ABSTRACT
Disclosed is a ball stop pad for use in a lacrosse head having improved ball retention characteristics, and which is impervious to repeated impacts and exposure to the elements, in a construction that complies with the rule-setting authorities' dimensional requirements. The ball stop pad is comprised of a fabric sleeve shaped for fitting within the ball stop region of a lacrosse stick head, and has a dry viscoelastic polymer on the interior of the sleeve that serves to absorb and dissipate the impact of a lacrosse ball as it first hits and then moves within and against the ball stop pad during play. The top surface of the ball stop pad is provided a series of tightly packed, circular, raised dimples that provide multiple points of contact with a ball as it impacts the ball stop, and thus constantly cushions the ball regardless of ball movement within the head of the lacrosse stick.
LACROSSE HEAD BALL STOP PAD
CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims priority from co-pending U.S. Provisional Patent Application Ser. No. 61/888,670 entitled "Lacrosse Head Ball Stop Pad," filed with the United States Patent and Trademark Office on Oct. 9, 2013, the entire disclosure of which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] This invention relates generally to sporting equipment, and more particularly to a ball stop pad for use in the head of a lacrosse stick.

BACKGROUND

[0003] Lacrosse sticks comprise a shaft or handle and a head at one end of the handle. The head is the part of the stick that engages the ball, and comprises the scoop (located at the top of the head), the sidewalls (where sidewalk strings of a mesh or leather/composite thong pocket are attached), the throat (the bottom end of the head that receives the lacrosse stick handle), and the ball stop (the center inside curved plastic wall of the head at the throat). A mesh or leather/composite thong pocket sits inside of and is tied to the head. A ball stop pad comprising a thin piece of foam, rubber, or plastic may be adhesively affixed in the ball stop area of the lacrosse head, the purpose of which is to help absorb the impact of the hard lacrosse ball against the ball stop area as the ball is caught. Secondary to this, the ball stop pad should serve to cushion the ball within the head and minimize the tendency for the ball to bounce out of the ball stop area of the head when a player is attempting to make a catch, pass the ball, or when they are trying to carry the ball while maneuvering on the field.

[0004] In order to improve safety in lacrosse games, rule setting authorities, including US Lacrosse, Inc. (a national governing body of men's and women's lacrosse) and the Federation of International Lacrosse (an international governing body of men's and women's lacrosse), the National Collegiate Athletic Association (a national governing body for men's and women's collegiate sports), as well as the National Federation of State High School Associations (a national governing body for boys' and girl's high school sports), have set rules mandating dimensions of various aspects of the lacrosse head (such published rules being known to those skilled in the art and being incorporated herein by reference thereto). One goal of such rules is to ensure that the shape of the lacrosse head does not unreasonably retain the ball during play, which in turn causes players to be more aggressive (e.g., through slashing and cross-checking) in attempts to dislodge the ball from another player's stick. Players, on the other hand, seek head configurations that will maximize ball retention which, in turn, will aid them in game play, but that will comply with the head configuration rules of the rule-setting organizations. This presents a challenge for designers of lacrosse heads, in that the head and any accessories therefor (e.g., a ball stop pad) must be configured such that a way so as to comply with the rules but still meet the players' desires for maximizing ball retention.

[0005] For the past 40 plus years, since the modern day lacrosse head was initially marketed in 1970, various manufacturers have been employing ball stop pads constructed most often of a resilient foam material of varying thicknesses, and to a lesser degree, rubber or plastic ball stop pads. These various materials do little to nothing to absorb the impact of the lacrosse ball hitting against the ball stop area of the lacrosse head, or in cushioning the ball after it has been caught. In actuality, the various materials from which ball stop pads have been constructed up to this point contribute to the ball's tendency to propel itself out of the pocket area. This is due to the fact that although the materials may be somewhat resilient, they do not absorb and dissipate the kinetic energy of the lacrosse ball when it strikes the ball stop pad's surface. In many cases, the materials thus used actually amplify the force of the lacrosse ball when it impacts the pad's surface, helping lead to a lack of control of the lacrosse ball within the ball stop area. This, in turn, greatly increases the potential for the player to lose the ball to an opposing player. Along with this, the pad material has a tendency to deteriorate quite rapidly, dry-rotting and falling apart due to repeated impacts, as well as exposure to the elements. This leads to even more unpredictable handling characteristics of the lacrosse stick by even the most accomplished players.

[0006] Previous efforts have been made to improve upon ball stops and lacrosse heads, generally, to provide greater control over the ball in the head, such as those disclosed in U.S. Pat. Nos. 7,803,300, 6,676,547, and 6,929,572. However, none of such efforts have fully satisfied the players' demand for maximum control in a configuration that will be acceptably received by governing bodies, such that there remains a need in the art for a ball stop pad of compact configuration that will meet the dimensional and other design restrictions of the relevant governing bodies, but that will likewise meet the desires of players for a ball stop that increases ball retention and control and that will remain intact over extended periods of use.

SUMMARY OF THE INVENTION

[0007] Disclosed is a ball stop pad for use in a lacrosse head having improved ball retention characteristics, and which is impervious to repeated impacts and exposure to the elements, in a construction that complies with the rule-setting authorities' dimensional requirements. With regard to certain aspects of an embodiment of the invention, a ball stop pad is provided for attachment to the ball stop portion of the head of a lacrosse stick. The ball stop pad is comprised of a fabric sleeve having a generally triangular, trapezoidal, or rectangular shape for fitting within the ball stop region of a lacrosse stick head, and has a dry viscoelastic polymer (otherwise known as an Ultra-soft Elastomer) on the interior of the sleeve which serves to absorb and dissipate the impact of a lacrosse ball as it first hits and then moves within and against the ball stop pad during play. The top surface of the ball stop pad is provided a series of tightly packed, circular, raised dimples that provide multiple points of contact with the ball as it impacts the ball stop, and thus constantly cushions the ball regardless of ball movement within the head of the lacrosse stick. The bottom of the fabric sleeve has an adhesive applied thereon so that the ball stop may be applied to and held within the lacrosse head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The numerous advantages of the present invention may be better understood by those skilled in the art by reference to the accompanying drawings in which:
FIG. 1 is a top perspective view of a lacrosse stick head frame and ball stop pad in accordance with aspects of an embodiment of the invention.

