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(54) **INFLATABLE BASE FOR PHYSICAL THERAPY**

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(60) Provisional application No. 62/726,243, filed on Sep. 1, 2018.

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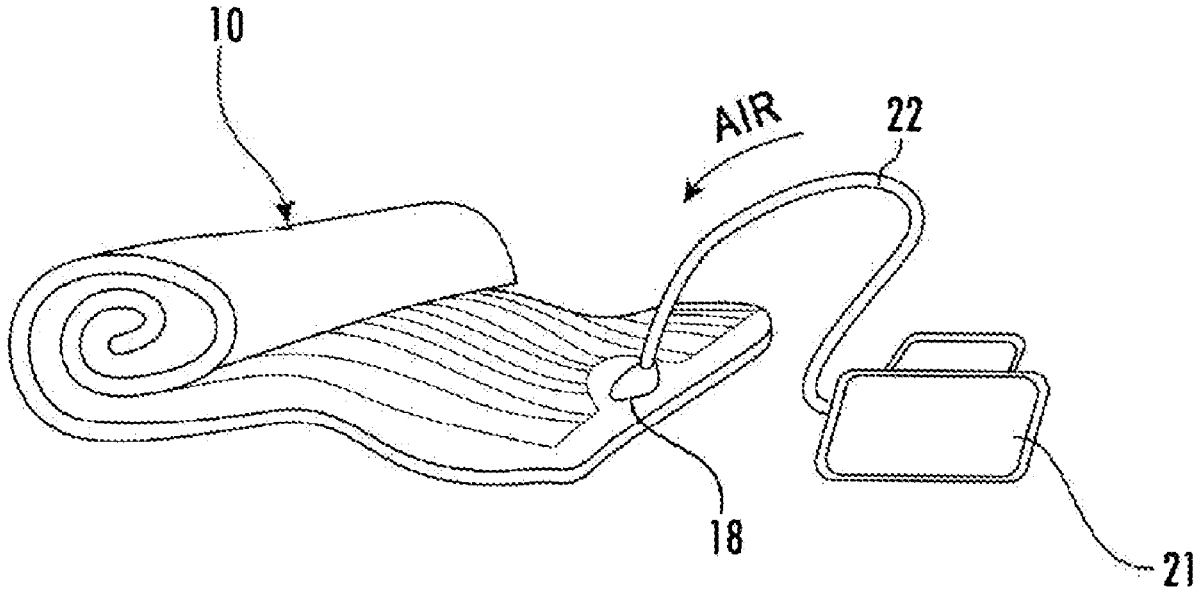
(57) **ABSTRACT**

A method of using a base for physical therapy is disclosed. The base includes a first major surface and a second major surface opposite the first major surface. A minor surface joins the first major surface to the second major surface, and the base has a deflated configuration at a first internal pressure and an inflated configuration at a second internal pressure that is greater than the first internal pressure. In the method, the second major surface of the base is positioned over a surface. The base is in the deflated configuration. Further, in the method, the base is inflated to the inflated configuration, and a physical therapy technique is performed on the base.



