STRENGTH TRAINING DEVICES FOR SKATERS

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ABSTRACT
The present invention relates to methods and devices for conditioning and the development of strength, particularly for skaters, while maintaining proper skating mechanics. In one aspect, the present invention provides a strength training device for skaters. The device includes a hollow receptacle defining a first chamber in fluid communication with a first opening for placement and removal of fluid within the first chamber. The device further includes a friction surface disposed proximate a bottom member of the hollow receptacle. The device also includes an engagement feature for releasable engagement with a controller suitable for causing movement of the device, wherein during movement the friction surface generates a reactionary counter-force.
Fig - 3a

Fig - 3b
STRENGTH TRAINING DEVICES FOR SKATERS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims benefit of U.S. Provisional Patent Application No. 61/300,234, filed Feb. 1, 2010, the contents of which are hereby incorporated by reference in their entirety for all purposes.

FIELD OF THE INVENTION

[0002] The present invention relates to methods and devices for conditioning and the development of strength, particularly for skaters, while maintaining proper skating mechanics.

BACKGROUND

[0003] Individuals desiring to play hockey must first attain a minimal level of skating in order to participate in the sport. Players seeking to perform at higher levels, whether novice, intermediate or experienced, must continually practice and develop their skating skills. Such skating skills may comprise, starting, stopping, edge work, transitioning, etc. All of these skating skills are dependent upon the development of muscles, particularly leg muscles.

[0004] As hockey players rely on timing and speed, one particular skating skill necessary to achieve higher levels of play is acceleration. Acceleration development is generally based upon two factors, skating skill and strength. While skills may be achieved through repetitious drills, strength must be achieved by breaking down muscle fibers through resistance training. Much of the resistant training, other than general skating, is performed through off-ice exercises, e.g. biking, running and the use of certain large, complicated and expensive off-ice skating devices. However, little has been done to develop on-ice strength training while maintaining the natural dynamic movement of the skater.

[0005] One on-ice device used for the development of skating strength comprises large resilient ropes, such as large bungee cords, fixed at one end and coupled to the waist of a skater at the other end. As the skater moves along the length of the ice, resistance is continually increased until the skater can no longer move. While this does provide a level of resistant training, often the natural stride of the skater, particularly the stride of a stick handling hockey player, is altered. Also, the distance of strength training is limited by the length of the resilient rope. Another on-ice training device comprises small parachutes configured for capturing air traveling about the skater to provide resistance. However, such parachutes are time consuming in attachment. More so, these parachutes often collapse during low speeds and in turns and thus provides little to no resistance.

[0006] Other devices utilized for hockey skill development, includes weighted objects that can be pushed along an ice surface, via a hockey stick. Such devices have included weighted pucks, tires and other heavy objects. However, these devices have several inherent problems. First, as the player reaches a maximum speed, usually within 3 to 5 strides, the weighted object has little resistance to movement and easily glides along the ice surface. Second, once these weighted objects obtain maximum speed, they become difficult to control. Third, due to the large weight differences between skaters, e.g. around a 30 lb to 250 lb, different weighted or resistant devices must be used.

[0007] In view of the foregoing, there is a need for improved methods and devices for developing skating strength, while maintaining the natural stride of the skater, particularly a hockey player.

SUMMARY OF THE INVENTION

[0008] The present invention provides methods and devices for strength training of skaters, particularly hockey players. In one aspect, the present invention provides a device configured for engagement with a hockey stick, or other control device, for providing resistance to a skater, via the hockey stick or controller, while providing the ability of the skater to maintain a natural skate stride. The device of the present invention may be used on various surfaces such as ice, plastic, concrete or otherwise.

[0009] In one embodiment, the present invention provides a strength training device for skaters. The device includes a hollow receptacle defining a first chamber in fluid communication with a first opening for placement and removal of fluid within the first chamber. The device further includes a friction surface disposed proximate a bottom member of the hollow receptacle. The device also includes an engagement feature for releasable engagement with a controller suitable for causing movement of the device, wherein during movement the friction surface generates a reactionary counter-force.

[0010] In another embodiment, the present invention provides a strength training device for skaters. The device includes a hollow plastic receptacle having an upper member, a lower member and a plurality of side members extending between the upper and lower members. The hollow plastic receptacle defines a chamber in fluid communication with an opening for placement and removal of fluid within the chamber. The device further includes a friction surface disposed on the bottom member of the receptacle. The friction surface includes a plurality of friction members disposed apart and extending along a width of the device. The friction surface further includes a friction coating formed of rubber and abrasive material. The device also includes an engagement feature configured for engagement with a blade of a hockey stick. The engagement feature includes an opening extending between a front portion and rear portion of the device.

