BALLISTIC HAND PROTECTOR

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ABSTRACT

A ballistic hand protector and methods of use are provided. The ballistic hand protector includes a ballistic pad having a hand surface adjacent to the back of a user's hand and an outer surface. A wrist strap wraps around the user's wrist and the ballistic pad, and a hand strap wraps around the user's palm and the ballistic pad. The wrist strap and hand strap are held in place on the ballistic pad by at least one wrist strap loop and one hand strap loop attached to the outer surface of the ballistic pad.
BALLISTIC HAND PROTECTOR

FIELD OF INVENTION

The present invention relates to ballistic armor and more specifically to a ballistic hand protector.

BACKGROUND

Ballistic resistant garments protect various parts of the body from various ballistic threats, such as bullets or shrapnel. Some ballistic resistant garments are made of “soft armor,” which is generally flexible. For example, ballistic resistant vests that are worn to protect a user’s torso are usually made of soft body armor. Other garments are made of “hard armor,” which are generally stiff and inflexible. For example, helmets worn to protect a user’s head are generally made of hard armor. Some garments may employ a combination of soft and hard armor to increase protection for the user.

Ballistic resistant garments are often used in high threat situations, such as firefights or riots, by military or police personnel. In these situations, a user of these ballistic resistant garments must be adequately covered but freely mobile. Any ballistic resistant garment worn by the user should provide maximum body coverage while not restricting the user’s mobility. If the ballistic resistant garment is restrictive or not comfortable, a user may not wear this protective equipment.

For military and police personnel, their hands are vital to use various weapons, such as handguns, rifles or batons. Further, military and police personnel often type on a keyboard or push button controls on other types of weapons. Thus, ballistic hand protection should provide adequate coverage for the hands while providing maximum user mobility, including finger dexterity. For example, a user will not wear the ballistic garment if he is unable to insert a finger into the trigger of a weapon, and the ballistic garment is thus useless.

Also, maximum protection is desired for a user’s hand and wrist. If a soldier or policeman sustains a hand or wrist injury, he may not be able to use the injured hand to return fire or call for help. A soldier or policeman is helpless in such a situation and may sustain further injury. Further, injury to a joint, such as a user’s wrist, may result in permanent loss of use of the hand, or require removal of the hand.

SUMMARY

The present invention provides a ballistic hand protector that provides improved protection for hands and wrists without restricting the user’s mobility or finger dexterity.

In general, in one aspect, the invention features a ballistic hand protector and methods of use, including a ballistic pad having a hand surface adjacent to a back of a user’s hand and an outer surface. A wrist strap is wrapped around the user’s wrist and the ballistic pad adjacent the outer surface, and is held in place by at least one wrist strap loop attached to the outer surface of the ballistic pad. A hand strap is wrapped across the user’s palm and the ballistic pad adjacent the outer surface, and is held in place by at least one hand strap loop attached to the outer surface of the ballistic pad. In certain embodiments, the ballistic pad may be symmetrical about a longitudinal axis.

In certain embodiments, the wrist strap is wrapped around the user’s lower arm and the hand strap is wrapped around the user’s wrist.

In various embodiments, the ballistic hand protector also includes at least one pocket attached to the outer surface of the ballistic pad. A hard armor element may be disposed within the pocket attached to the outer surface of the ballistic pad. In various embodiments, the hard armor element may be made of ceramic, titanium, boron carbide, silicon carbide, alumina, zirconia, magnesia, cubic boron nitride, silicon nitride, steel, or aluminum.

In embodiments, the ballistic pad includes an outer shell having a pocket formed therein and a ballistic panel disposed within the outer shell pocket. In certain embodiments, the ballistic panel includes a first and a second ballistic panel, each including a ballistic material, and a joint located between the first and second ballistic panels. In various embodiments, the ballistic material may be made of aramid, para-aramid, polypropylene, polyethylene, poly (p-phenylene-2,6-benzobisoxazole), or polyester.

In various embodiments, the wrist strap and the hand strap may each be a nylon strap having a removable connector. The removable connector may be a snap, a hook and loop fastener, a button, or a two-piece buckle. In other embodiments, the wrist strap and the hand strap are each a continuous elastic band.

