Title: LOCKING THERAPEUTIC DEVICE

Abstract: An improved locking therapeutic device for use in connection with a foot injury or other wound which is locked by a medical care provider. The locking therapeutic device may only be removed by the medical care provider or other authorized party in the event removal is necessary. The locking therapeutic device may be used in connection with medical applications where it is desired that the healing/protective environment remain in place for a prolonged period.
LOCKING THERAPEUTIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

1. Field of Invention

[0002] The present invention relates to creation of a healing environment for an injured foot or other body part that cannot be removed by the patient, and more specifically to a locking therapeutic device for a foot or other body part.

2. Background of the Related Art

[0003] Particularly in patients with diabetes related foot problems, maintaining a continuous healing protective environment for the foot 24 hours a day, 7 days a week, is key to successful healing of skin, soft tissue and bone injuries. In order to accomplish the desired healing, mechanical bracing / protection of the foot, dressings, topical therapies and other healing products must be consistently used by the wounded patient. Consistent use of such devices, products or dressings by the patient can be difficult to obtain or maintain, particularly where the device, product or wound dressing is removable. Recent research studies have shown that even the most compliant patients do not wear a removable protective device for more than 60% of their daily steps and that, for most patients, wearing it for 30% of their steps is the norm.
BRIEF SUMMARY OF THE INVENTION

[0004] The present application discloses a therapeutic footwear device or other body part product ("locking therapeutic device or footwear device") that covers the patient’s foot for use in connection with a foot injury or other wound, which is locked by a medical care provider. The locking therapeutic device or footwear device and the underlying or incorporated bracing, dressing or other therapeutic product may only be removed by the medical care provider, or by another party in the event the medical care provider supplies the appropriate unlocking information for the therapeutic device or footwear device to enable removal. The locking therapeutic device footwear device may be used in connection with orthopaedic, dermatologic, vascular and other medical applications, where it is desired that the healing / protective environment remain in place for a prolonged period.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Figure 1 provides a schematic side view of a protective device of the present application for a wound, which is a footwear device with a foot having a wound shown in phantom within the footwear device.

[0006] Figures 2A and 2B provide schematic views of alternate locking therapeutic devices for a wound, which are locking footwear braces which extend above the ankle in Figure 2A and to below the knee in Figure 2B.

[0007] Figure 3 schematically illustrates the locking therapeutic device of the present application with an outer cover and a remote release mechanism.

DETAILED DESCRIPTION OF THE INVENTION

[0008] The present application provides a simple and effective improved locking therapeutic device. In the first illustrated embodiment of Figure 1, a locking therapeutic footwear device 12 for use by a patient P with a foot wound W is
provided. The illustrated device has numerous improved features. The device is “shoe like” and as light weight as possible to improve patient acceptance over other bulky prior approaches. It is preferably about the height of a high top sports shoe.

Sizing of the device is intended to provide sufficient room for even a bulky dressing, shown schematically at reference 13, and/or for accepting a footbed 14 or other plantar load-relieving method (having openings 16 of the type shown to provide specific pressure relief locations) determined to provide optimal therapeutic benefit for treating wounds on the plantar surface.

The footwear device has an upper 18 that is very breathable (broad weave nylon mesh) so that the microclimate of the foot would not be adverse. Ideally the upper material has an outer surface 19 which is not permeable to external water - but an optional over garment or overshoe can be provided to prevent external water from entering the boot, as shown schematically in Figure 3. The footwear device 12 could include a rigid rocker sole 30 as illustrated.

A locking closure mechanism 20 is provided on the outside of the ankle, which can only be opened by the medical care provider (personally or remotely, using appropriate electronic communications). Alternatively, the lock 20 can be such that it can be easily unlocked by the patient, but cannot be relocked, so that any “breach” is apparent (similar to a “seal” on an electric access panel). The forefoot tabs 22 may be brought into the locking mechanism 20 via a loop system, as shown in Figure 1 generally at reference 24, or the loop system 24 may include only the ankle “Y” portion of the looping indicated at reference 26. As shown in Figure 1, the locking mechanism 20 includes an attachment section 21A, to which the loop system 24 is secured, and a lock section 21B, which engages with the attachment section to secure the device 12 in a locked position.
A tensioning mechanism 28 (as shown by the buttons in Figure 1) could be provided in the straps to properly position the loop system 24 of the device 12 prior to locking.

The lock section 21A may be provided as a very simple device, such as a conventional key or press fit lock – similar to the way that alarm tags are attached to clothing in a store. Alternatively, the lock could be more sophisticated, for example, in the illustration of Figure 1, the attachment section 21B is engaged with a combination lock by a conventional shackle-like mechanism. Alternatively, the combination lock portion of the lock section 21A may be provided with a password or cell phone/remote activated device 40 having LEDs or other lock/unlock indicators for use in releasing the device in an emergency.

An optional cover 33, similar to that provided for water protection in Figure 3, could be provided for use in bed that would prevent the bed linens catching on the device. Sensors 30, shown schematically in Figure 1, could be provided within the locking therapeutic device or footwear device to monitor conditions, such as pressure between the foot and footwear device or foot temperature, inside the device as may be desired. Data collected from such sensors 30 may be stored within a conventional electronic chip module 32, or transmitted from such a device 32 via wireless communications to a health care provider.

In the second illustrated embodiments of Figures 2A and 2B, the preferred device 121 is provided as a locking footwear brace 34 for use by a patient with a foot wound. The illustrated devices 34 have essentially the features of conventional orthopaedic walker (a brace or a cam boot), but with the additional locking mechanism 20 previously described. In particular, the illustrated locking cam boot embodiment could be provided at any desired height. For example, to a height
above the ankle to mid-calf, or to a height just below the knee. Again, the lock
section 21A of the locking mechanism 20 may be mounted on the brace for locking
engagement with the attachment section 21A which is secured to the brace, and when
engaged, prevents removal of the brace from the patient. Such a lock section 21A
may be in addition to conventional “joint angle” positioning mechanisms for fixing
the ankle in a specific position, and could be very simple (a key or press fit), or more
sophisticated (a combination lock, which could have a password or be unlocked by a
cell phone or other remote signal device 40 in an emergency, as shown in Figure 3.)

[0016] While different embodiments of the invention have been described in
detail herein, it will be appreciated by those skilled in the art that various
modifications and alternatives to the embodiments could be developed in light of the
overall teachings of the disclosure. Accordingly, the particular devices and
arrangements are illustrative only and are not limiting as to the scope of the invention
which is to be given the full breadth of any and all equivalents thereof.
Claims

We claim:

1. A protective device (12) for an injured body part (W) having a locking device (20), so that the protective device (12) is locked into position covering the injured body part.

2. The device of claim 1 wherein the locking device is a combination lock.

3. The device of claim 1 wherein the locking device (20) is an electronic lock which may be unlocked remotely or from a position adjacent the device.

4. The device of claim 1 wherein the locking device is easily opened but cannot be relocked without a specific key, code or another unique mechanism.

5. The device of claim 1 wherein the protective device is a shoe or boot-like device for wearing on a foot.

6. The device of claim 1 wherein the protective device is an orthopedic brace-like device for wearing on a foot and ankle.

7. The device of claim 1 wherein the protective device is an orthopedic brace-like device for wearing on a foot and up the leg near the knee.

8. The device of claim 1 having a waterproof protective cover.
9. The device of claim 1 having a cover to resist interference of the device with bedclothes or other coverings used by the wearer of the device.
Figure 3