago we asked ourselves just what would happen if the entire mass of a muscle was exposed to heavy resistance. But the answer was a long time coming… because the necessary equipment did not exist.

Redirecting the resistance by the use of pulleys was the first attempt in the direction of providing the proper mode of exercise… but this failed; primarily because the resistance was still "straight line" resistance. Although the direction of pull was changed, it still pulled in only one direction.

Such pulley and lever machines did offer some advantages by comparison to barbells, but the advantages were limited to improvements in safety, convenience and appearance. Insofar as results were concerned, the exercises provided by such machines were little if any better than barbell movements… and, in many cases, the results were worse.

Nevertheless, the use of pulleys, levers, and quick-change weight-stacks did lead to a far more widespread acceptance of heavy exercise. Conventional exercise machines were thus partially responsible for the growth of sports-connected strength training.

But the problem with such machines was, and remains, the fact that they were simply copies of barbell exercises… attempts to improve the safety and convenience of a barbell.

The entire approach to the situation was wrong… efforts were expended in the wrong direction… for many years, the people in the exercise equipment business continued to work within the limitations of the barbell.

INSTEAD… they should have been working within the limitations of human muscles. They should have tried to determine the requirements of muscles.

AND, in far too many cases… "the MEANS became the END."

Instead of lifting weights in order to become stronger, many people have tried to become stronger… IN ORDER TO LIFT MORE WEIGHT. Competitive weightlifting is a "means"… and an "end." The end result being an attempt to lift more weight than other men, in a contest… and the required means being the practice of exactly the same lifts that will be contested.

But most people who exercise with weights are not competitive weightlifters, are not concerned with just how much weight they can lift in a particular fashion… or, at least, SHOULD NOT be concerned. Instead, for most people, exercise should be the means of building strength for activities that are in no way related to lifting weights.

Lifting maximum weights, as in competitive weightlifting, certainly requires strength… but also requires skill. A skill that can be developed in no other way. Which skill must be developed by the practice of lifting maximum weights. Skill that is of no slightest value for any other purpose except weight lifting.

Apart from being a waste of time and effort, the development of a worthless skill is usually not bad in itself… but in this instance, it is. Because it is dangerous, exposes the trainee to great risk of injury FOR NO REASON.

Every single one of the actually worthwhile results that can be produced by exercise can be, and SHOULD BE, produced with little or no risk of injury… and the lifting of maximum weights is NOT THE WAY TO DO IT.

So the invention of the barbell was certainly a valuable contribution to the field of exercise… until its value was perverted. The barbell taught us a great deal… but should have taught us more.

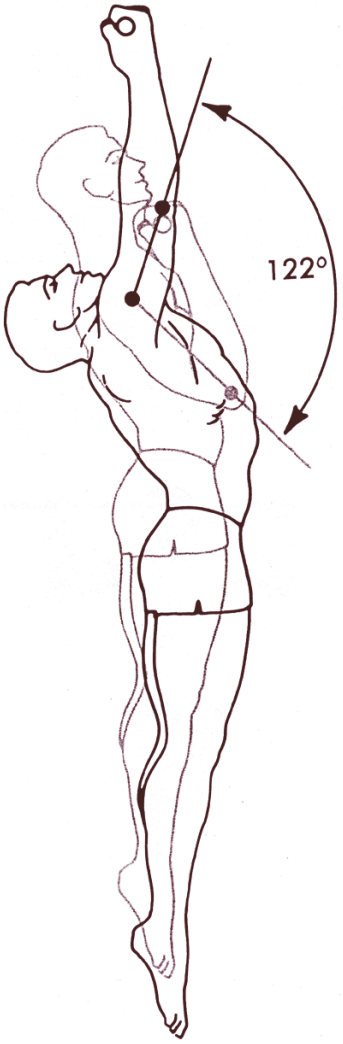
Used properly, the barbell is capable of safely producing very worthwhile results... the problem arises from the fact that very few people use a barbell properly. But even when it is used properly, a barbell has certain definite limitations. So if the value of the barbell is clearly understood, it then becomes possible to take the next step... an evolutionary step, a step up to a type of equipment that provides the actual value of a barbell without the limitations of a barbell.

And just what is the actual "value" of a barbell? It provides heavy resistance against the movement produced by muscular contraction. And what are the limitations of a barbell? Resistance is NOT provided against full-range movement. For several reasons.

