A tethered ball trainer includes a body harness having a primary belt, primary support arm, and secondary support structure. Both the primary belt and secondary support structure are attached to a user and the primary support arm. A tether is attached to the primary support arm opposite the primary belt and consists of a swivel hook, damper, cord, and ball support. The swivel hook prevents the cord from twisting, while the damper absorbs shock and reduces the impact on the user as a result of the ball being kicked. The ball is attached to the tether at a mounting point on the ball or by the ball support. An accelerometer in the ball measures the acceleration of the ball and sends electronic signals through a transmitter to a visual display having a communicably coupled receiver. A display processor unit records and displays information in regards to the ball being kicked.
FIG. 13
FIG. 14
FIG. 15
Display speaker --- Display processing unit --- Receiver

FIG. 16
TETHERED BALL TRAINER


FIELD OF THE INVENTION

[0002] The present invention relates generally to ball game and training apparatuses. More specifically, the present invention is an apparatus with an extendable and retractable tethered ball. The present invention allows a user to kick the ball from a stationary or moving position without having to retrieve the ball afterwards.

BACKGROUND OF THE INVENTION

[0003] Games involving kicked balls are often difficult to practice, particularly by a sole player. The player must repeatedly retrieve kicked balls, a process that is both time consuming and tiring. Additionally, kicked balls can become lost altogether. A common solution to the issue is kicking a ball against a surface such as a wall or into a net. However, kicking a ball into a wall can potentially result in damage to both the ball and the wall. A player may also miss an intended net target and be forced to retrieve the ball. The present invention seeks to address the aforementioned uses and provide users with a convenient and practical solution.

[0004] The present invention is a tethered ball trainer that may be worn by the user in order to practice kicking a ball while remaining in a stationary or moving position. In the preferred embodiment, the present invention comprises a primary belt that is worn by a user. The primary belt is attached to a primary support arm that is retractable. An extendable and retractable tether is attached to the primary support arm. The end of the tether is attached to the ball or a ball holder. The primary support arm of the trainer is further secured by means of a secondary support structure that is worn around a user's neck or upper body. The primary belt and secondary support structure are both adjustable in order to accommodate users of varying weights and heights. While wearing the trainer, a user is able to kick the tethered ball from a stationary or moving position. The primary support arm, tether, and ball are fully detachable from the primary belt, allowing the present invention to be used in a handheld configuration as well. The present invention has applications in training for sports such as soccer. The present invention is also useful for applications involving highly repetitive motions involving the legs such as leg muscle rehabilitation exercises. The ball of the present invention features a dynamic feedback system in the form of audio and visual cues such as lights and sounds. These cues are presented to the user after the ball is kicked. Additionally, the primary support arm of the present invention features a small visual display that displays to the user statistics such as the number of times that the ball has been kicked. The ball contains an embedded transmitter that communicates with a receiver housed within the visual display to relay data.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a perspective view of the present invention with the primary support arm in an extended position.

[0006] FIG. 2 is a left side elevational view of the present invention with the primary support arm in the extended position.

[0007] FIG. 3 is a perspective view of the present invention with the primary support arm in a retracted position.

[0008] FIG. 4 is a left side elevational view of the present invention with the primary support arm in the retracted position.

[0009] FIG. 5 is a perspective view of the primary belt.

[0010] FIG. 6 is a perspective view of the primary support arm in the extended position.

[0011] FIG. 7 is a perspective view of the primary support arm in the retracted position.

[0012] FIG. 8 is a perspective view of the secondary support structure.

[0013] FIG. 9 is a perspective view of the ball.

[0014] FIG. 10 is a perspective view of the present invention in an alternative embodiment.

[0015] FIG. 11 is a front elevational view of the ball being held by the ball support, wherein the ball support is a net.

[0016] FIG. 12 is a front elevational view of the ball being adhesively connected to the ball support being a suction cup, and wherein the tether has a plurality of lights.

[0017] FIG. 13 is a diagram depicting the electrical connections of the ball.

[0018] FIG. 14 is a diagram depicting the electronic connections of the ball.

[0019] FIG. 15 is a diagram depicting the electrical connections of the visual display.

[0020] FIG. 16 is a diagram depicting the electronic connections of the visual display.

[0021] FIG. 17 is a diagram depicting the receiver and the transmitter being communicably coupled.

