A dynamic low impact plyometric exercise device comprised of a tube having end caps with an elongated dynamic weight disposed in the tube between the end caps and proportioned to permit limited reciprocating movement therein. A tether cord interconnects between one end cap and the weight, and an elastic cord interconnects between the other end cap and the weight whereby the weight is positioned generally intermediate the length of the tube.
DYNAMIC LOW IMPACT PLYOMETRIC EXERCISE DEVICE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a method and apparatus for utilization during plyometric exercise to enhance the benefits thereof.

[0003] More particularly, the present invention is a low-impact resistance device which has the unique benefit of increasing progressively the amount of weight that an exerciser must lift and accelerate while jumping upward but which minimizes the initial impact the exerciser experiences while landing from the jump due to the weight increase.

[0004] Still more particularly, the present invention is a dynamic weight device which an exerciser carries while jumping that progressively increases the weight that the exerciser must accelerate on the upstroke yet minimizes the amount of initial impact an exerciser experiences while landing due to the extra weight he carries while jumping whereby the invention progressively imposes greater weight on the exerciser’s muscles during the upstroke for resistance to muscle exertion yet does not re-impose that weight to be decelerated until after the exerciser has landed.

[0005] Specifically, the present invention is a method and apparatus for adding an elastically suspended dynamic weight to a plyometric exerciser which the exerciser carries during performing vertical jumps and landings whereby the carried weight imposes essentially a zero amount of added weight on the exerciser during impact on landing from a jump but incrementally adds the full weight on the exerciser as he arrests his landing and reverses momentum to initiate his upstroke for the next jump.

[0006] 2. Description of the Prior Art

[0007] The use of various types of exercise apparatus in one form or another for the purpose of enhancing the effect of low resistance exercise is known in the prior art. However, despite the numerous designs, structures, and forms of apparatus which have been developed, disclosed, and utilized for the accomplishment of the specific objectives, purposes, and requirements of strength and health and muscle building exercise, the devices, machines, apparatus, and methods which have been heretofore devised to accomplish these goals consist basically of familiar, expected, and obvious configurations, combinations, and arrangements of well-known structural forms and apparatus. However, almost none of them have been used to supplement plyometric exercise routines. This will become apparent from the following the description of the closest known and relevant prior art.

[0008] Almost all types of exercise equipment designed for the purpose of building muscle strength are for slow muscle response and utilize the principal of lifting weights: either alone (free weights) or through the use of simple to complicated weight training machinery. None of this machinery has been designed for use in plyometric exercise which basically includes workouts based on a stretch/shortening cycle of muscle conditioning. It is characterized by rapid deceleration of a mass (a concentric that is a shortening muscular contraction) followed by almost immediate rapid acceleration of the mass (eccentric or lengthening contraction of the same muscle) in the same direction. Plyometric exercise, when used to train the muscles, nervous system, and connective tissue, can result in excellent results for competitive sports.

SUMMARY OF THE INVENTION

[0011] In view of the foregoing known, obvious, and described deficiencies inherent in the known types of exercise devices presently existing in the prior art for use in plyometric exercise, the present invention provides a new apparatus and construction for a low impact plyometric exercise resistance device wherein the same can be utilized in a new method to progressively (but rapidly) increase the weight which must be overcome by the muscle exertion during plyometric exercise but minimizes the initial impact weight experienced on landing from a jump but progressively increases the weight until the landing momentum is arrested and reversed.

[0012] The general construction of the present invention, which will be described hereafter in greater detail, has been designed to provide a new and improved low impact exercise apparatus and method for use which has many of the advantages of the prior art of progressively increasing the load on the muscles to be exercised as mentioned and described above without increasing the initial impact loads. It is comprised of many novel features and advantages and performs the functions that result in a new plyometric exercise device which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art of weight training and exercise devices heretofore known, either alone or in any combination thereof.

[0013] The present invention is a dynamic low impact exercise device comprised of a tube having first and second end caps. An elongated dynamic weight is disposed between the end caps in the tube and proportioned to permit limited reciprocating movement of the weight in the tube.

