A protective boxing glove includes a palm-side portion and back-side portion together forming a hand receiving opening and having a series of finger stalls for receiving and at least partially covering the fingers. The palm and back side portions extend to a point at least beyond the wrist and over the forearm to cover the wrist when the glove is worn by a user, the back side portion generally defining a predetermined lateral width in the region covering the metacarpals. A resilient cushion is provided on the back side portion for covering at least the knuckles and at least portions of the proximal phalanges. A wrist strap is used for manually tensioning the glove about the wrist portion. A self-adjusting tensioning strap extends laterally from side to side of a back-side portion substantially along a direction primarily normal to the orientations of the metacarpals. The strap has an elastic portion having a length less than said predetermined width to at least gather the back-side portion to normally reduce its width of the glove covering the metacarpals when a hand is not received with the glove, while the strap is caused to stretch laterally when a hand is received within the glove. The resulting restoring forces in the elastic portion are directed laterally inwardly, tending to compress the width of the hand in the region of the metacarpals and bring the metacarpals into closer juxtaposition relative to each other to better transfer any forces applied to one or more knuckles or metacarpals to at least one or more additional metacarpals, thereby reducing the likelihood of breakage or damage to the bones in the hand.
PROTECTIVE BOXING GLOVE

BACKGROUND OF THE INVENTION

0001 1. Field of the Invention

The invention generally relates to gloves used in sports and, more specifically, to protective boxing gloves.

0002 2. Description of the Prior Art

Hand injuries are the most common injuries in sports-related activities. Sports-related metacarpal fractures most commonly occur during participation in contact sports in which the hands are unprotected. In fact, a “boxer’s fracture” is well known and defined as a break of the bones of the hand that forms the knuckles. The metacarpal bones in a hand are the bones that connect the bones in the fingers to the bones in the wrist. There are five metacarpal bones—one to links each finger to the wrist. All metacarpal bones have substantially the same anatomic structure. Each consists of a base, a shaft, a neck, and a head. The base of the metacarpal bone is the portion that attaches to the bones of the wrist. The heads of the metacarpal bones form the knuckles of an closed fist. The so-called “boxer’s fracture” involves a break in the neck of the metacarpal bones. Boxer’s fractures frequently occur in the metacarpal bones that connect the ring finger or the little finger to the wrist. These are known as the fourth and fifth metacarpal bones. However, notwithstanding the relatively common occurrence of such fractures, a review of the prior art indicates that there is little that has been done structurally with gloves to prevent or minimize the occurrence of such fractures for use in the fields of boxing and martial arts.

0003 Most gloves are designed to be sport specific and to protect certain parts of the hand. Thus, for example, U.S. Pat. No. 7,107,623 to Hatch et al. is a glove structure specifically for rappelling in which the primary concern is the protection of the palm of the hand. Caswell U.S. Pat. No. 6,745,402 is designed primarily for lifting weights and is provided with a flexible fabric panel. There is no discussion of the nature or the effect of the panel. Additionally, there is provided a strap which, however, is positioned above the wrist and it appears that the strap itself is flexible or elastic and applies forces on the hand primarily to retain the glove on the hand.

0004 U.S. Pat. No. 6,618,860 to Sullivan is for a cycling glove and it is not concerned with application of any forces on any part of the hand but mostly to provide padding in the palm area.

0005 U.S. Pat. No. 5,803,614 to Charles Melone entitled “Universal Sports Glove” discusses common types of injuries for numerous sports and, presumably, the manner in which the disclosed glove helps to minimize such injuries. This patent reveals very little on how the glove can prevent or minimize injuries to the hand while boxing.

0006 U.S. Pat. No. 5,709,379 to Redwood et al. is for a glove with an elastic back. However, this elastic material is provided for facilitating bending of the fingers and apparently has nothing to do with protection of the hand.