[0011] In yet another exemplary embodiment, the present invention provides a strength training device for skaters. The device includes a triangular hollow plastic receptacle having an upper member, a lower member and a plurality of side members extending between the upper and lower members. The hollow plastic receptacle defines a chamber in fluid communication with an opening for placement and removal of fluid within the chamber. The device further includes a friction surface integrally formed on the bottom member of the receptacle. The friction surface includes a plurality of friction members disposed apart and extending along a width of the device. The friction surface further includes a friction coating formed of rubber and abrasive material. The device further includes an engagement feature configured for engagement with a blade of a hockey stick. The engagement feature comprises an opening extending between a front portion and rear portion of the device. The device further includes an alignment guide for stacking and maintaining the position of another strength training device on the upper member. The alignment guide comprises one or more projections and one or more recesses formed on the upper member. The device
also includes a handle integrally formed with the hollow plastic receptacle and recessed with respect to one of the plurality of side members.

[0012] The above-described and other features and advantages of the present invention will be appreciated and understood by those skilled in the art from the following detailed description, drawings, and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Other objects, features, advantages and details of the present invention appear, by way of example only, in the following detailed description of preferred embodiments of the invention, the detailed description referring to the drawings in which:

[0014] FIG. 1a illustrates a top perspective view of an exemplary training device of the present invention;
[0015] FIG. 1b illustrates a top perspective view of another exemplary training device of the present invention;
[0016] FIG. 2a illustrates a bottom perspective view of the training device shown in FIG. 1a;
[0017] FIG. 2b illustrates a bottom perspective view of the training device shown in FIG. 1b;
[0018] FIG. 3a illustrates a top view of the training device shown in FIG. 1a;
[0019] FIG. 3b illustrates a top view of the training device shown in FIG. 1b;
[0020] FIG. 4a illustrates a bottom view of the training device shown in FIG. 1a;
[0021] FIG. 4b illustrates a bottom view of the training device shown in FIG. 1b;
[0022] FIG. 5a illustrates a rear view of the training device shown in FIG. 1a;
[0023] FIG. 5b illustrates a rear view of the training device shown in FIG. 1b;
[0024] FIG. 6a illustrates a side view of the training device shown in FIG. 1a;
[0025] FIG. 6b illustrates a side view of the training device shown in FIG. 1b;
[0026] FIG. 7a illustrates a cross-sectional view of the training device shown in FIG. 3a;
[0027] FIG. 7b illustrates a cross-sectional view of the training device shown in FIG. 3b;
[0028] FIG. 8a illustrates another cross-sectional view of the training device shown in FIG. 3b;
[0029] FIG. 8b illustrates another cross-sectional view of the training device shown in FIG. 3b;
[0030] FIG. 9 illustrates a bottom perspective view of a training device of the present invention with a removable friction member;
[0031] FIG. 10 illustrates a bottom perspective view of a training device of the present invention with another removable friction member;
[0032] FIGS. 11 through 14 illustrate exemplary embodiments of friction members of the present invention;
[0033] FIGS. 15 through 22 illustrate exemplary embodiments of friction members and friction member patterns of the present invention;
[0034] FIG. 23 illustrates a cross-sectional view of a training device of the present invention showing an engagement feature;
[0035] FIG. 24 illustrates an alternate engagement feature of the training device shown in FIG. 23;
[0036] FIG. 25 illustrates another alternate engagement feature of the training device shown in FIG. 23;

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0037] FIGS. 26 through 28 illustrate exemplary methods of use of an exemplary training device of the present invention;
[0038] FIG. 29 illustrates an exploded perspective of multiple exemplary training devices of the present invention; and
[0039] FIG. 30 illustrates an exemplary stacking configuration of a training device of the present invention.

[0040] In general, the present invention relates to methods and devices for the development of strength and speed of the skater, particularly for hockey players, while maintaining a natural skate stride. The features of the present invention are predicated upon a device configured to provide resistance to a skater through a friction surface formed on the device, which is controllable and can be adjusted to allow all ages of skaters to utilize the device. In one configuration, the device is configured to engage a hockey stick of a skater to control the device during skating. While engaged with the device, the skater develops strength and speed throughout many portions of their body, with little to no change in their natural skate stride.

