A method for exercise by performing exercise sets in a sequence progressing from exertion of larger to smaller muscles, with the exercise movement performed using slow movements. Each exercise set is performed to a point of momentary failure. The slow movement is at a rate of less than about thirty degrees per second. The exercise sets are performed with as little rest between each exercise set as global or central fatigue will allow. Resistance is applied during each exercise set to produce muscle failure within a predefined time under tension parameter.
RESISTANCE EXERCISE METHOD AND SYSTEM

RELATED APPLICATIONS

[0001] This application is a non-provisional application claiming benefit under 35 U.S.C. sec. 119(e) of U.S. Provisional Application Ser. No. 60/729,326, filed Oct. 21, 2005 (titled RESISTANCE EXERCISE METHOD AND SYSTEM by Vincent J. Bocchicchio), which is incorporated in full by reference herein.

BACKGROUND

[0002] 1. Field

[0003] This invention relates in general to exercise systems and methods. More specifically, the present invention relates to a resistance exercise method and system using slow movements by an exerciser.

[0004] 2. General Background

[0005] The conventional wisdom and literature supports the mechanism of resistance (exercise) training incorporated to produce increases in muscle strength and size. Concurrently, the abundance of literature reinforces the cardiovascular (aerobic, endurance) responses to longer duration, lower intensity exercise.

[0006] In point of fact, the preponderance of established science indicates that the two aforementioned pathways (anaerobic/strength related and aerobic/endurance related) are in fact, inhibitory to and practically exclusive of the other. In the practical application of these established theories, separate exercise regimens are utilized in order to elicit the two predominantly corresponding responses. The term “circuit training” has been used to describe exercise regimens that attempt to combine elements of the two pathways to elicit the corresponding responses simultaneously. Some attempts to incorporate both of these exercise elements have been less effective than either type performed independently. In this linear approach, it is often unclear what “working model” drives the choice of exercises, duration of each and order in which they are performed.

[0007] Accordingly, it would be desirable to have an improved exercise method and system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] For a more complete understanding of the present disclosure, reference is now made to the following FIGURE:

[0009] FIG. 1 illustrates an inclined exercise bench system used in accordance with an exemplary embodiment of the present disclosure.

[0010] The exemplification set out herein illustrates particular embodiments, and such exemplification is not intended to be construed as limiting in any manner.

DETAILED DESCRIPTION

[0011] The following description describes specific embodiments sufficiently to enable those skilled in the art to practice it. Other embodiments may incorporate structural, process and other changes. Examples merely typify possible variations. Individual components and functions are optional unless explicitly required, and the sequence of operations may vary. Portions and features of some embodiments may be included in or substituted for those of others. The scope of the invention encompasses the full ambit of the claims and all available equivalents.

[0012] An improved resistance exercise method and system is described herein. The exercise method and system is generally a slow resistance training system. The method is designed to attempt to produce multi-dimensional physiological responses in an exerciser. It is desired that the exercise method instigate a myriad of positive physiological responses from a single exercise intervention. The conventional wisdom and literature refutes the concept that this scenario is even substantially plausible.

[0013] Generally, the method involves exercise by performing exercise sets in a sequence progressing from exertion of larger to smaller muscles, with the exercise movement performed using slow movements. A sequence of hips, legs, back, chest, shoulders and arms is a specific example of working larger to smaller muscles/groups.

[0014] Each exercise set is performed substantially to a point of momentary failure. The slow movement is, for example, at a rate of less than about thirty degrees per second. The exercise sets are typically performed with as little rest between each exercise set as global or central fatigue will allow. Resistance is applied during each exercise set to produce muscle failure within a predefined time under tension parameter.

[0015] One example of an exercise protocol according to the above method is outlined as follows:

Exercise Protocol

[0016] 1. Resistance exercise performed in a sequence of larger to smaller muscles.

[0017] 2. Each exercise performed for one set.


[0019] 4. Resistance applied on each exercise to produce failure within a given “time under tension” parameter.

