ABDOMINAL STRENGTHENING APPARATUS

Abstract

An abdominal strengthening apparatus is an apparatus to allow a user to perform core abdominal muscle exercises from a seated position. The abdominal strengthening apparatus includes a stationary base, a tilting arm, a supporting member, a handlebar, and a foot-supporting bar. The tilting arm is pivotally mounted to the stationary base. The supporting member is pivotally mounted to the tilting arm. The foot-supporting bar supports the user’s feet and is positioned opposite to the supporting member. The handlebar is adjacent connected to the supporting member opposite to the tilting arm. In implementation, the user grasps the handlebar and exerts the user’s body weight onto the handlebar. The force on the handlebar forces the supporting member downward to lever the foot-supporting bar. Therefore, the user engages the user’s core muscles through use of the user’s body weight to strengthen the user’s core muscles.
ABDOMINAL STRENGTHENING APPARATUS


FIELD OF THE INVENTION

[0002] The present invention relates generally to an abdominal strengthening apparatus.

[0003] More specifically, the present invention relates to an apparatus which allows the user to perform a plurality of abdominal exercises to strengthen the upper and lower abdominal as well as the oblique muscles of the user.

BACKGROUND OF THE INVENTION

[0004] Exercise is an important aspect of maintaining a person’s general health. Exercise promotes confidence and provides energy to a person, as well as, tones and strengthen muscles. While a majority of exercises may be performed without the aid of equipment, exercise equipment assists in prompting proper form for performing the exercises. Proper form allows the person to gain the most from the exercises, as performing the exercise with proper form engages all of the targeted muscles for the exercise. Thus, the person is able to maximize the potential of their exercise.

[0005] Some may argue that core strength, abdominal and oblique muscles, is one of the most important muscle groups to strengthen. Having good core strength helps to prevent injuries, protects inner organs and the central nervous system, assuages back pains, promotes good posture, and gives a sense of confidence to a person.

[0006] The present invention is an abdominal strengthening apparatus to strengthen the core of the user. The present invention allows a user to perform sitting crunches. The present invention provides resistance to the sitting abdominal crunching motion in order to maximize the strengthening potential for exercising the user’s core muscles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective view for the simplest embodiment of the present invention.

[0008] FIG. 2 is a perspective view of the present invention including a resistance mechanism, wherein a rotation mechanism is integrated into the adjustable tube.

[0009] FIG. 3 is a side view of the present invention, wherein the second tubular portion is positioned between the first tubular portion and the tilting arm for storage or transportation.

[0010] FIG. 4 is top view of the configuration of the present invention as shown in FIG. 3.

[0011] FIG. 5 is a cross-sectional view for the connection between the tilting arm and the stationary base along the line 5-5 from FIG. 3.

[0012] FIG. 6 is a detailed cross-sectional view for the connection between the mounting rod and the adjustable tube from FIG. 2.

[0013] FIG. 7 is a side view of the present invention wherein the first tubular portion is tethered to the second tubular portion by a tension cord.

[0014] FIG. 8 is a side view of the present invention, wherein the magnetic sensor is connected to the stationary base, and wherein the permanent magnet is connected to the tilting arm.

[0015] FIG. 9 is a cross-sectional view for the connection between the tilting arm and the stationary base along the line 9-9 from FIG. 8.

[0016] FIG. 10 is a perspective view of the present invention, wherein the output display is connected to the handlebar 5.

[0017] FIG. 11 is a schematic view for the electronic connections for the magnetic sensor to transmit a signal to the computing device and subsequently to the output display as the permanent magnet imposes a magnetic field onto the magnetic sensor.

DETAIL DESCRIPTIONS OF THE INVENTION

[0018] All illustrations of the drawings are for the purpose of describing selected versions of the present invention and are not intended to limit the scope of the present invention.

[0019] The present invention is an abdominal strengthening apparatus. The present invention allows a user to properly perform crunches from a seated position and enhances the strengthening effect of core abdominal muscles through resistance. The core abdominal muscles targeted through the use of the present invention are the upper abdominal muscles, lower abdominal muscles, and oblique muscles.