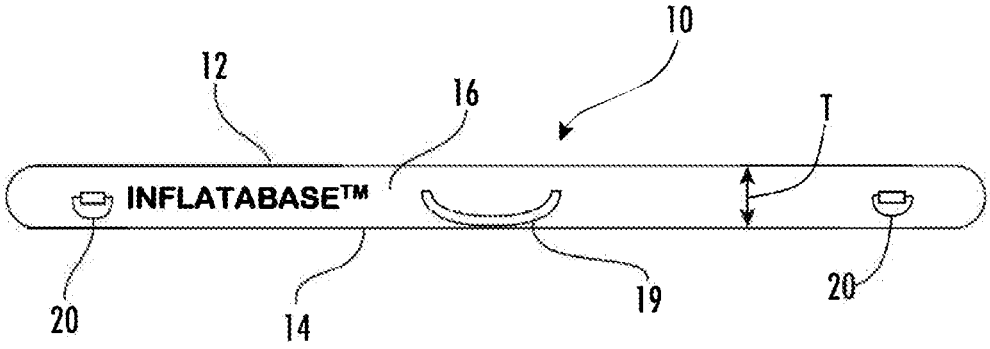


FIG. 1

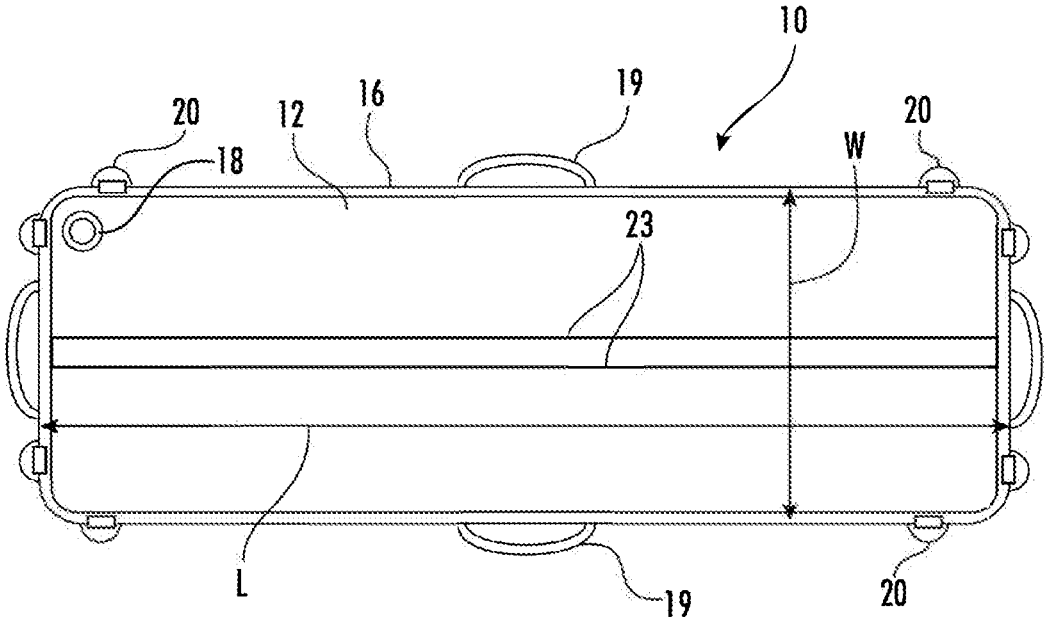


FIG. 2

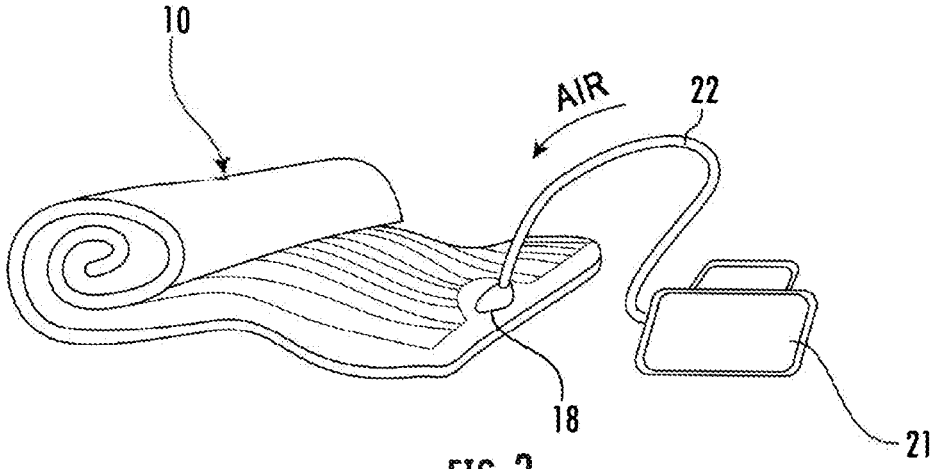


FIG. 3

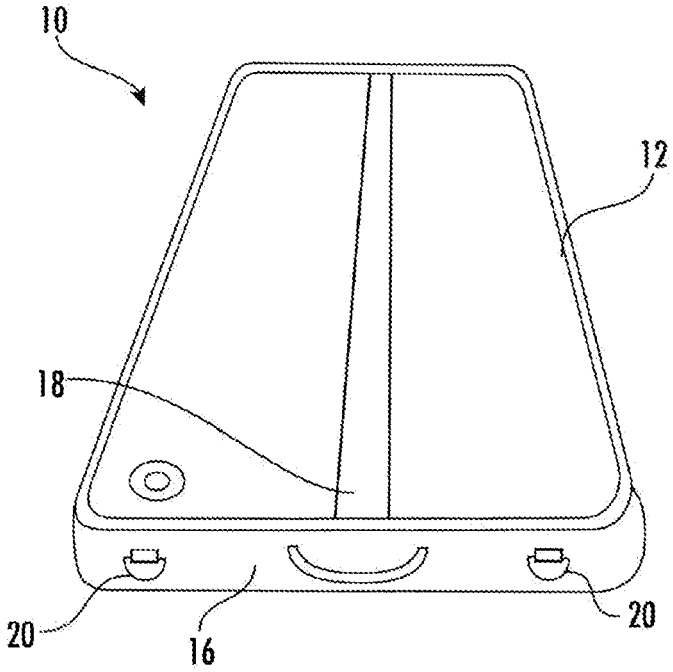


FIG. 4

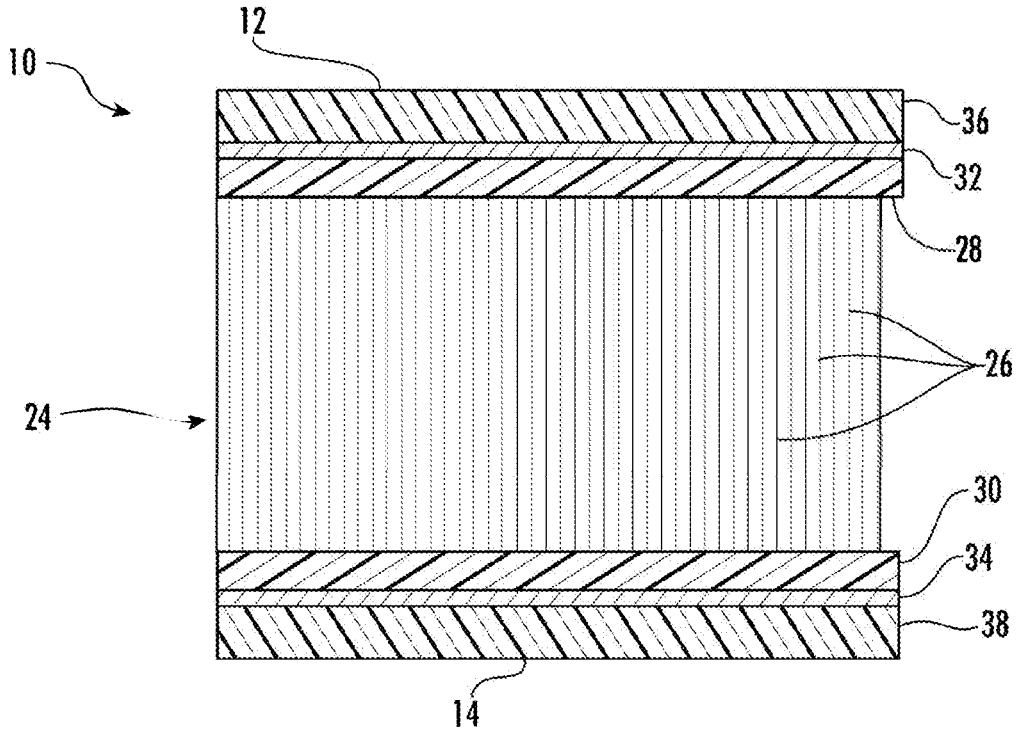


FIG. 5

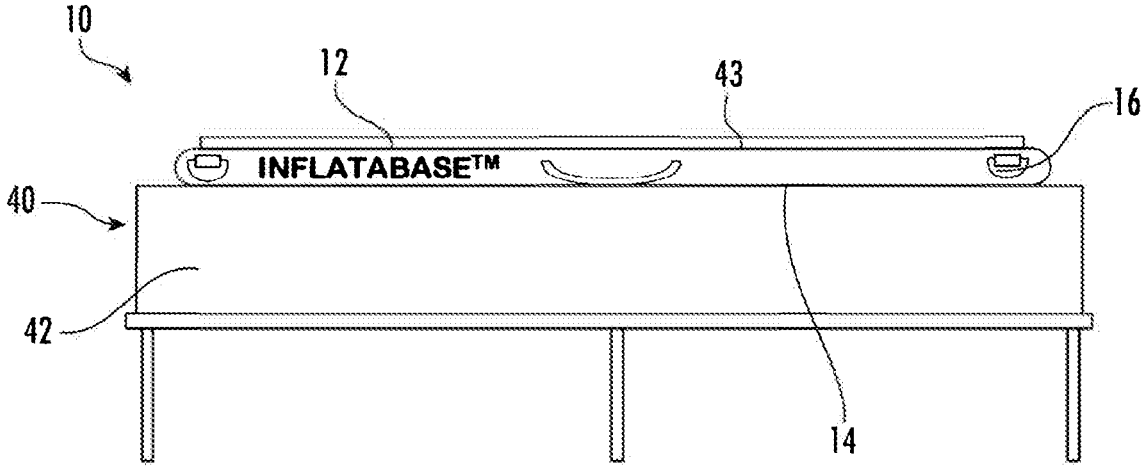


FIG. 6

