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THERMAL TREATMENT DEVICE AND METHOD OF USE

Abstract

A thermal treatment device for thermal treatment of human leg is disclosed. The thermal treatment device comprises a sleeve for covering a back of the human leg, and at least three pockets adjacent to a glute, a hamstring, and a calf of the leg. The sleeve is configured to be maintained on the leg. The pockets are adaptable to receive a thermal source. The sleeve covers the back of the leg from a calf to the glute and a front of the leg from a shin to a groin. The sleeve is a split sleeve having a first edge and a second edge. The sleeve is configured to be wrapped around the leg to cover the back of the leg.

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Background/Summary

FIELD

[0001] The field is related to a thermal treatment device. The field may particularly relate to a thermal treatment device and a method of thermally treating a human leg.

BACKGROUND

[0002] Thermal therapy conventionally involves the application of heat or cold to body tissue in an effort to heal and rehabilitate injuries such as bruises, sprains, or other trauma to bone, muscle, ligaments, tendons, and other tissue and to treat degenerative conditions and inflammatory diseases and disorders. In a cold application, a cold medium is applied to an affected bodily area to diminish swelling and inflammation so to reduce pain and promote healing of injured tissue. In a heat application, a hot medium is applied to an affected bodily area to loosen extremity tissue and joint tissue, such as muscles, ligaments, and tendons.

[0003] Application of heat promotes repair and healing by increasing the temperature of the affected area, thereby increasing the flow of blood and oxygen to the tissue and increasing respiration. In this manner, the application of heat serves to increase the range of motion and improve the flexibility in the patient's extremity, thus improving the functionality, comfort, and performance of the injured or infirm targeted area.

[0004] Application of cold diminishes inflammation of tissue. Chilling tissue causes vasoconstriction in which blood vessels contract and drain blood from chilled areas. After removing the chilling device from the vicinity of the tissue, fresh blood flows into the previously contracted vessels, invigorating the muscles with oxygen and in turn, reducing inflammation. This increase in blood flow also makes its way deep into the muscle tissue, helping flush out any built-up lactic acid. The combined effect of supplying oxygen to muscles while flushing out lactic acid facilitates recovery of muscles, tendons, bones, nerves, and other tissue.

[0005] A chilling method of thermal therapy which many people have resorted to is an ice bath. Ice baths can carry disadvantages. For example, the ice bath causes intense discomfort and severe pain owing to the frigid ice and water. Another disadvantage is that an ice bath indiscriminately chills the entire submerged portions of the body. Therefore, not only are the affected muscle groups exposed to the cold temperatures, but all neighboring parts of the anatomy must endure the intense cold of an ice bath, even if no benefit is attainable for those neighboring parts of the body. Additionally, ice baths are most effective when taken within a short period of time after an intense activity. However, ice baths are not typically portable and are often located remote from or inaccessible after intense activity.

[0006] Other conventional thermal therapies do not facilitate targeting a related group of muscles, ligaments, tendons, and tissues simultaneously. Instead, such other conventional thermal therapies typically involve wrapping a band around the heat source and a part of the body to attempt to maintain the heat source on the targeted bodily area. Applying a wrap to secure a heat source on a targeted bodily area may be difficult, and the heat source frequently shifts away from the targeted area. Consequently, these conventional therapies may only attempt to target only one part of the related muscle group and often imprecisely.

[0007] Sciatica is a symptom that refers to pain, weakness, numbness, or tingling in the legs, due to damage or pressure to the sciatic nerve. Sciatic nerves originate from the spinal cord at the lower spine and innervate various parts of the legs. The condition also gets worse with activities that increase the spinal load in addition to other causes. Spinal decompression is one of the usual methods used to treat sciatica. However, these usual methods are unable to off-load pressure from the vertebral column effectively.

[0008] Thus, there exists a need for an improved thermal treatment device and a method for targeting a group of muscles, ligaments, tendons, and other tissues simultaneously with a thermal medium.

SUMMARY

[0009] A thermal treatment device and a method for thermally treating a human leg are disclosed. The thermal treatment device may comprise a sleeve which is configured to be wrapped around the leg to cover the back of the leg. The thermal treatment device has a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg. The pockets are adapted to receive a thermal source. The thermal treatment device may have a plurality of bands for wrapping the sleeve around the leg. The thermal treatment device may be specifically used in a method to apply sequential cooling and heating to the back of the leg to treat a sciatica condition.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a front perspective view of the thermal treatment device maintained on a human leg in accordance with an embodiment of the present disclosure.

[0011] FIG. 2 is a rear perspective view of the thermal treatment device wherein the thermal treatment device is open and ready to be wrapped around the leg in accordance with another embodiment of the present disclosure.

[0012] FIG. 3 is a front perspective view of the thermal treatment device wherein the thermal treatment device is open and ready to be wrapped around the leg in accordance with another embodiment of the present disclosure.

[0013] FIG. 4 is a side perspective view of the thermal treatment device maintained on the human leg in accordance with another embodiment of the present disclosure.

