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(54) **EXTERIOR SPORT HELMET PAD**

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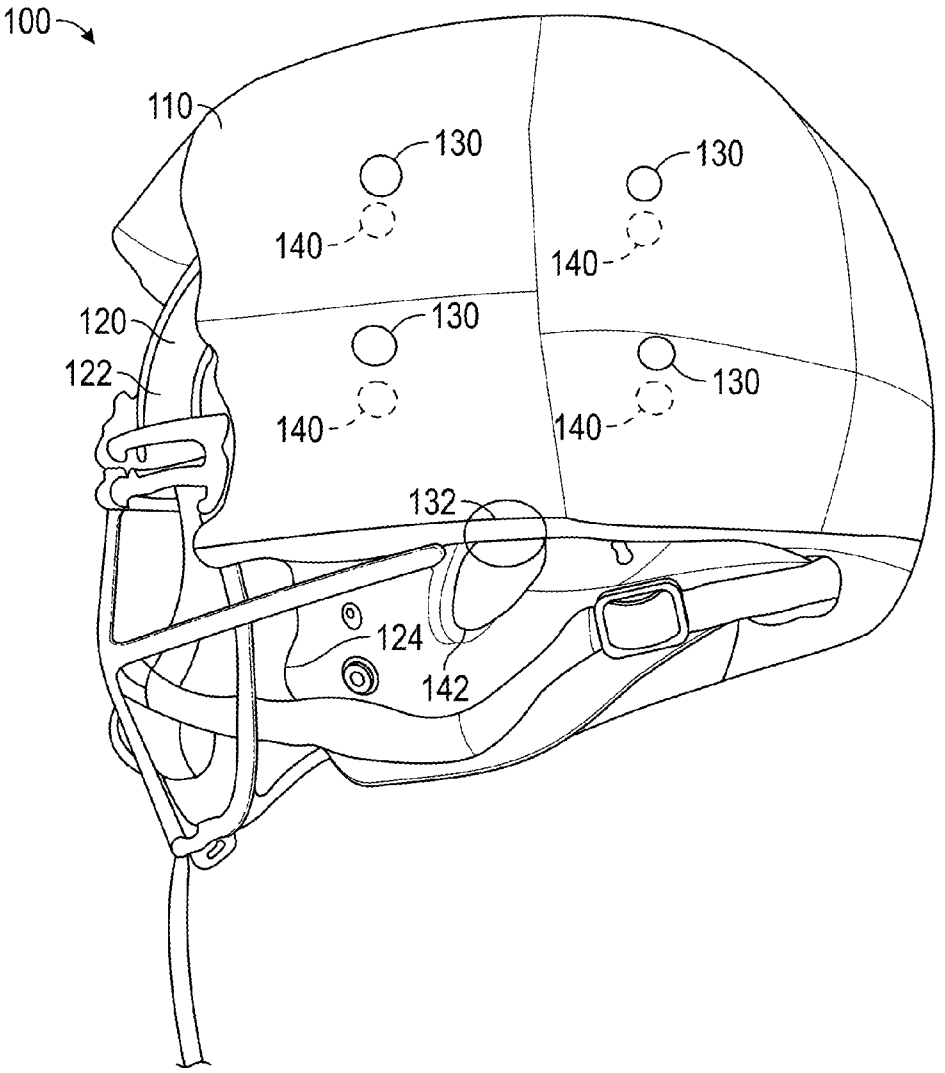
(57) **ABSTRACT**

An exterior sport helmet pad includes a formed base pad, the formed base pad accommodating a sports helmet with an outer shell, the formed base pad being fitted to the sports helmet by internal contact pressure, and a first plurality of holes disposed on the formed base pad, the first holes include a first pair of ear holes and the first holes provide ventilation to the formed base pad and the sports helmet.