When these reasons are understood, it then becomes possible to build a type of equipment WITHOUT LIMITATIONS... equipment that provides heavy resistance against the FULL-RANGE movement that is produced by full muscular contraction. The result being a form of exercise for the entire muscle, instead of merely part of a muscle. The Nautilus Pullover-torso Machine was the first successful tool designed to provide truly full-range exercise, total exercise (see photo on page 247).

"Function dictates design"... the use of round wheels is not an accident; round wheels are an absolute requirement for a smooth ride... and, until that requirement was clearly understood, practical transportation remained an impossible dream.

Full-range exercise requires a ROTARY form of resistance... resistance that rotates on a common axis with the body-part that is directly moved by the muscle being exercised. Full-range exercise also requires resistance with a range-of-movement that actually exceeds the possible range-of-movement of the involved joint... if this requirement is not provided, then the factors of 'stretching' for increased flexibility and 'pre-stretching' for inducing high-intensity muscular contraction are not provided.



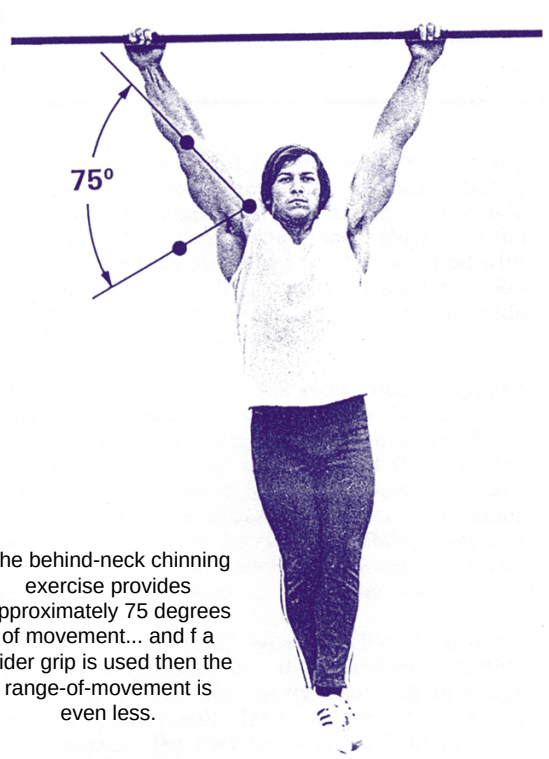
The range-of-movement in a chinning exercise is approximately 122 degrees... only half of a full-range movement.

And, since your available strength varies throughout the movement, full-range exercise requires a form of resistance that instantly and automatically varies in accord with your changing strength.

Finally, the resistance must be DIRECTLY applied against the body-part that is actually moved by the muscle being exercised.

Chinning type exercises have been used for many years in an attempt to develop the large muscles of the torso... but such exercises have severe limitations, for several reasons.

ONE... the large muscles of the torso are attached to and directly move the upper arms. DIRECT application of resistance that requires a form of resistance opposed to the movement of the upper arms... in practice, the resistance must be applied against the elbows.



The behind-neck chinning exercise provides approximately 75 degrees of movement... and f a wider grip is used then the range-of-movement is even less.

In chinning type exercises, the resistance is applied against the hands... the result being that the muscles of the arms and hands become a limiting factor. A point of failure is reached in such exercises when the smaller, weaker muscles of the arms and hands become exhausted... a point of failure that is reached long before the much larger and stronger muscles of the torso have been worked properly. So the development of the torso muscles is constantly limited by the weaker muscles of the arms and hands.

Before the invention of a squat rack, the development of the legs was limited by the strength of the arms.. a man was forced to shoulder the barbell before squatting.

TWO... the range-of-motion in chinning type exercises is limited to the mid-range of possible movement. Stretching is not provided in the starting position... and full muscular contraction is not provided in the finishing position. Remember... the torso muscles directly move the upper arms, so we are concerned only with the movement of the upper arms themselves; what happens to the hands and forearms is of no slightest concern, so long as the hands and forearms do not limit the movement of the upper arms.

In chinning type exercises with a normal grip, the upper arms move through an arc of approximately 122 degrees. In 'behind-the-neck' chinning, the range-of-movement of the upper arms is even less, approximately 75 degrees. And... if a wide grip is used in behind-the-neck chinning, the range-of-movement may be as little as 60 degrees. But... regardless of the style of chinning practiced, the movement is NOT a full-range movement.

