A resistance-based exercise device is disclosed. The device may include a bar with one or more grips; a first connector at a first end of the bar; a second connector at a second end of the bar; an adjustable elongated member attached at one end to the first connector and at a second end to the second connector, the adjustable elongated member configured to be adjusted to change its length; a third connector slidably connected to the adjustable elongated member; and an anchor connected to the third connector and attachable to an immobile object.
RESISTANCE-BASED EXERCISE DEVICE

BACKGROUND

[0001] This application is directed toward an exercise device. More specifically, it is directed toward an exercise device that provides resistance based on a user's own body weight.

[0002] Numerous different types of exercise equipment are used today for weight training and cardiovascular workouts. Some of these exercise devices include heavy machinery and/or fixed large equipment. Other of these devices use one or more attached weights. Still other exercise devices allow a user to use his/her own body weight to serve as the load for training. These weight-free devices, generally referred to as resistance training equipment, often include elastic type bands or cords that provide resistance. Elastic devices, however, typically fail to provide a consistent amount of resistance when stretched to different lengths. These elastic devices also often cause users to perform unnatural movements in order to work on particular muscle groups.

[0003] At least one resistance-based exercise device is described in U.S. Pat. No. 7,044,896. This patent describes an anchor connected to two arms, each arm made of an inelastic, flexible material, and including handles at the end of each arm. The device described in the U.S. Pat. No. 7,044,896 patent has been commercialized and used for the TRX© training system. This type of device allows a user's hands or feet, when attached to the handles, to move freely in relation to each other and to move freely in any direction. As such, location of the individual handles of this type of device tends to be unstable. As a result, the amount of strength needed to use this type of equipment is substantial, and people who are not already physically fit or in top physical shape may struggle to perform the suggested exercises for this equipment and/or sustain injuries in performing exercises incorrectly.

[0004] Therefore, a resistance-based exercise device that provides greater stability and ease of use is desirable. A resistance-based exercise device that is easily portable is also desirable.

SUMMARY

[0005] The disclosed embodiments describe an exercise device that provides resistance based on a user's own body weight. The exercise device may be a portable device. The device provides stability that allows people having different abilities, from the novice to the expert, to benefit from a number of resistance-based exercises.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 depicts an exemplary portable resistance-based exercise device, according to one embodiment.

[0007] FIG. 2 shows an exemplary depiction of the device of FIG. 1, when connected to a fixed anchor and when stretched taut.

[0008] FIG. 3 depicts an exemplary connector used in a portable resistance-based exercise device, according to one embodiment.

[0009] FIGS. 4A-4C depict connectors of a resistance-based exercise device, according to different embodiments.

[0010] FIGS. 5A-5C depict exemplary anchor portions of a resistance-based exercise device, according to certain embodiments.

[0011] FIG. 6 depicts an exemplary type of upper-body exercise that can be performed using a resistance-based exercise device, according to certain embodiments.

[0012] FIG. 7 depicts another exemplary type of upper-body exercise that can be performed using a resistance-based exercise device, according to certain embodiments.

[0013] FIG. 8 depicts different exemplary exercises that can be performed using a resistance-based exercise device disclosed herein.

[0014] FIG. 9 depicts an additional exemplary portable resistance-based exercise device, according to one embodiment.

[0015] FIG. 10 depicts different exemplary exercises that can be performed using a resistance-based exercise device such as described in FIGS. 1 and 2 or FIG. 9.

[0016] FIGS. 11A and 11B depict an exemplary collapsible bar for a resistance-based exercise device, according to certain embodiments.

[0017] FIGS. 12A-12C depict another example of a collapsible bar for a resistance-based exercise device, according to certain embodiments.

[0018] FIG. 13 depicts an additional exemplary portable resistance-based exercise device, according to one embodiment.

DETAILED DESCRIPTION

[0019] The present disclosure now will be described more fully hereinafter with reference to the accompanying drawings, in which various embodiments are shown. The invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. In the drawings, the size and relative sizes of different elements may be exaggerated for clarity. Like numbers refer to like elements throughout.

[0020] FIG. 1 depicts an exemplary portable resistance-based exercise device 100, according to one embodiment. FIG. 2 shows an exemplary depiction of the device of FIG. 1, when connected to a fixed anchor and when stretched taut. As shown in FIGS. 1 and 2, exercise device 100 includes a first portion 110, a second portion 120, and a third portion 130, and also includes connectors, such as connectors 140a and 140b connecting the first portion 110 to the second portion 120, and connector 150 connecting the second portion 120 to the third portion 130.

[0021] The first portion 110 may include a rigid member, such as a bar, for example. In one embodiment, the first portion 110 may be held or engaged by a user when performing exercises. First portion 110 is also referred to herein as a string portion or member, engagement portion member, or holding portion or member. In one embodiment, the first portion 110 includes a bar 112 and includes grips 114.

[0022] The bar 112 may be a rigid bar, having a strength to support a person's full body weight. The bar 112 may be formed, for example, of one or more materials, including a lightweight metal, fiberglass, wood, and/or other strong and relatively lightweight material. The bar 112 may have a thickness sufficient to allow people having different sized hands to grip the bar (for example, approximately 1-inch diameter). The bar may have a length L1 sufficient to allow people having different heights and different length arms to grip the bar in a variety of positions from less than to greater than shoulder-width apart. For example, a bar 112 in an exercise device for children may have a length L1 of between about 2 feet and about 3 feet. A bar 112 in an exercise device for adults may
have a length $L_1$ of between about 3 feet and about 4 feet. In one embodiment, the bar is about 36 inches long. In another embodiment, a shorter bar is used that is about 24 inches long. A shorter bar may be more easily portable.