[0020] 5. All movement performed in a slow manner (e.g., slower than 30 degrees per second).

[0021] 6. Exercises performed with as little rest between exercises as central fatigue will allow.

[0022] 7. Two exercise sessions are performed per week.

[0023] 8. Recovery time is prescribed between 48 and 96 hours.

[0024] It should be noted that many other variations may be implemented according to the slow resistance exercise method described herein.

The Mechanism of Action

[0025] This exercise system benefits from (without intending to limit the scope of the exercise method) sustained, multi-strata muscle fiber or motor unit recruitment eliciting multiple pathway (aerobic and anaerobic) responses substantially simultaneously. The neurological and central responses to sustained muscle recruitment trigger mechanisms conventionally associated with long duration exercise. In addition, at the site of the exercising muscle or muscle
group a variety of metabolite and signal molecule concentrations stimulate a typically predictable cascading of chemical events externally associated with positive lean tissue exercise responses. In addition (without intending to limit the scope of the exercise method), the fluid shear resulting from continuous tension dynamic exercise instigates an NO pathway and its associated physiological benefits.

0026] This novel system offers a novel usage of muscle fiber recruitment. One assumption is based on the skeletal muscle fiber recruitment model indicating an orderly and graduated recruitment pattern demonstrated repeatedly in the theoretical literature.

0027] This novel system establishes the attainment of both aerobic and anaerobic thresholds, as defined in the published technical literature, simultaneously for the first time. It has been heretofore accepted that the two energy pathways were mutually inhibitory to the extent of exclusion. It should be noted here that positive thresholds can be established substantially simultaneously.

0028] As an example: Production and removal of La are influenced by the content of lactate dehydrogenase (LDH) in the sarcoplasm of the muscle fibers. This LDH can be present as heart specific (H-LDH) or muscle specific (M-LDH) isozymes. M-LDH facilitates the reduction of pyruvate to La, whereas H-LDH favors oxidation of La to pyruvate. In the exercise method described herein, both of these enzyme responses can be induced simultaneously and can be measured either as elevated total LDH or fractionated as separate isoenzymes. Accordingly, both mechanisms can attain the required threshold concentrations and drive positive, albeit divergent, pathway responses as a result of a singular mechanical intervention.

Working Model

0029] The working model of slow resistance training performed under the following aspects generally refutes the conventional theories of exercise and their mechanical applications and instead supports a synergistic phenomenon:

0030] The mechanical aspects typically include the most or all of the following:

0031] Generally working (exercising) larger muscles to smaller muscles (or groups) (this initiates the central response mechanism more significantly and more readily than beginning with smaller, less demanding muscles);

0032] Achieving and maintaining an elevated cardiac response (demand), not necessarily absolutely correlated to heart rate response, to increase flux in and out of working muscles without creating global fatigue;

0033] Moving the resistance in a slow, deliberate manner in order to minimize unproductive kinetic forces (momentum), during both the positive (concentric) and negative (concentric) phases of the exercise;

0034] Working each muscle to a point of external (mechanical) failure through a full range of comfortable movement (the body’s fatigue mechanism is correlated with a threshold level of metabolite build-up correlated in this model as the trigger point for the cascading of positive metabolic events); and

0035] Performing one such set of repetitions for each exercise.

0036] Once the above threshold is attained, no more stimulation is desired or necessary. More of the same muscle stimulation is usually considered to be non-productive or counterproductive with regard to increased oxidative and mechanical stress. As one temporal example, the point of external failure may be reached in a time frame of about 40 seconds to 2 minutes under tension or exercise load.

0037] Consistent with the established parameters of muscle fiber recruitment and optimal sustained duration, the foregoing time constraints have been clinically observed to reinforce their utilization. Stimulatory (internal) chemical change is represented by the aforementioned external (mechanical) circumstance herein described as “failure”. Moving from one exercise to the next with little recovery allows an effort unencumbered by exaggerated respiratory fatigue (central failure).