Full-range exercise for these muscles (or for any muscle) requires movement against heavy resistance throughout a full range of possible movement... the movement must start with the muscles in a fully stretched position and end with the muscles in a fully contracted position. Requirements that are utterly impossible to provide in chinning type exercises.

However... when the resistance is applied directly against the upper arms (against the elbows), there is then no limitation in range-of-movement. At one time, a member of the Nautilus staff demonstrated a range-of-movement of 270 degrees. Truly full-range exercise for the muscles of the torso... a degree of flexibility that is a direct product of such full-range exercise, impossible to produce in any other way.

THREE... chinning type exercises do provide variable resistance, but it is random variation produced by the constantly changing leverage factors that result from movement. As a consequence, the resistance is too light in some areas of movement and too heavy in other areas... 'sticking points' are encountered where the resistance is too heavy, and you are thus forced to limit the resistance to an amount that you can handle at the sticking point.

Which is clear proof that the resistance is too light in every other position... the muscles are being worked properly at the sticking point, but do not have enough resistance at any other point throughout the movement. The actual range-of-movement may thus be 122 degrees... but the effective range of exercise may be as little as 10 or 15 degrees movement.

When the above limiting factors that are encountered in chinning type exercises are clearly understood, then the solution is obvious... (1) the resistance must be DIRECTLY applied to the upper arms (the elbows)... (2) the resistance must rotate on a common axis with the shoulder joints... (3) the resistance must instantly and automatically vary in accord with your available strength in different positions throughout the movement.

Both the Nautilus and **MedX** Pullover-torso Machines provide the above requirements, in the only possible manner... "function dictates design," and the functions of the torso muscles dictated design of the Pullover-torso Machine.

The development of the Pullover-torso Machine was not a sudden "breakthrough"... instead, it was a slow, step-by-step process of evolutionary development. Solving one problem made us aware of other problems... the solution which presented us with even more problems; until, finally, all of the requirements were provided... which happened, COULD ONLY HAPPEN, when all of the problems were understood and solved.

Serious attempts in the direction of solving the problems involved in providing full-range exercise for the muscles of the torso were first undertaken in 1948... and the first truly practical Pullover-torso Machine was built in 1967, nineteen years later.

In the meantime, other people were working on similar problems... from another angle; which work led to the development of conventional type exercise machines. Resistance was provided in the form of self-contained, quick-change, pin-selector type weight stacks. It was no longer necessary to add or remove barbell plates; instead, the required amount of resistance could be provided by moving a pin from one hole to another... so the speed of use, and thus the convenience, was greatly increased.

Resistance was "redirected" from the vertical, "up and down" direction provided by a barbell... the use of pulleys making it possible to perform exercises that were difficult or impossible to perform with a barbell.

The resistance was "guided" by the use of guide-rods... removing the requirements for balance that is involved in almost all barbell exercises.

Which features, in general, were improvements... but they were primarily improvements in convenience and safety; little or nothing was done in the way of improving the results of such exercise... an equal degree of results could still be produced by a barbell. And, in some cases, a barbell could produce better results.

BECAUSE... such exercises still had all the same problems encountered in barbell exercises. The resistance was still "indirectly" applied to secondary body-parts, instead of being directly applied to the prime body-part... the resistance was still "straight line" in nature, instead of rotating on a common axis with the involved joints... the resistance is still varied in a random manner as a result of changing leverage, instead of variation in proportion to available strength... sticking points are still encountered... areas of little or no resistance were still involved. In short... FULL-RANGE EXERCISE WAS NOT PROVIDED.