[0041] Referring to FIGS. 1a through 10, several embodiments of training devices 10, 10', 10" of the present invention are shown. While three distinct exemplary embodiments are shown and described, it should be noted that the features of any one embodiment may be incorporated in any other embodiment or may replace a similar feature. Accordingly, the features of these embodiments are not limited to the specific embodiment shown but may be incorporated or combined with other features of other exemplary embodiments to create yet further embodiments.

[0042] Referring again to the three exemplary embodiments shown in FIGS. 1a through 10, the training devices 10, 10', 10" include a top member 14, 14', 14" a bottom member 16, 16', 16" and a plurality of side members 18, 18', 18" joining the top and bottom members 14, 14', 14" and 16, 16', 16", respectively. The training devices 10, 10', 10" further include one or more guide engagement features 12, 12', 12" for causing and/or controlling movement of the training device 10, 10', 10" along a surface, such as ice, plastic, concrete or otherwise. In one exemplary embodiment, the guide engagement feature 12, 12', 12" is configured for engagement with a controller, such as a hockey stick 20 or otherwise. The training devices 10, 10', 10" form a hollow receptacle 22, 22', 22" configured for receiving and storing a weighted object, such as fluid 24. The training devices 10, 10', 10" further include a friction surface 26, 26', 26" formed with or disposed on the bottom member 16, 16', 16" of the training device 10.

In use, referring to FIGS. 26 through 28, the combination of fluid weight and the friction surface 26 causes the training device 10, 10', 10" to resist movement. Accordingly, when a skater 25 engages the training device 10, 10', 10" with a hockey stick 20, or other controller 83, the training device generates reactionary counter-force causing the player to develop various muscle groups within the body including, but not limited to, legs, arms, body core (e.g. back, stomach, etc.) or otherwise.

[0043] The hollow receptacle 22, 22', 22" forms one or more chambers 28, 28' for receiving one or more weighted objects within the device 10, 10', 10". In one configuration, the weighted object comprises a fluid 24, such a water or otherwise. Accordingly, as most skating arenas have an acces-
sible water supply, it is possible to add weight to the training device 10, 10', 10'' at the particular arena it is being used at. It should be appreciated that other fluids or fluid like materials may be used including sand, rocks, dirt or otherwise. Further, it is possible that the device may be used without any fluid, but instead be used with no additional weight or is used with other solid weights, such as pucks, lifting weights or otherwise. In any regard, each chamber 28, 28' is configured to allow a particular volume of fluid or other weighted object to be placed into the chamber such that each chamber filled adds a specific amount of weight, based upon the density of the fluid or otherwise. In one configuration, referring to FIGS. 1a through 8a, water is used to fill the chambers 28, wherein, each chamber, when filled, adds 25 lb of weight to the training device. In another configuration, referring to FIGS. 1b through 8b and 9 and 10, water is used to fill a single chamber 28', wherein, when filled, 50 lb of weight is added to the training device 10', 10''. It should be appreciated that the devices 10, 10', 10'' can be used without any additional weight. In this use, it is contemplated that the sole weight comprises the device itself, which in one exemplary embodiment comprises 8 lb. It is contemplated that other weight configurations are possible.

In one particular exemplary embodiment, referring to the exemplary embodiment shown in FIGS. 1a through 8a, a plurality of chambers 28 are provided for incrementally adding weight to the training device 10. The plurality of chambers 28 are separated to prevent fluid flow between the chambers, which may be used to limit lateral or rotational forces during use. The separation of chambers 28 also provide incremental weight increase of the training device 10. In the particular configuration shown, the training device 10 includes a first chamber 30 and a second chamber 32 separated by a barrier wall 34. The first chamber 30 is in fluid communication with a first opening 36 and the second chamber 32 is in fluid communication with a second opening 38 for receiving the fluid into the first and second chambers 30, 32, respectively. A first cap 40 and a second cap 42 are configured for closing the first and second openings 36, 38 for preventing fluid from leaving the first and second chambers 30, 32, respectively. The first and second caps 40, 42 are configured for threaded engagement with the device but may alternatively engage through snap fittings or through other means to positively engage the device and to form a seal about the first and second openings 36, 38.

As shown, the first and second chambers 30, 32 are vertically aligned and are configured to position the center of gravity of the fluid, within each of the chambers 30, 32, generally over a center of gravity of the device 10. As such, whether the first chamber 30 is filled with fluid, the second chamber 32 is filled with fluid or both, the device 10 will remain generally balanced about a center of gravity of the device 10. It should be appreciated that the hollow receptacle 16 may include 1, 2, 3, 4, 5, 6 or more chambers. Other configurations are possible.