In one embodiment, the grips 114 may be formed by the surface of the bar 112 having a rough texture, such as by sandblasting, being painted with a paint/sand mixture, and/or being etched or grooved, to increase friction between a user's hands and the bar 112. A similar process may be performed on the outer surface of grips that are adhered to the surface of the bar 112. The grips 114 may be spaced at different locations along the bar to allow a user to use different holds on the bar for different types of exercise. For example, three grips 114 for each hand are shown in FIGS. 1 and 2. These are described herein as three sets of grips. In one embodiment, one set of grips may be positioned so that when held by an adult user of average height, the user's hands are shoulder-width apart. A second set of grips may be positioned so that when held by an adult user of average height, the user's hands are greater than shoulder-width apart. A third set of grips may be positioned only a few inches apart, so that when held by a user, they are less than shoulder-width apart. As an example, an inner set of grips may have ends facing each other that are touching or are spaced apart about 2-3 inches (e.g., less than 5 inches apart). A middle set of grips may have ends facing each other that are spaced apart about 14-16 inches (e.g., less than 20 inches apart). An outer set of grips may have ends facing each other that are spaced apart about 25-27 inches (e.g., less than 30 inches apart).

In one embodiment, each grip 114 may be integrally formed as part of the bar 112. In one embodiment, the grips 114 may be formed by the surface of the bar 112 having a rough texture, such as by sandblasting, being painted with a paint/sand mixture, and/or being etched or grooved, to increase friction between a user's hands and the bar 112. A similar process may be performed on the outer surface of grips that are adhered to the surface of the bar 112. The grips 114 may be spaced at different locations along the bar to allow a user to use different holds on the bar for different types of exercise. For example, three grips 114 for each hand are shown in FIGS. 1 and 2. These are described herein as three sets of grips. In one embodiment, one set of grips may be positioned so that when held by an adult user of average height, the user's hands are shoulder-width apart. A second set of grips may be positioned so that when held by an adult user of average height, the user's hands are greater than shoulder-width apart. A third set of grips may be touching or may be positioned only a few inches apart, so that when held by a user, they are less than shoulder-width apart. As an example, an inner set of grips may have ends facing each other that are touching or are spaced apart about 2-3 inches (e.g., less than 5 inches apart). A middle set of grips may have ends facing each other that are spaced apart about 14-16 inches (e.g., less than 20 inches apart). An outer set of grips may have ends facing each other that are spaced apart about 25-27 inches (e.g., less than 30 inches apart).

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In one embodiment, the sets of grips 114 are positioned to guide a user where to hold the bar when performing different types of exercises. For example, the inner grips can be used to exercise a particular muscle group, and middle and outer grips each to exercise other respective muscle groups. Although separate grips 114 are shown, in certain embodiments, other types of hand position indicators may be used to instruct a user where to place his/her hands for different exercises (e.g., a single grip having markings to indicate where to hold the bar for different exercises). The plurality of hand position indicators allow users to easily change between different types of exercises during a workout routine, and to perform the correct exercises based on the locations of the indicators. For example, a continuous length or the entire surface of bar 112 may be suitable for gripping. The bar 112 may have indicators to denote different gripping locations (which may correspond in location to grips 114), such as use of a particular color to denote a gripping location, alphanumeric indicia to denote different gripping locations, and/or pictures to denote gripping locations associated with different exercises.

Although the bar 112 is shown as a straight bar, it may be bent or curved in a way that still allows a user to perform various exercises, such as those discussed below. In addition, although the bar 112 is shown in FIGS. 1 and 2 as having a fixed length having a plurality of grips 114 for each hand, in one embodiment, the bar 112 may be an extendable and contractible bar (e.g., a telescoping bar, foldable bar with locking hinges, etc.), and may have fewer grips for each hand. For example, rather than having three separate grips for each hand to hold, the bar 112 according to one embodiment can have only one grip for each hand, and the positioning of the grip can be adjusted by extending or contracting the bar 112.

FIG. 11A shows an exemplary telescoping bar 112 example. In this example, telescoping bar 112 may include a central tube 112a, two opposite end tubes 112c constituting ends of the telescoping bar when extended, and two intermediate tubes 112b each being located between the central tube 112a and the opposite end tubes 112c (when the telescoping bar 112 is extended). The central tube 112a may provide locations and/or indicators (not shown) corresponding to the inner pair of grips 114, the end tubes 112c corresponding to the outer pair of grips 114, and intermediate tubes 112b for the intermediate pair of grips. Alternatively in one embodiment, the tubes can be locked in different positions, so that the bar 112 can be fully extended, fully contracted, or temporarily positioned in one embodiment, only the two opposite end tubes 112c include grips, and the location of the grips can be adjusted by expanding or contracting the bar 112.

FIG. 11B shows the telescoping bar 112 in a collapsed position, where intermediate tubes 112b have been collapsed around central tube 112a, and end tubes 112c have been collapsed around intermediate tubes 112b and central tube 112a. In this example, the telescoping bar 112 has the central tube 112a with a smaller diameter than the outer tube 112c. However, depending on the arrangement of grips 114 included in the bar 112 the central tube 112a may have a larger diameter than the outer tubes 112c such that the outer tube 112c and intermediate tubes 112b collapse within the central tube 112a.

FIGS. 12A, 12B and 12C show another example of a collapsible bar. Bar 112c may include a central portion 112d and may allow insertion of ends of two outer portions 112c into corresponding ends of central portion 112d (or vice versa) to create a substantially rigid elongated bar 112c. Grips 114 or indicators may also be elements of bar 112c as described elsewhere herein. The outer portions 112c may be fully detached from the central portion 112d as shown in FIG. 12B to allow the bar 112c to collapse as shown in FIG. 12C. An elastic cord 112f may be inserted through the middle of central portion 112d and ends of the elastic cord 112f may be connected to an interior of outer portions 112c to keep the portions 112d and 112c together and facilitate assembly. By making bar 112 collapsible, the exercise device 100 can be easily transported in a carrying case, such as a backpack, small suitcase, or gym bag, for example.

Referring again to FIGS. 1 and 2, the second portion 120 may include a flexible member, such as a strap, chain, or cord, for example. In one embodiment, the second portion 120 is an adjustable, elongated member and serves to support the weight of the user and to stabilize the exercise device 100 when used. As such, the second portion 120 may be referred
to herein as a flexible portion or member, elongated member or portion, support portion or member, adjustable member or portion, and/or stabilizing portion or member. For the below discussion, second portion 120 is referred to as an adjustable elongated member 120.

