

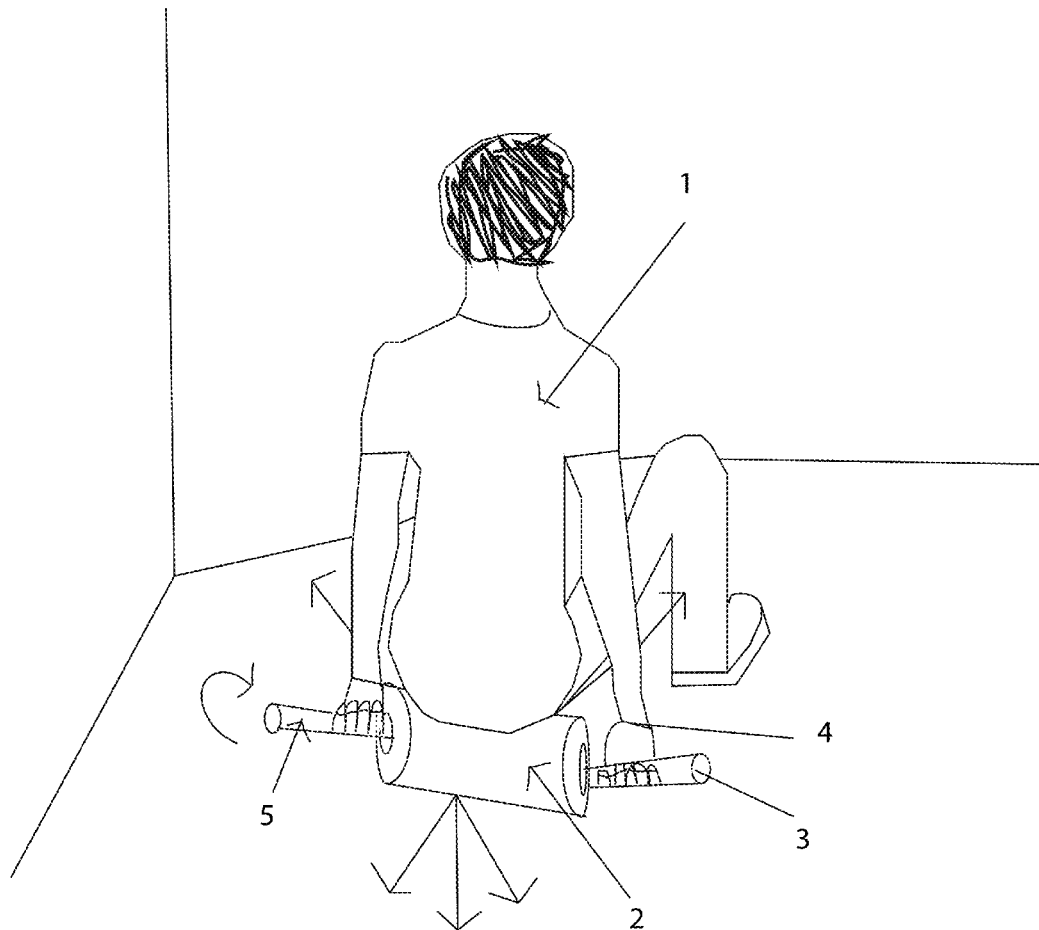


US 20170080283A1

(19) **United States**(12) **Patent Application Publication**
Harman(10) **Pub. No.: US 2017/0080283 A1**(43) **Pub. Date: Mar. 23, 2017**(54) **MECHANICAL FOAM ROLLER**(71) Applicant: **Mark Harman**, Dallas, TX (US)(72) Inventor: **Mark Harman**, Dallas, TX (US)(73) Assignee: **Mark Harman**(21) Appl. No.: **14/857,481**(22) Filed: **Sep. 17, 2015****Publication Classification**(51) **Int. Cl.**
A63B 22/20 (2006.01)(52) **U.S. Cl.**
CPC **A63B 22/20** (2013.01)(57) **ABSTRACT**

The present invention consists of low to high density cylinder shaped polyethylene mechanical foam roller. This unique foam roller can be used for novel stretching, exercise

and self myofascial release therapies/exercise programs. This mechanical foam roller is novel specifically because of the pairing of a single steel tube within a pair of bearings that are secured to the opposing ends of the foam-core opening. This invention improves upon the standard foam roller by allowing a user to engage the foam rollers handles in order to enhance their self-myofascial release experience related to the X,Y and handle specific Z-rotational-axis. All standard foam rollers are currently limited in scope because they lack the handles the Mechanical Foam Roller offers; it offers foam rolling while lying, sitting and self-myofascial release in the standing position. The core of the mechanical foam roller contains bearings that allow the user to utilize the handles for control and 360 degrees of directional control of the foam roller in the X & Y plane of direction. The directional forces of the mechanical foam roller relates novel ways of exercise, self-myofascial release, and stretching therapies. Currently there are no foam rollers with this type of mechanism. Users can feel that they have more control of their foam roller as they move it across affected body surfaces. Users can also ask significant others or friends to assist them in foam rolling and/or self-myofascial release.