The Cardio-Chemical Pathway

0038] Although it is complex in structure and function, the human body operates on a simple set of principles. One of these principles is that all “work, change and information utilization” in the body is primarily mediated through chemical means. Practically speaking, this statement means that any mechanical exertion that leads to a change in the body must be translated into a corresponding set of chemical exertions that lead to chemical change. Therefore, improved cardiovascular function resulting from exercise must be the result of a chemical change that produces a positive set of conditions. Furthermore, the systems of the body are non-linear in nature. This condition holds that one unit of work may result in many more than one unit of change.

0039] Conventional wisdom, reinforced by an abundance of data and experience, holds that one must perform a certain type of repetitive exercise for a minimum amount of time (approximately 20 minutes) at a level of exertion that does not cause the body to become systemically exhausted in order to achieve cardiovascular improvement. This improvement is measured in an increased ability of the body to do mechanical work that is linked to the uptake of oxygen (i.e., aerobic work). The cardiovascular system is said to become more efficient and therefore healthier.

0040] Based on the statements above, this improved efficiency must be the result of a positive chemical change that leads perhaps to (among other things) increased blood supply to tissue, more oxygen transported to and by-products transported away from tissues and in the long term new tissue being generated.

The New Working Model: NO Pathways

0041] Nitric oxide (NO) is a simple diatomic molecule that is the subject of a considerable body of work in the existing literature. NO has a role in molecular signaling and control of the cardiovascular system. In particular, NO is responsible for increasing blood flow to tissues through vasodilation and is a key signal molecule in the cytokine/ inflammation and tissue repair pathways. Because of this seminal work, there has been an overwhelming rush to produce drugs that tap into the NO pathways (Viagra is a popular example). But this information is not directly relevant to exercise needs.
The working model herein may be described in part by drawing an analogy to the results of a recent system of mechanical manipulation of the cardiovascular system known as Externally Enhanced Counter Pulsation or EECP. EECP is a simple technique approved by the FDA for improving the cardiovascular systems of people who suffer from congestive heart failure and other maladies but present too big a risk for surgery. In addition, it is used by many elite athletes to improve recovery time after workouts and to increase their training efficiency. EECP has been shown to initiate re-vascularization of damaged heart tissue and to elicit the equivalent response in terms of cardiovascular health to that of exercise. EECP works on the principal of forcing blood from the extremities back to the heart mechanically in a method that is timed when the aortic valve is closed. Blood flow to the heart is increased in such a way that vascular damage is greatly improved if not reversed. The mechanism of action has been elucidated to a large extent and it involves the local production of NO resulting from the shear force of the fluid moving through the cardiovascular system. Thus, mechanical work is translated into chemical work that results in tissue regeneration and improvement of the health of the cardiovascular system.

Much of the improvement in the functional capacity and concurrent “health” of the cardiovascular system is driven by this and related mechanisms, no matter what the origin of the stimulus. Therefore, this working model may be utilized to design an exercise regimen that is built around this mechanism of action to build local muscle strength (tissue increase) and global oxygen carrying capacity and efficiency (cardiovascular fitness) in a more efficient way.

Lean Tissue (Anabolic Pathways)

The stated objective of resistance training has traditionally been associated with the resulting increase in lean mass in the form of protein synthesis in the skeletal muscle structures and in the protein matrix of the bones. Much of the process of anabolic response has been deduced as being correlative in nature to numerous chemical actions, but at this time few specific actions have been identified. However, the mechanical interventions conventionally associated with this process are nebulous at best and inaccurate upon objective assessment.

The health of the human body is both reflected and affected in the maintenance of a certain optimal range (ratio) of fat-to-lean tissue. As this ratio increases for any reason, many disease states, such as Type II diabetes and cardiovascular disease, begin to appear. These disease states have a specific chemical basis—that is to say, they are the result of profound chemical imbalances locally and globally in the body. A major objective of any health-related exercise regimen must be to maintain the body at or close to the optimum fat-to-lean tissue ratio. By its very nature, this process will activate local and global growth factors not only for lean tissue generation and maintenance, but for the corresponding vasculature as well.