[0014] FIG. 5 is a rear perspective view of the thermal treatment device maintained on the human leg in accordance with yet another embodiment of the present disclosure.

[0015] FIG. 6 is another side perspective view of the thermal treatment device maintained on the human leg in accordance with another embodiment of the present disclosure.

DETAILED DESCRIPTION

[0016] In accordance with the present disclosure, a thermal treatment device is disclosed for providing a thermal treatment to a human leg. The thermal treatment device of the present disclosure is adapted for a human body, and may be dimensioned to accommodate different types, shapes and sizes of the human body sizes and its contours.

[0017] The thermal treatment device of the present disclosure can be wrapped around the leg to provide a heating or a cooling effect or both to the leg. The thermal treatment device of the present disclosure provides a thermal effect to the leg from the lower back to the ankle of the leg. The thermal treatment device of the present disclosure can be used to thermally treat a group of muscles, ligaments, tendons, and other tissues of the lower back and of the leg simultaneously with a thermal medium that can be placed in the thermal device and maintained in contact with the skin in the vicinity of the target area.

[0018] Referring to FIG. 1, a front view of a thermal treatment device **101** configured in accordance with an embodiment of the present disclosure is disclosed. In an aspect, the thermal treatment device **101** comprises a sleeve **102** for covering a human leg **110**. The thermal treatment device **101** also comprises a plurality of pockets to receive a thermal source located at predetermined positions on the sleeve **102** for providing thermal treatment to the leg **110**. In accordance with an exemplary embodiment of the present disclosure, the thermal treatment device **101** may be a split sleeve **102**. In accordance with another exemplary embodiment of the present disclosure, the thermal treatment device **101** may be a compression split sleeve **102**. The thermal treatment device **101** may be a form fitting split sleeve **102** that can extend from the waist to just above the ankle of a human leg **110**. In other embodiments, the thermal treatment device **101** may be a form fitting sleeve **102** without a split.

[0019] In another aspect of the present disclosure, the sleeve **102** may be a split brace for covering a human leg **110**. The sleeve **102** may comprise a suitable rigid material or include one or more plastic slats extending longitudinally along the sleeve for providing support to immobilize the leg **110**. The slats may be removably associated with the split sleeve **102** such as by being provided in pockets or removably fastened to the leg **110**.

[0020] The sleeve **102** is preferably maintained around the leg **110**. In an embodiment as shown in FIG. **1**, the sleeve **102** is maintained around a right leg **110**. The sleeve **102** may cover the back of the leg **110** from a calf to the glute. The sleeve **102** may cover a front of the leg from a shin to a groin. The different heights of the leg **110** are shown with the dotted lines in the Figures. The ankle is shown with a dotted line **1-1**, the knee joint is shown with a dotted line **2-2** and the waist is shown with a line **3-3** in FIG. **1**. The thermal treatment device **101** of the present disclosure is provided with a plurality of bands, a first band **104a**, a second band **104b**, a third band **104c**, and a fourth band **104d** for securing the sleeve **102** around the leg, so that the thermal treatment device **101** is maintained on the human leg **110**.

[0021] In an embodiment, the sleeve **102** comprises a belt **103** that may extend across a human waist. The belt **103** may be made of the same material as the split sleeve **102**. The belt **103** may be a continuous part of the sleeve **102** and is integrated with the sleeve **102**. The belt **103** may be of a suitable or an adjustable height “h” near the waistline **3-3** for securing the belt to the waist.

[0022] A rear plan view of thermal treatment device depicting the outer view of the split sleeve **102** is shown in FIG. **2**. As shown in FIG. **2**, the split sleeve **102** is open and is adaptable to be wrapped around the leg. A first edge **106** and a second edge **108** on opposite sides of the sleeve **102** are shown in FIG. **2**. An imaginary axis X-X demarks the middle line of the sleeve **102** between the first edge **106** and the second edge **108**. In an exemplary embodiment, four bands, the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** are shown. The split sleeve **102** has a rear or outside surface **121** which has the first side **114** and the second side **124** demarked by the imaginary axis X-X. In an embodiment, the first band **104a** extends at the same elevation as the belt across the waistline **3-3** to secure the sleeve **102** to the waist. The sleeve **102** has a first recess **136** on the first side **114** below the first band **104a** and/or the belt **103** and above the second band **104b**. The sleeve **102** has a second recess **138** on the second side **124** below the belt **103** and above the second band **104b**. The first recess **136** and the second recess **138** are provided in the sleeve **102** on the thigh area to enable the person wearing the sleeve **102** to move or sit comfortably. The first recess **136** and the second recess **138** expose the vicinity of the groin when worn on the leg **110**.