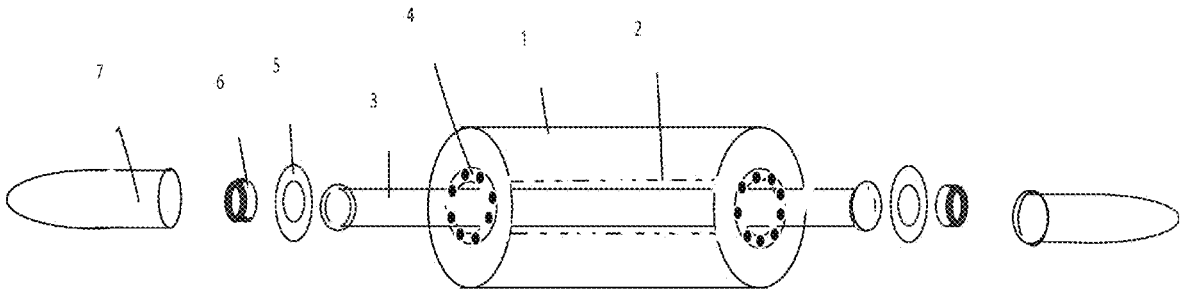


Figure 1

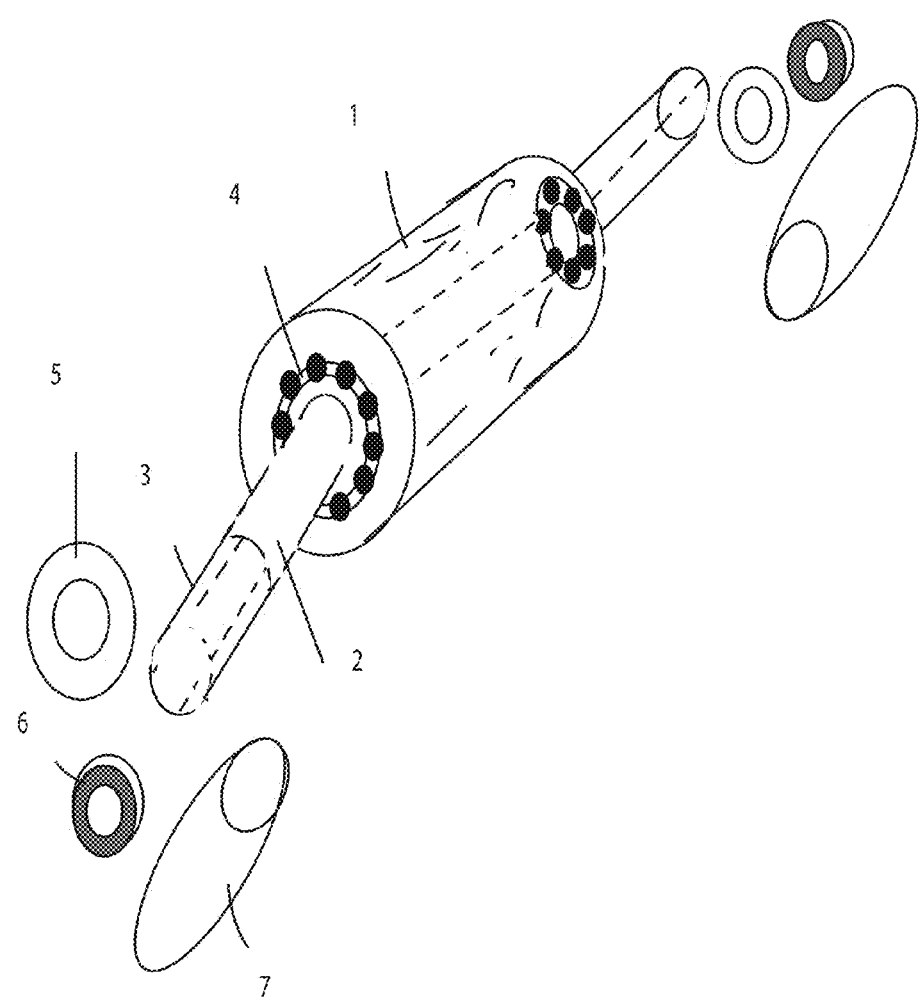