The Working Model

If the orderly recruitment of human skeletal muscle is used as a basis for the interpretation of muscle action and response, it becomes evident that any system that does not rely on metabolic responses to that recruitment pattern is flawed. The standard mechanical schemes that have been identified as correlative to enhanced lean tissue responses do not consider the metabolic pathways that must influence those responses.

The production of lean body mass is associated with an increase in the contraction proteins that constitute the skeletal muscle fibers (e.g., myosin and actin) referred to as hypertrophy. Traditionally, hypertrophic responses are thought to correspond to mechanical overload. It is not the mechanical overload per se that is the cause of the increase in lean mass, but it is rather the specific chemical response. The aforementioned chemical response attains threshold (stimulatory) status when the product of concentration and local half-life (time of sustained metabolism) concentration reach a critical level. In practical terms, the concentration of species surpasses a critical threshold for a long enough duration so that the product of the two is sufficient to drive the production of enhanced lean mass.

In order to achieve this unique set of conditions in any group of muscles, the fibers are activated that are most efficient in producing the proper chemical response. Under the circumstances described in the orderly recruitment of human skeletal muscle fibers, if the most difficult and last (in order) fiber types recruited are stimulated in the use of the muscle, then all (other, lower strata) fibers must be utilized and must be operating to their maximum capacity. This demand is correlated to the highest level of exercise intensity. Historically, that (level) has been conventionally associated with maximum force output by the working muscles.

The problem with this model is that extremely high forces and mechanical stresses are correspondingly imposed on the joints and attaching system involved. Furthermore, the critical element of sustaining a threshold level of chemical species is practically impossible to attain through the use of violent, sporadic contractions.

The working model described herein induces the corresponding muscle fiber recruitment pattern (the associated internal chemical mechanism) by substantially sustaining demand (constant load) on the exercising muscle structure at a level that ensures the inclusion of the most relevant fibers. The associated, external model of this mechanism utilizes resistance that achieves mechanical failure within the theoretically indicated time frame of; for example, approximately 45 to 90 seconds of highest level (fiber demand) muscle loading.

Mechanism of Action (IGF Pathway)

A major mechanism by which the body creates lean mass (muscle and bone) is through a pathway that originates with the secretion of human growth hormone and that is subsequently mediated by Insulin-Like Growth Factor-1 (IGF-1). These hormones are part of a so-called cascade that signals cellular function as well as the migration and differentiation of stem cells or progenitor cells. IGF-1 is found circulating in blood serum and can also be released locally in active tissue. This hormone axis is also responsible for stimulating the release of nitric oxide (NO) which in turn helps drive the production of new vascular tissue. It has been shown in separate studies that the hGH/IGF-1 axis is instrumental in maintaining left ventricle displacement volume as well as keeping the circulating levels of inflammatory cytokines low and insuring healthy endothelial tissue in the
vascular system. All of this is important because without healthy vascular and expanding vascular tissue there can be no creation of new lean tissue.

[0052] The mode of exercise described herein may access both the global and local IGF pathway. When an entire group of muscles with all types of fibers having both aerobic and anaerobic capability are taxed at their most intricate (highest) recruitment level and that recruitment level is sustained, then the concentration of species build to a critical level. Correspondingly, the IGF pathways are activated to create new tissue to support the new level of demand.

[0053] The effects take place not only locally in the activated muscle, but also in the vascular system because of the IGF cascade and the surging fluid in the arteries (especially in the coronary arteries) that cause NO to be released. All known mechanisms are at work simultaneously to drive tissue formation, increased metabolism, cell division and muscle fiber creation, new vasculature and increased cardiac function and efficiency. The nature of this cascade is that the chemical after-effects take place over many hours after the stimulation has ceased. This state may be correlated with the so-called “increase in metabolism” that leads to consumption of fat and creation and maintenance of lean mass.