In general, in another aspect, the invention features a ballistic hand protector including an outer shell having an outer surface, a hand surface and a pocket formed between the outer surface and the hand surface. A soft ballistic material is disposed within the outer shell pocket. A wrist strap is wrapped around the outer shell adjacent the outer surface and the hand surface and held in place by at least one wrist strap loop attached to the outer surface of the outer shell. A hand strap is also wrapped around the outer shell adjacent the outer surface and the hand surface and held in place by at least one hand strap loop attached to the outer surface of the outer shell.

In various embodiments, the outer shell is symmetrical about a longitudinal axis.

The invention can be implemented to realize one or more of the following advantages. The ballistic hand protector provides coverage of the hand and wrist of the user without limiting mobility or finger dexterity. The coverage of the user’s wrist provides more likelihood of retaining use of a hand if the wrist is struck with a ballistic threat. The soft, flexible ballistic material enables the ballistic hand protector to move with the user’s hand and conform to the back of the user’s hand. Further, the soft, flexible ballistic material is light, which helps alleviate user fatigue.

The ballistic hand protector may be worn in multiple positions, which provides varying levels of dexterity as needed. The ballistic hand protector enables a user to hold and fire a weapon without interfering with the operation of that weapon, including both individual and crew served weapons. The ballistic hand protector also provides manual dexterity and enables a user to perform such tasks as driving, typing, and using a keyboard or push buttons on a control pad as needed.

In high threat situations, hard armor can be added to the ballistic hand protector to provide more protection to the user’s hand. The ballistic hand protector may be worn with any other armor, and may be worn with or without a glove.

Because of the simple attachment mechanism, the ballistic hand protector may be put on and removed quickly, and is one size can fit all. Also, the configuration can be symmetrical, and thus can be worn on either hand.
Other features and advantages of the invention are apparent from the following description, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of an embodiment of the ballistic hand protector. FIG. 2 is a bottom view of the ballistic hand protector of FIG. 1. FIG. 3 is a top view of ballistic panels. FIG. 4 is a bottom view of a user wearing the ballistic hand protector of FIG. 1. FIG. 5 is a side view of a user wearing the ballistic hand protector as shown in FIG. 3. FIG. 6 is a bottom view of a user wearing the ballistic hand protector of FIG. 1 in an alternate position. FIG. 7 is a side view of a user wearing the ballistic hand protector as shown in FIG. 5.

Like reference numbers and designations in the various drawings indicate like elements.

DETAILED DESCRIPTION

As shown in FIGS. 1-3, a ballistic hand protector 10 includes a ballistic pad 15 made of soft armor ballistic panels 17A, 17B disposed in an outer shell 20, which has a hand surface 25 and an outer surface 30. A wrist strap 35 and a hand strap 40 encircle the outer shell 20 and may be attached to the outer shell 20 by passing through wrist strap loops 45 and hand strap loops 50 that are sewn to the outer surface 30 of the outer shell 20. The outer shell 20 may also include a pocket 55 on the outer surface 30 into which an optional hard armor element may be inserted to provide additional protection. The outer shell 20 may also be made of a water resistant material. As can be seen, the ballistic pad 15 is configured to be symmetrical about a longitudinal axis 12 so that it may be worn on either hand. The ballistic panels 17A, 17B include a joint 18 that enables the ballistic hand protector 10 to flex. The joint 18 is located proximate to the wrist strap 35 when disposed in the outer shell 20.

The ballistic panels 17A, 17B may include any type of soft armor. For example, to provide protection from a Level IIIA threat (as defined in the National Institute for Justice Standard 0101.04 (“NIJ Standard”)), the ballistic panels 17A, 17B may include an aramid fabric having a denier of 840 d and an areal density of 210 oz/yd² (1.46 psf). The aramid fabric may be made to a thickness of 0.33 inches, and disposed in a water resistant ballistic nylon cover. The outer shell 20, into which the ballistic panels 17A, 17B are placed, may be made from 500 d Cordura®. This configuration, which weighs approximately 15 ounces, may provide protection of V₅₀ at 0° of 1769 fps with an average deformation of 25 mm when struck with a 9 mm 124 grain full metal jacket bullet.