Figure 2

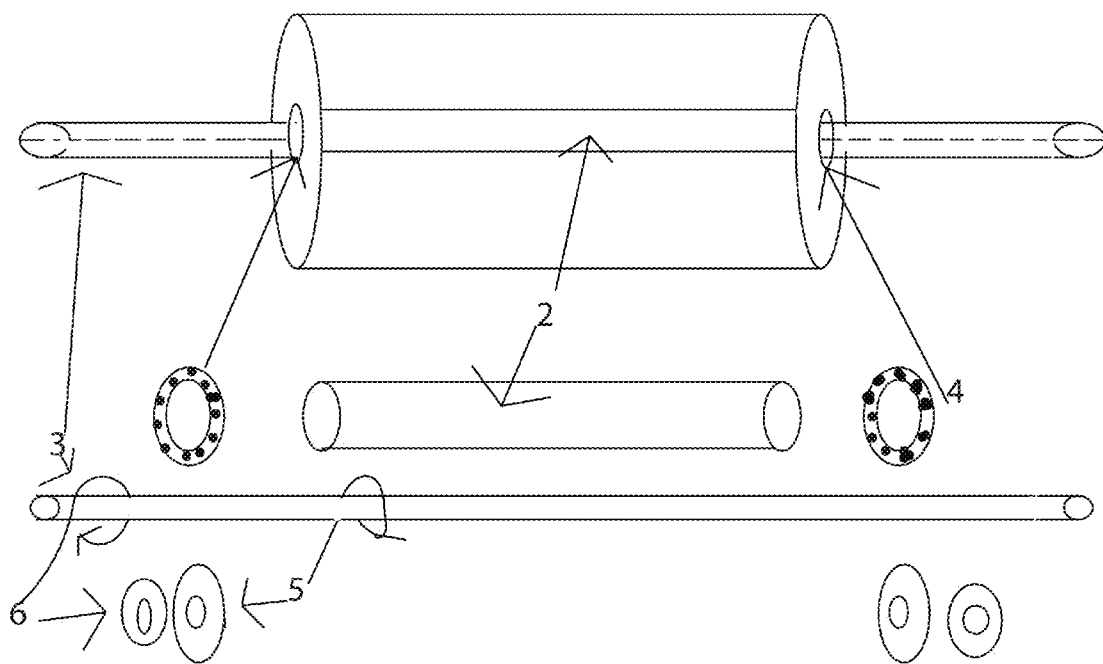


Figure 3