[0054] Regarding the access of these pathways simultaneously, two basic aspects, muscle excretion with a concomitant buildup of metabolites, and enzymes and hormones coupled with driving the NO pathway in the cardiovascular system, can only be attained by the proper muscle taxation (externally corresponding to muscle failure) and by the maintaining of a certain cardiac volume output for a minimum amount of time. These conditions require that the entire body is worked efficiently and that the cardiovascular system is functioning at high-volume output without central failure. There may be a large number of trajectories that result in these conditions being met, but it is the use of the general method as described herein that achieves this state.

[0055] An example of the application of the above exercise method in a clinical trial is described in the Appendix to this application, which is incorporated herein by reference. The clinical trial measured certain body characteristics before and after five weeks of incorporating the above exercise method as performed on an inclined exercise bench system. It should be noted that the above exercise method may be incorporated into many other types of exercise equipment, and the method may be incorporated into software used to control or operate or monitor such equipment and its conformance to the characteristics of the exercise method described above.

[0056] As a specific example of a use of the above exercise method with exercise equipment, FIG. 1 illustrates an inclined exercise bench system 100, which is a graduated resistance ladder/pulley type of system. More specifically, system 100 is a graduated, adjustable (e.g., by bench height adjustment), pulley-exercise device including a sliding bench 102 upon which an exerciser may sit, kneel or lie (depending on the part of the body being exercised). Bench 102 is connected to a pulley or series of pulleys 104. System 100 provides various gradients of resistance as a result of some vector of the exerciser’s body weight.

[0057] System 100 may include an electronic monitor (not shown) for monitoring the rate of exercise movement and providing an indication to an exerciser so that each exercise set may be performed substantially to a point of momentary failure. The electronic monitor may be any conventional monitoring device such as an accelerometer. The electronic monitor may include memory for storing software, a processor, and a user monitor or other feedback device. The software may be programmed to provide feedback to the user and/or to process other data related to the use of the exercise method described above by the exerciser, or coaching or training by a trainer or therapist. Feedback to the exerciser may also be provided, for example, using an LCD or other display or audio means such as a speaker.

[0058] In addition, system 100 may include a force monitor (not shown), connected to the user, operable to determine when the point of momentary failure is substantially reached. Also, system 100 may include a set of instructions (not shown) for communication to the exerciser prior to and/or during use of the inclined bench. The instructions implement the method of exercising as described herein. The instructions may be provided, for example, in a tangible form to the user, such as in a cardboard instruction sheet mounted on system 100 in a manner visible to the user during exercise.

[0059] Also, the set of instructions may be provided, for example, in the form of an exercise instruction video that is played during use of system 100. The instructions may also be used by a trainer that is directing the exerciser. The instructions are considered to be used by the exerciser in use of system 100 even if the trainer and/or the exerciser have studied or learned the instructions prior to any particular exercise session.

[0060] The set of instructions may also be programmed in software associated with system 100 and executed by the exerciser and/or trainer during exercise, or prior to exercise when first learning to use the exercise method described herein. The software may be stored in the memory of system 100 described above, or alternatively, may be executed and provided as, for example, a web service over the Internet or executed on a computer system separate from system 100. The computer system may be, for example, placed in the proximity of system 100 for use during exercise (e.g., guiding the user’s exercise and/or monitoring aspects of the user’s exercise progress).

[0061] By the foregoing description, an improved resistance exercise system and method have been described. The foregoing description of specific embodiments reveals the general nature of the system and method sufficiently that others can, by applying current knowledge, readily modify and/or adapt it for various applications without departing from the generic concept. Therefore, such adaptations and modifications are within the meaning and range of equivalents of the disclosed embodiments. The phrasing or terminology employed herein is for the purpose of description and not of limitation. Accordingly, the system and method embrace all such alternatives, modifications, equivalents and variations as fall within the spirit and scope of the appended claims.
APPENDIX

Total Gym® Exercise Bench Test Study

The benefits of the Exercise System as Performed on the Total Gym® Exercise Bench in a Cross-Sectional Population

Improved body composition (increased lean tissue and decreased fat content), cardio respiratory endurance, upper body and lower body strength, trunk flexibility, decreased resting blood pressure and heart rate are shown in a cross-population clinical trial set forth below.