[0022] FIG. 18 is a diagram depicting the electrical and electronic connections between the ball and the plurality of lights in the tether.

[0023] FIG. 19 is a diagram depicting the electrical and electronic connections between the visual display and the plurality of lights in the tether.

[0024] FIG. 20 is a diagram depicting the electrical and electronic connections between the visual display and the accelerometer.

[0025] FIG. 21 is a diagram depicting the electrical and electronic connections between the visual display and the ball speaker.

[0026] FIG. 22 is a diagram depicting the electrical and electronic connections between the visual display and the at least one light of the ball.

DETAIL DESCRIPTIONS OF THE INVENTION

[0027] All illustrations of the drawings are for the purpose of describing selected versions of the present invention and are not intended to limit the scope of the present invention.

[0028] The present invention is a tethered ball trainer that is worn by a user. The present invention can be used to train for sports such as soccer, be used for exercise, or simply be used as a toy. The tethered ball trainer comprises a body harness 1, a tether 2, a ball 3, and a visual display 4. The body harness 1 is attached to the user and supports the tether 2, which in turn supports the ball 3. The tether 2 allows the ball 3 to hang just above the ground, and allows the user to continually kick the ball 3 without having to chase and retrieve the ball 3. Additionally, the body harness 1 acts to extend the ball 3 away from the users body, such that the tether 2 does not become tangled with the legs of the user. The ball 3 is not limited to being spherical in shape and can be any number of different shapes depending on the application of the present invention.
In reference to FIG. 1, the body harness comprises a primary belt 10, a primary support arm 11, and a secondary support structure 12. The primary belt 10 is worn around the waist of the user and provides a point of attachment for bearing the primary support arm 11. A fastening mechanism 101, such as a buckle, is used to secure the opposing ends of the primary belt 10 to each other once the primary belt 10 is positioned around the user, as shown in FIG. 10. Additionally, the fastening mechanism 101 allows the user to adjust the length of the primary belt 10 in order to create the desired tightness around the waist of the user. The primary support arm 11 is attached to the primary belt 10 and extends outwards, away from the user. The tether 2 is attached to the primary support arm 11 opposite the primary belt 10. In the preferred embodiment of the present invention, the primary belt 10 comprises a mounting cavity 102, as shown in FIG. 5, wherein the primary support arm 11 is positioned into the mounting cavity 102. The primary support arm 11 can be held in place by a frictional fit, snap fit, threaded attachment, or any other suitable temporary means of connection. In an alternative embodiment of the present invention, the primary support arm 11 comprises an arm opening 114, as shown in FIG. 10. The primary belt 10 is positioned through the arm opening 114 and then secured around the waist of the user.

In reference to FIG. 6-7, the primary support arm 11 comprises a plurality of retractable members 111. The plurality of retractable members 111 slidable engages each other, either telescopically or scissionally, such that the primary support arm 11 can be configured into an extended position, as shown in FIG. 1-2, and a retracted position, as shown in FIG. 3-4. In the preferred embodiment of the present invention, the primary support arm 11 further comprises a base end 112 and a tapered end 113, wherein the plurality of retractable members 111 telescopically engages each other. The base end 112 and the tapered end 113 are positioned opposite each other along the primary support arm 11; the base end 112 being attached to the primary belt 10 and the tether 2 being attached to the tapered end 113.

In reference to FIG. 2 and FIG. 8, the secondary support structure 12 is attached along the primary support arm 11, ideally about the midpoint of the primary support arm 11 or the end of the support arm opposite the primary belt 10. The secondary support structure 12 is acutely angled in relation to the primary support arm 11, such that the secondary support structure 12 is angled towards the upper body of the user. The secondary support structure 12 provides a means of attachment to the upper body of the user, such as the shoulders, neck, chest, etc.

In the preferred embodiment of the present invention, the secondary support structure 12 is a length of cord, or cords, wherein a first end of the secondary support structure 12 is attached to the primary support arm 11. The secondary support structure 12 is then formed into a loop, wherein a second end of the secondary support structure 12 is then either attached to the primary support arm 11 as well, or attached along the secondary support structure 12.