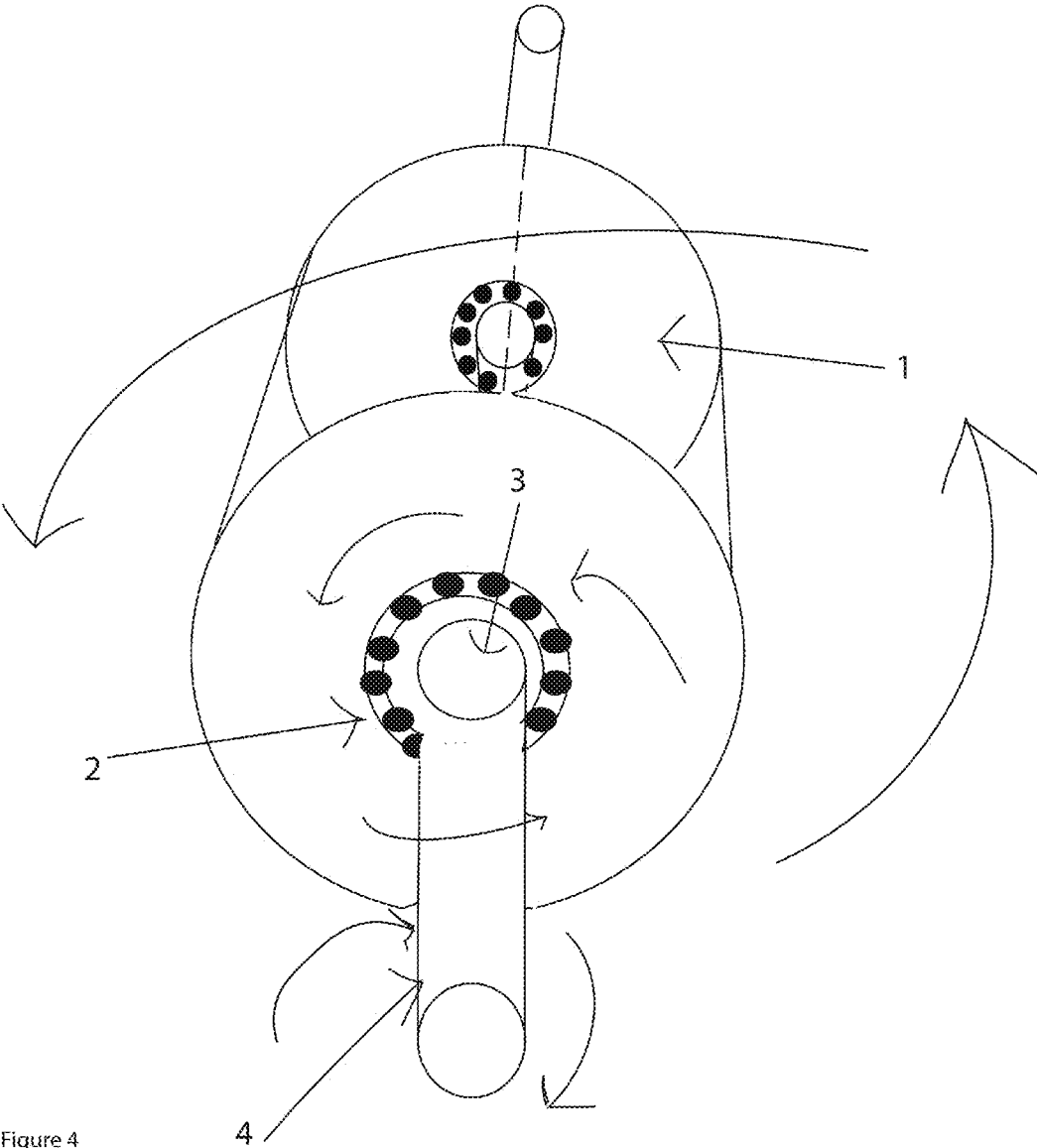
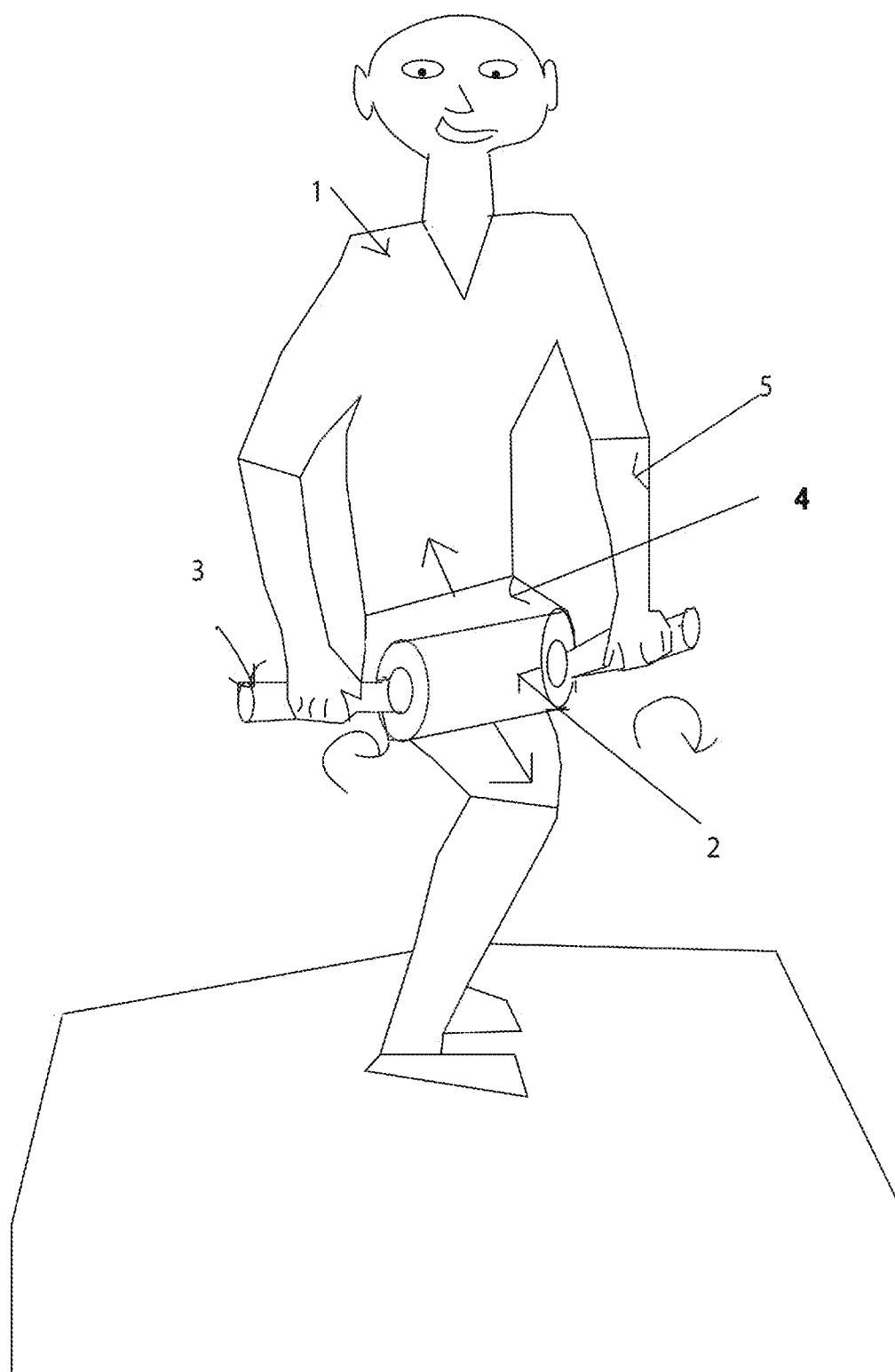