[0023] The first band **104a** has a first end **12** and a second end **14**, the second band **104b** has a first end **22** and a second end **24**, the third band **104c** has a first end **32** and a second end **34**, and the fourth band **104d** has a first end **42** and a second end **44**. The first end **12** of the first band **104a**, the first end **22** of the second band **104b**, the first end **32** of the third band **104c**, and the first end **42** of the fourth band **104d** are secured to the outside surface **121** of the first side **114** of the split sleeve **102**. The second end **14** of the first band **104a**, the second end **24** of the second band **104b**, the second end **34** of the third band **104c**, and the second end **44** of the fourth band **104d** are adaptable to be removably secured to the outside surface **121** of the second side **124** of the split sleeve **102**. A patch or strip **105** of mating fasteners is affixed to the second side **124** of the split sleeve **102** for matingly engaging with fasteners on the second end of the respective band. Although, a single strip **105** of mating fasteners is shown, separate dedicated patches of mating fasteners may be fastened to the outside surface **121** of the second side for each of the plurality of bands the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d**, respectively.

[0024] At least three pockets, a first pocket **116a**, a second pocket **116b**, and a third pocket **116c** are also shown in FIG. **2**. The first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are located on the outside surface **121** of the sleeve for receiving a suitable thermal source. In an embodiment, the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are located

on the first side **114** of the sleeve **102** as shown in FIG. 2. The rear side of the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are depicted in FIG. 2. The first pocket **116a** has a rear side **121a**, the second pocket **116b** has a rear side **121b**, and the third pocket **116c** has a rear side **121c**. For accessibility, the first pocket **116a** is open on the top side **11**, the second pocket **116b** is open on the top side **13**, and the third pocket **116c** is open on the top side **15** of the respective pocket. Alternatively, the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** may be open from any side as per suitability. The first pocket **116a**, the second pocket **116b**, and the third pocket **116c** may be configured to include a zipper or any suitable closure for closing the pockets after placing a thermal source inside the pockets to secure the thermal source inside the pocket. The first pocket **116a**, the second pocket **116b**, and the third pocket **116c** may be configured to include a fastener on the inner side of the pocket. The fastener may be selected from strips comprising a plurality of hooks that may matingly engage a plurality of loops such as Velcro or may comprise other disengageable fastening devices such as snaps, zippers, or buttons. However, the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** may be kept open without a closure for ease of accessibility.

[0025] In an embodiment, a fourth pocket **116d** and a fifth pocket **116e** are also shown in FIG. 2. The rear side of the fourth pocket **116d** and the fifth pocket **116e** is also depicted in FIG. 2. The fourth pocket **116d** has a rear side **121d**, and the fifth pocket **116e** has a rear side **121f**. For accessibility, the fourth pocket **116d** is open on the top side **17** and the fifth pocket **116e** is open on the top side **19**. Alternatively, the fourth pocket **116d** and the fifth pocket **116e** may be open on any side as per suitability. The fourth pocket **116d** and the fifth pocket **116e** may be configured to include a zipper or any suitable closure for closing the pockets after placing the thermal source inside the pockets to secure the thermal source when the thermal source is inside the pocket. However, the fourth pocket **116d** and the fifth pocket **116e** may be kept open for ease of accessibility. In an aspect, the fourth pocket **116d** and the fifth pocket **116e** are optional.

[0026] A front plan view of the open thermal treatment device depicting the inside surface **131** of the split sleeve **102** is shown in FIG. 3. As shown in FIG. 3, the split sleeve **102** is open and is ready to be wrapped around the leg. The split sleeve **102** has a front or inside surface **131** which has the first side **114** and the second side **124** demarked by the imaginary axis X-X as shown in FIG. 3. The first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are shown in FIG. 3. The inner side of the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** is depicted in FIG. 3. The first pocket **116a** has an inner side **131a**, the second pocket **116b** has an inner side **131b**, and the third pocket **116c** has an inner side **131c**. The first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are accessible from the outside surface **121** of the sleeve **102** as described previously. The fourth pocket **116d** and the fifth pocket **116e** are also shown. The fourth pocket **116d** has an inner side **131d**, and the fifth pocket **116e** has an inner side **131e**. FIG. 3 also shows an open rear view of the belt **103** of the sleeve **102**. The plurality of bands **104a**, **104b**, **104c** and **104d** may include one or more fasteners on an inside surface **134a** of the second end **14** of the first band **104a**, an inside surface **134b** of the second end **24** of the second band **104b**, an inside surface **134c** of the second end **34** of the third band **104c**, and an inside surface **134d** of the second end **44** of the fourth band **104d** as shown in FIG. 3. The fasteners may be selected from strips comprising a plurality of hooks that may matingly engage a plurality of loops such as Velcro or may comprise other disengageable fastening devices such as snaps, zippers, or buttons. As explained, an appropriate mating fastener may be located on the strip **105** on the second side **124** of the outside surface **131** of the split sleeve **102**, such that the second end **14** of the first band **104a**, the second end **24** of the second band **104b**, the second end **34** of the third band **104c**, and the second end **44** of the fourth band **104d** can be mated with the mating fastener to hold the bands around the leg and the sleeve closed about the split. Although, in the FIGURES, the thermal treatment device **101** is provided with four bands the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** on the sleeve **102**, there may be more or less than four

bands on the sleeve **102** to maintain the thermal treatment device **101** on the leg. The first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** secure the sleeve **102** on the leg and maintain the sleeve **102** in a wrapped condition.