[0031] In one embodiment, adjustable elongated member 120 is formed of an inelastic material. This provides additional stabilization. For example, in one embodiment, adjustable elongated member 120 is formed of an inelastic, flexible strap 122 made of a synthetic or natural fiber (e.g., nylon, polypropylene, or other polymeric fibers). The strap 122 may use a material and webbing or other construction to give it sufficient strength to support the weight of a person. Other materials or constructions may be used, however, such as a rope, chain, wire, etc.

[0032] In one embodiment, adjustable elongated member 120 includes a single strap 122. The use of a single strap allows for a simple design and manufacturing process and greater ease of adjustment. However, multiple strips connected to each other can be used. In one embodiment, whether single or plural straps are used, the adjustable elongated member 120 can be adjusted in length to provide different sized configurations of the exercise device 100. In one embodiment, a first end 121a of the adjustable elongated member 120 is attached to a first connector (e.g., 140a, described in greater detail below), and a second end 121b of the adjustable elongated member 120 is attached to a second connector (e.g., 141b, described in greater detail below). The first end 121a may be, for example, stitched to form a loop that connects around part of a connector 140a. Alternatively, the first end 121a may be attached in other ways (e.g., via an adhesive, a snap, clasp, or other connector). In one embodiment, the first end 121a is fixedly attached to the connector 140a.

[0033] The second end 121b of the adjustable elongated member 120 may pass through the second connector 140b. In one embodiment, a device (e.g., strap 122) that forms the adjustable elongated member 120 may be slidably engaged with the connector to allow the length of the adjustable elongated member 120 (e.g., L2 = L3) to be changed.

[0034] For example, in one embodiment, a strap 122 attaches an adjustable elongated member 120 extending from a first end 121a connected to a first connector 140a to a second end 121b connected to a second connector 140b. A first end of the strap 122 may substantially coincide with a first end 121a of the adjustable elongated member 120 (e.g., strap 122 may be sewn into a loop at its first end to loop through a slot of first connector 140a). A second end 123 of the strap 122 may be attached to an adjustment mechanism 124. The adjustment mechanism 124 may be, for example, a buckle, such as a cam buckle, that in one position may slide along the length of an intermediate portion of strap 122, and in another position, may be locked to hold the adjustment mechanism 124 to a user selected position along the intermediate portion of strap 122. The strap 122 may form a loop between the second end 123 of the strap and the location of the adjustment mechanism 124 attached to the intermediate portion of strap 122 (e.g., the user selected position along the intermediate portion of strap 122 to which the adjustment mechanism 124 may be locked). This loop of strap 122 may slide through a slot of second connector 140b at a point which corresponds to the second end 121b of the adjustable elongated member 120. Although the adjustment mechanism 124 is shown in FIGS. 1 and 2 as being attached at a terminal end of the strap 122, the adjustment mechanism 124 may be attached to a portion of the strap 122 that is not the terminal end. To adjust the length of the adjustable elongated member 120, in one embodiment, a user may simply slide the adjustment mechanism 124 along the strap 122 and then lock it into place. Alternatively, a user may pull the strap 122 through the adjustment mechanism 124. By using such a strap and adjustment mechanism, the length of the adjustable elongated member can be easily adjusted. In this example, if a user wants to change exercises or change a resistance amount, the user can do so by adjusting only the length of the adjustable elongated member 120, which may be done by operation of only the adjustment mechanism 124 without the need to remove, disassemble, or replace any other parts of the exercise device 100.

[0035] Connectors 140a and 140b may include one or more different mechanisms that connect the first portion 110 (e.g., the rigid member) to the second portion 120 (e.g., the adjustable elongated member). For example, as shown in FIG. 3, in one embodiment, a connector 140 includes a ball and socket joint 142 and a loop 144 enclosed around a strap (or other device that forms the adjustable elongated member). For example, a connector 140 may be formed of a rigid, strong structure that includes a socket 142a at one end and a loop 144 (e.g., a slot) at the other. The socket and loop may be integrally formed. Alternatively, they may be separately formed and permanently or removably attached to each other. The socket may be connected to a ball 142a, which in one embodiment is permanently affixed to the bar 122. The connection between the ball 142a and socket 142b may be arranged to allow for some range of flexibility and movement of the ball and socket joint 142. For example, in one embodiment, the socket can be rotated about a central axis of the bar 122, and can also be tilted toward or away from the central axis of the bar 122. As an example, in one embodiment, the bar 122 can be rotated, relative to connectors 140, around its central axis an entire 360 degrees, and the connectors 140 can be tilted approximately 20° toward or 20° away from the central axis of the bar 122.

[0036] The joint that forms the connector 140 may also be arranged to provide for a desired amount of friction. Different known materials and constructions may be used to allow for a particular desired range of motion. For example, the ball and socket joint 142 may be formed of one or more materials including metal, plastic, and/or other natural or synthetic materials. Different mechanisms and materials, such as for example a Delrin® seal, may be used to reduce and/or control the friction in the connector 140.

[0037] The use of a ball joint or other joint allowing rotation around a central axis of the bar 122, combined with a friction that permits rotating of the bar freely but with some resistance, allows the bar to be rotated about its axis when performing exercises in a controlled manner. This allows the user to maintain the same wrist position during a particular exercise, even though the angle of the exercise device 100 with respect to the user’s body may be changing. As a result, injuries or joint pain due to improper gripping or improper wrist or elbow positioning can be reduced.

[0038] The loop 144 may be formed of a single part, for example, an opening in a metal structure, that surrounds the device (e.g., strap 122) that forms the adjustable elongated member 120. However, the loop 144 may also be formed of two or more moveable parts that together surround the adjustable elongated member 120 or otherwise hold it in place.
One or both of the connectors 140a and 140b can have a construction such as depicted in FIG. 3. One or both of the connectors 140a and 140b can also have other constructions. In one embodiment, both connectors 140a and 140b have identical constructions. In another embodiment, they have different constructions. In addition, in one embodiment, both connectors 140a and 140b are permanently affixed to the bar 122.