Figure 4



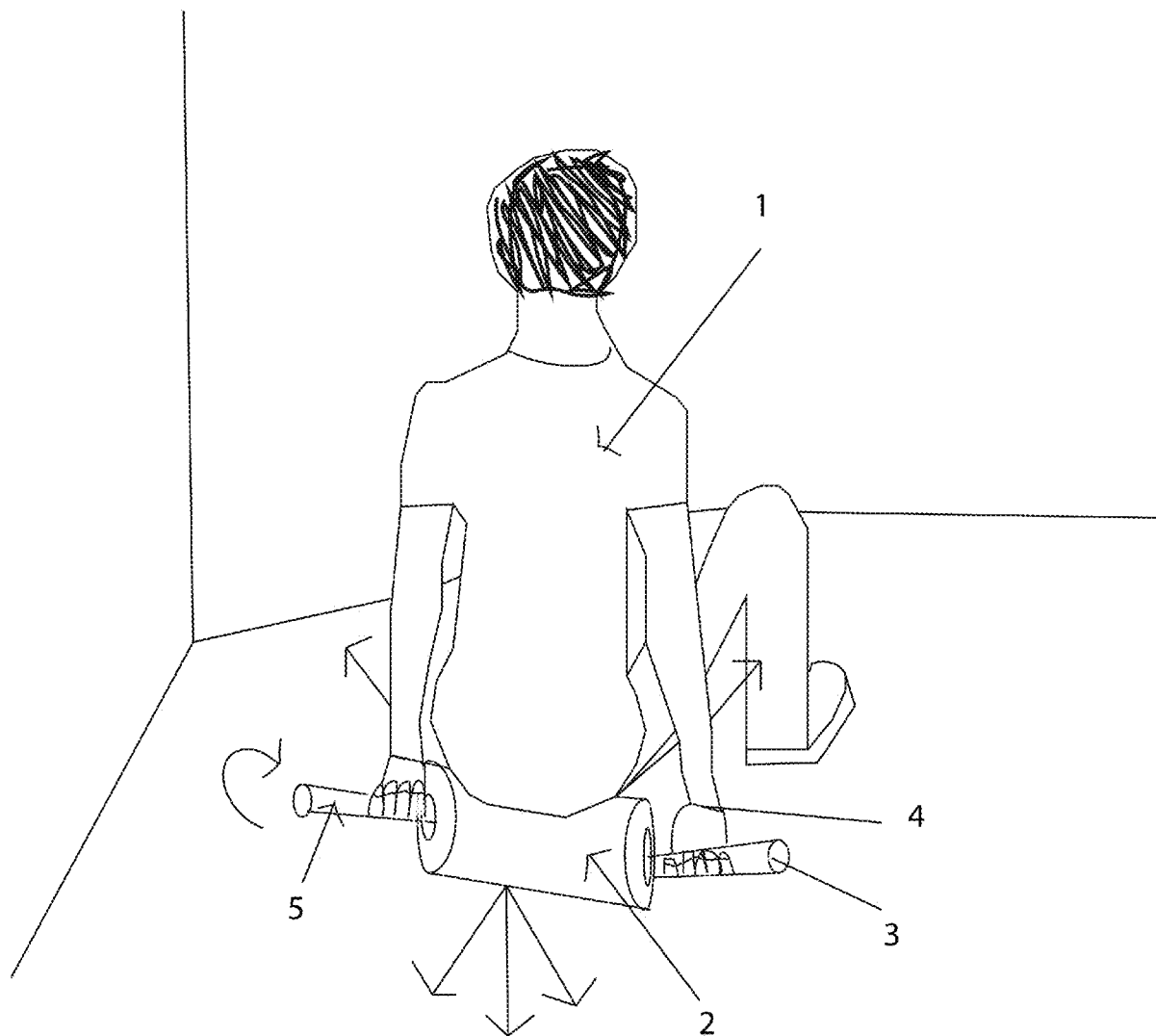


Figure 6

MECHANICAL FOAM ROLLER

FIELD OF INVENTION

[0001] The Mechanical Foam Roller can be used in exercise related fields, as a personal self- massage device and can be integrated into musculoskeletal rehabilitative, therapeutic and stretching programs.

DESCRIPTION OF PRIOR ART

[0002] 1. Phillips; Cassidy (Massage Roller, 2015) The present disclosure is generally directed to a massage roller which is particularly effective in relieving tender and painful conditions such as muscle or connective tissue conditions. An illustrative embodiment of the massage roller includes a generally resilient roller body and a plurality of massage zones having various densities provided on the roller body.

[0003] 2. Ateya Soliman; Roshdy Rady (2013, Body therapy massage roller, (D688,384))

[0004] 3. Nelson; Jeremy J. (2013, Massage roller D688, 380)

[0005] 4. Stacy Borrows, (Foam Roller (U.S. Pat. No. 7,137,926) developed a foam roller that is an object of the present invention to provide a foam roller with which people can balance more easily than they can balance with cylindrical foam rollers. Another object of the present invention is to provide a variable roller that has two surface options for beginner and advanced strategies of balance. Because the flatter surface also can apply less pressure on the skin and muscles, the two surfaces allow more people to tolerate lying on the roller. Finally, for exercises that use the roller to support a body part while a person moves the body part along the roller, the two surfaces allow for different movement speeds and different applied forces. This provides heightened sensitivity of movement to increase movement awareness.

[0006] 5. Poirier; Christopher J (Therapeutic roller apparatus, 2013) is an object of the present invention to improve the application of these rollers by incorporating a vibrating means therein. Thus, in accordance with one aspect of the present invention there is provided a therapeutic roller apparatus that comprises a rigid plastic roller member and a soft foam material sleeve that is adapted to fittingly mount about the rigid plastic roller member. The rigid plastic roller member preferably also has an inner tubular passage for fittingly receiving a vibration assembly.

[0007] 6. Louis; John G, 2001, muscle therapy tool (U.S. Pat. No. 6,267,738), The method and apparatus of the present invention are used to provide therapy by the application of pressure to muscles used in various therapeutic techniques such as trigger point, friction, effleurage and muscle stripping. In one embodiment, the present invention comprises a massage tool having a shaft of a predetermined length and one or more ring members associated with the shaft member.