[0020] In accordance to FIG. 1, the present invention comprises a stationary base 1, a tilting arm 2, a supporting member 3, a handlebar 4, and a foot-supporting bar 5. The stationary base 1 supports the present invention on a level ground or floor surface. The tilting arm 2 is pivotally connected to the stationary base 1. The pivotable connection is a fulcrum in order to allow the tilting arm 2 to move as a lever above the stationary base 1 during implementation of the present invention. The supporting member 3 allows the user to use their arms and shoulders to transfer force from the handlebar 4 to the tilting arm 2. The tilting arm 2 lifts the user’s legs, therefore forcing the user’s upper abdominal muscles and lower abdominal muscles to be engaged. The supporting member 3 comprises a mounting rod 20 and an adjustable tube 21. The mounting rod 20 connects the handlebar 4 to the tilting arm 2 through the adjustable tube 21. The mounting rod 20 is pivotally connected to the tilting arm 2 such that the orientation of the mounting rod 20 is maintained as the tilting arm 2 is depressed local to the mounting rod 20.

[0021] The adjustable tube 21 allows the user to change the length of the supporting member 3 to accommodate the height of the user. The adjustable tube 21 is telescopically engaged with the mounting rod 20 such that the user is able to adjust the length of the supporting member 3 between discrete heights. The adjustable tube 21 is positioned opposite to the tilting arm 2, along the mounting rod 20, such that the handlebar 4 is able to be conveniently accessed by the user. The handlebar 4 is adjacent connected to the adjustable tube 21 in order to allow the user to grasp the present invention and make use of the user’s own body weight to provide a downward force on the supporting member 3. The handlebar 4 is positioned opposite to the tilting arm 2 along the adjustable tube 21 in order to transfer the downward force along the supporting member 3. The foot-supporting bar 5 supports the user’s feet during implementation of the present invention. The foot-supporting bar 5 is perpendicular...
larly and adjacently connected to the tilting arm 2. The mounting rod 20 and the foot-supporting bar 5 are positioned opposite to each other along the tilting arm 2. As the downward force from the user is placed on the supporting member 3, the tilting arm 2 rotates about the pivotal connection with the stationary base 1 in order to simultaneously raise the foot-supporting bar 5. Thus, through the downward force from the user’s weight, the user’s knees are forced towards the user’s chest while the user’s chest is motioned towards the user’s knees, engaging the user in an abdominal crunching motion to engage the user’s core muscles.

[0022] In one embodiment of the present invention, the present invention comprises a rotation mechanism 6, as shown in FIG. 2. The rotation mechanism 6 allows the handlebar 4 to be rotated about the mounting rod 20, such that the user is able to engage the oblique muscles effectively by rotating the user’s torso during the abdominal crunching motion. The rotation mechanism 6 is mechanically integrated along the adjustable tube 21. The rotation mechanism 6 is positioned between the mounting rod 20 and the handlebar 4. A rotation axis 22 of the rotation mechanism 6 is collinear to the mounting rod 20. As the user grasps the handlebar 4 and presents the downward force onto the supporting member 3, the user is able to rotate the user’s torso from side to side in order to engage the oblique muscles during the abdominal crunching motion, strengthening the oblique muscles.

[0023] In another embodiment of the present invention, the present invention comprises a rotation mechanism 6, as shown in FIG. 9. The rotation mechanism 6 allows the supporting member 3 to be rotated, such that the user is able to engage the oblique muscles effectively by rotating the user’s torso during the abdominal crunching motion.

[0024] The mounting rod 20 is pivotally connected to the tilting arm 2 through the rotation mechanism 6. The rotation mechanism 6 is positioned opposite to the adjustable tube along the mounting rod. A rotation axis 22 of the rotation mechanism 6 is collinear to the mounting rod 20. As the user grasps the handlebar 4 and presents the downward force onto the supporting member 3, the user is able to rotate the user’s torso from side to side in order to engage the oblique muscles during the abdominal crunching motion, strengthening the oblique muscles as the supporting member 3 rotates along with the user’s motion.