In one embodiment, as discussed previously, one of the connectors (e.g., 140a) is fixedly attached to an end of the adjustable elongated member 120. The end of the adjustable elongated member 120 may include a terminal end of a strap 122 placed through the loop 144 of the first connector 140a, which may be stitched, adhered, bolted, or otherwise closed on itself to attach to first connector 140a. The second connector 140b may be slidably engaged with the strap 122, to allow the strap 122 to freely adjust to change the length of the adjustable elongated member 120.

However, the exercise device 100 may have other configurations. For example, both connections between the strap 122 and the loop 144 (e.g., on each of connectors 140a and 140b at ends 121a and 121b of the adjustable elongated member 120) can be slidably engaged, so both ends of the adjustable elongated member 120 may be adjusted. Alternatively, the strap 122 can be fixedly attached to the loops 144 at both connectors 140a and 140b (e.g., by a stitched loop of the strap). In such a case, if an adjustable second portion 120 is not to be used, it can include other mechanisms for adjusting its length (e.g., another than a slidably engaged strap).

Third portion 130 may be an anchor configured to attach to an immobile object. In one embodiment, the anchor may include, for example, one or more flexible members 132, and one or more connection mechanisms 133. The one or more flexible members 132 may include, for example, a strap, cord, or other strong and flexible material. The one or more connection mechanisms 133 may include one or more snaps, clasps, carabiners, or other connectors that can lock in order to fasten the exercise device 100 to an immobile object. The anchor 130 may, for example, include a strap fixedly attached at one end to connector 150 (described in more detail below), and including at another end a connector that can connect to and lock with connector 150. For example, in one embodiment, connector 150 is a D-ring, and the end connector includes a snap or carabiner that can hook onto the D-ring to securely attach the anchor 130 to an immobile object.

As such, the anchor 130 can be used to attach the exercise device 100 to any sturdy object capable of holding the weight and stress exerted by a user (e.g., part of heavy exercise equipment, a ceiling hook or beam, a tree branch, etc.). Because the exercise device 100 is lightweight and includes a flexible anchor 130, it can be transported easily to and from the gym, within the house, outside to a park, or to other locations so that it can be attached and used virtually anywhere that there is a sturdy object to which it can be affixed.

Exemplary connectors 150 for connecting the adjustable elongated member 120 to the anchor 130 are depicted in FIGS. 4A, 4B, and 4C. In one embodiment, as shown in FIG. 4A, a connector 150a includes a D-ring 151a. The D-ring may be slidable along the length of the adjustable elongated member 120, and may be permanently attached to an end of the anchor 130, such as a strap 132 looped around the D-ring. In another embodiment, as shown in FIG. 4B, a connector 150b includes a D-ring 151a that connects to another D-ring 151b attached to a strap 132 that forms the anchor 130.

In another embodiment, as shown in FIG. 4C, a connector 150c includes a loop 152, a swivel 154, and a snap or clasp 156. In one embodiment, the loop 152 is slidably engaged with the adjustable elongated member 120, such as a strap 122. As described further below, this allows the length of the arms of the second portion 120, when used, to be easily adjusted and to be balanced without any additional manipulation from a user during performing exercises. The swivel 154 permits the strap 122 to be rotatably connected to the anchor, so that the placement of the anchor does not restrict the angle at which the exercise device 100 can be used. The connectors 150a-150c, described above may be formed, for example, of one or more metals.

Additional examples of anchors are depicted in FIGS. 5A-5C. As shown in FIG. 5A, in one embodiment, anchor 130 may include a flexible member 132, that attaches to connector 150, and attaches to another connector, such as connector 133. As such, one end of an anchor may be permanently connected to a first connector 150, such as a D-ring, and a second end of an anchor may be permanently connected to a second connector 133, such as a carabiner. In one embodiment, the second connector 133 is attachable to and detachable from the first connector. Flexible member 132 may be, for example, a strap. The strap may be formed of the same material and/or same type of webbing as a strap 122 used for the adjustable elongated member 120. However, other constructions, or other types of devices, such as a rope, chain, or wire may be used to form the flexible member 132. In one embodiment, flexible member 132 is formed of an inelastic material.

Connector 133 may be, for example, a carabiner, snap clip, or other device. Connector 133 may attach in a locked manner around connector 150, in order to anchor the exercise device 100 to an immobile object. Although not shown, flexible member 132 may include an additional D-ring or other connector fixedly attached to flexible member 132 between connector 150 and connector 133. As such, to attach around immobile objects having different sizes, flexible member 132 can be wrapped around the immobile object and can attach to one of the additional D-rings or the connector 150 for a closer fit. In another embodiment, flexible member 132 can be adjustable to have different lengths, to allow it to wrap around and attach to different-sized objects. In certain embodiments, anchor 130 may have a length between connector 133 and connector 150 sufficient to permit the anchor 130 to surround an immobile object having a thickness between, for example about 1 inch to about 6 inches. For example, the length between connector 133 and 150 may be between 1 and 2 feet (e.g., so that it can surround, for example, a bar or post having a thickness of about 1 inch, a piece of exercise equipment having a thickness of about 2-4 inches, or a tree branch or post having a thickness up to about 6 inches). Alternatively, to connect the anchor 130 to an immobile object, connector 133 can be directly attached to a hook or other connection mechanism on the immobile object. In one embodiment, though not shown, anchor may consist only of a connector 133, such that the connector 133 connects to connector 150 and to a hook or other connection mechanism on the immobile object, and does not include a flexible member 132.
FIG. 5B depicts an alternate exemplary anchor 130′, according to one embodiment. As shown in FIG. 5B, anchor 130′ may include a flexible member 132′, a connector 133′, and a securing member 134′. In one embodiment, flexible member 132′ is a flat thin strap. For example, it may be between about 1 mm and about 4 mm thick. In one embodiment, flexible member 132′ has a thickness that permits it to fit between a door and a door frame. Connector 133′ may be a lockable clip, carabiner, or clasp, that is attachable and detachable from a connector, such as connector 151α shown in FIG. 4B or connector 156 shown in FIG. 4C. Securing member 134′ may be a block, formed, for example, of rubber, urethane, plastic, or other material that is fixedly secured to flexible member 132′.