In reference to FIG. 10, in an alternative embodiment of the present invention, the secondary support structure 12 comprises a secondary belt 121 and a secondary support arm 123. The secondary support arm 123 is either pivotally attached, or attached at a fixed angle, to the primary support arm 11 opposite the primary belt 10, and the secondary belt 121 is connected to the secondary support arm 123 opposite the primary support arm 11. The secondary support arm 123 is a rigid member, while the secondary belt 121 is a flexible strap, such that secondary belt 121 can be fitted around the desired upper body section of the user. The secondary support arm 123 comprises a secondary arm opening 124 through which the secondary belt 121 is positioned. A secondary fastening mechanism 122 is then used to secure both ends of the secondary belt 121 to each other. The secondary support arm 123 and the primary support arm 11 may also be connected to each other through a mid support member that is positioned in between the secondary support arm 123 and the primary support arm 11.

In reference to FIG. 1, the tether 2 is attached to the primary support arm 11 opposite the belt, and is positioned about the primary support arm 11 opposite the secondary support structure 12, wherein the tether 2 hangs below the primary support arm 11. The tether 2 supports the ball 3, which is attached to the tether 2 opposite the primary support arm 11. The tether 2 may be attached to the primary support arm 11 in such a way that the tether 2 has an adjustable length in order to accommodate user’s of various height.

In reference to FIG. 10, the tether 2 comprises a cord 20, a damper 21, a swivel hook 22, and a ball support 23. The swivel hook 22 is attached to the primary support arm 11, while the damper 21 is connected to the swivel hook 22 opposite the primary support arm 11. The cord 20 is connected to the damper 21 opposite the swivel hook 22, wherein the ball 3 is attached to the cord 20 opposite the damper 21. The cord 20 is flexible, yet inelastic. The damper 21 acts to soften the impact of kicking the ball 3 on the user by absorbing energy such that less force is directed on the user as a result of tension in the cord 20. The damper 21 can be a bungee cord, a spring, or similar elastic member. The swivel hook 22 allows the cord 20 to rotate without the cord 20 becoming twisted about the length of the cord 20. It is also possible for the cord 20 to be attached directly to the primary support arm 11 without the use of the swivel hook 22 and the damper 21.

In reference to FIG. 11-12, the ball support 23 is the portion of the tether 2 that engages and supports the ball 3. In one embodiment of the present invention, the ball 3 support 23 is a net in which the ball 3 is positioned. The net is then closed using a fastener such as a draw string in order to secure the ball 3 within the ball support 23. In another embodiment of the present invention, the ball support 23 is a suction cup that is mounted onto the ball 3 through the use of an adhesive. It is also possible for the ball support 23 to be any other support structure that is adhesively connected to the ball 3. As an alternative to the ball support 23, the ball 3 may comprise a mounting point 30 to which the tether 2 is attached, such as an eyelet through which the cord 20 can be threaded.

In reference to FIG. 1, the visual display 4 is connected to the primary support arm 11 and capable of recording and relaying information to the user in regards to the ball 3 being kicked. The visual display 4 provides a screen for displaying information such as the number of times the ball 3 is kicked, the speed of the ball 3, the distance the ball 3 would travel if the ball 3 were not attached to the tether 2, etc. In order to record and display such information, the visual display 4 comprises a receiver 40, a display processing unit 41, and a display power source 42, while the ball 3 comprises an accelerometer 31, a transmitter 32, a ball processing unit 33, and a ball power source 34.
[0039] In reference to FIG. 13-14, the ball power source 34 is a battery or other portable source of energy. The ball power source 34 is electrically connected to the accelerometer 31, the transmitter 32, and the ball processing unit 33 in order to supply current to said components of the ball 3. A ball power switch may also be provided in order to activate and deactivate the ball power source 34. A cavity traversing into the surface of the ball 3 should be provided, such that the ball power switch is recessed below the surface of the ball 3 and not accidentally actuated when the ball 3 is in use. Both the accelerometer 31 and the transmitter 32 are electronically connected to the ball processing unit 33. The accelerometer 31 measures the acceleration of the ball 3 when the ball 3 is kicked and produces electronic signals as a response. The ball processing unit 33 receives the electronic signals from the accelerometer 31 and passes said electronic signals to the transmitter 32. The ball processing unit 33 may first convert the electronic signals, such that the electronic signals are suitable to be transmitted via the transmitter 32.