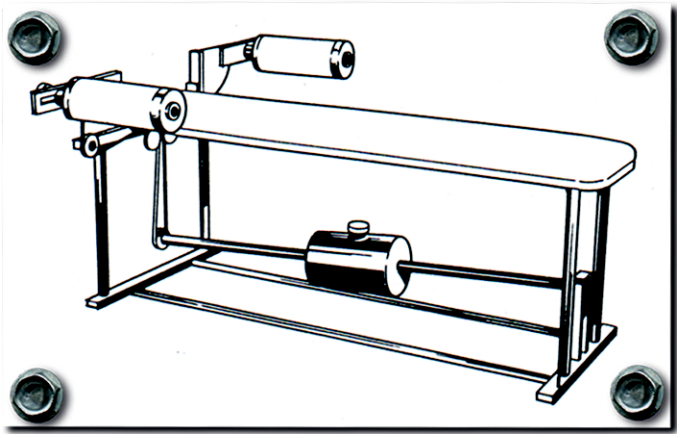
A few hesitant attempts at providing a rotary form of resistance were attempted... the leg-extension machine being one example, and the leg-curl machine being another. But even a casual examination of these machines make it immediately obvious that the designers simply did not understand the requirments. A conventional leg-extension machine is a perfect example of this lack of understanding.

In general appearance, at first glance... the conventional leg-extension machine seems to provide a rotary form of exercise; but look closer, appearances can be misleading... and in this case, they are.

The resistance is "directly" applied to the prime body-part, the lower legs, as it should be... so far, so good, a start in the right direction. The axis of rotation of the machine is situated in line with the axis of the knee, as it should be... another step n the right direction. BUT... at that point the designer went astray.

Two sources of resistance are provided in a conventional leg-extension machine; the primary source of resistance is a built-in stack of weights... and this resistance is directed against the moment-arm of the machine by a series of pulleys. Directed in such a way that the "direction of pull" is approximately horizontal, parallel to the floor. The result being that DIRECT resistance is provided only at the start of the movement.

AND... as the direction of movement changes, as it must, the resulting change in the direction of pull of the resistance causes the amount of the resistance to rapidly drop off. In effect, the resistance is heavy at the start of the movement.. and then gets lighter at the end of the movement.



HOWEVER... a secondary source of resistance is provided in the form of a horn on the front of the moment-arm; a pin put there for the purpose of holding additional resistance in the form of barbell plates.

And the geometry of this resistance source is exactly backward to the primary resistance source. Barbell plates added to the pin provide literally ZERO resistance at the starting position... and provide direct resistance only in the finishing position.

So the evolutionary development of this machine is obvious; the machine was the first built with only one resistance source, the weight stack... but, when it was seen that the weight stack did not provide enough resistance for this exercise, it was then decided to add more resistance in the form of barbell plates.

And it is just as obvious that the designers of the machine remained unaware of the fact that one source of resistance was providing INCREASING resistance while the other source was providing DECREASING resistance.

Rotary MOVEMENT is not enough... you must also have a rotary form of resistance against that movement. The conventional leg-extension machine provides rotary movement of the lower legs, and it directly applies the resistance against the lower legs... but it does not provide a rotary form of resistance.

A man named Bob Clark built a curling machine that did provide a rotary form of resistance, so it went a step more in the right direction... but again it failed, because it was based on a round pulley; the resistance was direct and constant throughout the movement... all well and good, but it did not vary in proportion to your changing strength in various positions. The resistance was thus far too heavy at the start of the movement and too light at every other point in the movement.

The so-called “butterfly” machine (above) was another attempt at the direction of providing rotary form, full-range exercise... but it failed also, for the same reason that Clark’s curling machine failed, and for another reason.

It also failed because the location of the arm pads literally prevented a full-range movment. The pads prevented the user from reaching a position of full muscular contraction.

So we were certainly not the only people who were aware of the shortcomings of barbell exercises, and a long list of exercise machines and devices have been built by a number of people... but if the results of the developmental work on the part of other people is any clue to their knowledge, then it is obvious that their thinking is still being limited by the same problems encountered in barbell exercises.

But a clear understanding of the requirements for truly full-range exercise did not come to us in a moment of flashing insight either... instead, it was a long, slow process.

The Pullover-torso Machine was the first result of our knowledge of the actual requirements for full-range exercise… and, once those requirements were understood, and the related problems were solved, it then became possible to apply the same principles to the development of almost any muscular structure.