[0025] In another embodiment of the present invention, the adjustable tube 21 comprises a first tubular portion 27 and a second tubular portion 28, as shown in FIG. 3, FIG. 4, FIG. 7, and FIG. 8. The first tubular portion 27 telescopically engages the mounting rod 20. The second tubular portion 28 is connected to the handlebar 4. In one embodiment of the adjustable tube 21, the first tubular portion 27 is hingedly and adjacently connected to the second tubular portion 28 such that the second tubular portion 28 is able to be position between the mounting rod 20 and the stationary base 1. The first tubular portion 27 and the second tubular portion 28 allow the adjustable tube 21 to be foldable for storage or transportation by allowing the handlebar 4 to be positioned between the stationary base 1 and the mounting rod 20.

[0026] In another embodiment of the adjustable tube 21, the present invention comprises a tension cord 12, as detailed in FIG. 7. The tension cord 12 tethers the first tubular portion 27 to the second tubular portion 28 to prevent the second tubular portion 28 from being disconnected from the first tubular portion 27 as the second tubular portion 28 is pulled away from the first tubular portion 27. The tension cord 12 comprises a first cord end 23 and a second cord end 24. The first cord end 23 is internally mounted to the first tubular portion 27. The second cord end 24 is internally mounted to the second tubular portion 28. Thus, the tension cord 12 allows the second tubular portion 28 to be dislodged from the first tubular portion 27 while preventing the second tubular portion 28 from being disconnected from the first tubular portion 27.

[0027] In accordance to the preferred embodiment of the present invention, the present invention comprises a pair of handgrips 7. The pair of handgrips 7 assists the user in maintaining the user’s grasp on the handlebar 4 during implementation of the present invention. The pair of handgrips 7 is fixed to the handlebar 4. The pair of handgrips 7 is positioned opposite to each other along the handlebar 4, such that the user comfortably grasps the handlebar 4 for implementation of the present invention.

[0028] Further in accordance to the preferred embodiment of the present invention, the present invention comprises a pair of foot pedals 8, as detailed in FIG. 2 and FIG. 4. The pair of foot pedals 8 assists in preventing the user’s feet from being dislodged from the foot-supporting bar 5 during implementation of the present invention. The pair of foot pedals 8 is adjacent to the foot-supporting bar 5. The pair of foot pedals 8 is positioned opposite to each other along the foot-supporting bar 5, such that the user’s feet engage the foot pedal 8 comfortably during implementation. In one embodiment of the present invention, the pair of foot pedals 8 is rotatably connected to the foot-supporting bar 5 such that the user’s feet are able to pivot as the foot-supporting bar 5 raises and lowers during implementation.

[0029] Still further in accordance to the preferred embodiment of the present invention, the stationary base 1 comprises a first base member 17, a second base member 18, and a mounting bracket 19, as exemplified in FIG. 2. The first base member 17 and the second base member 18 provide structural support for the present invention. The mounting bracket 19 supports the tilting arm 2. In accordance to FIG. 3, the first base member 17 is perpendicularly connected to the second base member 18. The second base member 18 is terminally positioned to the first base member 17, such that the first base member 17 and the second base member 18 form a stable base for the present invention. The mounting bracket 19 is centrally connected along the first base member 17. The tilting arm 2 is pivotally connected to the mounting bracket 19, such that the mounting rod 20 is able to translate towards or away from the stationary base 1 in order to allow the user to perform sitting crunches. The tilting arm 2 is positioned coplanar to the first base member 17 such that the tilting arm 2 is positioned above the first base member 17. The tilting arm 2 is connected to the mounting bracket 19 between the foot-supporting bar 5 and the mounting bracket 19, such that the mounting bracket 19 is a fulcrum for the tilting arm 2. In one embodiment of the mounting bracket 19, the mounting bracket 19 is permanently connected to the first base member 17, as shown in FIG. 3 and FIG. 5. The mounting bracket 19 is welded onto the first base member 17 in order to retain the connection between the mounting bracket 19 and the first base member 17.
In accordance to FIG. 8 and FIG. 9, another embodiment of the mounting bracket 19 is removably connected to the first base member 17. The removable connection between the mounting bracket 19 and the first base member 17 allows for the stationary base 1 to be disassembled and stored more conveniently. The configuration also allows the stationary base 1 to be modular such that the mounting bracket 19 is able to be replaced if the mounting bracket 19 were to fracture or otherwise inoperable. The mounting bracket 19 comprises a first bracket member, a second bracket member, and a pivoting pin 11. The first bracket member engages the second bracket member about the first base member 17. The tilting arm 2 being positioned between the first bracket member and the second bracket member such that the tilting arm 2 is able to pivot about the pivotable connection between the tilting arm 2 and the mounting bracket 19.