In another exemplary embodiment, referring to FIGS. 1a through 8a, a training device 10 is provided including a single chamber 28. The chamber 28 is in communication with an opening 36' for receiving fluid or other weighted objects within the device. A cap, which may comprise the caps 40, 42 shown in FIGS. 1a through 8a, is provided for closing the opening 36' for preventing fluid from leaving the chamber 28'. The cap engages the device 10' through a threaded engagement, or other suitable engagement, for forming a seal about the opening 36'. In this configuration, the opening 36' and cap are recessed to prevent damage thereto during use of the device 10'. The chamber 28 is generally vertically aligned with the device 10 to position a center of gravity of the fluid within the chamber with a center of gravity of the device 10' to maintain balance of the device during use.

The friction surfaces 26, 26', 26'' are configured for increasing drag or friction coefficient of the training device 10, 10', 10''. In one configuration, referring to FIGS. 1a through 9, the friction surface 26, 26' is particularly configured for increasing drag along an ice surface. In another configuration, referring to FIG. 10, the friction surface 26'' is particularly configured for increasing drag along a cement, concrete or other similar type surface. The friction surface 26 can be integrally formed with the hollow receptacle and/or device 10, 10', 10'', as shown in FIG. 1a through 8b, or may comprise a separate component attached thereto, as shown in FIGS. 9 and 10.

Referring to FIGS. 9 and 10, the friction surface 26 is formed on a removable friction plate 27, 27' and is removable attached to the hollow receptacle 22', through fasteners or otherwise, such that the friction surface can be replaced as it becomes worn, damaged or as the device is used on different surfaces, such as ice, concrete or otherwise. In the exemplary embodiments shown, the friction surface is attached to the bottom member 16 of the device 10'. However, the device 10'' may be configured to attach the friction plate 27, 27' to a top, bottom or both members of the device 10''. Accordingly, the top and/or bottom members 14', 16'' may include attachment features, such as threaded openings, configured for engagement with corresponding attachment features, such as threaded screws. This allows the device 10'' to have multiple friction surfaces available, which may have different drag capabilities, or the ability to use the device on either side, for example, when the device 10'' is particularly suited for left or right handed hockey sticks, such as shown in FIG. 25.

In a first friction surface configuration, referring to FIGS. 1a through 8a, and 11 through 22, the friction surface is particularly suited for on-ice use. In these configurations, the friction surface 26 includes a plurality of friction members 44 extending from the device 10, 10', 10''. The friction members 44 may be disposed randomly or in a particular pattern to achieve a particular drag result. The friction members 44 may be arcuate, substantially linear or a combination thereof. The friction members may be further disposed generally parallel or perpendicular with respect to one another. In the exemplary embodiments shown, the friction members 26 comprise molded members extending from the device but may be formed through machining, such as grinding, sanding, knurling combinations thereof or otherwise. It is further contemplated that the plurality of friction members 44 may be separately formed and attached to the device through mechanical fasteners, adhesives or otherwise. In one exemplary embodiment, the friction members are spaced apart to create voids 45 therebetween. Such voids may comprise channels, grooves, pockets or other recessed configurations. The voids 45 are configured to collect ice remnants, direct ice remnants toward or away from the friction surface or a combination thereof. However, in one particular exemplary embodiment, the voids 45 collect ice remnants, between the friction members, which act to increase drag of the training device 10, 10'' along an ice surface.

Referring to FIG. 11, a first cross-sectional configuration of a friction member 44 is shown. In this configuration,
the friction member 44 is square or rectangular in shape and includes rounded or generally sharp corners 46 joining a friction edge 48 to lateral support edges 50. It is contemplated that the corners 46 can be self-sharpening due to the movement of the friction edge 48 along a coarse surface, such as ice, concrete or otherwise. In another example, referring to FIG. 12, the friction member is triangular in shape and includes a rounded or sharp corner 46 joining lateral support edges 50. In this configuration, the contact surfaces area between the training device 10 and a support surface is reduced to increase pressure along the corner to increase drag. In yet another configuration, referring to FIG. 13, the friction member 44 includes a concave portion 52 formed by a self-sharpening corner 46 connecting two arcuate lateral support edges 50. During movement across an ice surface, ice remnants are accumulated and optionally directed by the concave portion 52. In another configuration, referring to FIG. 14, the friction member 44 includes a semi-circular portion 54 providing both support and contact with a support surface. Other configurations are possible such as skate blade edge profiles or otherwise. It should be appreciated that the material forming the friction members may be formed of a material configured for sharpening, such as metal, plastic or otherwise, or configured of a material that maintains sharpness such as carbide or other hardened material.