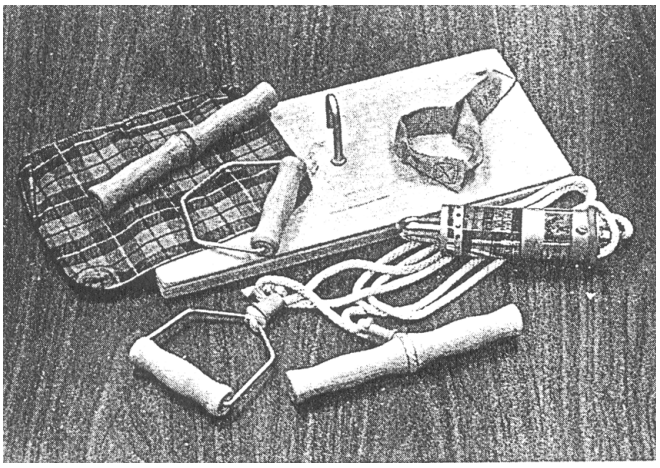
The mechanical problems were somewhat different in each individual case, but the basic principles remained the same… all muscles function in the same manner, producing movement of a related body-part by contraction, so the requirements for muscular development are the same regardless of which muscle is involved.

THEN… along came “Isokinetics.” The claims made on behalf of isokinetic exercises were many and varied… (1) it provides full-range exercise… (2) it provides a higher intensity of muscular contraction… (3) it provides a very safe

form of exercise. None of the above three claims are true, for obvious reasons.

Full-range exercise is utterly impossible without the "back pressure" of a force pulling against your muscles prior to the start of movement. Full-range exercise is also impossible without resistance in the fully-contracted position at the end of an exercise movement. Isokinetic exercises do not have "back pressure"… and thus stretching at the joints and pre-stretching of the involved muscles is not provided by such a form of exercise.

Secondly, without back pressure there is no resistance in the position of full muscular contraction at the end of an exercise… again, isokinetic exercise fails to provide this requirement. SO, IN FACT… since there is no resistance at either end of a movement, isokinetic exercise obviously is not a full-range form of exercise.



A highly-advertised, friction-based Isokinetic exercise device

Next claim… that isokinetic exercise provides a higher level of intensity. Also invalid on the face of it, and for the same reason; because there is no back pressure at the start of a movement... back pressure that is required for pre-stretching the involved muscles. It is a well-established fact that pre-stretching of a muscle is required for a maximum muscular contraction. So again the claim is false.

Final claim… that isokinetic resistance provides the safest form of exercise. When, in fact, it is probably the most dangerous form of exercise. Dangerous for two reasons… (1) because it results in greatly elevated blood pressure… and (2) because the involved forces are far higher than either necessary or desirable. Or, at least, the forces will be higher if the user performs the exercises in the manner suggested by the makers of isokinetic devices.

So all of the first three claims are patently false, obviously untrue… but some of the other claims being made in regard to isokinetic exercises are true. For example, it is claimed that such exercises produce little or nothing in the way of muscular soreness… and this lack of resulting soreness is attributed to the fact that isokinetic exercises involve no eccentric contraction (negative work). Both of these claims are true… but they certainly are not advantages. The total lack of negative work is the very root of most of the problems encountered in isokinetic exercises.

It is negative work that provides stretching… negative work that provides pre-stretching… negative work that provides resistance in the position of full muscular contraction. Without the back pressure that produces negative work, full-range exercise is simply IMPOSSIBLE.

Obviously being clearly aware of this major shortcoming in their exercises, the makers of isokinetic devices engaged in a massive advertising program in an attempt to convince the public that the negative work was somehow "bad"… of no value, to be avoided, dangerous.

After reading such statements for a year or so, and being clearly aware the actual facts all the time… we decided to run some tests to determine the value of "negative only" exercise, as compared to normal exercise which provides both negative and positive work. When these tests were conducted, it was quickly obvious that negative work is actually the most important part of exercise… for the purpose of increasing muscular strength.

So, in fact, the makers of isokinetic exercises had removed the most important part of exercise… and then pointed to the result an as improvement. Which is NOT meant to imply that positive work has no value as part of exercise… it certainly does; but it is not as important as negative work for the purpose of increasing strength. AND, REMEMBER… full-range exercise is utterly IMPOSSIBLE without negative work. Not "difficult"… not "less productive"… utterly IMPOSSIBLE.

Negative work does result in muscular soreness when used by a previously untrained individual… but this is apparently the unavoidable price of worthwhile results; and in any case, the soreness will be gone in two or three days… and will not return so long as you continue training on a fairly regular basis.

An isokinetic form of resistance could easily be incorporated into Nautilus Machines… and doing so would reduce the weight, the complexity, and the cost of the machines, thus providing a much larger market. But this will never be done… BECAUSE, using an isokinetic form of resistance requires the total removal of negative work. The result being a mid-range, positive-only form of exercise with very little value.