Anchor 130′ may be removably attachable to an adjustable elongated member, such as discussed above. One end of the anchor 130′ is configured to attach to the adjustable elongated member, and the other end of the anchor 130′ is configured to be placed in a doorway to secure the anchor to the doorway. For example, to anchor the exercise device using anchor 130′, a user places the securing member 134′ on the outside of a doorway near where the door meets the top door frame when closed. Then, the flexible member 132′ is positioned over the door and under the door frame, so that it remains between the door and the door frame. The flexible member 132′ is extended to the inside of the doorway, so that the connector 133′ is on the inside of the doorway. The connection point between the flexible member 132′ and the securing member 134′ may be the middle of the securing member 134′, so that when anchored to a doorway, part of the securing member 134′ rests against the door, and another part of the securing member 134′ rests against the door frame.

The anchor 130′ may attach to a doorway in the manner described above, thus functioning as a door hook. The connector 133′ can then be attached to a connector on the adjustable elongated member, and exercises can be performed with the exercise device securely supported in the doorway.

FIG. 5C depicts an alternate exemplary anchor 130′, according to one embodiment. As shown in FIG. 5C, anchor 130′ may include a flexible member 132′, a first connector 133′, and a second connector 134′. Flexible member 132′ and first connector 133′ may be the same or similar to flexible member 132′ and connector 133′ shown in FIG. 5B, so a detailed discussion of connector 133′ and flexible member 132′ is omitted here. Second connector 134′ may include a connector configured to connect to first connector 133′. For example, second connector may be a ring, such as a D-ring, to which first connector 133′ can be removably attached. As such, anchor 130′ can be removably attached to an immobile device, and can also be removably attached to itself in order to anchor to the immobile device.

Although the connectors 140a, 140b, and 150 are described separately in relation to portion 110, second portion 120, and third portion 130, the connectors may be considered to be part of the first, second, or third portions 110, 120, or 130. For example, connector 150 may permanently affixed to second portion 120 to make it part of second portion 120, or may be permanently affixed to third portion 130 to make it part of third portion 130 (e.g., it can be considered to be part of an anchor, or part of a flexible support portion). As another example, connectors 140a and 140b may be permanently affixed to the first portion 110 and the second portion 120, or part of each connector (e.g., part of a joint or connection device) can be permanently affixed to the first portion 110 and another part of each connector (e.g., the other part of the joint or connection device) can be permanently affixed to the second portion 120.

Referring back to FIG. 2, when used for certain exercises, the exercise device 100 can be extended to a taut position, such that the support portion 120 includes two arms 122a and 122b that are substantially straight. In one embodiment, when a user uses the exercise device 100, the two arms 122a, 122b, and the handling portion 110 (e.g., a bar) form a triangle shape. One arm 122a has a length L3, a second arm 122b has a length L3, and the handling portion 110 has a length L3. In one embodiment, where a connector 150 is used that is slidingly engaged with the support portion 120, a user can easily grasp two grips equidistant from the center of the handling portion 110, and can adjust and balance the exercise device 100 so that the arms 122a and 122b are substantially the same length (i.e., L3 = L3), thereby forming an isosceles triangle shape with the handling portion 110. This provides additional stability.

Because a rigid member, such as bar 112, is connected between a user’s hands when the user grips the bar, the exercise device 100 has a greater stability than devices that have separate freely moving handles for each hand. As a result, the exercise device 100 allows users to perform a range of exercises from easier to more difficult.

As discussed earlier, the exercise device 100 may include an adjustment mechanism 124, such as a buckle. As a result, the lengths L2 and L3, as well as the angles a2 and a3, can be easily adjusted using a single adjustment mechanism. As will be discussed below, the ease at which the length of the support portion 120 can be adjusted, the stability the handling portion 110 provides, the versatility the anchor 130 provides, and the portability of the exercise device 100, each allow the exercise device 100 to be used in a variety of locations and for a variety of exercises. In addition, because of its construction and lack of the need for weights, the entire exercise device 100 can be easily transported (e.g., an exemplary weight of the device is between about 5 and 10 pounds).

Examples of setups for two types of exercises that can be performed with the exercise device 100 are shown in FIGS. 6 and 7. FIG. 6 shows a setup for an upper body pull-type exercise using an exercise device 100 with a bar, and FIG. 7 shows a setup for an upper body push-type exercise using an exercise device 100 with a bar.

As shown in FIG. 6, in certain embodiments, a user can set up the exercise device 100 by connecting it to an immobile object (e.g., heavy exercise equipment, a sturdy hook, a tree branch, etc.). The connection point where the anchor connects to the object (anchor point A) may be, for example, from about head height to about 2 feet above head height. For example, in one embodiment, the anchor point A is at a height H about 5-7 feet high, depending on the height of the user. The user may adjust the length of a support member 120 so that a distance between the bar 112 and the anchor has a desired length L4. The length L4 may be selected to be, for example, between about 3 feet and about 6 feet. The length of the support member 120 may be selected to be, for example, between about 8 feet and about 12 feet. The user then stands on the opposite side of the bar 112 from the anchor point A, positions his or her body at an angle a2 with respect to the ground, and exerts a pulling force on the bar 112. The angle between the taut exercise device 100 and the ground is shown as a2. The user selects a desired grip set to grip, and can
use an overhand or underhand grip on the bar 112. The user can perform a number of different exercises for a number of different muscle groups simply by adjusting the length \( L_{14} \), the angles \( a_1 \) and \( a_2 \), the grips used, and even the height \( H \) (by using a different object for anchoring).