In several exemplary embodiments, referring to FIGS. 4a, 4b, 9 and 15 through 22, the friction surface comprises a plurality of friction members 44 extending across the bottom member 16, 16' of the device 10, 10'. In one particular exemplary embodiment, the pattern is symmetrical about the training device, such as about a direction axis 'A' of the training device 10. It is also contemplated that the pattern is configured to optimize drag of the training device by collecting and/or directing ice remnants. As an example, with particular reference to FIGS. 15 and 16, it is contemplated that a first friction member, or set of friction members, are disposed at an angle 'α' with respect to a second friction member, or set of friction members. Such angles 'α' include between about 30° to 180°. In one exemplary embodiment, the angle 'α' is about 90°. It is further contemplated that the friction members 44 are at an angle 'β' with respect to the movement axis 'A' of the training device 10. The angle 'β' between the direction of the training device, during use, and the friction members may be between about 0° to 180°. In one configuration, the angle 'β' is about 45°. Other configurations are possible.

In greater detail, with respect to particular patterns, in a first configuration, referring to FIGS. 4a and 4b, a generally uniform pattern of friction members 44 is arranged. The pattern of friction members 44 is symmetric about a direction axis 'A' of the training device. In this configuration, the friction members are arcuate to collect ice remnants between the friction members 44 thereby increasing drag of the training device. In another configuration, referring to FIG. 15, another generally uniform pattern of friction members is provided. The pattern of friction members is symmetric about a direction axis 'A' of the training device. In this configuration, the friction members are at an angle 'β' with respect to the directional axis, which is opposite the directional movement of the training device 10. In this configuration, ice remnants collected between the friction members 44 are gradually moved away from the directional axis 'A'. In a similar configuration, referring to FIG. 16, ice remnants collected between the friction members 44 are gradually moved towards the direction axis 'A'. In another configuration, referring to FIG. 17, another symmetric pattern of friction members is provided. In this configuration, ice remnants are collected at a front portion of the training device and gradually directed away from the direction axis 'A'. In still another configuration, referring to FIGS. 18 and 18', another symmetric pattern of friction members 44 is provided. In this configuration, a crisscross pattern is formed generating equal resistance in any direction of the training device 10, which is useful while the skater is turning. In another configuration, referring to FIGS. 19 and 19', a pattern of segmented friction members 44 is provided. The segmented friction members 44 are arranged in a plurality of rows, wherein gaps 56 formed between the friction members 44. In one exemplary embodiment, friction members 44 are disposed on one or both sides of the gap, albeit in different rows, to provide a gradual cycling of ice remnants through the training device. In another configuration, referring to FIGS. 20 and 20a, a random pattern of friction members 44 are formed of arcuate segments 58 and linear segments 60. In this configuration, the random pattern provides generally equal resistance in any movement direction of the training device. In two additional embodiments, referring to FIGS. 21, 21a and 22, 22a patterns of friction members 44 are formed of geometric segments 62. In these embodiments, the patterns provide generally equal resistance in any movement direction of the training device 10. It should be appreciated that the friction members shown through the drawings may include any of the cross-section configurations shown or described with respect to FIGS. 11 through 14 or otherwise.

In one exemplary embodiment, the friction surface 28 includes a coating for increasing the friction coefficient of the device 10, 10', 10", improving durability of the friction surface, or both. In one particular exemplary embodiment, the coating is configured for scraping or grinding along a surface of the ice to provide increased drag. Advantageously, the scraping and grinding along an ice surface results in the formation of ice remnants which enter the voids between the friction members 44 causing further drag. The coating may be applied to any portion of the device 10, 10, 10" and in particular the top member 14, 14' and bottom member 16, 16'. Further, it may be applied to a separate component, such as shown in FIG. 9, and subsequently attached to the device. In one particular exemplary embodiment, the coating is applied over the friction members 44.