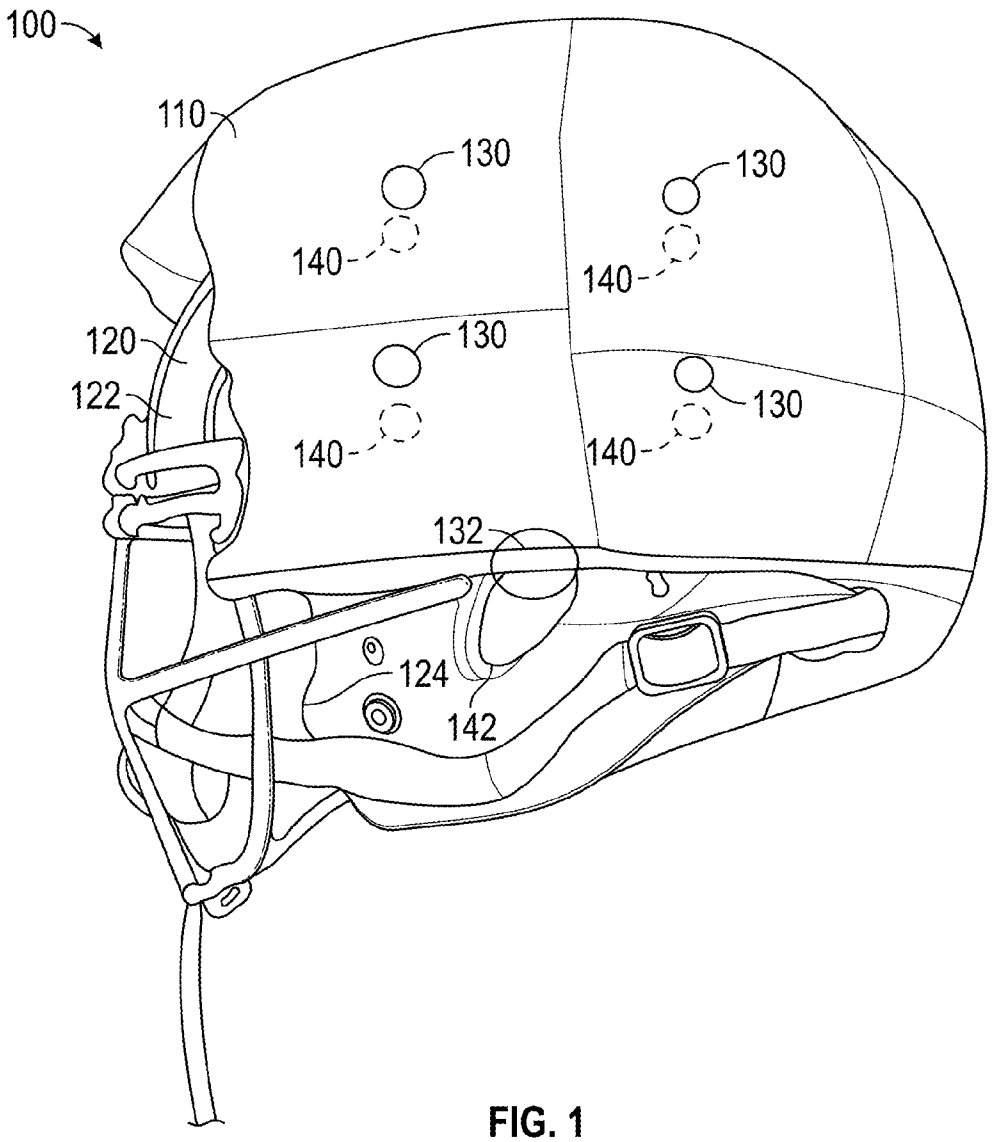


FIG. 1

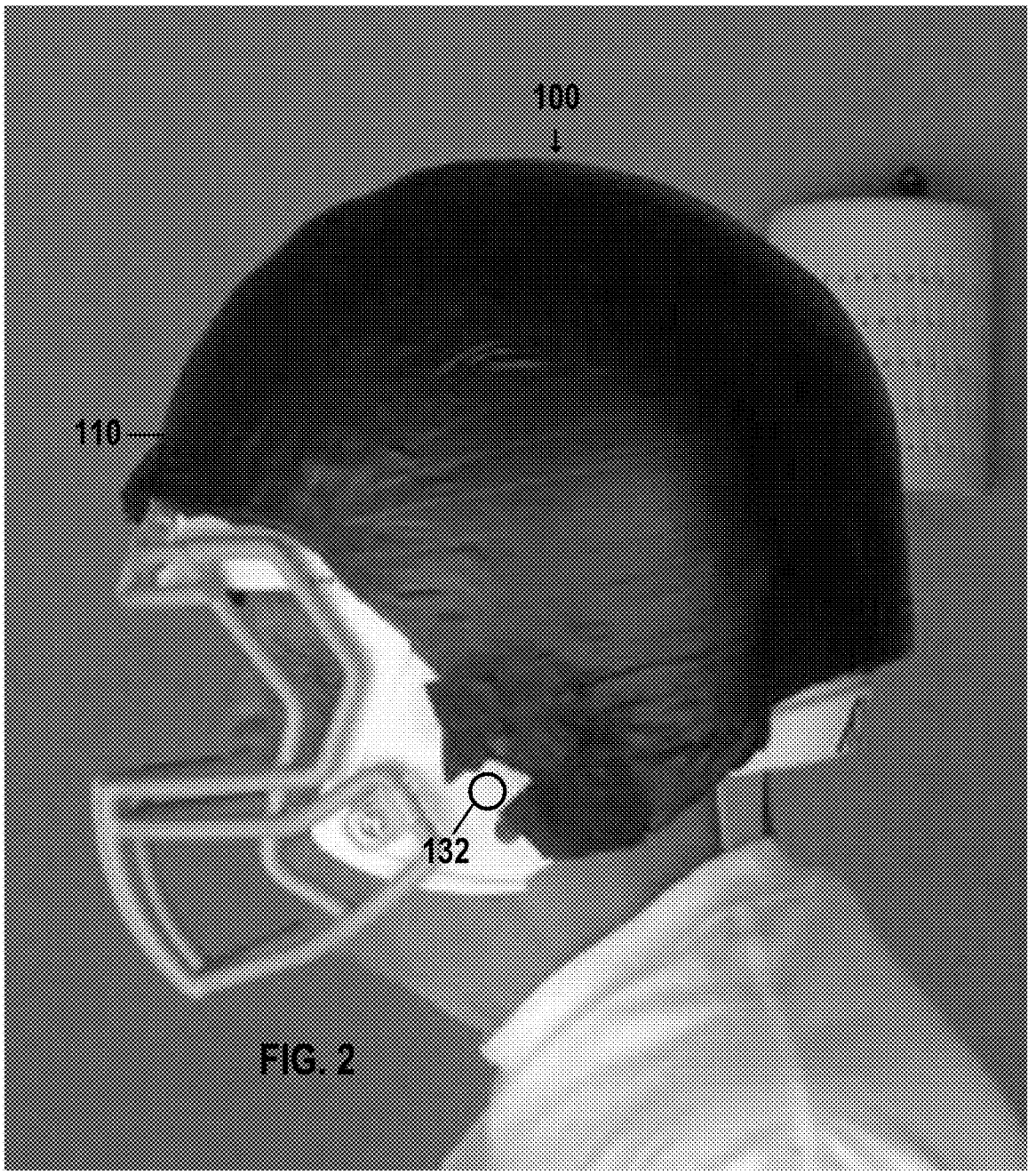


FIG. 2

EXTERIOR SPORT HELMET PAD

RELATED APPLICATION

[0001] This patent application claims the benefit of pending U.S. Provisional Patent Application No. 61/779,889, filed Mar. 13, 2013, which is hereby incorporated by reference.

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention generally relates to a sport helmet pad. More specifically, the invention is an exterior sport helmet pad.

BACKGROUND

[0003] Collisions obey the laws of physics. If a person is in a car travelling at 50 mph and crashes into a cement wall, the car body and frame will collapse about 18 inches in the process of coming to a dead stop. If the person is wearing a seat-belt, the person also stops in about 18 inches. While this creates a tremendous g-force on the person's body, the person's body can usually withstand the force.

[0004] If, however, a person is not wearing a seat-belt, the person keeps going forward at about 50 mph while the car is suddenly coming to a stop and the person hits the windshield or the dashboard of the car and the person stops in 2 to 3 inches, the person's body cannot stand that kind of g-force and the person will likely be killed.

[0005] The number of concussions in football is on the increase as is the number of injuries incurred when players are struck by the hard plastic of a football helmet driven at them by another player. The various football leagues tried to implement new rules making it illegal for players to use their helmet as a weapon but injuries still kept occurring.

[0006] Even younger players are encouraged to engage in rough physical contact resulting in concussions in them, too.

SUMMARY OF INVENTION

[0007] In one embodiment, an exterior sport helmet pad has a formed base pad, which accommodates a sports helmet with an outer shell, and a first plurality of holes disposed on the formed base pad, the first holes including a first pair of ear holes and a plurality of venting holes providing ventilation to the formed base pad and the sports helmet. The first plurality of holes overlie holes on the sports helmet, thus avoiding degradation of hearing and venting.