[0057] As shown in FIG. 7, similar to FIG. 6, the connection point where the anchor connects to the object (anchor point A) may be, for example, from about head height to about 2 feet above head height. For example, in one embodiment, the anchor point A is at a height H about 5-7 feet high, depending on the height of the user. The user may adjust the length of a support member 120 so that a distance between the bar 112 and the anchor has a desired length \( L_{14} \). The length \( L_{14} \) may be greater than the length associated with FIG. 6 of \( L_{14} \) because the user needs to stand between the bar 112 and the anchor point A. For example, \( L_{14} \) may be selected to be, for example, between about 5 feet and about 7 feet. Similarly, the length of the support member 120 may be selected to be greater than the length associated with FIG. 6, such as between about 10 feet and about 14 feet. The user then stands between the bar 112 and the anchor point A, positions his or her body at an angle \( a_1 \) with respect to the ground, and exerts a pushing force on the bar 112. The angle between the taut exercise device 100 and the ground is shown as \( a_2 \). The user selects a desired grip set to grip, and can use an overhand or underhand grip on the bar 112. The user can perform a number of different exercises for a number of different muscle groups simply by adjusting the length \( L_{14} \), the angles \( a_1 \) and \( a_2 \), the grips used, and even the height \( H \) (by using a different object for anchoring).

[0058] As discussed above, by using, for example, a single cam buckle and a slidable connector between the support portion 120 and the anchor 130, adjusting the exercise device 100 needs only a single adjustment, which allows a user to perform a range of exercises for all different body parts and muscle groups in an exercise session.

[0059] FIG. 8 depicts different exemplary exercises that can be performed using a portable resistance-based exercise device disclosed herein. The exercises shown in FIG. 8 primarily work the upper body, including chest, arms, shoulders, and back.

[0060] As shown in example (a), a user performs a pull-type exercise holding the bar about chest height. An underhand grip is shown. This stance can be used, for example, to focus on exercising muscles of the back and shoulders. For example, row-type exercises can be performed. The bar can be raised or lowered (e.g., by changing the angle between the extended exercise device and the ground) for each exercise set to exercise different muscle groups and to change the amount of resistance. For example, a ground-to-extended device angle may range from about 30° to about 45°. The user's body angle can also be adjusted to change the amount of resistance or the muscle groups exercised. The grips used can additionally affect the muscle groups exercised.

[0061] As shown in example (b), a user performs a pull-type exercise holding the bar about chest height. An underhand grip is shown, as opposed to the underhand grip depicted in example (a). This stance can be used, for example, to vary the muscle groups exercised in example (a) while performing similar exercises.

[0062] As shown in example (c), a user performs a pull-type exercise holding the bar about head height or slightly higher. An underhand grip is shown, though an underhand grip can also be used to exercise a different muscle group. This stance can be used, for example, to focus on exercising muscles of the arms, such as the biceps. In one embodiment, the length of the elongation member may be increased compared to exercises (a) and (b) to allow for a ground-to-extended device angle to be more appropriate for this exercise. For example, a ground-to-extended device angle may range from about 10° to about 20°. The user's body angle can also be adjusted to change the amount of resistance or the muscle groups exercised. The grips used can additionally affect the muscle groups exercised.

[0063] As shown in example (d), a user performs a more difficult pull-type exercise by placing the user's feet on a vertical support (e.g., a wall, tree), and holding the exercise device at an angle that is closer to 90° with respect to the ground. For example, a ground-to-extended device angle for these exercises may range from about 60° to about 80°. The length of the elongation member may be increased compared to exercises (a)-(b) and/or (c) to allow the bar to reach closer to the ground for this exercise. An overhand or underhand grip can be used, and the bar can be held near a chest level. A user in this position can perform exercises that are more like pull-ups than in the embodiments shown in examples (a)-(c).

[0064] In the examples (a)-(d) described above, for certain exercises, the user holds the bar of the exercise device to remain in substantially the same location while the user performs an exercise set. This is made more easy through the use of the exercise device 100 described herein. For example, because both hands hold a single rigid member and do not move in relation to each other, the user's hands need not exert a transverse force toward or away from each other or up and down in relation to each other in order to maintain balance. The user therefore does not need to independently balance each hand when performing exercises using the exercise device 100 described herein.

[0065] As shown in example (e), a user performs a push-type exercise holding the bar about chest height. An overhand grip is shown. This exercise can be used, for example, to focus on exercising muscles of the chest, arms, and shoulders. For example, push-type exercises can be performed that exercise pectoral muscles. The bar can be raised or lowered (e.g., by changing the angle between the extended exercise device and the ground) for each exercise set to exercise different muscle groups and to change the amount of resistance. For example, a ground-to-extended device angle may range from about 30° to about 45°. The user's body angle can also be adjusted to change the amount of resistance or the muscle groups exercised. The hand grips used can additionally affect the muscle groups exercised.

[0066] As shown in example (f), a user performs a push-type exercise holding the bar about head height, or just above head height. An overhand grip is shown, though an underhand grip can also be used to exercise a different muscle group. This exercise can be used, for example, to focus on exercising muscles of the arms, such as triceps muscles. It also may be used to exercise the abdominal muscles. The bar can be raised or lowered (e.g., by changing the angle between the extended exercise device and the ground) for each exercise set to exercise different muscle groups and to change the amount of resistance. In these exercises, for example, a ground-to-extended device angle may range from about 0° to about 20°. The user's body angle can also be adjusted to change the amount of resistance or the muscle groups exercised. The hand grips used can additionally affect the muscle groups exercised.
As can be seen from the discussion above, by simply adjusting the length of an elongation member connected between ends of a bar, and adjusting a user’s body position, an entire exercise routine can be performed including a number of different exercises, and using different amounts of resistance. By including a bar or other rigid member that allows a user’s hands to remain in the same position in relation to each other, the types of exercises that can be performed are generally easier to perform, while still providing for a large range of resistance values. In addition, because the exercise device is easily portable and attachable to different objects, a user can perform an exercise routine at any convenient location.