[0027] In an alternate embodiment, the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** may be placed alternatively on the first side **114** and the second side **124** of the outside surface **121**. In the alternate embodiment, for example, the first end **12** of the first band **104a**, and the first end **32** of the third band **104c** may be secured to the first side **114**, and the first end **22** of the second band **104b**, and the first end **42** of the fourth band **104d** may be secured to the second side **124** of the outside surface **121**. The mating fasteners for the second end **14** of the first band **104a**, and the second end **34** of the third band **104c** can be fastened on the second side **124**, and the mating fasteners for the second end **24** of the second band **104b**, and the second end **44** of the fourth band **104d** can be fastened to the first side **114**. In another alternate embodiment, the first end **12** of the first band **104a**, and the first end **32** of the third band **104c** may be fastened to the second side **124**, and the first end **22** of the second band **104b**, and the first end **42** of the fourth band **104d** may be fastened to the first side **114** of the outside surface **121**. The mating fasteners for the second end **14** of the first band **104a**, and the second end **32** of the third band **104c** can be fastened on the first side **114**, and the mating fasteners for the second end **24** of the second band **104b**, and the second end **44** of the fourth band **104d** can be fastened to the second side **124**.

[0028] FIG. 4 is a side view of the split sleeve **102** maintained on the leg **112**. In an exemplary embodiment, the split sleeve **102** has the first edge **106** on the first side **114** and the second edge **108** on the second side **124** of the split sleeve **102**. When wrapped around the leg **110**, the first edge **106** and the second edge **108** define a split **109**. The split sleeve **102** is configured to be wrapped around the leg **110** in one embodiment to cover both the back and the front of the leg. In another embodiment, the sleeve **102** may be wrapped around the leg to partially cover the leg. When the sleeve **102** is wrapped around the leg **110**, the first edge **106** and the second edge **108** may lie opposite to each other to define a split **109** on the outer side **112** (FIG. 1) of the leg **110**.

Alternatively, the split sleeve **102** may be configured such that when wrapped around the leg **110**, the first edge **106** and the second edge **108** of the split sleeve **102** may lie opposite to each other to define a split on the inner side **122** (FIG. 1) of the leg **110**. In another embodiment, the first edge **106** and the second edge **108** may be spaced apart from each other to define a wider split **109**. A side perspective view of the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** is also shown. FIG. 4 also depicts a side perspective view of the first pocket **116a**, the second pocket **116b**, and the third pocket **116c**.

[0029] When the split sleeve **102** is wrapped around the leg, the sleeve encases the leg such that the first edge **106** of the split sleeve is opposed to the second edge **108** of the split sleeve **102**. The first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** are provided on the outside surface **121** of the split sleeve **102** to traverse the split **109** while wrapping around the sleeve **102** to maintain the sleeve on the leg.

[0030] Referring to FIG. 4, the thermal treatment device **101** is shown wrapped around a right leg **110**. The plurality of bands, the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** traverse from the first side **114** across the split **109** to the second side **124**. The first band **104a** has the first end **12** fastened to the outer surface **121** of the first side **114** of the sleeve **102**, wraps around the leg **110** across the split **109** and fasteners on an inside surface **134a** (FIG. 3) of the second end **14** engage a strip **105** (FIG. 2) of mating fasteners on the outer surface **121** of the second side **124**. The second band **104b** has the first end **22** fastened to the outer surface **121** of the first side **114** of the sleeve **102**, wraps around the leg **110** across the split **109** and fasteners on an inside surface **134b** (FIG. 3) of the second end **24** engage a strip **105** (FIG. 2) of mating fasteners on the outer surface **121** of the second side **124**. The third band **104c** has the first end **32** fastened to the outer surface **121** of the first side **114** of the sleeve **102**, wraps around the leg **110** across the split **109** and fasteners on an inside surface **134c** (FIG. 3) of the second end **34**

engage a strip **105** (FIG. 2) of mating fasteners on the outer surface **121** of the second side **124**. The fourth band **104d** has the first end **42** fastened to the outer surface **121** of the first side **114** of the sleeve **102**, wraps around the leg **110** across the split **109** and fasteners on an inside surface **134d** (FIG. 3) of the second end **44** engage a strip **105** (FIG. 2) of mating fasteners on the outer surface **121** of the second side **124**. The thermal treatment device **101** can be equally maintained on a left leg **120** (FIG. 1) with the plurality of bands, the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d**, on the split sleeve **102**.

[0031] Referring back to FIG. 3 in conjunction with FIG. 4, when the sleeve **102** is secured on the leg, the inner side **131a** of the first pocket **116a**, the inner side **131b** of the second pocket **116b**, and the inner side **131c** of the third pocket **116c** are in direct contact with the leg. Particularly, the inner side **131a** of the first pocket **116a** is in direct contact with the glute muscle area of the leg, the inner side **131b** of the second pocket **116b** is in direct contact with the hamstring muscle area of the leg, and the inner side **131c** of the third pocket **116c** is in direct contact with the calf muscle area of the leg.