0007 A martial arts training glove is disclosed in U.S. Pat. No. 5,575,008 to McBride et al. However, the glove is more concerned with providing one or more sealed compartment that are filled with loose grain, such as steel shot, that presumably conforms to the contour of the hand, including the knuckles. Preferably the compartments are located on sides to provide a balanced weight distribution of the grains with respect to the glove body which allows hand movements without impairment. However, the provision of such multiple pockets filled with lead shot or other grain materials renders the glove bulky, heavy and uncomfortable.

0008 U.S. Pat. No. 4,843,651 to Gramza et al. discloses a wrist support glove with an elastic back material. However, the glove is primarily concerned with providing a length of stretchable material attached to the rear edge of the glove that wraps around the area of the wrist or just beyond the wrist.

0009 In Overton’s U.S. Pat. No. 4,701,963 two straps are provided to draw the gloves snugly around subject’s wrist. While the object of the two straps is to result in a snug and secure fit about the subject’s hand, that will, of course, depend on how forcefully the straps are pulled together before being closed and this can differ from time to time or user to user.

0010 U.S. Pat. No. 3,504,379 to Glick discloses a glove that is designed to assist in retention of a shaft being gripped. The glove also includes two straps that are intended to apply lateral tension. However, as with the Overton patent, the effectiveness of the straps is a function of how they are manually tensioned and can, likewise, vary from time to time and from user to user.

0011 In view of the foregoing known prior art fails to disclose an elastic pre-tensioned strap that is permanently secured across the top of the hand between the knuckles and the wrist to draw the two sides of the glove portion covering the metacarpals in each hand to reliably and consistently ensure a tight fit, creating laterally-inwardly directed forces imparted to the metacarpals whenever the glove is worn by a user.

0012 None of the patents specifically discuss the benefit of having the region of the hand between the knuckles and the wrist tightly pulled towards the center to distribute any loads or blows to one of the knuckles to the other bones in the hand to minimize the risk of fracture when a significant load or impact force is directed to fewer than all of the knuckles.

SUMMARY OF THE INVENTION

0013 Accordingly, it is an object of the invention to provide a protective boxing glove that does not have the disadvantages of the prior art or known protective gloves.

0014 It is another object of the invention to provide a protective boxing glove that is simple in construction and economical to manufacture.

0015 It is still another object of the invention to provide a protective boxing glove as in the previous objects that is effective in reducing the occurrences of “boxer’s fracture,” involving the breaking of bones of a hand that form the knuckles.

0016 It is yet a further object of the invention to provide protective boxing glove of the type under discussion that protects the metacarpal bones in the hand by providing a resilient cushioning layer of material above the knuckles and metacarpal bones to reduce the levels of impact forces on the metacarpals and, additionally, distributing any such forces that are applied through the knuckles to one or more metacarpal bones in a hand to reduce the concentration of forces or stresses on any one given metacarpal bone.

0017 It is still a further object of the invention to provide protective boxing glove as in the previous objects which does not rely on the reliability and consistency of the user in manually tightening any straps, bands or the like but automatically applies laterally-inwardly directed forces to adjust the tension of the glove when placed on the hand.

0018 It is yet a further object of the invention to provide a protective boxing glove as in the previous objects in which a
self adjusting elastic tensioning strap is oriented along a direction transverse to the axis of the glove and any restoring forces automatically created by stretching of the elastic strap when a hand is inserted into the glove are laterally inwardly directed so that any and all forces created that draw the metacarpal bones together are thereby optimized.