[0040] In reference to FIG. 15-16, the display power source 42 is a battery or other portable source of energy. The display power source 42 is electrically connected to the receiver 40 and the display processing unit 41 in order to supply current to said components of the visual display 4. A display power switch may also be provided in order to activate and deactivate the display power source 42. The display power switch can be positioned anywhere about the visual display 4, such that the display power switch is readily accessible to the user. The receiver 40 is electronically connected to the display processing unit 41. The receiver 40 is communicably coupled to the transmitter 32, as depicted in FIG. 17, such that the electronic signals from the accelerometer 31 can be relayed wirelessly to the receiver 40 through the transmitter 32. The display processing unit 41 then receives electronic signals from the receiver 40 and uses information from the electronic signals to compute the desired information to be displayed to the user.

[0041] The visual display 4 may further comprise a display speaker 43, while the ball 3 may further comprise a ball speaker 35. The display speaker 43 is electrically connected to the display power source 42 and is electronically connected to the display processing unit 41, as depicted in FIG. 15-16. In this way, the display speaker 43 is controlled by the display processing unit 41 and can be used to produce a sound under certain constraints. For example, the display speaker 43 could be used to signal the end of a timer determined by the display processing unit 41, or be used as a signal each time the ball 3 is kicked. Similar to the display speaker 43, the ball speaker 35 is electrically connected to the ball power source 34 and electronically connected to the ball processing unit 33, as depicted in FIG. 13-14. In this way, the ball speaker 35 is controlled by the ball processing unit 33 and can be used to produce a sound under the desired constraints, such as every time the ball 3 is kicked or when the ball 3 is kicked with a certain amount of force.

[0042] In reference to FIG. 13-14, the ball 3 may also further comprise an at least one light 36. Similar to the ball speaker 35, the at least one light 36 is electrically connected to the ball power source 34 and electronically connected to the ball processing unit 33. In this way, the at least one light 36 is controlled by the ball processing unit 33 and can be used to emit light as a signal under certain constraints. Preferably the at least one light 36 is a light emitting diode, however, it is possible for any type of light emitting device to be used. Additionally, the ball 3 should comprise at least one transparent or semi-transparent section, or a channel through which the light can be emitted from the ball 3, such that the light is visible to the user.

[0043] In reference to FIG. 20, the accelerometer 31 can alternatively be electrically connected to the display power source 42 and electronically connected to the display processing unit 41. In such an embodiment, the receiver 40, the transmitter 32, the ball power source 34, and the ball processing unit 33 are not included in the present invention. The accelerometer 31 can be wired to the display power source 42 and the display processing unit 41 either internally through the tether 2 or externally with wire wrapped around or running adjacent to the tether 2. Wire can be run through the tether 2, or heavy duty cable can be used as the tether 2. If wire is run through the tether 2, then the tether 2 may be permanently connected to both the primary support arm 11 and the ball 3, or electrical connectors can be used between the primary support arm 11 and the tether 2, and between the ball 3 and the tether 2, such that the tether 2 is removable.

[0044] In reference to FIG. 21-22, if the ball speaker 35 or the at least one light 36 is included, then it is also possible for the ball speaker 35 or the at least one light 36 to be electrically connected to the display power source 42 and the display processing unit 41. When used, the ball speaker 35 and the at least one light 36 are wired to the display power source 42 and the display processing unit 41 in the same way as the accelerometer 31. The ball speaker 35 and the at least one light 36 may use the same wire as the accelerometer 31, or may be separately wired.

[0045] In reference to FIG. 18-19, the tether 2 may further comprise a plurality of lights 24. The plurality of lights 24 are positioned along the tether 2. The plurality of lights 24 can be either electrically connected to the display power source 42 and electronically connected to the display processing unit 41, or electrically connected to the ball power source 34 and electronically connected to the ball processing unit 33. The plurality of lights 24 may be designed to illuminate all at once or progressively. For example, as the user kicks the ball 3 more, the plurality of lights 24 will begin to light up along the tether 2 starting from the ball 3 and traveling up to the primary support arm 11 as the ball 3 is kicked more and more. Each of the plurality of lights 24 is preferably a light emitting diode, however, any light source can be implemented.

[0046] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:
1. A tethered ball trainer comprises:
   a body harness;
   a tether;
   a ball;
   the body harness comprises a primary belt, a primary support arm, and a secondary support structure;
   the primary support arm being attached to the primary belt, wherein the primary belt is attached around the waist of a user;
   the secondary support structure being attached along the primary support arm, wherein the secondary support structure is attached to the user opposite the primary support arm;
the tether being attached to the primary support arm opposite the primary belt; the tether being positioned about the primary support arm opposite the secondary support structure; and the ball being attached to the tether opposite the primary support arm.