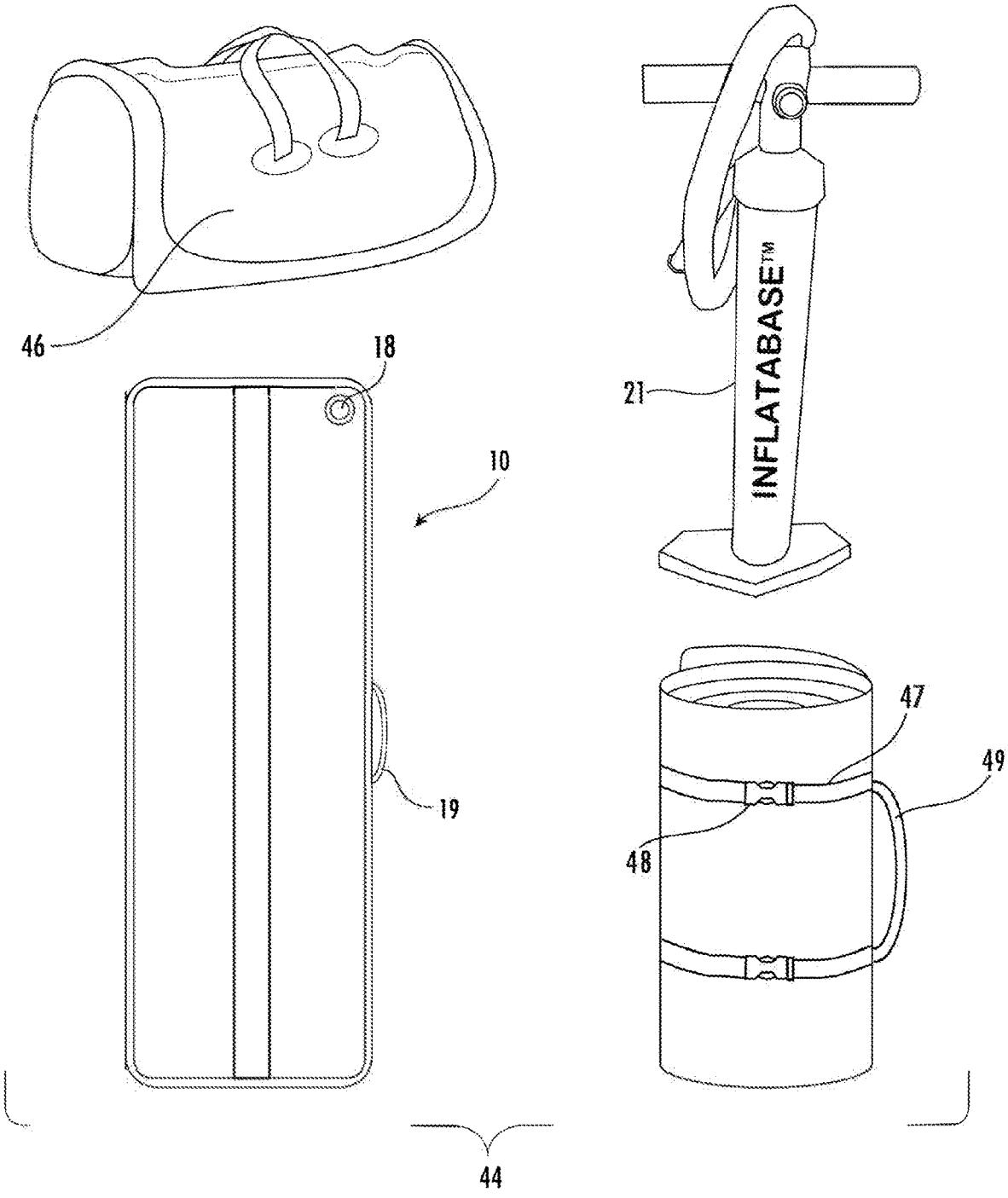


FIG. 7

INFLATABLE BASE FOR PHYSICAL THERAPY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application is a continuation of International Application No. PCT/US2019/049116, filed Aug. 30, 2019, which claims the benefit of U.S. Provisional Application No. 62/726,243, filed Sep. 1, 2018, the entire teachings and disclosure of which are incorporated herein by reference thereto.

FIELD OF THE INVENTION

[0002] This invention generally relates to the field of physical therapy and more particularly to a method of utilizing an inflatable base to perform physical therapy.