BRIEF DESCRIPTION OF DRAWINGS

[0008] FIG. 1 illustrates the side view of the components and insertion points related to the embodiment of the present disclosure.

[0009] FIG. 2 illustrates a frontal view of the components that are present in the embodiment of the present disclosure.

[0010] FIG. 3 illustrates the components and how they interact with each other related to the embodiment of the present disclosure.

[0011] FIG. 4 illustrates how the steel tube components and bearing work together within the foam in order to create movement when operated in accordance with certain embodiments in the present disclosure.

[0012] FIG. 5. illustrates how an individual can interact with the mechanical rollers components, in accordance with certain embodiments in the present disclosure

[0013] FIG. 6 illustrates how an individual can manipulate the components to produce desired movement, in accordance with certain embodiments in the present disclosure

DETAILED DESCRIPTION OF DRAWINGS

[0014] The 0.75" hollowed out core, of the foam cylinder piece, allows a PVC tube, steel tube and ball bearings to be placed within the core of the hollowed out foam cylinder. The 0.75" ID circular bearings are. each situated and fitted at the opening of the hollowed out foam core against the PVC tube. The steel tube is first placed through the center of one of the cylindrical/ball bearings. The head of the steel tube then passed through the center of the hollowed out foam or PVC tube and finally exiting through the center of the second cylindrical bearing or ball bearing. The steel tube is then equally fastened to the lateral end of the ball bearings. The ball bearings allow for axial movement as the person grips the fin ends of the tube. The device allows user to control movement on both the X and Y plane while rotating handles on the Z-axis.

[0015] A user places his or her hands at the level of the handles in order to enact a foam rolling stretch routine. The user can choose whether to stretch out on the floor, seated position or standing position. The user can also lean against a wall to peruse a more unique stretching experience, stretching out. the back muscles and other non-activated muscle fibers.

[0016] This mechanical foam roller is novel specifically because of the pairing of a single steel tube within a pair of bearings that are secured to the opposing ends of the foam-core opening. This invention improves upon the standard foam roller by allowing a user to engage the foam rollers handles in order to enhance their self-myofascial release experience related to the X,Y and handle specific Z-rotational-axis. The mechanical foam roller is a device that works as a partner- assisted myofascial and/or self-myofascial release tool and stretching tool; the device is operated by either lying on the ground, maintaining a seated position and/or standing position; the high density polyethylene foam roller hollowed-out core allows insertion of a mechanical core comprised of a pair of bearings, a PVC pipe and a steel tube that allow the mechanical foam rollers cylinder shape to perform work in a multi-angled circular rotation in the forward, sideways and reverse direction. It can be used as an individual self-massage or exercise tool and can be used as a partner assisted myofascial-release and exercise device.

[0017] FIG. 1 represent the side angle depicting how the core components of the foam roller 1 are all inserted and assembled. A standard pipe 2 is inserted to give support. A steel tube 3 is inserted and rests within the PVC pipe, R12 or R12Z ball bearing 4 and are housed within the ends of the foam piece encompassing the PVC pipe adding stability and mechanical rotation of the steel tube cover and protect the

bearings on each side. A pair of metal collars 6 sit against the outside or lateral ends of the metal washers. Finally, a pair of textured/vinyl grips 1 are placed over the ends of the steel tube.

[0018] FIG. 2 illustrates the front angle of the Mechanical Foam Roller depicting the required components for assembly. The PVC pipe 2 is inserted into the vacant central hole within the round foam 1. Both the R12 or R12Z ball bearings 4 are placed on both ends of the hollowed out foam cylinder sitting against the PVC pipe. The steel tube 3 is passed through the center of the ball bearings, continuing through the PVC pipe and exiting the opposite end. The two metal washers 5 are placed on both ends as support along with a pair of metal collars 6 to secure all internal components. A pair of rubber handles 7 are placed on the ends of the metal tube.

[0019] FIG. 3 illustrate how the mechanical foam roller is capable of multiple angles of rotation. Rotation is a function of the ball bearings 4 coupled to the fixed position of the steel tube 3, the PVC pipe 2 and the foam cylinder 1. The bearings allow rotational movement of the steel tube. Component shifting is protected by the metal washers 5 and metal collars 6. The metal collars 6 assure that the external washers 5 and internal bearings 4 do not slip out of place during self-myofascial release or exercise movements.

[0020] FIG. 4 represents the simple mechanical movements of this foam roller 1 as it rotates on its axis. The ball bearings 2 allow the steel tubing to rotate 360 degrees around its fixed axis producing rotational movement.

[0021] FIG. 5 represent a general idea of this invention with respect to the mechanics as an individual stands holding the handles 3 of the foam roller 2 as they foam roll their lower extremities 4. The individual 1 is able to foam roll or perform "self-myofascial release" in a standing position.

[0022] FIG. 6 illustrates how an individual can sit on the foam roller 2 while holding onto the handles in order to balance and have full control of the foam roller grasping the handles 3. The Person can proceed to allow their wrists 4 to relax as the mechanical foam roller freely rotates on its axis 5 producing rotational motion and self-myofascial release of the gluteal muscles. The individual can also use the handles 3 to balance and also to pull themselves into the foam cylinder 2 to increase the trigger point self-myofascial release effect.