Study Background

Decreased muscle mass, bone density and cardio respiratory endurance are associated with increased risk of cardiovascular disease, stroke, hypertension, type II diabetes, osteoporosis and mortality. (1), (2) (see citation references used throughout this Appendix listed by reference number in the Bibliography provided below). Improvements in the aforementioned areas can decrease the probability of disease, disability and mortality. (3), (4) Aerobic exercise is conventionally associated with increased cardio respiratory endurance. (5) Anaerobic, strength training is conventionally associated with increasing lean mass. (6) To date, no studies are known to have been designed to measure or observe the effects of total body resistance exercise on all of the aforementioned areas of human performance and their correlation to known health risks.

Purpose of This Study

This clinical trial was undertaken to measure body composition, cardio respiratory endurance, upper body strength, lower body strength, trunk flexibility, resting blood pressure and resting heart rate before and after 5 weeks of incorporating the resistance exercise method above as performed on an inclined exercise bench system (sold under the trademark TOTAL GYM®).

Participants and Methodology

Ten healthy adults were intentionally selected on an age, gender and fitness level varied basis from the age of 18 to 72 within fitness levels categorized from non-conditioned to highly-fit. The participants all performed the same seven-exercise protocol two times per week.

The exercise method utilized was the resistance exercise method described in the application above. This regimen incorporates very slow speed resistance training performed in a sequence of large to small muscle (groups) to a point of (perceived) momentary failure within time under load parameters that coincide with physiological indices and clinical observation. (6) Each exercise followed with as little rest as required by the subject to perform the next exercise without perceived respiratory limitation. All subjects at all levels were readily capable of following these design parameters.

All exercises were performed on a Total Gym XL or a Total Gym 26000 exercise system. All increments were recorded for each training session. All repetitions and sets were timed under load, and the total workout time was recorded for each session. All exercise sessions were constantly supervised by two testers. Subjects reported very little difficulty in performing the basic exercises and very little was noted by the supervisors. No specific diet or exercise supplementation was prescribed.

All participants underwent the following assessments on a pre-test and post-test basis:

Body Composition Analysis:

Using an RJL B-103 Analyzer, all subjects were pre-tested using a bio-electrical impedance method. The instrument was calibrated each day testing was recorded. All tests were performed by the applicant and an assistant to witness data collection. (7)

Aerobic Power Assessment:

Using a Schwinn Airdyne ergometer, each subject was pre-tested using an incremental protocol of one minute intervals after a 30-second exposure at the minimum level of resistance. Each full interval was sustained for one minute and then increased for each additional minute or part thereof until the subject felt a perceived exertion of 8 to 8.5 on the Borg scale. (8)

Upper Body Strength Assessment:

Using a MAXICAM seated bench press machine, each subject was tested for a one, full repetition maximum lift. If the subject succeeded, he or she elected to increase the load by 5 to 20 pounds until a maximum lift was attained.

Lower Body Strength Assessment:

Using a MAXICAM leg extension machine, each subject was tested for a one, full-repetition maximum lift. If the subject succeeded, he or she elected to increase the load by 5 to 20 pounds until a maximum lift was attained.

Trunk Flexibility:

Each subject was pre-tested performing a simple sit and reach trunk extension test. The subjects were given three attempts and instructed not to bounce or strain.

Resting Blood Pressure:

Each subject was seated for 5 minutes and a simple plethysmographic measurement was taken on the left arm and repeated to insure accuracy.

Resting Heart Rate:

While seated for the blood pressure analysis, each subject was manually tested for resting heart rate using a left arm radial pulse count for 60 seconds.

It should be noted that none of the performance testing indices were performed during the study in order to prevent any level of skill acquisition from convoluting the data.