In another embodiment of the present invention, the present invention comprises an elastic resistance mechanism 9, in accordance to FIG. 2, FIG. 3, and FIG. 7 to FIG. 9. The elastic resistance mechanism 9 provides tension between the stationary base 1 and the foot-supporting bar 5. The elastic resistance mechanism 9 is mounted to the stationary base 1. The elastic resistance mechanism 9 is selectively tethered to the foot-supporting bar 5. In a more specific embodiment of the present invention, the elastic resistance mechanism 9 is mounted onto the first base member 17, as shown in FIG. 3, FIG. 7, and FIG. 8. As an example of this embodiment, the elastic resistance mechanism 9 is an elastic cord and a hook. The hook is adaptably connected to the first base member 17 opposite to the mounting bracket 19. The elastic cord is selectively tethered between the hook and the foot-supporting bar 5, such that the user is able to add or remove the resistance in accordance to their preference. In some embodiments, the elastic resistance mechanism 9 comprises a pulley. The pulley is mounted onto the second base member 18. The pulley rotatable engages the elastic cord in order to reduce friction and to redirect the direction of force along the elastic cord. As the foot-supporting bar 5 is forced away from the stationary base 1 as the user forces weight onto the mounting rod 20, the elastic cord resists the force from the user’s weight in order to engage the user’s core abdominal muscles to a greater extent than the user’s weight alone.

In another specific embodiment of the elastic resistance mechanism 9, the elastic resistance mechanism 9 is an elastic ring, as shown in FIG. 1, FIG. 2 and FIG. 9. The elastic resistance mechanism 9 is mounted across the second base member 18, such that the elastic ring is oriented parallel to the foot-supporting bar 5. A hook is centrally mounted onto the foot-supporting bar 5 and the hook is oriented towards the stationary base 1. The elastic ring is selectively engaged with the hook such that the user is able to add or subtract resistance in accordance to their preference by tethering the elastic ring to the hook or removing the elastic ring from the hook.

As an additional means of providing resistance to the user, one embodiment of the present invention allows the user to adjust the fulcrum point of the mounting bracket 19 onto the tilting arm 2. The present invention, therefore, comprises a pivoting pin 11, the mounting bracket 19 comprises a support aperture 25, and the tilting arm 2 comprises a plurality of moment-adjusting apertures 30, as shown in FIG. 3 and FIG. 5. The plurality of moment-adjusting apertures 30 allows the user to discretely adjust the fulcrum point along the tilting arm 2, such that the amount of force on the mounting rod 20 to raise the foot-supporting bar 5 is increased or decreased in accordance to the user’s preference.

The plurality of moment-adjusting apertures 30 laterally traverses into through the tilting arm 2. The plurality of moment adjusting apertures 30 is centrally positioned along the tilting arm 2. The plurality of moment-adjusting apertures 30 is positioned perpendicularly to the mounting rod 20. The plurality of moment-adjusting apertures 30 is offset from each other. A selected aperture of the plurality of moment-adjusting apertures 30 is concentrically positioned to the support aperture 25. The pivoting pin 11 engages the selected aperture and the support aperture 25 in order to support tilting arm 2 and allow the tilting arm 2 to pivot on the mounting bracket 19.