[0008] Optionally, the exterior sport helmet pad's formed base pad is made of NEOPRENE® polychloroprene or non-cross linked polyethylene closed cell foam. The exterior sport helmet pad is used on a football helmet. The exterior sport helmet pad is coupled to the helmet by internal contact pressure. The exterior sport helmet pad's first holes and the helmet holes are the same size and shape. The exterior sport helmet pad's first holes are aligned with the helmet holes to provide ventilation to the user's head while the user is wearing the sports helmet. The exterior sport helmet pad is placed over the outer shell of the sports helmet.

[0009] Another embodiment of the exterior sport helmet pad has a formed base pad, the formed base pad accommodating a sports helmet with an outer shell, the formed base pad being sized to couple to the sports helmet by internal contact pressure. It also has a first plurality of holes disposed on the formed base pad, the first holes including a first pair of ear holes and the first holes providing ventilation to the formed base pad and the sports helmet. The formed base pad holes overlay ear holes and ventilation holes on the sports helmet.

[0010] Optionally, the exterior sport helmet pad's formed base pad is made of NEOPRENE® polychloroprene or non-cross linked polyethylene closed cell foam. The exterior sport helmet pad is NEOPRENE® polychloroprene and non-cross linked polyethylene closed cell foam are light, tough and durable. The exterior sport helmet pad is used on a football helmet. The exterior sport helmet pad's holes are aligned with the holes on the helmet to provide ventilation to the user's head while the user is wearing the sports helmet and helmet pad. The exterior sport helmet pad is placed over the outer shell of the sports helmet.

[0011] In yet another embodiment, an exterior football helmet pad has a formed base pad, the formed base pad being sized to fit a football helmet by internal contact pressure. The form base has a first plurality of holes, including a first pair of ear holes and the first holes providing ventilation to the formed base pad and the football helmet. A second plurality of holes are disposed on the football helmet including a second pair of ear holes and the second holes providing ventilation to a user's head wearing the football helmet. The first holes and the second holes are about the same size and shape.

[0012] Optionally, the exterior sport helmet pad's formed base pad is made of NEOPRENE® polychloroprene or non-cross linked polyethylene closed cell foam. The exterior sport helmet pad's NEOPRENE® polychloroprene and non-cross linked polyethylene closed cell foam are light, tough and durable. The exterior sport helmet pad has first holes aligned with the helmet holes to provide ventilation to the user's head while the user is wearing the football helmet. The exterior sport helmet pad is placed over the outer shell of the football helmet. The exterior sport helmet pad is placed over the outer shell of the football helmet is made of hard plastic. The exterior sport helmet pad's first pair of ear holes are aligned with the helmet's ear holes to allow the wearer to hear any nearby sounds or voices while wearing the exterior football helmet pad and the football helmet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. **1** illustrates a side perspective view of an exterior sport helmet pad, in accordance with the invention.

[0014] FIG. **2** illustrates a side perspective view of an exterior helmet pad made of NEOPRENE® polychloroprene.

DETAILED DESCRIPTION

[0015] The number of concussions in football is on the increase as is the number of injuries incurred when players are struck by the hard plastic of a football helmet driven at them by another player. The various football leagues tried to implement new rules making it illegal for players to use their helmet as a weapon but the injuries still kept occurring.

[0016] The players today are bigger and faster than in previous years and with their greater weight and speed more injuries, including serious injuries, are occurring despite attempts to reduce injuries by making certain tackles against the rules.

[0017] My solution is to make improvements to the equipment used so that, even if the new tackling rules were violated, the likelihood of serious injury is reduced by the addition of an exterior cushion. The cushioning effect of the exterior sport helmet pad does two things. First, it lessens the damage that can be done by a football helmet in much the

same way a boxing glove lessens the impact of a punch as compared to a punch thrown with a bare fist. Second, when the wearer of an exterior sport helmet pad is tackled and strikes his head on the ground, the exterior sport helmet pad reduces the g-force on the head. Instead of the player's head smashing hard on the ground and stopping basically in half an inch, it now has another inch of stoppage by virtue of the thickness of the pad. Even if a player's head is violently smashed to the ground and, despite the exterior sport helmet pad, the player ended-up with a concussion, the severity of the concussion is dramatically reduced.