FIG. 9 depicts an additional exemplary portable resistance-based exercise device 100, according to one embodiment. As shown in FIG. 9, the first through third portions of the exercise device can be the same as the first through third portions described in connection with FIGS. 1 and 2. Therefore a repetitive discussion of first through third portions is not needed. The exercise device 100 of FIG. 9 includes a fourth portion 160. Fourth portion 160 may be used as a holding mechanism, for holding one or more parts of a user’s body. As such, fourth portion 160 is also referred to herein as a holding member 160.

Holding member 160 may include one or more holding devices, such as a foot strap 162, and/or a handle 164. In addition, holding member may include a plurality of connectors (e.g., 166a and 166b) that connect the holding device(s) to a rigid member (e.g., a bar) of the exercise device 100.

In one embodiment, foot strap 162 is formed of a strap and a padding attached to the strap. The foot strap 162 may have a size sufficient to hold two feet of a user, either at the back heel or ankle, or at the front ankle. The foot strap 162 may hang from two connection points on the rigid member, and may form a curved shape when hung. The foot strap 162 may have a rectangular or oval shape. For example, in one embodiment, when flat, foot strap 162 is between 12 and 16 inches long, and between 4-5 inches wide. Foot strap may be formed of materials such as polyurethane, cotton, or other fabrics, and may include paddings to better cushion the heel or ankle when used.

Each connector 166a and 166b may include one or more parts to secure the foot strap 162 to the bar. For example, each connector 166a and 166b may include a screw eye 167 affixed to the bar, and a snap 168 connected to the screw eye and to the foot strap 162 (e.g., the snap can be a swivel snap having a loop on one end that connects to the foot strap 162 and a spring snap on the other end that connects to the screw eye). In one embodiment, connectors 166a and 166b are symmetrical about the center of the bar, to allow for precision balancing when using the foot strap 162 and/or the handle 164.

The handle 164 may be formed of similar material as the foot strap 162, and may also include padding for cushioning. Handle 164 may be in the form of a strap. Handle 164 may have a size sufficient to allow a user to hold the handle 164 with one hand, or to place one foot in the handle. For example, it may have a length of about 5-8 inches. The handle 164 may be connected to the foot strap 162 using, for example, stitching, and may be reinforced with additional straps 169a, 169b, that are attached to the foot strap (e.g., via stitching). The handle 164 may also be symmetrical about the center of the foot strap 164 and the bar to allow for balanced exercises.

FIG. 10 depicts three different exemplary exercises that can be performed using a portable resistance-based exercise device such as described in FIG. 9, and one additional exercise that can be performed using either the device of FIG. 9 or the device of FIGS. 1 and 2. In addition, it should be noted that the exercises described above in connection with FIGS. 6-8 can also be performed using the device of FIG. 9.

As shown in example (a) of FIG. 10, a user may use the handle 164 to perform exercises using only one arm. For example, a number of different pull-type exercises using the right and left arms separately may be performed. Because of the balanced design of the exercise device 100 and because of the use of inelastic materials, stability is increased. As a result, exercises can be more easily performed than when resistance exercise devices having a handle attached to a single length of rope or strap is used. Adjustments to the length and angle of the exercise device 100, as well as the angle of the user’s body, allow the user to perform different types of one-armed exercises in example (a). In certain embodiments, a ground-to-extended device angle may range from about 30° to about 45° when performing one-armed exercises.

As shown in examples (b) and (d) of FIG. 10, a user may place both feet in the foothold 162 to perform certain exercises that work the body core, such as abdominal muscles and back muscles. In example (b), a user lies with her back facing the floor, and may rest on both forearms. The user then places her feet in the foothold 162 by resting her heels or back of ankles on the foothold 162. The user may then start in a plank position, and may pull her legs toward her chest. For these exercises, the bar may not remain in about the same place throughout the exercise, but may move with the user’s feet. A ground-to-extended device angle used for this exercise may begin at about 90°, and may change to about 60° when the user’s legs are maximally bent.

In example (d), a user lies with her front facing the floor, and supports her body with her outstretched hands, or optionally with her forearms. The user then places her feet in the foothold 162 by resting the front of her ankles on the foothold. The user may start in a plank position, and may pull her legs toward her chest. For these exercises, the bar may not remain in about the same place throughout the exercise, but may move with the user’s feet. A ground-to-extended device angle used for this exercise may begin at about 90°, and may change to about 60° when the user’s legs are maximally bent. Although not shown, handle 164 may be used for additional single-leg exercises by a user placing one foot in the handle and performing exercises in that position.

In example (c), a user performs squats while holding onto a bar of the exercise device 100 (or 100′). By using the exercise device 100 for assistance while performing squats, a user can relieve pressure on the knees, and can also maintain the correct squat position. Therefore, exercise device 100 may be used to assist users in particular exercises that require balancing. The device 100 may both serve as a balance, and also serve to reduce the amount of weight or pressure on a user’s joints, such as the knees.

The exercises described above in FIGS. 8 and 10 are exemplary only. A number of additional exercises can also be performed using the exercise device described herein. By using the exercise device of the present disclosure, which includes a number of advantageous features, users can perform entire resistance-based exercise routines with a single portable device that can be easily adjusted for the different
exercises of the routine. The exercise device provides a balanced, stable, and evenly distributed amount of resistance that can be easily adjusted by the user to perform a variety of exercises having different resistance amounts.

[0079] FIG. 13 depicts an additional exemplary portable resistance-based exercise device, according to one embodiment. As shown in FIG. 13, different devices can be connected to the bar 112 to allow for different exercises to be performed. For example, in one embodiment, triceps ropes or adaptors 162 including a rope attached to a ball at one end can be connected to an attachment mechanism 167 on the bar 112. These additional devices can include a connector 168 such as a clip, snap, or clasp to connect to the attachment mechanism 167 on the bar 112.