The wrist strap 35 and the hand strap 40 may be one inch wide nylon straps. The wrist strap 35 and the hand strap 40 wrap around the outer shell 20 and are secured to themselves by a removable connector 60. The removable connector 60 may be hook and loop, snaps, buttons, a buckle or any other suitable two piece fastener. A removable connector 60 made of hook and loop is preferred because it enables easier attachment and removal and a greater range of adjustability.

Referring to FIGS. 4 and 5, the ballistic hand protector 10 is worn in a primary position on a user’s hand 100 by wrapping the wrist strap 35 around the user’s wrist 110 and the hand strap 40 across the user’s palm 115, with the hand surface 25 of the outer shell 20 adjacent a back of the user’s hand 100. The joint 18 between the ballistic panels 17A, 17B is positioned generally over the point at which the user’s wrist 110 bends. In this position, the back of the user’s hand 100 is completely covered, including the user’s wrist 110 and fingers 105, and the joint 18 enables the ballistic hand protector 10 to easily flex with the user’s movement. This position enables full dexterity of the user’s fingers 105 to hold and fire a weapon, drive a vehicle, use hand tools and perform most other tasks.

Referring to FIGS. 6 and 7, the ballistic hand protector 10 is shown in an alternate position in which the ballistic hand protector 10 is worn on a user’s hand 100 by wrapping the wrist strap 35 around the user’s lower arm 120 and the hand strap 40 adjacent to or around the user’s wrist 110, with the hand surface 25 of the outer shell 20 adjacent a back of the user’s hand 100. In this position, the back of the user’s hand 100 is completely covered, including the user’s wrist 110, and the user’s fingers 105 are substantially covered. This position enables better dexterity for the user’s fingers 105 to perform such tasks as using push buttons on a control pad or a keyboard.

It is to be understood that the foregoing description is intended to illustrate and not to limit the scope of the invention, which is defined by the scope of the appended claims. Other embodiments are within the scope of the following claims. For example, while joint 18 has been described as a space separating the two the ballistic panels 17A, 17B, the ballistic panels 17A, 17B could be disposed in a single ballistic nylon cover with a joint 18 sewn into the cover to separate the ballistic material and provide a line of flexibility. Further, while two ballistic panels 17A, 17B have been described, more than two ballistic panels may be used. For example, a third ballistic panel could be included positioned over the joint 18 and overlapping the first and second ballistic panels 17A, 17B to provide protection at the joint 18.

Also, while the ballistic panels 17A, 17B have been described as being made from an aramid fabric, they may be made of any soft body armor, such as para-aramid (e.g., Kevlar®), polypropylene, poly (p-phenylene-2,6-benzobisoxazole) (“PBO”), polyethylene or any other ballistic resistant material or combination thereof. Further, while the aramid fabric was described as being of a particular denier, areal density and thickness, ballistic resistant fabric having any denier, areal density or thickness may be used.

Further, several layers of ballistic resistant fabric may be combined together to produce the ballistic panels 17A, 17B, and the various layers may be of different ballistic resistant materials. Further still, the several layers may include woven and non-woven fabrics.

Also, while the pocket 55 has been described as holding a hard armor element, the pocket may be configured to hold further soft armor or other items a soldier or police personnel might need to carry.

Further, the outer shell 20, may be completely sewn around the ballistic material so that the ballistic material is not removable. In another embodiment, the outer shell 30 may include an opening through which the ballistic material can be inserted and removed. In this embodiment, the opening may include a pocket with a connector to close the pocket, such as a zipper, hook-and-loop fastener, snaps, or buttons.

Further still, while the wrist strap 35 and hand strap 40 have been described as one inch wide nylon straps with a removable connector 60, the straps may be made of any
suitable material of any size. Also, the straps may be a closed loop of elastic material (i.e., an elastic band). What is claimed is:

1. A ballistic hand protector comprising:
   a ballistic pad having an outer surface and a hand surface;
   a wrist strap disposed around the ballistic pad adjacent the outer surface and the hand surface and held in place by at least one wrist strap loop attached to the outer surface of the ballistic pad; and
   a hand strap disposed around the ballistic pad adjacent the outer surface and the hand surface and held in place by at least one hand strap loop attached to the outer surface of the ballistic pad.