[0018] In one embodiment, this cushion is formed of a compressible natural or synthetic rubber, including but not limited to ETHAFOAM® polyethylene, NEOPRENE® polychloroprene, polyisoprene and like materials. The cushion can also be formed from styrene butadiene polymers, or combinations of the preceding materials. Closed cell foam has stable gas bubbles that compress and rapidly return to their normal size.

[0019] ETHAFOAM® polyethylene (PE) is preferably a non-cross linked polyethylene closed cell foam used in the making of the exterior sport helmet pad. ETHAFOAM® products are available in a variety of strengths, making them suitable for protecting products ranging from just a few pounds up to hundreds of pounds of weight. This material is available in densities ranging from 2.0 pound density to 9 pound density. These foams are also available in anti-static and formulations.

[0020] ETHAFOAM® military series (M-series) foams are prepared to meet the stringent military and blowing agent requirements, with less than 10 percent LEL. ETHAFOAM® M-series products also meet or exceed the requirements of CID A-A-59136 and PPP-C-1752.

Product	Density Pcf (kg/m^3)	Color
ETHAFOAM ® M1	2.3 (36.8)	Black
ETHAFOAM M1 AS	2.3 (36.8)	Pink
ETHAFOAM M1 FR/AS	2.3 (36.8)	Blue-Gray
ETHAFOAM M3	4.0 (64.1)	Black
ETHAFOAM M4	6.0 (96.1)	Black
ETHAFOAM M5	10 (160.2)	Black

[0021] The exterior sport helmet pad, dramatically reduces the ability of the football helmet to be a weapon against another player, it also reduces the impact on the head when the player is tackled and hits his head on the ground and; when two players end-up head to head in a tackling situation, there is two inches of cushioning by virtue of both helmets being covered with the one inch of ETHAFOAM®.

[0022] NEOPRENE® polychloroprene is an all-purpose very tough synthetic rubber material that well maintains its strength and flexibility at a wide temperature range. It is available as high strength, medium and low strength material, or with inserted cloth such as fiberglass, or as a foamed material for shock absorption. These materials are manufactured in quantity in a range of thicknesses from which can be chosen the preferred thickness. Currently the preferred thicknesses are 0.5 inches (½ inches) and 0.75 inches (¾ inches).

[0023] High-strength NEOPRENE® polychloroprene is very tough, resists tearing and compresses to about 1500 psi; however, it is typically stiff which is valuable for flanges with a high bolt load, but not as useful for putting on and removing from a football helmet.

[0024] Medium-strength NEOPRENE® polychloroprene is not quite as tough but still has high tensile strength and relatively low stretchability and is useful in this application. A preferred form is NEOPRENE® polychloroprene closed foam, which has great compressibility and firmness without being particularly stiff.

[0025] Other closed foam products are suitable in this invention, including but not limited to "XPE" which is cross-linked polyethylene which has the property of not losing its compressibility over time.

[0026] FIG. **1** illustrates a side perspective view of an exterior sport helmet pad **100**. The exterior sport helmet pad **100** includes a formed base pad **110**, to fitover a sports helmet **120**. The formed base pad **110** has a first plurality of holes **130** that are similar to a second plurality of holes **140** on the underlying helmet.

[0027] The formed base pad **110** accommodates a sports helmet **120**, including a football helmet **122**, a lacrosse helmet (not shown) or other protective helmet (not shown). The formed base pad **110** is preferably coupled to the sports helmet **120** by internal contact pressure and can be removed as desired. The formed base pad **110** may be made of non-cross linked polyethylene closed cell foam or ETHAFOAM®. The ETHAFOAM® unicellular plastic is extremely light while still being tough and durable. The ETHAFOAM® is sponge-like and cushions when pressure is applied to its surface, but unlike a sponge it will not absorb moisture. The formed base pad **110** can be formed from a metal mold (not shown). Another example of a suitable synthetic rubber is NEOPRENE® polychloroprene, which is very resistant to the outdoor elements, has high tensile strength and flexibility.

[0028] The sports helmet **120** provides some cushioning protection for a user's head but the outer shell **124** of the sports helmet **120** is made of a very hard plastic. As such, it can and is used as a weapon by football players who ram their helmet into the body of an opposing player. The sports helmet **120** can be a football helmet **122**, a lacrosse helmet (not shown) or a protective helmet (not shown).