[0032] In accordance with the present disclosure, the sleeve **102** may be made of tight flexible fabric, such as polyester, elastane, or spandex or it may be made of a looser fabric. When maintained on the leg **110**, the sleeve **102** covers the back of the leg from a calf to the glute and the front of the leg from a shin to a groin as depicted in FIG. 1.

[0033] FIG. 5 is a rear view of the sleeve **102** maintained on the right leg **110**. In an exemplary embodiment, the three pockets, the first pocket **116a**, adjacent to a glute, the second pocket **116b** adjacent to a hamstring, and the third pocket **116c** adjacent to a calf of the leg **110** when the sleeve is worn on the leg are shown in FIG. 5. The first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are adaptable to receive a thermal source for providing a thermal treatment to the leg **110**. The sleeve **102** may comprise more or less than three pockets **116a**, **116b**, and **116c** for receiving the thermal sources. In an aspect, the split sleeve **102** may comprise a fourth pocket **116d** located behind the kneecap to provide thermal treatment to the underside of the knee. In an exemplary embodiment, the fourth pocket **116d** located behind the kneecap has a smaller size than the first pocket **116a**, the second pocket **116b**, and the third pocket **116c**.

[0034] In accordance with an aspect of the present disclosure, the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are configured on the outside surface **121** of the sleeve **102**. The pockets **116** are adaptable to receive a thermal source to provide heating or cooling to the leg **110**, particularly, the first pocket **116a** is adaptable to receive a thermal source to provide heating or cooling to the glute, the second pocket **116b** is adaptable to receive a thermal source to provide heating or cooling to the hamstring, and the third pocket **116c** is adaptable to receive a thermal source to provide heating or cooling to the calf at the back of the leg **110**. A heated or a cooled thermal source can be placed inside the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** for providing the thermal treatment to the leg **110**. In an exemplary embodiment, the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** are accessible on the outside surface **121** of the split sleeve **102**. The split sleeve **102** can be wrapped on the leg **110** and secured to the leg with the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** such that the inner side **131a** of the first pocket **116a**, the inner side **131b** of the second pocket **116b**, and the inner side **131c** of the third pocket **116c** on the inside surface **121** of the sleeve **102** are in contact with the leg **110**. Thereafter, a heated or a cooled thermal source can be placed into the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** which are accessible on the outside surface **121** of the sleeve **102**. When the sleeve **102** is wrapped around the leg **110**, the inside surface **131** of the sleeve **102** is in direct contact with the leg **110**.

[0035] Another exemplary embodiment of the side perspective view of the thermal treatment device maintained on the human leg in accordance with another embodiment of the present disclosure is shown in FIG. 6. In an aspect of the present disclosure, the split sleeve **102** may further comprise a plurality of pockets configured at a location on the top and back of the leg **110**.

In an exemplary embodiment the split sleeve **102** may comprise a plurality of pockets, a sixth pocket **116f** adjacent to an upper thigh, a seventh pocket **116g** adjacent to a lower thigh, and an eighth pocket **116h** adjacent to a shin of the leg **110** on the outside surface **121** of the sleeve **102** as shown in the FIG. **6**. In accordance with the present disclosure, the fourth pocket **116d** may be located behind the kneecap and the fifth pocket **116e** may be located at the kneecap area for receiving a thermal source and provide heat treatment to the knee. When the sleeve **102** is secured on the leg **110**, the inner side **131d** (FIG. **3**) of the fourth pocket **116d** and the inner side **131f** (FIG. **3**) of the fifth pocket **116e** are in direct contact with the leg **110**. Particularly, the inner side **131d** of the fourth pocket **116d** is in direct contact with the underside area of the knee and the inner side **131f** of the fifth pocket **116e** is in direct contact with the kneecap area of the leg **110**.

[0036] In an exemplary embodiment, the fifth pocket **116e** located at the kneecap area has a smaller size than the first pocket **116a**, the second pocket **116b**, the third pocket **116c**, the fourth pocket **116d**, the sixth pocket **116f**, the seventh pocket **116g**, and the eighth pocket **116h**. In an aspect, the fifth pocket **116e** located at the kneecap area may have an equal size as the fourth pocket **116d** located behind the kneecap. The fourth pocket **116d** located behind the kneecap and the fifth pocket **116e** located at the kneecap area are located on the knee area to cover the knee from the top and bottom to provide double thermal treatment to the knee. For accessibility, the sixth pocket **116f** may be open on the top side **31**, the seventh pocket **116g** may be open on the top side **33**, and the eighth pocket **116h** may be open on the top side **35** from the outside surface **121** of the sleeve **102**.

Alternatively, the sixth pocket **116f**, the seventh pocket **116g**, and the eighth pocket **116h** may be open on any side as per suitability. The rest of the elements are the same as described in FIG. **4** previously.

[0037] In another aspect of the present disclosure, the thermal treatment device **101** of the present disclosure may comprise a non-split sleeve **102** with pockets to cover the human leg. The non-split sleeve **102** may comprise a first open end at the waistline **3-3** and a second open end at the ankle line **1-1**. The non-split sleeve **102** may be worn like a sleeve from the first open end at the waistline **3-3** and the second open end at the ankle line **1-1** to cover the leg **110**.