2. The tethered ball trainer as claimed in claim 1 comprises: the tether comprises a cord, a damper, and a swivel hook; the swivel hook being attached to the primary support arm; the damper being connected to the swivel hook opposite the primary support arm; the cord being connected to the damper opposite the swivel hook; and the ball being attached to the cord opposite the damper.

3. The tethered ball trainer as claimed in claim 1 comprises: the secondary support structure comprises a secondary belt and a secondary support arm; the secondary support arm being connected to the primary support arm; and the secondary belt being attached to the secondary support arm opposite the primary support arm, wherein the secondary belt is attached to the user.

4. The tethered ball trainer as claimed in claim 1 comprises: the tether comprises a ball support; the ball support being positioned on the tether opposite the primary support arm; and the ball support engaging the ball, wherein the ball is supported by, removably attached to, or permanently connected to the ball support.

5. The tethered ball trainer as claimed in claim 1 comprises: the ball comprises a mounting point; and the tether being attached to the mounting point.

6. The tethered ball trainer as claimed in claim 1 comprises: the primary support arm comprises a plurality of retractable members; and the plurality of retractable members slidably engaging each other.

7. The tethered ball trainer as claimed in claim 6 comprises: the primary support arm further comprises a base end and a tapered end; the base end and the tapered end being positioned opposite each other along the plurality of retractable members; the base end being attached to the primary belt; and the tether being attached to the tapered end.

8. The tethered ball trainer as claimed in claim 1 comprises: a visual display; the visual display comprises a display power source, a receiver, and a display processing unit; the visual display being connected to the primary support arm; the receiver and the display processing unit being electrically connected to the display power source; and the receiver being electronically connected to the display processing unit.

9. The tethered ball trainer as claimed in claim 8 comprises: the visual display further comprises a display speaker; the display speaker being electrically connected to the display power source; and the display speaker being electronically connected to the display processing unit.

10. The tethered ball trainer as claimed in claim 1 comprises: the ball comprises a transmitter, an accelerometer, a ball processing unit, and a ball power source; the transmitter, the accelerometer, and the ball processing unit being electrically connected to the ball power source; and the transmitter and the accelerometer being electronically connected to the ball power source.

11. The tethered ball trainer as claimed in claim 10 comprises: the ball further comprises a ball speaker; the ball speaker being electrically connected to the ball power source; and the ball speaker being electronically connected to the ball processing unit.

12. The tethered ball trainer as claimed in claim 10 comprises: the ball further comprises an at least one light; the at least one light being electrically connected to the ball power source; and the at least one light being electronically connected to the ball processing unit.

13. The tethered ball trainer as claimed in claim 1 comprises: a visual display; the visual display comprises a receiver; the ball comprises a transmitter; and the receiver being communicably coupled to the transmitter.

14. The tethered ball trainer as claimed in claim 1 comprises: the ball comprises a plurality of lights; and the plurality of lights being positioned along the tether.

15. The tethered ball trainer as claimed in claim 14 comprises: a visual display; the visual display comprises a display power source and a display processing unit; the plurality of lights being electrically connected to the display power source; and the plurality of lights being electronically connected to the display processing unit.

16. The tethered ball trainer as claimed in claim 14 comprises: the ball comprises a ball power source and a ball processing unit; the plurality of lights being electrically connected to the ball power source; and the plurality of lights being electronically connected to the ball processing unit.

17. The tethered ball trainer as claimed in claim 1 comprises: a visual display; the visual display comprises a display power source and a display processing unit; the ball comprises an accelerometer; the visual display being connected to the primary support arm; the accelerometer and the display processing unit being electrically connected to the display power source; and the accelerometer being electronically connected to the display processing unit.

18. The tethered ball trainer as claimed in claim 17 comprises: the visual display further comprises a display speaker; the display speaker being electrically connected to the display power source; and
the display speaker being electronically connected to the display processing unit.
19. The tethered ball trainer as claimed in claim 17 comprises:
   the ball further comprises a ball speaker;
   the ball speaker being electronically connected to the display power source; and
   the ball speaker being electronically connected to the display processing unit.
20. The tethered ball trainer as claimed in claim 17 comprises:
   the ball further comprises an at least one light;
   the at least one light being electrically connected to the display power source; and
   the at least one light being electronically connected to the display processing unit.

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