BACKGROUND OF THE INVENTION

[0003] During a physical therapy session, a physical therapist will lead a patient through a variety of exercises and stretches designed to rehabilitate an injury or impairment. Such sessions are typically performed at a clinic or in the patient's home, but in either case the physical therapist often supplies all necessary equipment for properly performing the exercises and stretches.

[0004] Additionally, a physical therapist will typically assign the patient a variety of exercises and/or stretches ("movements") to perform between sessions. These movements are not performed under the physical therapist's observation and without access to the physical therapist's equipment. Performing these movements speeds recovery, but the patient should be careful to perform them correctly, including from a well-supported position, in order to maximize the benefits and reduce the risk of injury. In this regard, patients with limited mobility will often perform their movements on an elevated surface, such as a bed or couch, so as to avoid having to drop down to and get up from the floor. However, the cushioning surface of the bed or couch may not provide adequate support or allow for proper alignment to effectively perform the movements.

[0005] As will be discussed herein, the inventor has recognized a need in the art for a base that can convert a variety of at-home surfaces into flat and stable exercise table while also being economical and easily storable for the user. These and other advantages of the invention, as well as additional inventive features, will be apparent from the description of the invention provided herein.

BRIEF SUMMARY OF THE INVENTION

[0006] In an aspect, embodiments of a method of using a base for physical therapy are disclosed. The base includes a first major surface and a second major surface opposite the first major surface. A minor surface joins the first major surface to the second major surface, and the base has a deflated configuration at a first internal pressure and an inflated configuration at a second internal pressure that is greater than the first internal pressure. In the method, the second major surface of the base is positioned over a surface while the base is in the deflated configuration. Further, in the method, the base is inflated to the inflated configuration, and a physical therapy technique is performed on the base.

[0007] In the method, the surface may be an article of furniture, such as at least one of a bed, a couch, a chair, or a table. Further, in the method, the surface may be the ground. In embodiments, the base is inflated to a second internal pressure of from 10 to 15 psi.

[0008] In embodiments, the physical therapy technique is performed in at least one of a standing position, a supine position, a prone position, a hooklying position, a sidelying position, a kneeling position, a quadruped position, or a sitting position.

[0009] In embodiments, the first major surface has a width dimension and a length dimension in which the length dimension is perpendicular to the width dimension, and the length dimension is greater than the width dimension. For example, the length dimension may be from 65 to 85 inches, and the width dimension may be from 27 to 35 inches. Additionally, the base has a height dimension in the inflated configuration, which is the distance between the first major surface and the second major surface. In embodiments, the height dimension is from 1.5 to 5.0 inches.

[0010] In embodiments, the base is made from a drop stitch material. In certain embodiments, the drop stitch material includes a traction layer on the first major surface. Further, the traction layer may be ethylene-vinyl acetate.

[0011] In embodiments, the base includes one or more rings or straps, and the method further comprises anchoring the base to the surface using a tether connected to the one or more rings or straps. Additionally, in embodiments, performing of a physical therapy technique may involve connecting exercise equipment, such as resistance bands or foot straps, to the one or more rings or straps.

[0012] In embodiments of the method, a foam layer may be arranged over the first major surface prior to performing a physical therapy technique. In other embodiments, the foam layer may be integral with the first major surface.

[0013] Other aspects, objectives and advantages of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The accompanying drawings incorporated in and forming a part of the specification illustrate several aspects of the present invention and, together with the description, serve to explain the principles of the invention. In the drawings:

[0015] FIG. **1** is a side view of an inflatable base for performing a physical therapy technique, according to an exemplary embodiment;

[0016] FIG. **2** is a top view of the base of FIG. **1**, according to an exemplary embodiment;

[0017] FIG. **3** depicts the base being inflated by a pump, according to an exemplary embodiment;

[0018] FIG. **4** depicts a front perspective view of the base shown in FIGS. **1** and **2**, according to an exemplary embodiment;

[0019] FIG. **5** depicts a cross-sectional view of an inflated drop-stitch material used to form the base, according to an exemplary embodiment;

[0020] FIG. **6** depicts the inflatable base positioned on a bed, according to an exemplary embodiment; and

[0021] FIG. **7** depicts a kit for inflating, storing, and transporting the inflatable base, according to an exemplary embodiment.