[0038] The thermal treatment device **101** of the present disclosure with the sleeve **102** provides an effective device for treating sciatica. The thermal treatment device **101** may also be integrated into the existing or known products and used in combination with other devices. The sleeve **102** of the thermal treatment device **101** comprises at least three pockets the first pocket **116a** adjacent to the glute, the second pocket **116b** adjacent to the hamstring, and the third pocket **116c** adjacent to the calf of the leg **110** when the sleeve is on the leg. A thermal source can be placed at least in the first pocket **116a**, the second pocket **116b**, and the third pocket **116c** and the pockets are in direct contact with the leg **110**. The thermal source provides a thermal effect to the sciatic nerve. The position on the sleeve **102** of the first pocket **116a** near to and in contact with the glute, the second pocket **116b** near to and in contact with the hamstring, and the third pocket **116c** near to and in contact with the calf is judiciously located to effectively provide relief to the sciatic nerve which runs the whole length of the leg. The plurality of bands, the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** and the design of the split sleeve **102** with the belt **103** secures the device **101** at its intended place on the leg **110**.

[0039] Targeted thermal treatment of a plurality of muscles, ligaments, tendons, and other tissue on the leg and back simultaneously with a thermal medium effectively treats and provides relief to a person suffering from sciatic pain. The sleeve **102** of the thermal treatment device **101** may comprise the fourth pocket **116d** on the back of the knee and the fifth pocket **116e** on the top of the kneecap for receiving the thermal source. The sleeve **102** may also be used to provide the thermal treatment to the knee. Also, when wrapped around the leg **110** with the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** of the sleeve **102** may provide compression treatment to the leg **110**. The sleeve when wrapped around the leg **110**, may distribute pressure over some or all of a surface of the leg **110**, in all directions, thereby significantly

lowering the pressure or weight on a given region.

[0040] In accordance with the present disclosure, a method of thermally treating a human leg is also disclosed. The leg **110** is covered with the sleeve **102** as shown in FIG. **1**. The sleeve **102** is wrapped around the leg **110** by placing the sleeve **102** on the leg **110**. The sleeve **102** is fastened to the leg **110** by wrapping the first band **104a**, the second band **104b**, the third band **104c**, and the fourth band **104d** from the first side **114** to the second side **124** and engaging the fasteners on the second end **14** of the first band **104a**, the second end **24** of the second band **104b**, the second end **34** of the third band **104c**, and the second end **44** of the fourth band **104d** with the patch or strip **105** of mating fasteners on the second side **124** of the sleeve **102** to secure it on the leg **110**. A thermal source is placed in at least the three pockets, the first pocket **116a** adjacent to the glute, the second pocket **116b** adjacent to the hamstring, and the third pocket **116c** adjacent to the calf of the leg **110** as shown in FIG. **4**. In accordance with an exemplary embodiment, the thermal source is a gel pack. Gel packs can be heated by microwave or cooled by refrigeration. Suitable gel packs are available from Gelpax.com in Ontario, Canada.

[0041] In the method, first, a cooled thermal source is placed in each of the first pocket **116a** adjacent to the glute, the second pocket **116b** adjacent to the hamstring, and the third pocket **116c** adjacent to the calf of the leg **110** to provide a cooling effect to the leg **110** or the sciatic nerve in particular. The thermal source can be cooled in a freezer or refrigerator or may contain ice. Thereafter, the cooled thermal source is placed inside each of the first pocket **116a** adjacent to the glute from the open side **11**, the second pocket **116b** adjacent to the hamstring from the open side **13**, and the third pocket **116c** adjacent to the calf from the open side **15**. The cooled thermal source inside the first pocket **116a** is adjacent to the glute, the cooled thermal source inside the second pocket **116b** is adjacent to the hamstring, and the cooled thermal source inside the third pocket **116c** is adjacent to the calf to provide cooling to the glute, the hamstring, and the calf of the leg **110**, respectively. The cooled thermal source is maintained on the leg **110** within the pockets of the split sleeve **102** for a first predetermined period of time such as 5 to 15 minutes. Thereafter, the cooled thermal source is removed from the leg **110** such as by removing the cooled thermal source from each of the open side **11** of the first pocket **116a**, from the open side **13** of the second pocket **116b**, and from the open side **15** of the third pocket **116c**. The cooling of the leg tissue diminishes inflammation. Thereafter, a heated thermal source is contacted with the leg **110**. The thermal source may be a pack of material that is heated in a microwave oven or in heated water. A heated thermal source is placed inside each of the first pocket **116a** adjacent to the glute through the open side **11**, the second pocket **116b** adjacent to the hamstring through the open side **13**, and the third pocket **116c** adjacent to the calf through the open side **15** to provide a heating effect to the leg **110** or the sciatic nerve in particular. Heating the leg tissue causes dilation of the blood vessels, which facilitates blood and oxygen transfer to the affected tissue hastening its relief and repair. The heated thermal source is maintained on the leg **110** within each of the first pocket **116a** adjacent to the glute, the second pocket **116b** adjacent to the hamstring, and the third pocket **116c** adjacent to the calf of the sleeve **102** for a second predetermined period of time such as 5 to 15 minutes. The heated thermal source transfers the heat to the leg **110** or the sciatic nerve in particular. Thereafter, the heated thermal source is removed from the leg **110** such as by removing the heated thermal source from each of the open side **11** of the first pocket **116a**, from the open side **13** of the second pocket **116b**, and from the open side **15** of the third pocket **116c**.