[0021] In order to achieve the above another object of the invention, a protective boxing glove in accordance with the invention comprises a palm-side portion and a back-side portion together forming a hand receiving opening. The hand receiving opening has a series of fingers stalls for receiving and at least partially covering the fingers. Said palm and back side portions extend to a point at least beyond the wrist and over the forearm to cover the wrist when the glove is worn by a user. The back side portion generally defines a predetermined lateral width in the region covering the metacarpals when the glove is worn by a user. Resilient cushioning means is provided on the back side for covering the knuckles and at least portions of the proximal phalanges. A wrist strap is provided for manually tensioning the glove above the wrist portion. A self-adjusting tensioning strap is permanently fixed to and extends laterally from the side to side of said back portion substantially along the direction generally normal or transverse to the orientation of the metacarpals. The strap has an elastic portion that has a length less than said predetermined width to at least gather said back side portion and reduce its lateral width when the hand is not received within the glove. However, such strap stretches when the hand is received within the glove, resulting in restoring forces that are directed laterally and inwardly tending to compress the width of the hand in the region of the metacarpals and bring the metacarpals into closer juxtaposition relative to each other. Under this condition forces applied to less than all of the knuckles or metacarpals are better distributed to the other metacarpals to reduce the likelihood of damage to the metacarpal to which the force was initially applied.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Those skilled in the art will appreciate the improvements and advantages that derive from the present invention upon reading the following detailed description, claims, and drawings, in which:

[0023] FIG. 1 is a perspective view of a protective boxing glove in accordance with the present invention, as viewed from the back side portion of the glove, before a hand is inserted into it, with the wrist strap in an open position;

[0024] FIG. 2 is similar to FIG. 1 but showing the wrist strap tensioned about the wrist once the hand is inserted into the glove and the self-adjusting tensioning strap stretched to create restoring laterally inwardly directed forces; and

[0025] FIG. 3 is a longitudinal cross-sectional view of the protective boxing glove shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] Referring now specifically to the Figures, in which identical or similar parts are be designated by the same reference numerals throughout, and first referring to FIG. 1, a protective boxing glove in accordance with the invention is generally designated by the reference numeral 10.

[0027] Referring especially to FIG. 3, the protective boxing glove 10 includes a palm-side portion 12 and a back-side portion 14 together forming a hand receiving opening and having a series of finger stalls 16a-16e for receiving and at least partially covering the fingers. In the present preferred embodiment, the finger stalls 16a-16e cover at least portions of the proximal phalanges.

[0028] The palm and back side portions 12, 14 extend to a point at least beyond the wrist and over the forearm to cover the wrist when the glove is worn by a user, as best shown in FIG. 2. The palm-side and back-side portions of the glove generally define a predetermined lateral width for a given user and size of hand. Thus, the predetermined lateral width is that width of the glove, between the finger receiving portion 16a-16e and the wrist section 18, when the hand is inserted into the glove.

[0029] A feature of the present invention is the provision of a resilient cushioning member 20 provided on the back side portion 14 of the glove at least covering the knuckles and at least portions of the proximal phalanges. The resilient cushioning member is formed of a sealed pocket secured to the back side portion 14 and a generally soft resilient material 20' is used to fill such pocket, as best shown in FIG. 3. In accordance with the presently preferred embodiment, such resilient material 20' comprises a soft gel material.

[0030] As best shown in FIG. 1, the back side portion 14 is formed of a highly flexible material that can be easily gathered and is typically a mesh material that also allows breathing. Such mesh material easily gathers when pulled together and assumes the predetermined lateral width of the glove when the hand is placed into the glove, as shown in FIG. 2.

[0031] An important feature of the present invention is the provision of a self adjusting permanently fixed tensioning strap member that extends from side to side of the glove along a transverse direction T (FIG. 2) that is substantially normal or perpendicular to axis A or length direction of the glove. In the presently preferred embodiment, such as self adjusting tensioning strap includes a pair of tabs 28a, 28b made of essentially non-extendable or non-elastic material attached to laterally opposite regions of the glove, proximate to the seam where the palm and back side portions or sections 12, 14, respectively, of the glove are stitched together. Such non extendable tabs are secured to the glove of each of the sides of the metacarpals. An elastic strap 30 is attached to the tabs 28a, 28b as shown. When the hand inserted into the glove, as shown in FIG. 2, the hand stretches the elastic strap 30 only or primarily along the lateral or transverse direction T, although the connecting tabs themselves are not stretched. By making the elastic strap 30 relatively short, the percentage of stretch when the hand is inserted into the glove can be significantly increased. The restoring forces created in the elastic strap 30 when the hand is inserted into the glove are directed inwardly along the transverse direction T, tending to draw the metacarpals closer together.