Further in accordance to the preferred embodiment of the present invention, the present invention comprises a locking pin 10, as shown in FIG. 6, in order to secure the adjustable tube 21 onto the mounting rod 20. The mounting rod 20 comprises a height-fixing aperture 29 and the adjustable tube 21 comprises a plurality of mounting apertures 26. The locking pin 10 secures the adjustable tube 21 onto the mounting rod 20 through an aperture of the plurality of mounting apertures 26 and the height-fixing aperture 29. The plurality of mounting apertures 26 laterally traverses through the adjustable tube 21. The plurality of mounting apertures 26 is positioned opposite to the handlebar 4 along the adjustable tube 21, and the plurality of mounting apertures 26 is offset from each other in order for the user to position the adjustable tube 21 at discrete heights. The height-fixing aperture 29 laterally traverses through the mounting rod 20. The height-fixing aperture 29 is positioned opposite to the tilting arm 2 along the mounting rod 20 in order to effectively engage the plurality of mounting apertures 26. The height-fixing aperture 29 is concentrically positioned to a selected aperture of the plurality of mounting apertures 26. The locking pin 10 engages the selected aperture and the height-fixing aperture 29 in order to secure the adjustable tube 21 at a discrete height for the user to comfortably implement the present invention.

In accordance to one embodiment of the present invention, the present invention comprises a magnetic sensor 13, a permanent magnet 14, and a computing device 15, as shown in FIG. 8 and FIG. 1. The magnetic sensor 13, the permanent magnet 14, and the computing device 15 allow the user to keep track of repetitions and time performing the exercise. In accordance to FIG. 8, the permanent magnet 14 is adaptably connected to the tilting arm 2. The permanent magnet 14 is positioned between the foot supporting bar 5 and the mounting bracket 19. The magnetic sensor 13 is mounted onto the stationary base 1. The magnetic sensor 13 is electronically connected to the computing device 15, as shown in FIG. 10. This configuration allows a magnetic field exerted by the permanent magnet 14 to be assessed by the magnetic sensor 13. The magnetic sensor 13, the permanent magnet 14, and the computing device 15 are in a repetition detection state when the permanent magnet 14 is positioned adjacent to the magnetic sensor 13 and the permanent magnet 14 is magnetically engaged with the magnetic sensor 13. When the magnetic sensor 13 and the permanent magnet 14 enter the repetition state detection state, the magnetic sensor 13 transmits an output to the computing device 15 to increment a repetition counter.
In one embodiment of the present invention, the present invention comprises an output display 16, as shown in FIG. 10 and FIG. 11. The output display 16 is electronically connected to the computing device 15 in order to display the repetition counter value or the elapsed exercise time to the user, as detailed in FIG. 11. In accordance to FIG. 10, the output display 16 is centrally connected to the handlebar 4 such that the user is able to easily view the number of repetitions for the exercise they have completed or the elapsed exercise time on the output display 16.

Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. An abdominal strengthening apparatus comprises:
   a stationary base;
   a tilting arm;
   a supporting member;
   a handlebar;
   a foot-supporting bar;
   the supporting member comprises a mounting rod and an adjustable tube;
   the tilting arm being pivotably connected to the stationary base;
   the mounting rod being pivotably connected to the tilting arm;
   the adjustable tube being telescopically engaged with the mounting rod;
   the adjustable tube being positioned opposite to the tilting arm, along the mounting rod;
   the handlebar being adjacent connected to the adjustable tube;
   the handlebar being position opposite to the tilting arm, along the adjustable tube;
   the foot-supporting bar being perpendicularly and adjacent connected to the tilting arm; and
   the mounting rod and the foot-supporting bar being positioned opposite to each other along the tilting arm.

2. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
   a rotation mechanism;
   the rotation mechanism being mechanically integrated along the adjustable tube;
   the rotation mechanism being positioned between the mounting rod and the handlebar; and
   a rotation axis of the rotation mechanism being collinear to the mounting rod.

3. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
   a rotation mechanism;
   the mounting rod being pivotably connected to the tilting arm through the rotation mechanism;
   the rotation mechanism being positioned opposite to the adjustable tube, along the mounting rod; and
   a rotation axis of the rotation mechanism being collinear to the mounting rod.

4. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
   the adjustable tube comprises a first tubular portion and a second tubular portion;
   the first tubular portion telescopically engaging the mounting rod; and
   the second tubular portion being connected to the handlebar.

5. The abdominal strengthening apparatus, as claimed in claim 4, comprises:
   the first tubular portion being hingedly and adjacent connected to the second tubular portion.