[0080] It will be understood in this specification that when an element is referred to as being “connected” or “coupled” to or “on” another element, it can be directly connected or coupled to or on the other element or intervening elements may be present. In contrast, when an element is referred to as being “directly connected” or “directly coupled” to another element, there are no intervening elements present.

[0081] As used herein, the term “and/or” includes any and all combinations of one or more of the associated listed items and may be abbreviated as “/”.

[0082] It will be understood that, although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. Unless indicated otherwise, these terms are only used to distinguish one element from another. For example, a first connector could be termed a second connector, and, similarly, a second connector could be termed a first connector without departing from the teachings of the disclosure.

[0083] As used herein, the singular forms “a”, “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” or “includes” and/or “including” when used in this specification, specify the presence of stated features, regions, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, regions, integers, steps, operations, elements, components, and/or groups thereof.

[0084] Embodiments described herein will be described referring to different views by way of ideal schematic views. Accordingly, the exemplary views may be modified depending on manufacturing technologies and/or tolerances. Therefore, the disclosed embodiments are not limited to those shown in the views, but include modifications in configurations formed on the basis of manufacturing processes. Therefore, regions exemplified in figures have schematic properties, and shapes of regions shown in figures exemplify specific shapes of regions of elements, and the specific properties and shapes do not limit aspects of the invention.

[0085] Spatially relative terms, such as “beneath,” “below,” “lower,” “above,” “upper” and the like, may be used herein for ease of description to describe one element’s or feature’s relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as “below” or “beneath” other elements or features would then be oriented “above” the other elements or features. Thus, the term “below” can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

[0086] Terms such as “same,” “planar,” or “coplanar,” as used herein when referring to orientation, layout, location, shapes, sizes, amounts, or other measures do not necessarily mean an exactly identical orientation, layout, location, shape, size, amount, or other measure, but are intended to encompass nearly identical orientation, layout, location, shapes, sizes, amounts, or other measures within acceptable variations that may occur, for example, due to manufacturing processes.

[0087] The term “permanently” as used herein is intended to convey a permanence within the context of the device’s typical use. Therefore, an attachment may be described as a permanent attachment, even though it can, technically speaking, be detached by breaking a solid structure or cutting a stitched or webbed fabric.

[0088] The term “inelastic” as used herein is intended to convey either no elasticity, or an amount of elasticity that is negligible in the context of the objects, materials, and actions being described. For example, a member, such as a strap, described as inelastic and including a webbing made of a polymer may have some amount of minimal elasticity to prevent the strap from breaking when stress is applied, but does not allow for significant stretching when used that would affect the nature of the exercises performed.

[0089] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and/or the present application, and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

1. A resistance-based exercise device, comprising:
   a bar including one or more grips;
   a first connector at a first end of the bar;
   a second connector at a second end of the bar;
   an adjustable elongated member attached at one end to the first connector and at a second end to the second connector, the adjustable elongated member configured to be adjusted to change its length;
   a third connector slidably attached to the adjustable elongated member; and
   an anchor connected to the third connector and attachable to an immobile object.

2. The device of claim 1, wherein:
   the adjustable elongated member is formed of a strap that can be adjusted using a single adjustment mechanism.

3. (canceled)

4. The device of claim 1, wherein the adjustable elongated member is a flexible, inelastic strap.

5. The device of claim 1, wherein:
   the bar is rotatable about its central axis in relation to the adjustable elongated member.

6. The device of claim 1, wherein:
   the bar includes a plurality of grip sets, each grip set including two grips symmetrically disposed about the center of the bar.
7. The device of claim 6, wherein:
a first grip set of the plurality of grip sets includes grips
having facing ends less than 30 inches apart; and
a second grip set of the plurality of grip sets includes grips
having facing ends less than 20 inches apart.
8. The device of claim 1, wherein:
the adjustable elongated member is adjustable to have a
length between about 8 feet and about 14 feet.
9. The device of claim 8, wherein:
the bar has a length between about 3 feet and about 4 feet.
10. The device of claim 1, further comprising:
one or more holding devices attached to the bar and sym-
metrically arranged about the center of the bar.
11. The device of claim 10, wherein:
the one or more holding devices includes a foothold con-
figured to allow two feet of a user to rest in the foothold.
12. The device of claim 1, wherein the anchor includes a
flexible portion configured to surround an object having a
thickness between about 1 and about 6 inches.
13. A resistance-based exercise device, comprising:
a rigid member;
a first connector at a first end of the rigid member;
a second connector at a second end of the rigid member;
an adjustable elongated member attached at one end to the
first connector and at a second end to the second con-
ector, the adjustable elongated member configured to be
adjusted to change its length;
an anchor for connecting the adjustable elongated member
to an immobile object.
14. The device of claim 13, wherein:
the rigid member is a bar.
15. The device of claim 13, further comprising:
a third connector slidably attached to the adjustable elon-
gated member.
16. The device of claim 15, wherein:
the anchor includes a fourth connector connected to a strap,
the strap connected to the third connector; and
the fourth connector is configured to be attached and
detached to the third connector to anchor the device to an
immobile object.
17. (canceled)
18. The device of claim 13, wherein:
the anchor is removably attachable to the to the adjustable
elongated member.
19-20. (canceled)
21. The device of claim 13, wherein:
the adjustable elongated member is formed of a flexible,
inelastic strap that can be adjusted using a single adjust-
ment mechanism.
22-23. (canceled)
24. The device of claim 13, wherein:
the rigid member is a bar rotatable about its central axis in
relation to the adjustable elongated member.
25. The device of claim 24, wherein:
the bar includes a plurality of hand location indicator sets,
each hand location indicator set including two hand
location indicators symmetrically disposed about the
center of the bar.
26. The device of claim 25, wherein:
a first hand location indicator set of the plurality of hand
location indicator sets includes grips having facing ends
less than 30 inches apart; and
a second hand location indicator set of the plurality of hand
location indicator sets includes grips having facing ends
less than 20 inches apart.
27. The device of claim 13, wherein:
the device is portable.
28-33. (canceled)
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