[0014] A collapsible tether interconnects the first or lower end cap and the weight. An elastic interconnection extends between the second or upper end cap and the weight whereby the weight is positioned to suspend generally intermediate the length of the tube whereby, when the tube is oriented vertically, it can move a limited restricted distance toward the second or upper end cap due to the tether
but the weight can move a variable distance toward a first or lower end cap in the tube due to induced inertial momentum of the weight stretching the elastic interconnection.

[0015] The more important features of the invention have been broadly outlined in the preceding summary of the invention in order that the detailed description thereof which follows may be better understood and in order that the present contribution to an improvement in the art may be better appreciated. There are additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto.

[0016] With respect to the claims hereof, and before describing at least one preferred embodiment of the invention in detail, it is to be understood that the invention is not to be limited in its application to the details of construction and to the arrangements of the components which are set forth in the following description or illustrated in the accompanying drawings. The invention is capable of being created in other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

[0017] As such, those skilled in the art in which the invention is based will appreciate that the conception upon which this disclosure is predicated may readily be utilized as a basis for the designing of other forms, structures, apparatus, systems, and methods for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions in so far as they do not depart from the spirit and scope of the present invention.

[0018] Further, the purpose of the appended abstract is to enable the United States Patent and Trademark Office, and the public generally, and especially scientists, engineers and practitioners of the art who are not familiar with the patent and legal terms or phraseology, to determine quickly from cursory inspection the nature and essence of the technical disclosure of the application. The abstract is neither intended to define the invention of the specification, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

OBJECTS OF THE INVENTION

[0019] It is therefore an important object of the present invention to provide a new method and apparatus for use during plyometric exercise to enhance the benefits thereof.

[0020] It is another object of the present invention to provide a low impact plyometric resistance device which can be carried by an exerciser in a vest or backpack, or combination thereof, while exercising which increases the load which the exerciser’s muscles must accelerate during jumping and decelerate after impact.

[0021] It is a further object of the present invention to provide a dynamic plyometric exercise device which adds weight during an upstroke when an exerciser jumps but removes the weight from the exerciser for initial impact upon landing and then adds it again.

[0022] It is still another object of the present invention to provide a dynamic weight apparatus which can be carried by an exerciser while performing plyometric exercises which has a synergistic effect and adds progressively more weight for the exerciser’s muscles to overcome, lift, accelerate, and move upward during the upstroke while jumping than the actual weight itself, and then the apparatus adds the momentum of the weight progressively back on after initial impact during landing for the muscles to decelerate and arrest.

[0023] And it is yet a further object of the present invention to provide a method for increasing the benefits of plyometric exercise by providing a low impact exercise device in the form of a dynamic weight suspended by an elastic cord in a container which can be carried by an exerciser performing plyometric exercises for the muscles of the exerciser to lift and accelerate upward during jumping and for the muscles to decelerate and progressively arrest the momentum of the weight only after initial impact.

[0024] Other objects and advantages of the present invention will become apparent when the method and apparatus of the present invention are considered in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

[0025] The invention is illustrated in the accompanying drawing but it is not limited by reference to the particular embodiments shown therein of which:

[0026] FIG. 1 is a side elevation of the present invention shown in cross-section, and

[0027] FIG. 2 is a perspective view of the device of the invention carried by an exerciser in a backpack.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0028] Reference is made to the drawings for a description of the preferred embodiment of the present invention wherein like reference numbers represent like elements on corresponding views.

[0029] FIG. 1 shows the apparatus of the present invention in side elevation. There shown is a dynamic low impact exercise device comprising a tube 11 having end caps 13, 15. The tube can be made of light weight metal, plastic such as ABS or PCV, or other rugged materials such as fiberglass, and impregnated cardboard. The tube is oriented essentially vertically during use. One or more of the units can be carried in a vest or backpack 31 or a combination of both which the exerciser wears while performing plyometric exercises.