[0042] The sleeve **102** can also provide thermal treatment to the knee. A heated or a cooled thermal source can be placed inside the fourth pocket **116d** to provide the thermal effect behind the knee or in the fifth pocket **116e** to provide the thermal effect to the kneecap area, or in both the fourth pocket **116d** and the fifth pocket **116e**. The thermal source is heated or cooled and placed inside either or both of the fourth pocket **116d** from the open side **17** and inside the fifth pocket **116e** from the open side **19**. The thermal source is maintained on the leg **110** within either or both of the fourth pocket **116d** and the fifth pocket **116e** of the split sleeve **102** for a third predetermined period of

time such as 5 to 15 minutes to provide a thermal treatment to the knee area.

[0043] The split sleeve **102** can also provide thermal treatment to the thigh. A heated or a cooled thermal source can be placed inside the sixth pocket **116f** to provide the thermal effect to the upper thigh or in the seventh pocket **116g** to provide the thermal effect to the lower thigh, or inside both the sixth pocket **116f** and the seventh pocket **116g**. The thermal source is heated or cooled and placed inside the sixth pocket **116f** from the open side **31** and inside the seventh pocket **116g** from the open side **33**. The thermal source is maintained on the leg **110** within either or both of the sixth pocket **116f** and the seventh pocket **116g** of the split sleeve **102** for a fourth predetermined period of time such as 5 to 15 minutes to provide a thermal treatment to the thigh of the leg **110**.

[0044] Further, the split sleeve **102** can also provide thermal treatment to the shin. A heated or a cooled thermal source can be placed inside the eighth pocket **116h** to provide the thermal effect to the shin. The thermal source is heated or cooled and placed inside the eighth pocket **116h** from the open side **35**. The thermal source is maintained on the leg **110** within the eighth pocket **116h** of the split sleeve **102** for a fifth predetermined period of time such as 5 to 15 minutes to provide a thermal treatment to the shin of the leg **110**.

[0045] Provided is a device for effectively administering thermal treatment to the leg to address a sciatic nerve condition and a method of administering thermal treatment to relieve the pain suffered by the sciatic nerve.

Specific Embodiments

[0046] While the following is described in conjunction with specific embodiments, it will be understood that this description is intended to illustrate and not limit the scope of the preceding description and the appended claims.

[0047] A first embodiment of the present disclosure is a thermal treatment device, comprising a sleeve for covering a back of a human leg; and the sleeve has a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg when the sleeve covers the back of the human leg, the pockets adaptable to receive a thermal source. The thermal treatment device of claim **1** wherein the sleeve covers the back of the leg from a calf to the glute. The thermal treatment device of claim **1** wherein the thermal source is selected from one or more of a gel pack. The thermal treatment device of claim **1** further comprising a plurality of bands for wrapping the sleeve around the leg. The thermal treatment device of claim **1** wherein the sleeve is a split sleeve having a first edge and a second edge that are adjacent to each other when the split sleeve is wrapped around the leg. The thermal treatment device of claim **5** wherein the split sleeve, when wrapped around the leg, encases the leg such that the first edge of the split sleeve is opposed to the second edge of the split sleeve. The thermal treatment device of claim **1** wherein the sleeve has an inside surface and an outside surface, and wherein the inside surface is in direct contact with the leg. The thermal treatment device of claim **7** wherein the pockets are located on the outside surface of the sleeve. The thermal treatment device of claim **7** wherein the pockets are accessible on the outside surface of the sleeve. The thermal treatment device of claim **1** further comprising a fourth pocket adjacent to an underside of a knee and a fifth pocket adjacent to a kneecap. The thermal treatment device of claim **1** further comprising a sixth pocket adjacent to an upper thigh, a seventh pocket adjacent to a lower thigh. The thermal treatment device of claim **1** further comprising an eighth pocket adjacent to a shin of the leg. The thermal treatment device of claim **1**, wherein the sleeve provides compression to the leg when maintained on the leg. The thermal treatment device of claim **4** wherein the band includes a patch of hook-and-loop fasteners. The thermal treatment device of claim **4** further comprising a band that extends across a human waist.

[0048] A second embodiment of the present disclosure is a method of thermally treating a human leg, comprising placing a first cooled thermal source adjacent to a glute, placing a second cooled thermal source adjacent to a hamstring, and placing a third cooled thermal source adjacent to a calf of a human leg; removing the first cooled thermal source from adjacent to the glute, removing the second cooled thermal source from adjacent to the hamstring, and removing the third cooled

thermal source from adjacent to the calf of the human leg; and placing a first heated thermal source adjacent to the glute, placing a second heated thermal source adjacent to the hamstring, and placing a third heated thermal source adjacent to the calf of the human leg. An embodiment of the present disclosure is one, any or all of prior embodiments in this paragraph up through the second embodiment in this paragraph further comprising covering a back of a human leg with a sleeve comprising at least three pockets, a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg, wherein the thermal source is placed inside the first pocket, the second pocket, and the third pocket.