PROBLEMS RELATED TO CONVENTIONAL FOAM ROLLERS

[0023] Foam rollers are currently are limited in their scope and application related to stretching and exercise and targeted myofascial-release (deep tissue tension release and trigger point release). Current foam rollers do not allow the user a wide range of alternate adaptations to be made in order to challenge and "stretch-out" other musculoskeletal systems with handle control or both handle control centered within ball bearings all owing axial movement. Specifically, users cannot control a foam roller with certainty on all surfaces that are suggested by manufacturers and retailers other than the floor without the foam roller shifting around on the surface they are on. The shifting can cause the user discomfort or possibly injury due to limited control of themselves and the foam roller piece.

[0024] The core of conventional foam rollers lose elasticity and rigidity due to repeated weight bearing loads that is placed upon them over a short period of time

depending on load capacity and frequency of use. One common complaint is that the center of conventional polyethylene.

[0025] (PE) and polyurethane (PU) foam rollers tend to weaken after repeated use, and some even have been reported as prematurely fall apart contrary to manufacturer guarantees. As the standard foam roller wears, the conventional polyethylene (PE) and polyurethane (PU) foam rollers that Foam rollers are currently are limited in their scope and application related to stretching and exercise and targeted myofascial-release (deep tissue tension release and trigger point release). Current foam rollers do not allow the user a wide range of alternate adaptations to be made in order to challenge and "stretch-out" other musculoskeletal systems with handle control or both handle control centered within ball bearings all owing axial movement. Specifically, users cannot control a foam roller with certainty on all surfaces that are suggested by manufacturers and retailers other than the floor without the foam roller shifting around on the surface they are on. The shifting can cause the user discomfort or possibly injury due to limited control of themselves and the foam roller piece.

[0026] The core of conventional foam rollers lose elasticity and rigidity due to repeated weight bearing loads that is placed upon them over a short period of time depending on load capacity and frequency of use. One common complaint is that the center of conventional polyethylene.

[0027] (PE) and polyurethane (PU) foam rollers tend to weaken after repeated use, and some even have been reported as prematurely fall apart contrary to manufacturer guarantees. As the standard foam roller wears, the conventional polyethylene (PE) and polyurethane (PU) foam rollers that over time becomes reduced even further as the foam roller weakens, thus weakening the therapeutic effectiveness. These standard foam rollers have been reported to lose effectiveness over a short period of time.

[0028] Standard PVC, PE and PU foam rollers have a limited scope, PE and PU foam rollers wear over a short period of time, while all three types are all limited in range of motion related to dynamic musculoskeletal system exercises and partner assisted self-myofascial release therapies. It would be impossible for an individual to massage out another individual without some type of mechanical addition to the core of the standard foam roller. The therapeutic effect of a standard foam rollers assisted trigger-point partner assisted self-myofascial release would be deficient in precise control and pressure thus most likely would aid in both the loss of control of the foam roller while increasing the likelihood of injury or other uncertain strains within the targeted muscle fibers.

SOLUTION TO THE LIMITATIONS OF CONVENTIONAL FOAM ROLLERS

[0029] The present invention seeks to provide a solution to this problem(s) by providing a mechanically rotating steel tube that rests in a 0.75" PVC pipe out core that both fortifies the hollowed out core of the foam cylinder and allows handle guided rotation. The core is fortified with a PVC pipe and a steel tube. The steel tube passes through the center of the PVC pipe in order to limit wearing out of the foam core. The unique handling mechanics give the user more options to challenge their diverse musculoskeletal systems while most importantly allowing the user to control their foam

roller to the degree at which they were not capable of doing so with a standard foam roller.

[0030] The handles increase the overall surface area at which the user can target with this novel foam roller, including upper body, lower body, limbs and the neck while lying, sitting and/or standing position. The handles coupled to the rotating ball bearings allow the user to achieve a novel yet tailored experience to their fitness level, comfort zone and mode of stretching.

[0031] The handles give a user more self-myofascial release options while also providing a more dynamic yet comprehensive exercise and stretch routine; i.e. the user can handle or grip this tool at the ends of the steel tube in order to pursue a wall guided stretch or alternative preferred stretch. The user in fact gains total control of the foam roller allowing oneself to discover new ways to stretch out back muscles, shoulder joints and other targeted musculoskeletal areas that the standard foam roller and other related exercise tools fail to achieve. The user can also request a partner to assist self-myofascial release techniques if the user is incapable because of limited mobility, injury or other anatomical limitations.

[0032] Alternatively the user can use the mechanical foam roller for an anteriorly or posteriorly directed deep tissue massage device. The user can place the device on his/her upper or lower body while applying manual pressure while freely flowing up or down the hard to reach surfaces of their upper torso or partner's torso. The user now has the ability to assist a client, patient or friend in foam rolling and myofascial massage techniques. The term is coined "partner assisted self-myofascial release, aka—posterior partner assisted myofascial (muscle) release device."