[0030] An elongated weight 17 is disposed between the end caps 13, 15 in the tube 11 and proportioned to permit limited reciprocating movement therein. In other words, it is of such a length that it can move or reciprocate within the tube between limits which are determined by the structure of the invention. The weight can be between five (5) and twenty-five (25) lbs (approximately 2.25 and 11.35 kg) with the optimum being about 10 lbs (22 kg). The tube is dimensioned accordingly to relatively closely surround the external longitudinal configuration of the weight. The tube is preferably between 3 and 6 inches (7.5-15 cm) in external diameter with 4 inches (10 cm) being optimum.

[0031] The clearance between the weight 17 and the interior sidewalls 19 of the tube 11 is such as to prevent friction between the two from inhibiting reciprocating
movement of the weight within the tube. A clearance 21 of at least one-sixteenth of an inch on opposite sides of the weight has proven adequate. During use, the tube is usually not oriented exactly vertically, and continually gyrates slightly, whereby the weight generally slides along varying parts of the interior wall of the tube. As a result, a larger clearance between the wall of the tube and the weight reduces slightly the frictional contact between the two.

[0032] The weight 17 can be made of various dense materials such as cement, steel, cast iron, bonded metal particles, encased lead, or other common dense materials, all with or without a sheath. Providing the weight with a coating which reduces the friction between the weight and the tube 11 material is desirable but not necessary due to the abrupt reciprocating motion imparted to the tube by the exerciser due to the rather violent motion induced in the tube by an exerciser performing plyometric exercises.

[0033] A collapsible tether 23 in the form of a flexible cord interconnects the first end cap 13 and the weight 17. In the operation, the tube 11 is oriented generally vertically with this tether disposed at the lower end thereof. As the tube rises during the upstroke of an exercise jump, as a result of the device being carried by an exerciser, the inertia of the weight keeps the weight biased toward the lower end of the tube. As the exerciser reaches the apex of the jump, and reverses direction under the influence of gravity and starts to descend, the weight moves up in the tube to reach the end of the tether, and it reverses direction in the tube along with the exerciser and is pulled downward at the end of the tether under the accelerating influence of gravity and the pull of the tether. When the exerciser initially impacts or contacts the ground, the weight is still descending at the end of the tether and imposing no weight on the exerciser at the time of the exerciser’s impact with the ground, or possibly even a very minute up force until the tether slackens and the weight continues downward, while the tube containing the weight commences a steep rate of deceleration.

[0034] An elastic interconnection in the form of a rubberized cord 25 extends between the second or upper end cap 15 and the weight 17 whereby when the tube 11 is at rest and not moving, the weight is positioned generally intermediate the length of the tube under the counteracting forces of the tether secured to one end cap 13 and the elastic interconnection between the weight and the other end cap. The rubberized cord in the preferred embodiment of the invention is very elastic surgical rubber tubing. The size or number of strands of rubberized cord are determined by the weight utilized and selected by trial and error.

[0035] The weight 17 can move a limited restricted distance toward the second end cap 15 due to the tether 23 but the weight can move a variable distance toward the first end cap 13 in the tube 11 due to induced inertial momentum caused by gravity on the weight stretching the elastic interconnection 25 and the fact the flexible tether can collapse.

[0036] In the preferred embodiment of the invention, the weight 17 is provided with screw eyes 27 disposed at opposite ends thereof. The end caps are also provided with screw eyes 29 disposed internally thereof whereby the pairs of screw eyes at opposite ends of the tube project toward each other from the ends of the weight and the interior sides of the end caps. The flexible tether 23 and elastic cord 25 are secured between the opposing screw eyes.

[0037] The invention also includes a method for increasing the benefits of plyometric exercise by providing a low impact exercise device in the form of a dynamic weight suspended on an elastic cord in a concentric enclosure. The device is carried by an exerciser while performing plyometric exercise whereby, as the exerciser lands from a jump, the elastic cord allows the suspended weight to move downward through a controlled decelerating descent to a static point which is determined by the force of impact upon landing and the amount of upward thrust applied by the user and the elasticity constant of the elastic cord, whereby the exerciser increases the amount of weight to be accelerated upward in addition to his own body weight and the weight increase is compounded beyond that of the suspended weight and applied (incrementally) as the upward stroke accelerates as a result of the elastic band allowing the momentum to increase gradually to the maximum until the maximum acceleration of the exerciser is achieved as he moves his body upward.