The only real advantage provided by isokinetic resistance is the fact that it does not require a heavy and expensive stack of weights… instead of weights, a simple and relatively inexpensive friction device is used. This "advantage," of course, is purchased at the price of almost total destruction of the function… so it is clearly no bargain, not even a compromise worthy of serious consideration.

THEN… along came INFItonic and INFImetric exercise. A totally new form of exercise that does not involve the use of weights… a form of exercise that requires no resistance source of any kind… yet a form of exercise that provides all of the requirements for truly full-range exercise… while actually IMPROVING the production of results.

Any really productive form of exercise provides both positive and negative work… with a barbell you perform positive work while lifting the weight and negative work while lowering the weight.

During the performance of standing presses with a barbell, you perform positive work with both arms while raising the weight… then perform negative work with both arms while lowering the weight back to your chest. AND… if the speed-of-movement is steady while both raising and lowering the weight, the forces are exactly the same in both cases.

With a pair of dumbbells, it is possible to press one dumbbell overhead while lowering the other dumbbell back to your shoulder… thus one arm is performing positive work while the other arm is performing negative work. In a manner of speaking, we might say that one arm is "doing work" while the other arm is "un-doing work."

If the movement of the two dumbbells is perfectly synchronized… if one dumbbell reaches the top position at exactly the same time that the other dumbbell reaches the bottom position… and if both dumbbells reach the mid-point of movement at the same time… then, in effect and in fact… the net balance of work that has been performed at any given moment in literally ZERO.

This being true, and it is true… then why do you need weights at all? IN FACT… you don't need weights. You don't need any source of resistance. OR, AT LEAST… when the implications are clearly understood, it then becomes possible to design a perfect form of exercise without any external source of resistance. WITH full-range movement against constant resistance… WITH both negative and positive work… WITH both stretching for increased flexibility and pre-stretching for high-intensity of muscular contraction… WITH resistance in the position of full muscular contraction.

The only change that is involved is a change from "two-limb movement" to alternate "one-limb movement"… in effect, you can not perform either positive or negative work with both arms (or legs) at the same time… instead, you must perform positive work with one arm (or leg) while you are performing negative work with the other arm (or leg). BECAUSE… the arm (or leg) that is performing negative work is providing the resistance for the arm (or leg) that is performing positive work, and vice versa.

Human muscles are capable of working with more resistance while performing negative work… in effect, you can lower more weight than you can lift. But in almost all forms of exercise that fact has no slightest effect upon the exercise itself… because you are always limited by your strength that is available for positive work. You COULD lower more weight under full control… if you could lift it… but you can't lift it; so the momentary level of your positive strength serves as a limited factor for both your positive and negative work.

THUS… if both the positive and negative parts of your exercises are performed properly, in good form… then the forces involved in the positive part will be exactly equal to the forces involved in the negative part. This is true with a barbell, with a conventional machine, and with most Nautilus Machines.

This being true, as it is… it should then be obvious that the forces (both positive and negative) in INFItonic-INFImetric exercise are in no way different from the forces involved in most other exercises. AND IN PRACTICE… they may well be better. Because, many people pay careful attention to the "lifting" part of their exercises (the positive work)… then drop the weight back down in a very sloppy fashion, thus depriving themselves of the most productive part of the exercise, the negative work.

HOWEVER… with INFItonic and INFImetric exercises, the form must be good during both the positive and negative parts of the movement; because the positive work provides the negative resistance… and the negative work provides the positive resistance. You literally can NOT have one without the other.