[0029] The first plurality of holes **130** are disposed on the formed base pad **110**. The first holes **130** provide ventilation to the formed base pad **110** and the sports helmet **120**. The first holes **130** also include a first pair of ear holes **132** to allow a user to hear any nearby sounds or voices while wearing the exterior sport helmet pad **100** and the sports helmet **120**. The holes on the base pad preferably are near or overlie holes on the underlying sports helmet.

[0030] More holes **140** are disposed on the sports helmet **120**. The second set of holes **140** provide ventilation to a user's head wearing the sports helmet **120**. The first holes **130** and the helmet holes **140** can be approximately the same size and shape. The first holes **130** are but need not be aligned with the helmet holes **140** to provide ventilation to the user's head while the user is wearing the sports helmet **120** from the exterior of the exterior sport helmet pad **100**. The helmet holes **140** also include a second pair of helmet ear holes **142** that roughly align with the first pair of ear holes **132** in the base pad to enable a user to hear any nearby sounds or voices while wearing the exterior sport helmet pad **100** and the sports helmet **120**.

[0031] In use, the exterior sport helmet pad **100** is placed over the outer shell **124** of the hard surface of a football helmet **122** or a different protective helmet (not shown) used in sporting or recreational activities. The exterior sport helmet pad **100** is coupled to the sports helmet **120** by internal contact

pressure and can be removed as desired. There is a snug fit so that the pad **100** does not easily come loose upon jarring.

[0032] FIG. **2** shows another version of the sport helmet pad **110** over the same helmet **120**. In this version, the sport helmet pad **110** is a NEOPRENE® polychloroprene mockup. This sport helmet pat more closely follows the contours of the underlying helmet. Although not shown, it can be easily equipped with the same holes shown in FIG. **1** to enable air circulation and better hearing via the sport helmet pad's ear hole **132**.

EXAMPLE 1

[0033] To illustrate the improvements available with our helmet protector we test it in comparison to helmets alone. Before we sell any helmet protector, it is tested according to the protocols of the National Operating Committee on Standards for Athletic Equipment (NOCSAE). The most recent protocol for testing of helmets is the "Standard Test Method and Equipment Used in Evaluating the Performance Characteristics of Protective Headgear/Equipment" NOCSAE DOC (ND) 001-11m13. This discloses an apparatus to be used to obtain comparable data headgear drop testing. The apparatus consists of a frame and a helmet holder on a sliding vertical rail on one side of the frame. Basically a helmet (with the inventive protector) is affixed to the helmet holder. Initially helmet protectors made of NEOPRENE® polychloroprene with thicknesses of, for example, 0.25 inch, 0.5 inch, 0.75 inch and 1 inch are tested for impact reduction. Initially only NEOPRENE® polychloroprene strips are affixed individually in a "mohawk" location from the helmet front, crown and back of head. Head injury criteria (HIC) are calculated for each location and each thickness. HIC is calculated in a differential equation and preferably in less than 1000 units.

[0034] The helmet holder is released to fall at least six feet. Various impact surfaces are provided for the helmet apparatus to fall onto, such as a 3" calibration pad with specifications including molded polyurethane thermoplastic elastomer, a ½" test MEP pad also of polyurethane or ⅛" faceguard pad calibration also of polyurethane. Part of the system is a tri-axial accelerometer that measures the impact vibrations in three orthogonal axes and is mounted inside the helmet holder that supports the helmet and protector. Data from the accelerometer are processed with standard Severity Index computation software. In addition, there is an electronic speed monitor to measure the last three inches of movement just above the collision. The test is run at standard room temperature. The tested parts (helmet and protector) are first conditioned to that temperature. Another test is run at 115° which is summerfield temperature in Arizona.

[0035] This test is also called a linear impactor test because the test object falls in a straight line to impact. To assure accurate comparisons, the helmet, helmet holder and helmet protector are required to have an adjusted mass of 13.3 kg (±3%). Impact velocities are in the range of 6-12 meters per second. For other, non-football headgear, there are other standards to be applied.

[0036] In the helmet impact test, usually the only result is pass or fail. For the helmet protector to pass, it must be able to withstand the impact at an acceptable severity index (SI). SI is a function of the acceleration at the last 1.5 inch of the six-foot drop taken to the power of 2.5 and multiplied by the short duration of the acceleration pulse. If the velocity at impact is too great, the test result is considered inconclusive and the test is re-run.