Health Benefits of Exercise Training

The benefits of both aerobic training and resistance training are widely and consistently reported and supported in the literature. (9), (10), (11) An overview of that scientific data provides the consensus that aerobic activity reduces the long-term development of cardiovascular disease. (12), (13) Concurrently, resistance training has been more recently reported to promote musculoskeletal fitness and metabolic improvements in insulin sensitivity, glucose metabolism and a host of other health related conditions. (14), (15)
A significant finding from this clinical trial is that multiple (beneficial) metabolic pathways can be stimulated by a singular mechanical (exercise) intervention. In addition, the exercise exposure (time) required to elicit these myriad responses can be reduced drastically from that supported in the existing literature.

Results

As a result of a five-week, ten-session exposure utilizing the exercise system conducted on the Total Gym exercise bench, the following responses were attained:

1. **BODY COMPOSITION:** The average body composition change was minus 5.89%, which constituted a 26.4% loss in body fat.

2. **FAT LOSS:** The average fat loss was 10.43 pounds. Again, that loss is indicated as an average 26.4% loss of fat tissue in 5 weeks.

3. **LEAN TISSUE (MUSCLE) GAIN:** The average increase in lean (muscle) mass was 7.88 pounds in 5 weeks.

4. **AEROBIC POWER:** The average increase in aerobic power was 36% with no “conventional” aerobic training involved. That was an average increase of 3.79 METS.

5. **TRUNK FLEXIBILITY:** The average trunk flexibility increase was 2.175 inches.

6. **UPPER BODY STRENGTH:** The average upper body strength increase was 16.5 pounds which was an average increase of 24.7%. No bench presses (the test exercise) were performed during the study.

7. **LOWER BODY STRENGTH:** The average lower body strength increase was 26.75 pounds which was an average increase of 19.7%. No leg extensions (the test exercise) were performed during the study.

SUMMARY AND CONCLUSIONS

The predominant theme of public health advisors reinforces the need to institute and program productive exercise for all Americans from childhood through the elder years. (16), (17) The growing prevalence of type II diabetes, obesity, osteoporosis and a number of fat-related, sedentary lifestyle disorders mandates that real intervention is essential on a social, economic and a scientific level. (18) (19)

The governmental and academic models for exercise adherence have not been embraced and have largely failed. Recently, those recommendations have increased with regard to the suggested optimal exercise exposure. However, that is an unrealistic approach. It is preferred to provide a viable alternative to the apparently overwhelming (with regard to compliance) prior model that has failed so convincingly. (20)

Significant long-term weight loss is typically sustained only with the inclusion of exercise. As substantiated by the preponderance of the associated literature, the predictable metabolic response to caloric restriction is (metabolic) rate reduction. (21), (22) With the exception of precarious pharmacological intervention or radical surgery, no methodology other than exercise has proven to be an effective adjunct to long-term weight loss maintenance. The working model described herein suggests that the metabolic pathways that stimulate protein uptake also stimulate fat utilization and inhibit fat storage. A modest regimen of exercise that effectively stimulates these cascading pathways associated with protein uptake is valuable for continued positive feedback and associated widespread adherence.

This study, in addition to a long-term clinical observation, also supports that older populations can significantly increase lean mass. (23), (24) This working model attributes this phenomenon to local growth factor responses to this protocol. (25), (26) The consequences of that mechanism can reasonably be assumed to provide additional benefits manifested in the support systems (cardiac, vascular, endocrine etc.) as reinforced by the data in this trial. (27), (28), (29)

In addition, it is noted that the average cumulative muscle load time of the exercise protocol was less than 13 minutes per session. Nothing approaching such a limited exercise exposure (as used in this study) has produced positive responses of this magnitude using such a wide variety of parameters.

This study provided a small reflection of a fairly simple, safe, and universally-applicable exercise protocol performed on a simple device that can be utilized in a home or other setting. The prescription of this protocol is palatable (e.g., twice per week for approximately 20 minutes per session). It has been demonstrated historically that its application can provide ample stimulus to produce positive responses in the muscle, skeletal and cardiovascular systems. In addition, consistent and universal (at typically all fitness levels) increases in performance and physiological status have been noted and reinforced by the study data.