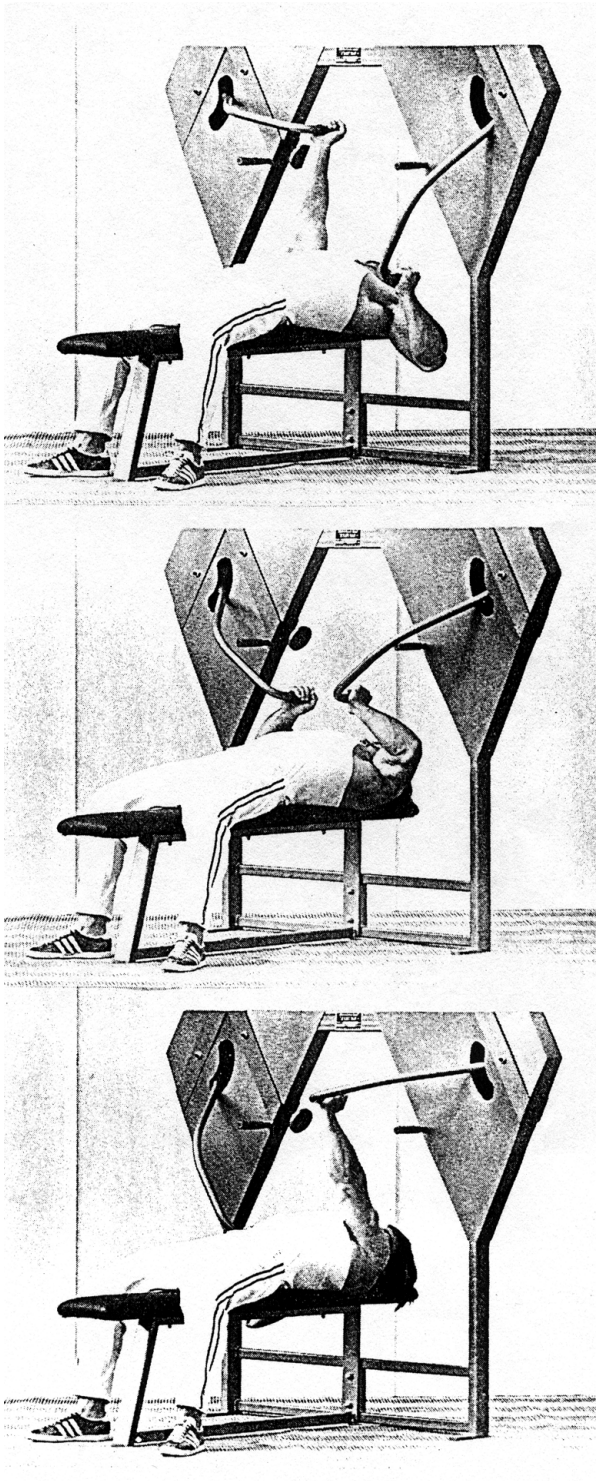
Isokinetic exercises, in addition to all of their other problems and shortcomings, are limited to a particular, pre-set speed of movement… which limitation is NOT encountered in INFItonic-INFImetric exercises. You can move as fast as possible, or as slow as you choose… or any speed between "zero speed" and maximum speed. This is, in fact, literally an UNLIMITED form of exercise… INFINITE EXERCISE; thus the name, INFItonic-INFImetric.

Another advantage to be found in this form of exercise also results from the fact that the movements must be performed alternately; such a style of performance makes "cheating" almost impossible… since the fact that your limbs are moving in opposite directions makes good posture (and thus good form) a requirement.

AND… such a style of performance also makes it possible to move into positions that would normally be impossible. For example; in a normal bench-press, contraction of the pectoral muscles is limited by the fact that your hands must remain fairly wide-spread in the finishing position… but in an INFItonic-INFImetric bench-press, your arms can actually cross above your chest, thus allowing full contraction of the pectoral muscles during the bench-press. This is possible because both arms are not in the contracted position at the same time.

Another advantage relates to the fact that it is much easier to enter the machines… in an INFItonic-INFImetric Pullover-torso Machine, for example, both the two separate moment-arms are in the mid-range of possible movement when you enter the machine.

In a normal Pullover Machine, the single moment-arm that serves both arms is in the rear position when you enter