[0037] With the inventive helmet protector, control tests of helmet impact without the inventive protector are also obtained to assess the improvement (decrease) in impact accelerometer data.

[0038] While the invention has been described in conjunction with specific embodiments thereof, it is evident that many alterations, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alterations, modifications, and variations in the appended claims.

What is claimed is:

1. An exterior sport helmet pad, comprising:

a formed base pad, the formed base pad accommodates a sports helmet with an outer shell; and

a first plurality of holes disposed on the formed base pad, the first holes including a first pair of ear holes and a plurality of venting holes providing ventilation to the formed base pad and the sports helmet;

wherein the first plurality of holes overlie holes on the sports helmet thus avoiding degradation of hearing and venting.

2. The exterior sport helmet pad according to claim **1**, wherein the formed base pad is made of NEOPRENE® polychloroprene or a non-cross linked polyethylene closed cell foam.

3. The exterior sport helmet pad according to claim **1**, wherein the sports helmet is a football helmet.

4. The exterior sport helmet pad according to claim **1**, wherein the formed base pad is coupled to the sports helmet by internal contact pressure.

5. The exterior sport helmet pad according to claim **1**, wherein the first holes are the same size and shape as holes on the sports helmet.

6. The exterior sport helmet pad according to claim **1**, wherein the first holes are aligned with the helmet holes to provide ventilation to the user's head while the user is wearing the exterior sport helmet pad and sports helmet.

7. The exterior sport helmet pad according to claim **1**, wherein the exterior sport helmet pad is placed over the outer shell of the sports helmet.

8. An exterior sport helmet pad, comprising:

a formed base pad, the formed base pad accommodating a sports helmet with an outer shell, the formed base pad being sized to couple to the sports helmet by internal contact pressure; and

a first plurality of holes disposed on the formed base pad, the first holes including a first pair of ear holes and the first holes providing ventilation to the formed base pad and the sports helmet;

wherein: the first plurality of holes overlays the ear holes and ventilation holes on the sports helmet and are the same size and shape.

9. The exterior sport helmet pad according to claim **8**, wherein the formed base pad is made of NEOPRENE® polychloroprene or non-cross linked polyethylene closed cell foam.

10. The exterior sport helmet pad according to claim **9**, wherein the NEOPRENE® polychloroprene and non-cross linked polyethylene closed cell foam comprise light, tough and durable versions.

11. The exterior sport helmet pad according to claim **8**, wherein the sports helmet is a football helmet.

12. The exterior sport helmet pad according to claim **8**, wherein the first holes are aligned with hearing and ventila-

tion holes to provide ventilation to the user's head while the user is wearing the sports helmet and the exterior sport helmet pad.

13. The exterior sport helmet pad according to claim **8**, wherein the exterior sport helmet pad is placed over the outer shell of the sports helmet.

14. An exterior football helmet pad, comprising:

a formed base pad, the formed base pad sized to accommodate a football helmet with an outer shell, the formed base pad being sized to fit the football helmet by internal contact pressure; and

a first plurality of holes disposed on the formed base pad, the first holes include a first pair of ear holes and the first holes provide ventilation to the formed base pad and the football helmet;

wherein: a second plurality of holes are disposed on the football helmet, the second holes include a second pair of ear holes and the second holes provide ventilation to a user's head wearing the football helmet and the first holes and the second holes are the same size and shape.

15. The exterior sport helmet pad according to claim **14**, wherein the formed base pad is made of NEOPRENE® polychloroprene or non-cross linked polyethylene closed cell foam.

16. The exterior sport helmet pad according to claim **15**, wherein the NEOPRENE® polychloroprene and non-cross linked polyethylene closed cell foam is light, tough and durable material.

17. The exterior sport helmet pad according to claim **14**, wherein the first holes are aligned with the helmet holes to provide ventilation to the user's head while the user is wearing the football helmet.

18. The exterior sport helmet pad according to claim **14**, wherein the exterior sport helmet pad is placed over the outer shell of the football helmet.

19. The exterior sport helmet pad according to claim **14**, wherein the outer shell of the football helmet is made of hard plastic.

20. The exterior sport helmet pad according to claim **14**, wherein the second pair of ear holes are aligned with the first pair of ear holes to allow the user to hear any nearby sounds or voices while wearing the exterior football helmet pad and the football helmet.

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