[0049] A third embodiment of the present disclosure is a thermal treatment device, comprising a sleeve for covering a back of a human leg, the sleeve has a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg when the sleeve covers the back of the human leg, the pockets adaptable to receive a thermal source; and a plurality of bands for wrapping the sleeve around the leg. An embodiment of the present disclosure is one, any or all of prior embodiments in this paragraph up through the third embodiment in this paragraph wherein the sleeve is a split sleeve having a first edge and a second edge, the split sleeve is configured to be wrapped around the leg to cover the back of the leg from the calf to the glute. The thermal treatment device of claim **18** wherein the split sleeve, when wrapped around the leg, encases the leg such that the first edge of the split sleeve is opposed to the second edge of the split sleeve.

[0050] Without further elaboration, it is believed that using the preceding description that one skilled in the art can utilize the present disclosure to its fullest extent and easily ascertain the essential characteristics of this disclosure, without departing from the spirit and scope thereof, to make various changes and modifications of the present disclosure and to adapt it to various usages and conditions. The preceding preferred specific embodiments are, therefore, to be construed as merely illustrative, and not limiting the remainder of the disclosure in any way whatsoever, and that it is intended to cover various modifications and equivalent arrangements included within the scope of the appended claims.

Claims

1. A thermal treatment device, comprising: a sleeve for covering a back of a human leg; and the sleeve has a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg when the sleeve covers the back of the human leg, said pockets adaptable to receive a thermal source.
2. The thermal treatment device of claim 1 wherein the sleeve covers the back of the leg from a calf to the glute.
3. The thermal treatment device of claim 1 wherein the thermal source can be a gel pack.
4. The thermal treatment device of claim 1 further comprising a plurality of bands for wrapping the sleeve around the leg.
5. The thermal treatment device of claim 1 wherein the sleeve is a split sleeve having a first edge and a second edge that are adjacent to each other when the split sleeve is wrapped around the leg.
6. The thermal treatment device of claim 5 wherein the split sleeve, when wrapped around the leg, encases the leg such that the first edge of the split sleeve is opposed to the second edge of the split sleeve.
7. The thermal treatment device of claim 1 wherein the sleeve has an inside surface and an outside surface, and wherein the inside surface is in direct contact with the leg.
8. The thermal treatment device of claim 7 wherein the pockets are located on the outside surface of the sleeve.
9. The thermal treatment device of claim 7 wherein the pockets are accessible on the outside surface of the sleeve.

- 10.** The thermal treatment device of claim 1 further comprising a fourth pocket adjacent to an underside of a knee and a fifth pocket adjacent to a kneecap.
 - 11.** The thermal treatment device of claim 1 further comprising a sixth pocket adjacent to an upper thigh, a seventh pocket adjacent to a lower thigh.
 - 12.** The thermal treatment device of claim 1 further comprising an eighth pocket adjacent to a shin of the leg.
 - 13.** The thermal treatment device of claim 1, wherein the sleeve provides compression to the leg when maintained on the leg.
 - 14.** The thermal treatment device of claim 4 wherein the bands include a patch of hook-and-loop fasteners.
 - 15.** The thermal treatment device of claim 4 further comprising a band that extends across a human waist.
 - 16.** A method of thermally treating a human leg, comprising: placing a first cooled thermal source adjacent to a glute, placing a second cooled thermal source adjacent to a hamstring, and placing a third cooled thermal source adjacent to a calf of a human leg; removing the first cooled thermal source from adjacent to the glute, removing the second cooled thermal source from adjacent to the hamstring, and removing the third cooled thermal source from adjacent to the calf of the human leg; and placing a first heated thermal source adjacent to the glute, placing a second heated thermal source adjacent to the hamstring, and placing a third heated thermal source adjacent to the calf of the human leg.
 - 17.** The method of claim 16 further comprising: covering a back of a human leg with a sleeve comprising at least three pockets, a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg, wherein the thermal sources are placed inside the first pocket, the second pocket, and the third pocket.
 - 18.** A thermal treatment device, comprising: a sleeve for covering a back of a human leg, the sleeve has a first pocket located adjacent to a glute, a second pocket adjacent to a hamstring, and a third pocket adjacent to a calf of the leg when the sleeve covers the back of the human leg, said pockets adaptable to receive a thermal source; and a plurality of bands for wrapping the sleeve around the leg.
 - 19.** The thermal treatment device of claim 18 wherein the sleeve is a split sleeve having a first edge and a second edge, the split sleeve is configured to be wrapped around the leg to cover the back of the leg from the calf to the glute.
 - 20.** The thermal treatment device of claim 18 wherein the split sleeve, when wrapped around the leg, encases the leg such that the first edge of the split sleeve is opposed to the second edge of the split sleeve.
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