[0022] While the invention will be described in connection with certain preferred embodiments, there is no intent to

limit it to those embodiments. On the contrary, the intent is to cover all alternatives, modifications and equivalents as included within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE INVENTION

[0023] Various embodiments of an inflatable base for the performance of physical therapy techniques or yoga are disclosed herein. In general, the base may be described as a lightweight, portable, inflatable platform that transforms an item of furniture (e.g., a bed, a couch, a chair, etc.) into an exercise table comparable to the plinths used in a physical therapy clinic. As mentioned above, certain users may find it painful, difficult, or impossible to lie down or get up from the floor, and thus, the inflatable base disclosed herein allows for the conversion of an item of furniture into an elevated exercise platform. Additionally, because the base is inflatable/deflatable, the base can be deployed in a matter of minutes while also providing convenient storage. These and other aspects and advantages will be discussed herein in relation to the embodiments described below and shown in the figures. These embodiments of the inflatable base and associated method of performing physical therapy methods are provided by way of example and not by limitation.

[0024] Referring first to the embodiment depicted in FIG. **1**, a base **10** for performing physical therapy has a first major surface **12** and a second major surface **14**. As can be seen in FIG. **1**, the first major surface **12** and the second major surface **14** are joined by a minor surface **16** that extends between the first major surface **12** and the second major surface **14** and around the perimeter of the base **10**. In embodiments, the first major surface **12** and the second major surface **14** define a thickness T of the base **10**. In embodiments, the thickness T is from about 1.5 inches to about 5.0 inches, more particularly from about 2.0 inches to about 4.0 inches, and preferably from about 2.0 inches to about 3.5 inches. As will be discussed below, the base is thick enough to provide adequate support for performance of physical therapy techniques but also thin enough to be grasped easily for positioning.

[0025] FIG. **2** depicts a top view of the base **10**, showing the first major surface **12**. As can be seen in FIG. **2**, the first major surface **12** of the base **10** defines a rounded rectangular shape, such that the base **10** overall is substantially cuboid. The first major surface has a width dimension W and a length dimension L. In the embodiment depicted, the width dimension W and the length dimension L are not equal. However, in other embodiments, the width dimension W and the length dimension L may be equal such that the first major surface **12** is a rounded square shape. In embodiments, the width dimension W is from 27 inches to 35 inches, more particularly from 27 inches to 32 inches, and preferably from 29 inches to 32 inches. In embodiments, the length dimension L is from 65 inches to 85 inches, more particularly from 70 inches to 80 inches, and preferably from 71 inches to 75 inches. In embodiments, the width dimension W and length dimension L are selected to replicate a plinth such as might be found in a physical therapy clinic. In other embodiments, e.g., for a chair or for a larger patient, the width dimension W and the length dimension L may be smaller or larger depending on the particular circumstances. In a particular embodiment designed for a chair or as a stability cushion on the floor, the width dimension W and the length dimension L of the base **10** are equal and are from 10 inches to 18 inches, more particularly about 15 inches (38 cm×38 cm).

[0026] As can be seen in FIG. **2**, the first major surface **12** includes a valve port **18**. The valve port **18** allows for the inflation and deflation of the base **10**. In particular, the valve port **18** allows air to enter the interior of the base **10** in order for the base to inflate and air to exit from the interior of the base **10** in order for the base to deflate. While the valve port **18** is depicted on the first major surface **12**, the valve port **18** may also be provided on the second major surface **14** or the minor surface **16**. Additionally, the valve port **18** is depicted in a corner at one end of the first major surface **12**, but the valve port **18** may be positioned substantially anywhere on the first major surface **12**, the second major surface **14**, or the minor surface **16**.

[0027] Additionally, as can be seen in FIG. **2**, the base **10** may include one or more handles **19** or rings **20**, such as D-rings. The handles **19** allow for a person to position the base **10**. Additionally, the handles **19**, as well as the rings **20**, allow a person to anchor the base **10** to the ground or to a piece of furniture. For example, a tether, such as a strap or bungee cord, may be attached to the handles **19** or the rings **20**. The tether may be looped around the furniture, such as around a chair or mattress, to anchor the base **10**, or the tether may be attached at the other end to a stake that can be driven into the ground to keep the base stable. Additionally, handles **19** or rings **20** may be used as attachment points for exercise equipment, such as resistance bands or foot straps. FIG. **2** also depicts center lines **23** running along the length of the base **10**. The center lines **23** may be used to aid in alignment during the performance of various physical therapy techniques or yoga positions.

[0028] FIG. **3** depicts the base **10** being filled with air to transition from a deflated sate to an inflated state. As can be seen in FIG. **3**, a pump **21** compresses air and forces it into the interior of the base **10**. Specifically, the pump **21** includes a hose **22** that is connected at one end to the valve port **18**. The pump **21** draws in surrounding air, compresses it, and forces it through the hose **22** into the base **10**. FIG. **3** depicts an electrical pump **21**, which may be powered by an AC or DC power supply (e.g., electrical plug, battery, solar panel, etc.). Further, in embodiments, the pump **21** may be a mechanical pump, comparable to a bike pump (as shown in FIG. **7**). In FIG. **3**, the base **10** is being inflated form a storage configuration in which the deflated base **10** is rolled-up along its length dimension. FIG. **4** depicts the fully-inflated base **10**. In embodiments, the fully inflated base **10** is at a pressure of from 10 to 15 psi. It is believed that the base as described, including the above-described dimensions and internal pressure, are sufficient to support patients up to about 300 lbs.