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0033] Herein the mechanical foam roller is capable of multiple angles of directional movement related to common and novel areas of motion specific to the foam roller's mechanical bearings allow axial motion of the central 24"-28" long steel tube (FIG. 3). The core mechanics in FIG. 1 exhibit how a user can simply place their hands at opposite ends of the steel tube allowing for control of the foam roller and circular movement of the ball bearings. The bearings on each end allows for X&Y plane axial movement because the stationary tube sits on the cylindrical bearings within the PVC pipe that is inserted into the core (lengthwise) of the foam (FIG. 2). The steel rod, bearings and PVC pipe both work synergistically to resist heavy forced placed on the foam as the device is being used (FIG. 2).

[0034] The bearing are held in tight at the ends of the cylindrical foam by using a metal cylindrical collar and washer that can be fastened to the steel rod closest at the opening of the center of the hollowed out foam (FIG. 2). The aforementioned metal components assures a stable mechanical matrix. Additionally a 5/8" vinyl sleeve supports the fastened metal collar. This sleeve ensures the collar will not accidentally slip from a loosened screw (FIG. 2).

[0035] The vinyl sleeve, metal collar and metal washer all support the stability of the inserted ball bearing (FIG. 2). Both the vinyl sleeve and metal collar keep the metal tube and bearings from slipping or shifting while the operator is exercising or stretching. Additionally, the vinyl sleeve adds an aesthetic appearance and protective component so the bearings do not slip-out. This is a considered to be a safety

mechanism so the unit will not fall apart after brief to long-term use. The collars locking mechanism can be adjusted for user preference. The additional vinyl grips on the end of the steel rod prevent slippage as the user begins to perspire and gives the user grip strength and comfort (FIG. 2).

SUMMARY OF THE DISCLOSURE

[0036] The Mechanical Foam Roller can be used in exercise related fields, as a personal self-massage device and can be integrated into musculoskeletal rehabilitative therapeutic and stretching programs. Foam rollers are currently are limited in their scope and application related to stretching and exercise and targeted myofascial-release (deep tissue tension release and trigger point release). Current foam rollers do not allow the user a wide range of alternate adaptations to be made in order to challenge and "stretch-out" other musculoskeletal systems with handle control or both handle control centered within ball bearings all owing axial movement.

[0037] The present invention seeks to provide a solution to this problem(s) by providing a mechanically rotating steel tube that rests in a 0.75" PVC pipe out core that both fortifies the hollowed out core of the foam cylinder and allows handle guided rotation. The core of the mechanical foam roller contains bearings that allow the user to utilize the handles for control and 360 degrees of directional control of the foam roller in the X & Y plane of direction. The directional forces of the mechanical foam roller relates novel ways of exercise, self-myofascial release and stretching therapies.

[0038] Currently there are no foam rollers with this type of mechanism. Users can feel that they have more control of their foam roller as they move it across affected body surfaces. Users can also ask significant others or friends to assist them in foam rolling and/or self-myofascial release.

1. The mechanical foam roller is a device that works as a partner-assisted myofascial and/or self-myofascial release tool and stretching tool; the device is operated by either lying on the ground, maintaining a seated position and/or standing position; the high density polyethylene foam roller hollowed-out core allows insertion of a mechanical core comprised of a pair of bearings, a pvc pipe and a steel tube that allow the mechanical foam rollers cylinder shape to perform work in a multi-angled circular rotation in the forward, sideways and reverse direction; the mechanical foam roller works for entire musculoskeletal system including the neck, back, spine, buttocks, hips, legs, feet, and limbs, chest, shoulders of the axial and appendicular musculoskeletal framework; the technique for myofascial release includes lying, seated and standing positions on all solid structured X and Y planes; the unit is stabilized by supporting metal washers, collars and vinyl tubing.

2. The mechanical foam roller contains a hollowed out core according to claim 1 allows mechanical components to be inserted for functional use.

3. According to claim 2 of the mechanical foam roller components inserted reside in a 0.75 inch×12-18 inch long hollow lumen core.

4. According to claim 3 a 10-16" long, 3/4" ID PVC-pipe is inserted in the center of the 0.75 inch ID polyethylene hollow lumen core.

5. The Mechanical Foam Roller according to claim 4, contains a 24-28" long and 0.625" OD steel tube that fits into the center of the PVC-pipe, situated within the hollow lumen.

6. The mechanical foam roller as it relates to claim 5 has two ball bearing components, 0.75" ID, situated at the opening of the hollow foam core allowing the steel tube to rest within both ball bearings while also resting against the two ends of the pvc-pipe.

7. The mechanical foam roller as it relates to claim 6 is entirely secured with a pair steel $\frac{3}{4}$ " ID steel washer pieces that rest on the outside of the polyethylene foam securing both the tube and ball bearings.

8. The mechanical foam roller as it relates to claim 7 is finally secured with a metal collar with a ID and progressively advancing screw that tightens and secures the metal collar to the steel tube.

9. The mechanical foam roller as it relates to claim 8 contains two vinyl sleeves that offer more support to the metal collars.

10. The mechanical foam roller as it relates to claim 9 ultimately contains a vinyl-rubber hybrid hand grip offers comfort and extra grip support.

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