The coating may comprise any suitable coating for increasing friction along an ice surface, particularly an ice surface that has been recently resurfaced, such as done through a Zamboni® or other similar device. In one exemplary embodiment, the coating includes an additive for increasing friction. One non-limiting example of a suitable coating comprises a mixture of rubber and friction additive. In one particular exemplary embodiment, the friction coating is formed by a mixture of Plasti Dip® Rubber, sold by Plasti Dip International, Blaine, Minnesota, which can be found at http://www.plastidip.com/industrial.php and SharkGrip® friction additive, sold by Hi&® and Sherwin-Williams®, of Cleveland, Ohio, which can be found at http://www.sherwin-williams.com/pro/products/sharkgrip/, the both of which are hereby incorporated by reference. Other friction coatings are possible.

In one exemplary embodiment, the friction coating is applied to the bottom member 16, 16" of the device 10, 10', 10". Application of the friction coating may be performed in any suitable manner, such as dipping, brushing, spraying or...
otherwise. In one particular exemplary embodiment, the friction coating is sprayed onto the device 10, 10', 10". The device having the friction coating is placed in an oven and heated to a temperature of approximately 150° to 180° for several minutes to dry the friction coating. It should be appreciated that multiple coats of friction material may be applied to the device 10, 10', 10". To this end, it is contemplated that 2 or more friction coats may be applied to the device to achieve a desired thickness. For example, it is contemplated that the thickness of the friction coat is approximately 3 mils. Other thicknesses are possible.

In a second configuration, the friction surface is configured for off-ice use, such as on concrete, cement, asphalt or other similar type surface. The device 10, 10', 10" can include one or more of the designs shown in FIGS. 1a through 9 including the friction surface 26, friction members 44, friction member patterns, coatings or otherwise as described herein. In one exemplary embodiment, referring to FIG. 10, the device includes a friction surface 26" comprising a plurality of wires extending from the bottom member 16" of the device 10". The wires extend over a substantial majority of the friction surface 26" and may be arranged in any of the friction member patterns described herein. In one particular exemplary embodiment, still referring to FIG. 10, the wires are disposed on a removable friction plate 27 that is removable from the bottom member 16". The friction plate 27 can be attached to the device 10 using any of the components and means described with reference to the removable friction plate 27 described with FIG. 9. Advantageously, this allows the device 10" to be used both on-ice and off-ice by changing the removable friction plate 27, 27".

As previously indicated, the training device 10 further includes one or more engagement features 12 for engagement with a controller, such as a hockey stick 20 or otherwise. In one exemplary embodiment, referring to FIGS. 5a, 5b, 7a, 7b, 8a and 8b, the engagement feature 12 includes an opening 64 configured for receiving a blade 66 of a hockey stick 20. The opening 64 includes a width ‘W’ and a height ‘H’ and extends from a rear portion 70 to a front portion 68 of the training device. The depth ‘D’ of the opening 64 extends to a back wall 72, which is particularly shaped to engage a toe of the hockey blade.

It should be appreciated that the opening 64 is configured for receiving the blade 66 of a hockey stick, regardless to whether the bottom member 16 is disposed proximate a support ice surface or the training device 10 is inverted and the top member 14 is disposed proximate the support ice surface. For example, referring to FIGS. 5a, 7a, 8a and 23, an opening 64 is formed that is suitable in size and shape for receiving a right-handed hockey stick or a left-handed hockey stick. The opening is defined by a plurality of side walls 74 extending between the rear portion 70 of the training device and back wall 72. In one embodiment, the training device 10 further includes a locking feature 76 for maintaining engagement between the controller, e.g. hockey stick 20 or otherwise, and the training device. In the exemplary embodiment shown in FIG. 8a, a locking feature is shown in phantom which includes a locking tab 78 extending from an upper side wall 74. The locking tab 78 includes a shape generally corresponding to an average lie of a hockey stick such that once the hockey stick is engaged with the engagement feature 12 and brought to a playing or skating position, the locking tab 78 engages a toe 80 of the hockey blade 66 to prevent it from disengagement with the engagement feature 12.

In several other configurations, referring to FIGS. 24 and 25, the opening is shaped to provide improved and/or locking engagement with the blade 66 of the hockey stick 20. In the configuration shown in FIG. 24, the side walls 74 are non-parallel forming an opening 64 having a narrowing width ‘W’ towards the front portion 68 of the device 10 for causing engagement of two sides of the hockey blade 66 with side walls 74. It should be appreciated that this configuration provides two side engagements of the hockey blade with both left-handed and right-handed hockey sticks. In the configuration shown in FIG. 25, the side walls 74 are arcuate to have a shape generally corresponding to a right or left handed hockey stick.