[0029] Additionally, the base **10** can be inflated to less than the fully inflated configuration for performance of certain physical therapy techniques or yoga. For example, at a pressure less than the fully inflated pressure, the base **10** provides an unstable surface to practice balance activities. Further, the partially inflated base **10** can act as a crash pad for falls (for example, cushioning a fall from a bed in the night).

[0030] In embodiments, the base **10** is made of a drop-stitch material **24** as shown in FIG. **5**. Drop-stitch material **24** allows structures to be inflated to high pressures by joining the first major surface **12** to the second major surface **14** by thousands of threads **26**. In embodiments, the drop

stitch material **24** includes a first woven support fabric **28** and a second woven support fabric **30** that are joined by the threads **26**. In embodiments, the first woven support fabric **28** and the second woven support fabric **30** are a polyester, and the threads **26** are also a polyester. The polyester materials are used in embodiments because polyester is generally strong, durable and has very little stretch. In embodiments, the first woven support fabrics **28** is coated with a first air-tight layer **32**, and the second woven support fabric **30** is coated with a second air-tight layer **34**. In embodiments, the air-tight layers are PVC coatings. The drop-stitch material **30** further includes a first outer layer **36** that, in embodiments, defines the first major surface **12** and a second outer layer **38** that defines the second major surface **12**. In embodiments, the first outer layer **36** and the second outer layer **38** are made of an ethylene-vinyl acetate (EVA) material. In embodiments, one or both of the outer layers **36**, **38** may be textured to provide traction. Further, in embodiments, a foam layer (such as shown in FIG. **6**) may be provided on the first outer layer **36**. In embodiments, the foam layer may be a separate article that is placed over the first outer layer **38**, or in other embodiments, the foam layer is integral with the first outer layer **38**. In embodiments, the foam comprises one or more of EVA, polyurethane, neoprene, nitrile rubber, low density polyethylene, and silicone, among others.

[0031] In embodiments, the material of the minor surface **16** (not shown) includes a polyester base fabric with an air-tight PVC coating and optionally an outer layer of, e.g., EVA. In embodiments, the material of the minor surface is sewn or glued to the drop-stitch material in a manner that creates an airtight seam with the first major surface **12** and the second major surface **14**.

[0032] As mentioned above, the inflatable base **10** is particularly suitable for performing physical therapy techniques, particularly when placed over a piece of furniture. FIG. **6** depicts the inflatable base **10** positioned on a piece of furniture **40**, in particular a bed **42**. Physical therapy patients, who may not be able to easily perform physical therapy movements on the floor or ground and who do not have access to a physical therapy plinth, often perform the physical therapy techniques on a bed, couch, or in a chair. Such surfaces typically do not provide the requisite support and flatness necessary to perform the techniques correctly. Accordingly, by placing the inflatable base **10** over the piece of furniture **40**, a flat and rigid support surface is provided for performing the physical therapy techniques.

[0033] Additionally, in embodiments, the base **10** may be placed on the ground, and in this way, a flat, elevated surface may be provided on damp or lumpy ground. In an exemplary embodiment, the inflatable base **10** may be used to perform yoga outdoors.

[0034] In the method, the base **10** is positioned such that the second major surface **14** of the base **10** is over a surface, such as a mattress **42** as shown in FIG. **6**. In embodiments, when the base **10** is positioned, the base **10** is in the deflated configuration. Then, in embodiments, the base **10** is inflated to the inflated configuration. Thereafter, a physical therapy technique can be performed on the base **10**. The base **10** allows for a person performing the physical therapy technique to be in at least one of a standing position, a supine position, a prone position, a hooklying position, a sidelying position, a kneeling position, a quadruped position, or a sitting position, among others. Further, as shown in FIG. **6**, the inflatable base **10** is provided with a foam layer **43** to provide additional comfort for a patient performing the physical therapy technique.