Seven-Week Follow-Up

The subjects were followed for seven additional weeks following the five-week protocol. They all adhered to the study regimen on their own. They all used the Total Gym exercise bench at a supervised exercise facility or in their homes. Seven persons have been re-tested and have all maintained or improved their post-test scores. It should be noted that the average training time is less than 20 minutes, two times per week.

BIBLIOGRAPHY FOR CITATION NUMBER REFERENCES IN TEST STUDY ABOVE


What is claimed is:
1. A method for exercising, comprising:
   performing a regimen of single exercise sets in a sequence progressing substantially from exertion of larger to smaller muscles, wherein exercise movement is performed substantially using slow movements; and
   performing each exercise set substantially to a point of momentary failure.
2. The method of claim 1 wherein the slow movements comprise movement at a rate of less than about thirty degrees per second.
3. The method of claim 1 further comprising:
   performing the regimen of single exercise sets with substantially little rest between each exercise set; and
   applying appropriately determined resistance during each exercise set to produce failure substantially within a predefined time under tension parameter.
4. The method of claim 3 further comprising performing the regimen of single exercise sets about two times per week.
5. The method of claim 4 further comprising providing recovery time of at least about 48 hours between performing the regimen of single exercise sets.
6. A method for exercising, comprising:

performing a regimen of single exercise sets in a sequence, wherein exercise movement is performed substantially using slow movements; and

performing each exercise set substantially to a point of momentary failure.

7. The method of claim 6 further comprising performing the regimen of single exercise sets with substantially little rest between each exercise set.

8. An inclined exercise system configured for operation according to the method of claim 1.

9. The system of claim 8 further comprising an inclined, moving platform for supporting an exerciser.

10. The system of claim 8 further comprising memory including software for executing computer instructions according to the method comprising:

performing a regimen of single exercise sets in a sequence progressing substantially from exertion of larger to smaller muscles, wherein exercise movement is performed substantially using slow movements; and

performing each exercise set substantially to a point of momentary failure.

11. The system of claim 10 further comprising a feedback means for providing feedback information to an exerciser as to conformance to the method comprising:

performing a regimen of single exercise sets in a sequence progressing substantially from exertion of larger to smaller muscles, wherein exercise movement is performed substantially using slow movements; and

performing each exercise set substantially to a point of momentary failure.

12. The system of claim 11 wherein the feedback means is an LCD display or speaker.

13. A system for exercising comprising:

an inclined exercise bench to provide exercise resistance for an exerciser; and

means for coaching or monitoring the exerciser's use of the inclined exercise bench in a regimen of single exercise sets in a sequence progressing substantially from exertion of larger to smaller muscles, wherein exercise movement is performed substantially using slow movements.

14. The system of claim 13 wherein the means for coaching or monitoring is an electronic monitor for monitoring the rate of exercise movement by the exerciser and for providing an indication to the exerciser so that each exercise set may be performed substantially to a point of momentary failure.

15. The system of claim 14 wherein the monitor comprises a memory containing program instructions to implement the method comprising:

performing a regimen of single exercise sets in a sequence, wherein exercise movement is performed substantially using slow movements; and

performing each exercise set substantially to a point of momentary failure.

16. A system for exercising, comprising:

an inclined bench to provide an exercise resistance for an exerciser using the bench; and

a set of instructions for communication to the exerciser prior to and/or during use of the inclined bench, wherein the set of instructions comprises instructions to implement the method of exercising of claim 1.

17. The system of claim 16 wherein the set of instructions is communicated to the user solely during use of the inclined bench.

18. The system of claim 16 further comprising a force monitor, connected to the user, operable to determine when the point of momentary failure is substantially reached.

19. A method of teaching an exercise method, comprising instructing an exerciser to implement the method of exercising of claim 1.

20. The method of claim 19 further comprising using an inclined bench to implement the method of exercising.