Advantageously, with a training device having multiple friction surfaces 26, such as friction surfaces formed on or disposed proximate the top and bottom members of the training device, the training device can be inverted so as to engage a hockey stick having an opposite blade curve. It should be appreciated that the locking device 76 shown in FIG. 8a may also be incorporated into the configurations of FIGS. 24 and 25 to provide further engagement between the hockey stick 20 and the device 10.

It is further contemplated that the device may include a controller, in lieu of a hockey stick 20, that is permanently or releasably attached to the training device 10 for controlling movement. In this configuration, the controller is rigidly or pivotally attached to the hollow receptacle 22 at a first end and includes a handle resembling a gripping portion of a hockey stick at a second end. Other similar configurations are possible.

In yet another configuration, referring to FIGS. 26 and 27, the training device 10 is configured for pulling along an ice surface. In this configuration, the training device 10 includes an additional or alternate engagement feature 81 for engagement of the training device 10 with a skater 25. In one exemplary embodiment, the engagement feature 81 includes loops 84 forming eyelets for receiving rope, straps, the like or otherwise, that is attached to the training device 10 on a first end and to the skater 25 at a second end.

It is further contemplated that multiple training devices 10 may be stacked to provide additional weight and drag. For example, referring to FIGS. 29 and 30, the top member 14 includes an alignment guide 91 including one or more projections 92 and one or more recesses 94 formed on the top member 14 of the training device for engagement with one or more other projections 92 and recesses 94 formed on a top member 14 of another training device 10. In one configuration, the projections and recess 92, 94 are approximately 1 inch in height and 1 inch in diameter. This configuration maintains alignment and connection of multiple training devices 10 during use thereof.

In one exemplary embodiment, the training device 10 includes additional features for carrying the device between ice rinks or otherwise. Advantageously, the fluid weight placed within the hollow receptacle 22 can be removed prior to this movement. In one exemplary embodiment, referring to FIGS. 1a and 2a, the training device 10 includes a carrying handle 82 configured for hand carrying the device. In another embodiment, the loops 84 forming eyelets 85 of the training device 10 may be used for receiving rope 88, straps, or the like for carrying the training device over the shoulder. In another exemplary embodiment, referring to FIGS. 1b and 2b, the training device 10 includes a carrying
The training device 10 is formed of material suitable in strength for use as a hockey training device, in particular for cold use. It is contemplated that the device is suitable in strength to endure static forces applied by a controller, such as a hockey stick or otherwise, dynamic forces such as blunt forces encountered during impacts with ice rink boards, another device, skate, goal post or otherwise, and friction force encountered by sliding along a support surface, such as an ice surface 90. It is also contemplated the material forming the device is relatively light so that the device is easily carried about. Accordingly, it is contemplated that the device may be formed of metal, plastic, rubber, ceramic, combinations thereof or otherwise. Further, it is contemplated that the training device 10 may be formed of multiple material having different strength, friction coefficients or otherwise.

In one exemplary embodiment, the material forming the training device comprises plastic. The plastic comprises a high-strength plastic such as linear low density polyethylene (LLDPE), though other plastics are available. The plastic materials may include a filler, such as fibers or otherwise, for improving the strength and performance of the device.

The training device 10, 10', 10" of the present invention can be used in different ways for developing strength of a skater. In a first and second method of use, referring to FIGS. 26 and 27, respectively, the training device 10, 10', 10" is pulled along a surface of the ice, while attached to a skater 25 via a belt 89, rope 88, controller 83, or otherwise. In these configurations, the device is dragged while the skater is moving forward, e.g., FIG. 26, or backwards, e.g., FIG. 27. As the skater traverses across the ice surface 90, the friction surface 26 engages the ice surface 90 causing drag and resistance to the skater 25, via the rope 88 and/or controller 83. As the weight of the training device 10 increases, through placement of fluid or otherwise within or on the chamber(s), the drag caused by friction surface 26 increases. Further, due to the configuration of the pattern of friction members 44 on the friction surface 26, the training device maintains general alignment with the skater during movement.

In a third method of use, referring to FIG. 28, the training device 10 is engaged with a hockey blade 66 of a hockey stick 20. As a skater 25 traverses across the ice surface 90, the friction members engages the ice surface 90 causing drag and resistance to the skater, via the hockey stick 20. As the weight of the training device 10 is increased, through placement of fluid or otherwise within or on the chamber(s), the drag caused by friction surface 26 increases. Further, due to the configuration of the pattern of friction members 44 on the friction surface 26, the training device maintains general alignment with the skater during movement.