[0032] The wrist strap, for manually tensioning the glove above the wrist portion, is conventional and may consist of an elongated strap that wraps around the wrist and provided with securing means 32, such as being covered with complementary hook and loop fasteners 32a, 32b, respectively.

[0033] The human hand has 27 bones, the wrist of which accounts for eight bones. The metacarpal bones contain five bones, while the remaining fourteen are digital bones or phalanges of the fingers and thumb. Although many of the bones in the hand are fairly strong, the impacts forces on the phalanges and the knuckles in particular when the hand is clenched to make a fist can be extremely high when the hand hits a hard or stationary surface. These forces, if applied to a single bone
or metacarpal, can cause such bone to crack or break. The protective boxing glove 10 of the invention can be effective to substantially reduce “boxer’s fractures” or other damage to the bones. Any impact on the knuckles are lessened or reduced by the resilient cushion 20, thereby substantially reducing the level of forces that are directly transmitted or imparted to the hand and the bones. Additionally, by selecting an elastic strap 30 that is sufficiently short and strong, insertion of the hand into the glove causes the elastic strap 30 to create restoring inwardly-directed forces only or primarily along the transverse direction T when the elastic is stretched and placed on the hand. Such restoring forces are directed inwardly and tend to move or bring the metacarpals closer together. By doing so, any forces that are transmitted through the resilient cushion 20 to one or more metacarpals are at least partially transmitted to one or more of the other metacarpals and, thereby, somewhat dissipate or reduce the intensity or level of the initially applied force, minimizing the probability that any given metacarpal bone will break or be damaged.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What we claim:

1. A protective boxing glove comprising a hand palm-side portion and hand back-side portion together forming a hand receiving opening and having a series of finger stalls for receiving and at least partially covering the fingers and wherein said palm and back side portions extend to a point at least beyond the wrist and over the fore-arm to cover the wrist when the glove is worn by a user, the back side portion generally defining a predetermined lateral width in the region covering the metacarpals;

   resilient cushioning means provided on said back side portion for covering at least the knuckles and the metacarpal phalanges;

   a wrist strap for manually tensioning the glove about the wrist portion; and

   a self adjusting tensioning strap extending laterally from side to side of said back portion substantially along a direction generally normal to the orientations of the metacarpals,

   said strap having an elastic portion having a length less than said predetermined width to at least gather said back side portion and reduce its width when a hand is not received with the glove and said strap is caused to stretch when a hand is received within the glove and resulting restoring forces are directed laterally inwardly tending to compress the width of the hand in the region of the metacarpals and bring the metacarpals into closer juxtaposition relative to each other.

2. A protective boxing glove as defined in claim 1, wherein said resilient cushioning means comprises a sealed pocket secured to said back-side portion, and a generally soft resilient material filling said pocket.

3. A protective boxing glove as defined in claim 2, wherein said resilient material comprises a gel material.

4. A protective boxing glove as defined in claim 1, wherein said back side portion comprises a highly flexible material that can be easily gathered.

5. A protective boxing glove as defined in claim 4, wherein said flexible material is a mesh material.

6. A protective boxing glove as defined in claim 1, wherein said strap comprises a pair of tabs made of essentially non extendable material attached to laterally opposite regions of the glove to each of the sides of the metacarpals and an elastic attached to said tabs, whereby insertion of a hand into the glove stretches only said elastic along a lateral or transverse direction and said tab connecting tabs.

7. A protective boxing glove as defined in claim 6, wherein the dimension of said elastic along said transverse direction is approximately equal to the transverse dimension each of said tabs in said transverse direction.

8. A protective boxing glove as defined in claim 1, wherein said glove generally defines an axis substantially parallel to the metacarpal bones when a hand is inserted into the glove, said self adjusting strap being arranged along a transverse direction substantially normal to said axis, whereby the entire restoring force created by the stretching of said self adjusting strap when the glove is placed on a hand is directed inwardly along said transverse direction tending to draw the metacarpals closer together.

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