[0035] Advantageously, once the patient is finished performing the physical therapy technique, the base **10** can be deflated, rolled-up, and stowed in a compact package. FIG. **7** depicts an embodiment of an inflatable base kit **44**. In an embodiment, the kit **44** includes the inflatable base **10**, a pump **21**, and a duffle bag **46**. The base **10** can be rolled-up and stored in the duffle bag **46** along with the pump **21**. In the embodiment shown in FIG. **7**, the base **10** includes one valve port **18** and one handle **19**, and the base **10** has the dimensions of 182 cm×81 cm×5 cm. In another embodiment, the kit **44** includes the base **10**, the pump **21**, and one or more straps **47** and clips **48** (e.g., side-squeeze style plastic buckles). In such an embodiment, the base **10** can be rolled-up and clipped in a storage position using the straps **47** and the clips **48**. The straps **47** and clips **48** may be sewn, glued, or otherwise permanently secured onto the drop-stitch material of the base **10**, or the straps **47** and clips **48** may be separate from the base **10** and wrapped around the base **10**. In embodiments, the straps **47** are long enough to wrap around both the base **10** and the pump **21** to secure the pump **21** against the rolled-up base **10**. Further, the straps **47** may also be provided with a handle **49** to facilitate carrying of the base **10** (and pump **21**) without needing a duffle bag **46**. Further, in embodiments, the inflatable base **10** may include Velcro straps and handles that allow the rolled up inflatable base **10** to be maintained in the rolled-up configuration while also providing a way to carry the base **10** without the use of the duffle bag **46**. Accordingly, the inflatable base **10** is portable and stores in a small package size.

[0036] While the base **10** can be easily deflated to provide compact storage, the inflatable base **10** can also be stored in the inflated configuration, e.g., by propping against a wall or stored under a bed, because of its thinness and low weight that allow for easy manipulation.

[0037] The inventor believes that the inflatable base **10** can play an important role in patient compliance with home exercise programs by making available a space-saving and light weight clinic-quality plinth suitable for the patient's home. By improving patient compliance with home exercise plans, inflatable base **10** may support better clinical outcomes for patients. This in turn helps physical therapists/clinics improve their outcome scores, which can lead to increased reimbursement payments from insurance.

[0038] All references, including publications, patent applications, and patents cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

[0039] The use of the terms "a" and "an" and "the" and similar referents in the context of describing the invention (especially in the context of the following claims) is to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,") unless otherwise noted. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually

recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

[0040] Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

What is claimed is:

1. A method of using a base for physical therapy, the base comprising a first major surface and a second major surface opposite the first major surface, wherein a minor surface joins the first major surface to the second major surface and wherein the base has a deflated configuration at a first internal pressure and an inflated configuration at a second internal pressure that is greater than the first internal pressure, the method comprising the steps of:

positioning the second major surface of the base over a surface, the base being in the deflated configuration;

inflating the base to the inflated configuration; and

performing a physical therapy technique on the base.

2. The method of claim **1**, wherein the surface is an article of furniture.

3. The method of claim **2**, wherein the article of furniture includes at least one of a bed, a couch, a chair, or a table.

4. The method of claim **1**, wherein the surface is the ground.

5. The method of claim **4**, wherein the physical therapy technique is yoga.

6. The method of claim **1**, wherein the second internal pressure is from 10 to 15 psi.

7. The method of claim **1**, wherein the physical therapy technique is performed in at least one of a standing position, a supine position, a prone position, a hooklying position, a sidelying position, a kneeling position, a quadruped position, or a sitting position.

8. The method of claim **1**, wherein the first major surface comprises a width dimension and a length dimension, the length dimension being perpendicular to the width dimension, and wherein the length dimension is greater than the width dimension.

9. The method of claim **8**, wherein the length dimension is from 65 to 85 inches.

10. The method of claim **8**, wherein the width dimension is from 27 to 35 inches.

11. The method of claim **1**, wherein the base has a height dimension in the inflated configuration, the height dimension being a distance between the first major surface and the second major surface, and wherein the height dimension is from 1.5 to 5.0 inches.

12. The method of claim **1**, wherein the base comprises a drop stitch material.

13. The method of claim **12**, wherein the drop stitch material comprises a traction layer on the first major surface.

14. The method of claim **13**, wherein the traction layer comprises ethylene-vinyl acetate.

15. The method of claim **1**, wherein the base further comprises one or more rings or straps, and the method further comprises anchoring the base to the surface using a tether connected to the one or more rings or straps.

16. The method of claim **1**, wherein the base further comprises one or more rings or straps and wherein the performing step further comprises connecting exercise equipment to the one or more rings or straps.

17. The method of claim **1**, further comprising the step of arranging a foam layer over the first major surface prior to the step of performing.

18. The method of claim **1**, wherein the base further comprises a foam layer integral with the first major surface.

* * * * *