In a fourth method of use, referring to FIGS. 26 and 28, it is contemplated that a skater 25 utilizes two training devices 10, one being dragged as shown in FIG. 26 and one being pushed as shown in FIG. 28, for providing further skating resistance. It should be appreciated that yet additional weight may be added by stacking training devices as shown in FIGS. 29 and 30. Further it should be appreciated that the weight of each training device 10 may vary by filling the chamber(s) of the training devices. While substantial weight may be used during training, the friction surface of the training devices 10, upon discontinued use the training devices quickly slows and stops, unlike other on-ice training devices.

While the invention has been described with reference to a preferred embodiment it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

1. A strength training device for skaters, comprising: a hollow receptacle defining a first chamber in fluid communication with a first opening for placement and removal of fluid within the first chamber; a friction surface disposed proximate a bottom member of the hollow receptacle; and an engagement feature for releasable engagement with a controller suitable for causing movement of the device, wherein during movement the friction surface generates a reactionary counter-force.

2. The strength training device of claim 1, wherein the friction surface includes a plurality of friction members extending from the bottom member.

3. The strength training device of claim 2, wherein the plurality of friction members extend along a width of the device, the friction members being generally perpendicular with respect to a directional axis of the device.

4. The strength training device of claim 3, wherein the plurality of friction members are spaced apart to define grooves therebetween.

5. The strength training device of claim 2, wherein the plurality of friction members form a pattern.

6. The strength training device of claim 2, wherein the plurality of friction members are integrally formed with the hollow receptacle.

7. The strength training device of claim 2, wherein the plurality of friction members are formed on a friction plate that is releasably attached to the hollow receptacle.

8. The strength training device of claim 2, wherein the plurality of friction members comprise wires.

9. The strength training device of claim 1, wherein the friction surface includes an abrasive coating.

10. The strength training device of claim 9, wherein the abrasive coating is formed of rubber and an abrasive material.

11. The strength training device of claim 2, wherein the friction surface includes an abrasive coating disposed over the plurality of friction members.

12. The strength training device of claim 1, wherein the hollow receptacle defines a second chamber in fluid communication with a second opening for placement and removal of fluid within the second chamber, wherein the first and second chambers are separated by a barrier for preventing fluid flow therebetwen.

13. The strength training device of claim 1, wherein the engagement feature is suitable in size and shape for receiving a blade of a hockey stick.

14. The strength training device of claim 1, wherein the engagement feature includes eyelets for engagement with a rope.
15. The strength training device of claim 1, wherein the hollow receptacle includes a surface having an alignment guide for stacking and maintaining the position of another strength training device.

16. The strength training device of claim 1, wherein the hollow receptacle further includes an upper member and plurality of side members extending between the upper and lower members, the hollow receptacle being triangular in shape.

17. A strength training device for skaters, comprising:
   a hollow plastic receptacle including an upper member, a lower member and a plurality of side members extending between the upper and lower members, the hollow plastic receptacle defines a chamber in fluid communication with an opening for placement and removal of fluid within the first chamber;
   a friction surface disposed on the bottom member of the receptacle, the friction surface includes a plurality of friction members disposed apart and extending along a width of the device, the friction surface further includes a friction coating formed of rubber and abrasive material; and
   an engagement feature configured for engagement with a blade of a hockey stick, the engagement feature comprising an opening extending between a front portion and rear portion of the device.

18. The strength training device of claim 17, wherein the plurality of friction members are formed on a friction plate that is releasably attached to the hollow receptacle.

19. The strength training device of claim 17, wherein the plurality of friction members are integrally formed with the bottom member.

20. A strength training device for skaters, comprising:
   a triangular hollow plastic receptacle including an upper member, a lower member and a plurality of side members extending between the upper and lower members, the hollow plastic receptacle defines a chamber in fluid communication with an opening for placement and removal of fluid within the chamber;
   a friction surface integrally formed on the bottom member of the receptacle, the friction surface includes a plurality of friction members disposed apart and extending along a width of the device, the friction surface further includes a friction coating formed of rubber and abrasive material;
   an engagement feature configured for engagement with a blade of a hockey stick, the engagement feature comprising an opening extending between a front portion and rear portion of the device;
   an alignment guide for stacking and maintaining the position of another strength training device on the upper member, the alignment guide comprising one or more projections and one or more recesses formed on the upper member; and
   a handle integrally formed with the hollow plastic receptacle and recessed with respect to one of the plurality of side members.

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