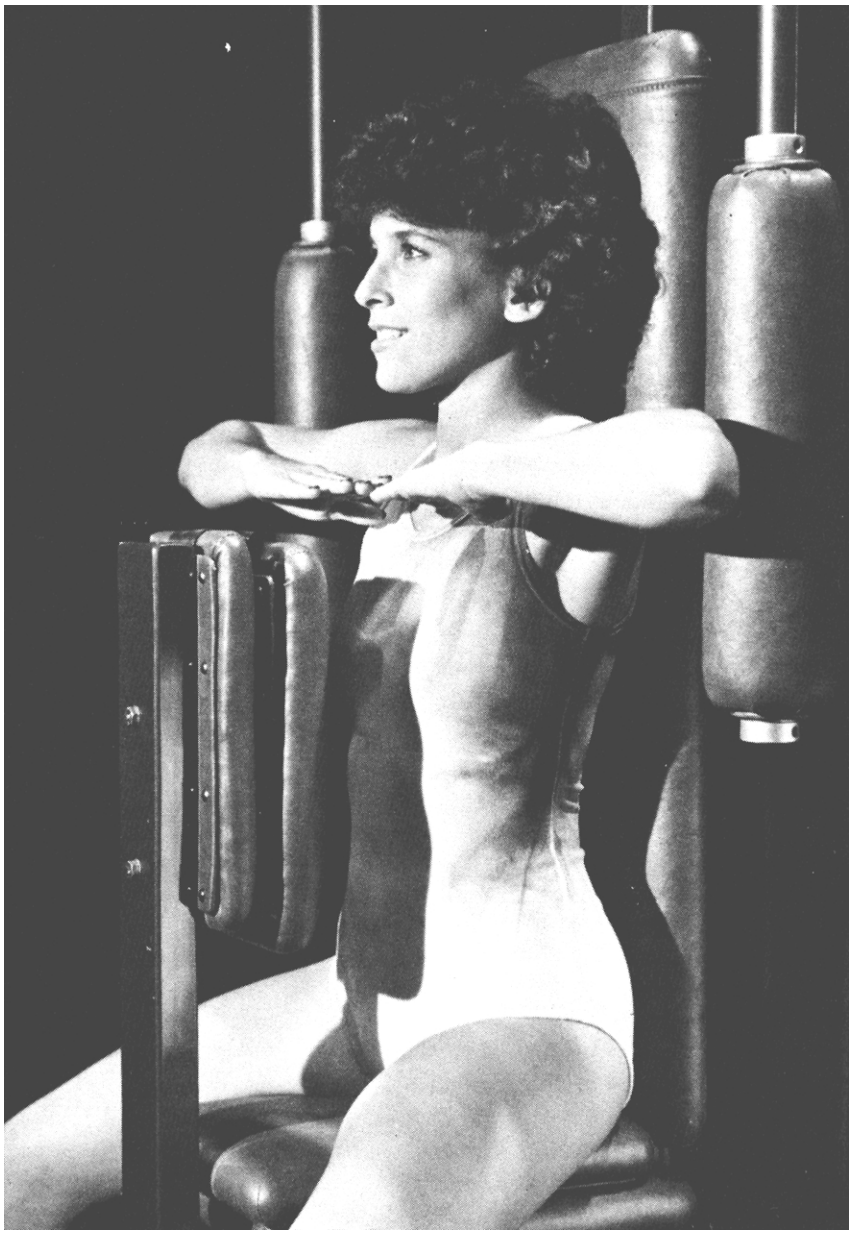


Casey Viator on the INFItonic-INFImetric bench-press

the machine… and it would be impossible for most people to get their arms far enough back to start the exercise without help. Thus a "foot pedal" device is incorporated into normal Pullover Machines for the purpose of rotating the moment-arm far enough forward to make entry and exit easy and simple.

But in the INFItonic-INFImetric Pullover Machine, such a device is not necessary… because, when one moment-arm is in the rear position the other is in the front position… and, when one moment-arm is halfway "down" the other is halfway "up." So entry is quick and simple.

ALL of the other features of Nautilus Machines are still required… the resistance must still be directly applied against the prime body-part… the resistance must still rotate on a common axis with the involved joint… and the resistance must still be varied automatically and instantly in accord with your available strength in all positions throughout a full range of possible movement.



All that has really been done (quite a lot, as it happens) is to remove the requirement for a weight stack… and make the machines easier to enter.

And what effect will this new form of exercise have on the production and sale of the regular line of Nautilus Machines? Probably little or no effect for a period of at least several years… because the regular line of Nautilus Machines is just as good if properly used, and because it will take most people quite a long time to accept the fact that weights are actually no longer required.

REMEMBER… in the minds of many people, the "means has become an end." They like to see the weights go up and down… without weights, it will be hard to convince many people that exercise is being provided. Eventually, some time in the probably distant future, weights will become a thing of the past… in any form.

If you are building strength "in order to lift weights"… then you will have to continue lifting weights, in order to develop the required style if for no other reason. But if you are lifting weights to build strength, then weights are no longer required… better results can be produced without them.