[0038] The present invention includes a carrier 31 in the form of either a chest or backpack (chest/backpack) for containing the device which can be worn by an exerciser. For advanced exercisers, both a chest and backpack may be worn with multiple devices carried in each. The chest/backpack has straps 33 attached to the upper end thereof which fit over the exerciser’s shoulders and a waist belt 35 secured to the lower end thereof which holds the backpack close to the exerciser’s body. The pack has one or more pockets 37 for containing one or more exercise devices in a vertical orientation. The pocket(s) have a sealable flap 39 for holding the device(s) in the pocket(s).

[0039] Thus, it will be apparent from the foregoing description of the invention in its preferred form that it will fulfill all the objects and advantages attributable thereto. While it is illustrated and described in considerable detail herein, the invention is not to be limited to such details as have been set forth except as may be necessitated by the appended claims.

We claim:
1. A dynamic low impact plyometric exercise device comprising
   a tube having first and second end caps
   an elongated dynamic weight disposed between said end caps in said tube and proportioned to permit limited reciprocating movement therein,
   a collapsible tether interconnecting said first end cap and said weight, and
   an elastic interconnection between said second end cap and said weight whereby said weight is positioned to suspend generally intermediate the length of said tube when the tube is oriented vertically and said weight can move a limited restricted distance toward said second end cap due to said tether but said weight can move a variable distance toward said first end cap in said tube when induced inertial momentum of said weight stretches said elastic interconnection.

2. The dynamic low impact plyometric exercise device of claim 1 wherein said tether is a rubberized cord.

3. The dynamic low impact plyometric device of claim 1 wherein said elastic interconnection is a rubberized cord.
4. The dynamic low impact plyometric device of claim 3 wherein said rubberized cord is surgical rubber tubing.

5. A dynamic low impact plyometric resistance device comprising
   a tube having first and second end caps,
   an elongated dynamic weight disposed between said end caps in said tube and proportioned to permit limited reciprocating movement therein,
   a flexible cord interconnecting said first end cap and said weight, and
   a length of surgical rubber tubing interconnecting said second end cap and said weight whereby said weight is positioned generally intermediate the length of said tube and can move a limited restricted distance toward said second end cap due to said flexible cord but said weight can move a variable distance toward said first end cap in said tube due to induced inertial momentum of said weight stretching said surgical rubber tubing interconnection.

6. The dynamic low impact plyometric resistance device of claim 5 wherein said weight is provided with screw eyes disposed at opposite ends thereof and said end caps are provided with screw eyes disposed internally thereof, and said flexible and elastic cords are secured between opposing screw eyes.

7. The dynamic low impact plyometric device of claim 5 including a carrier in the form of a chest/backpack having straps attached to the upper end thereof which fit over an exerciser's shoulders and a waist belt secured to the lower end thereof which holds said pack close to the exerciser's body, said pack having a pocket for containing said device and supporting it in a vertical orientation, said pocket having a sealable flap for holding said device in said pocket.

8. The dynamic low impact plyometric device of claim 7 wherein said pack has a multiple of pockets for containing one or more of said devices.

9. A method for increasing the benefits of plyometric exercise by

   providing a dynamic low impact exercise device in the form of a dynamic weight suspended on an elastic cord in an elongated enclosure and tethered at the other end, carrying in said device generally vertically with said tethered end down while performing plyometric exercise whereby as the exerciser lands from a jump the elastic cord allows the suspended weight to move downward through a decelerated descent to a static point which is determined by the momentum of the weight and the force of impact upon landing and the amount of upward thrust applied by the user and the elasticity constant of the elastic cord whereby the exerciser increases in addition to his own body weight the amount of weight to be accelerated upward and the weight increase is compounded beyond that of the suspended weight and applied progressively as the upward stroke accelerates as a result of the elastic band allowing the dynamic weight to increase gradually to the maximum until the maximum acceleration of the exerciser is achieved as he moves his body upward.

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