6. The abdominal strengthening apparatus, as claimed in claim 4, comprises:
   a tension cord;
   the tension cord comprises a first cord end and a second cord end;
   the first cord end being internally mounted to the first tubular portion; and
   the second cord end being internally mounted to the second tubular portion.

7. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
   a pair of handgrips;
   the pair of handgrips being fixed to the handlebar; and
   the pair of handgrips being positioned opposite to each other along the handlebar.

8. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
   a pair of foot pedals;
   the pair of foot pedals being adjacent connected to the foot-supporting bar; and
   the pair of foot pedals being positioned opposite to each other along the foot-supporting bar.

9. The abdominal strengthening apparatus, as claimed in claim 8, comprises:
   the pair of foot pedals being rotatably connected to the foot-supporting bar.

10. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
    the stationary base comprises a first base member, a second base member, and a mounting bracket;
    the first base member being perpendicularly connected to the second base member;
    the second base member being terminally positioned to the first base member;
    the mounting bracket being centrally connected along the first base member;
    the tilting arm being pivotably connected to the mounting bracket; and
    the tilting arm being positioned coplanar to the first base member.

11. The abdominal strengthening apparatus, as claimed in claim 10, wherein the mounting bracket is permanently connected to the first base member.

12. The abdominal strengthening apparatus, as claimed in claim 10, wherein the mounting bracket is removable connected to the first base member.

13. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
    an elastic resistance mechanism;
    the elastic resistance mechanism being mounted to the stationary base; and
    the elastic resistance mechanism being selectively tethered to the foot-supporting bar.

14. The abdominal strengthening apparatus, as claimed in claim 13, comprises:
    the stationary base comprises a first base member; and
    the elastic resistance mechanism being mounted onto the first base member.
15. The abdominal strengthening apparatus, as claimed in claim 13, comprises:
- the stationary base comprises a second base member; and
- the elastic resistance mechanism being mounted across the second base member.

16. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
- a locking pin;
- the mounting rod comprises a height-fixing aperture;
- the adjustable tube comprises a plurality of mounting apertures;
- the plurality of mounting apertures laterally traversing through the adjustable tube;
- the plurality of mounting apertures being positioned opposite to the handlebar along the adjustable tube;
- the plurality of mounting apertures being offset from each other;
- the height-fixing aperture laterally traversing through the mounting rod;
- the height-fixing aperture being positioned opposite to the tilting arm along the mounting rod;
- the height-fixing aperture being concentrically positioned to a selected aperture of the plurality of mounting apertures; and
- the locking pin engaging the selected aperture and the height-fixing aperture.

17. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
- a pivoting pin;
- the stationary base comprises a mounting bracket;
- the mounting bracket comprises a support aperture;
- the tilting arm comprises a plurality of moment-adjusting apertures;
- the plurality of moment-adjusting apertures laterally traversing through the tilting arm;
- the plurality of moment-adjusting apertures being centrally positioned along the tilting arm;
- the plurality of moment-adjusting apertures being positioned perpendicularly to the mounting rod;
- the plurality of moment-adjusting apertures being offset from each other;
- a selected aperture of the plurality of moment-adjusting apertures being concentrically positioned to the support aperture; and
- the pivoting pin engaging the selected aperture and the support aperture.

18. The abdominal strengthening apparatus, as claimed in claim 1, comprises:
- a magnetic sensor;
- a permanent magnet;
- a computing device;
- the permanent magnet being adjacent to the tilting arm;
- the permanent magnet being positioned between the foot-supporting bar and the mounting bracket;
- the magnetic sensor being mounted onto the stationary base; and
- the magnetic sensor being electronically connected to the computing device.

19. The abdominal strengthening apparatus, as claimed in claim 18, comprises:
- wherein the magnetic sensor, the permanent magnet and the computing device are in a repetition detection state;
- the permanent magnet is positioned adjacent to the magnetic sensor; and
- the permanent magnet being magnetically engaged with the magnetic sensor.

20. The abdominal strengthening apparatus, as claimed in claim 18, comprises:
- an output display;
- the output display being electronically connected to the computing device; and
- the output display being centrally connected to the handlebar.