2. The ballistic hand protector of claim 1 further comprising:
   at least one pocket attached to the outer surface of the ballistic pad.

3. The ballistic hand protector of claim 1 wherein the ballistic pad comprises:
   an outer shell having a pocket formed therein; and
   a ballistic panel disposed within the outer shell pocket.

4. The ballistic hand protector of claim 3 wherein the ballistic panel comprises:
   a first ballistic panel including a ballistic material;
   a second ballistic panel including a ballistic material; and
   a joint disposed between the first and second ballistic panels.

5. The ballistic hand protector of claim 4 wherein the ballistic material is selected from the group consisting of aramid, para-aramid, polypropylene, polyethylene, poly (p-phenylene-2,6-benzobisoxazole), and polyester.

6. The ballistic hand protector of claim 1 wherein the wrist strap and the hand strap are each a nylon strap comprising a removable connector.

7. The ballistic hand protector of claim 6 wherein the removable connector is selected from the group consisting of a snap, a hook and loop fastener, a button, and a two-piece buckle.

8. The ballistic hand protector of claim 1 wherein the wrist strap and the hand strap are each a continuous elastic band.

9. The ballistic hand protector of claim 2 further comprising:
   a hard armor element disposed within the pocket attached to the outer surface of the ballistic pad.

10. The ballistic hand protector of claim 9 wherein the hard armor element is selected from the group consisting of ceramic, titanium, boron carbide, silicon carbide, alumina, zirconia, magnesium, cubic boron nitride, silicon nitride, steel, and aluminum.

11. The ballistic hand protector of claim 1 wherein the ballistic pad is symmetrical about a longitudinal axis.

12. A ballistic hand protector comprising:
   an outer shell having an outer surface, a hand surface and a pocket formed between the outer surface and the hand surface;
   a soft ballistic material disposed within the outer shell pocket;
   a wrist strap disposed around the outer shell adjacent the outer surface and the hand surface and held in place by at least one wrist strap loop attached to the outer surface of the outer shell; and
   a hand strap disposed around the outer shell adjacent the outer surface and the hand surface and held in place by at least one hand strap loop attached to the outer surface of the outer shell.

13. The ballistic hand protector of claim 12 wherein the soft ballistic material is selected from the group consisting of aramid, para-aramid, polypropylene, polyethylene, poly (p-phenylene-2,6-benzobisoxazole), and polyester.

14. The ballistic hand protector of claim 12 further comprising:
   at least one pocket attached to the outer surface of the outer shell; and
   a hard armor element disposed within the pocket attached to the outer surface of the outer shell.

15. The ballistic hand protector of claim 12 wherein the wrist strap and the hand strap are each a nylon strap comprising a removable connector.

16. The ballistic hand protector of claim 12 wherein the wrist strap and the hand strap are each a continuous elastic band.

17. The ballistic hand protector of claim 12 wherein the outer shell is symmetrical about a longitudinal axis.

18. A method of protecting a hand from a ballistic threat comprising:
   disposing a ballistic hand protector on a user’s hand, the ballistic hand protector comprising:
   a ballistic pad having a hand surface adjacent a back of the user’s hand, and an outer surface;
   a wrist strap disposed around the user’s wrist and the ballistic pad adjacent the outer surface and held in place by at least one wrist strap loop attached to the outer surface of the ballistic pad; and
   a hand strap disposed across the user’s palm and the ballistic pad adjacent the outer surface and held in place by at least one hand strap loop attached to the outer surface of the ballistic pad.

19. The method of claim 18 wherein the wrist strap is disposed about the user’s lower arm and the hand strap is disposed around the user’s wrist.

20. The method of claim 18 wherein the ballistic pad further comprises at least one pocket attached to the outer surface of the ballistic pad.

21. The method of claim 18 wherein the ballistic pad comprises:
   an outer shell having a pocket formed therein; and
   a ballistic material disposed within the outer shell pocket.

22. The method of claim 21 wherein the ballistic material is selected from the group consisting of aramid, para-aramid, polypropylene, polyethylene, poly (p-phenylene-2,6-benzobisoxazole), and polyester.

23. The method of claim 18 wherein the ballistic pad is symmetrical about a longitudinal axis.