FIG. 2 is a top view of the ball stop pad of FIG. 1.

FIG. 3 is a cross-sectional view of the ball stop pad of FIG. 2 along section line A-A.

FIGS. 4(a) through 4(f) are top schematic views of the ball stop pad of FIG. 2 shown in varying dimensions.

FIG. 5 is a top perspective view of a lacrosse stick head frame and ball stop pad in accordance with further aspects of an embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description is of a particular embodiment of the invention, set out to enable one to practice an implementation of the invention, and is not intended to limit the preferred embodiment, but to serve as a particular example thereof. Those skilled in the art should appreciate that they may readily use the conception and specific embodiments disclosed as a basis for modifying or designing other methods and systems for carrying out the same purposes of the present invention. Those skilled in the art should also realize that such equivalent assemblies do not depart from the spirit and scope of the invention in its broadest form.

With regard to certain aspects of an embodiment of the invention, FIG. 1 shows a lacrosse stick head frame (shown generally at 100) having a scoop portion 102, side-walls 104, throat portion (shown generally at 106), and ball stop portion 108 at the center of the throat. The frame is typically formed of a substantially rigid, light-weight plastic, such as a nylon, a polyurethane, or mixtures of thermoplastic polymers. Holes 110 are provided throughout the head frame that receive portions of nylon stringing and possibly leather or composite thongs (not shown), which in turn are then secured to either a nylon mesh or other nylon stringing, in order to create a pocket for catching the lacrosse ball within the frame of the lacrosse head (or “crosse,” as is designated for the women’s game).

Positioned within the ball stop portion 108 is a ball stop pad 120 in accordance with certain features of an aspect of the invention. Ball stop pad 120 is positioned so that a ball within the head will lie against ball stop pad 120 when it is carried by a player, and will stop a ball when one is received or caught from another player or scooped off of the ground. Ball stop pad 120 is preferably adhesively joined to ball stop portion 108 of head 100, such as through application of adhesive to ball stop portion 108, to the back of ball stop pad 120, or the like.

FIG. 2 shows a top view of ball stop pad 120. Ball stop pad 120 is sized to fit within the ball stop portion of frame 100, in accordance with the size regulations set forth by US Lacrosse, Inc. and the Federation of International Lacrosse. Ball stop pad 120 has a top surface 121, which is the surface of ball stop pad 120 that faces the interior of frame 100 when installed on frame 100. A plurality of dimples 122 cover top surface 121 of ball stop pad 120, which dimples have a circular diameter, and which dimples 122 extend up from top surface 121 by an amount so that a maximum thickness T (FIG. 3) of ball stop pad 120 does not exceed 5 mm, and that is more preferably between 4 mm and 5 mm. An outer portion of top surface 121 of ball stop pad 120 (along the perimeter of top surface 121) forms a space without dimples 122 along the region in which the top and bottom surfaces (121 and 123 of FIG. 3, respectively) are heat sealed together. Dimples 122 are positioned close to one another across top surface 121, and in a particularly preferred embodiment are so close so as to have at least a portion of the perimeters of adjacent dimples contacting one another. Such raised, circular dimple configuration applied to the top surface of ball stop pad 120 provides multiple points of contact with a ball as it impacts the ball stop pad 120, and thus constantly cushions the ball from multiple directions regardless of ball movement within the head of the lacrosse stick. Dimples 122 preferably have a diameter of approximately 5 mm to 6 mm, and a height of approximately 1 mm measured from the outer perimeter of a single dimple 122 to the center of such dimple 122, and are provided in whatever number as will fit within the overall dimensions of the particular ball stop pad 120. Moreover, dimples 122 are tightly positioned on top surface 121 of ball stop pad 120, and preferably so tightly positioned so that at least a portion of an outer perimeter of each dimple is approximately in contact with a portion of an outer perimeter edge of another dimple (i.e., with a separation of no more than 1 mm), as best shown in FIG. 2. This configuration is beneficial in ensuring multi-point contact of a lacrosse ball with ball stop pad 120, and in multiple directions, which are believed to further aid in limiting bounce and improving control of the ball in the lacrosse stick head. With dimples configured having a diameter of approximately 6 mm, such positioning may be achieved by spacing the centers of adjacent dimples at a distance of approximately 7 mm.

FIG. 3 shows a cross-sectional view of the ball stop pad 120 of FIG. 2 along section line A-A. As shown in FIG. 3, dimples 122 extend up from top surface 121 of ball stop pad 120 so as to provide multiple, distinct points of contact with a ball when it impacts ball stop pad 120. As mentioned above, dimples 122 rise up from top surface 121 of ball stop pad 120 by an amount that insures that maximum thickness T of ball stop pad 120 does not exceed 5 mm, and that is more preferably between 4 mm and 5 mm with each dimple 122 having a height H of approximately 1 mm.

The outer surface of ball stop pad 120 preferably comprises a fabric sleeve covering 124 extending around the entire exterior of ball stop pad 120. Fabric sleeve covering 124 may be formed of a polyethylene or polyester film, although other soft, pliable materials may likewise be used without departing from the spirit and scope of the invention. A suitable material for a fabric sleeve for use on ball stop pad 120 is a well knitted fabric having a polyurethane transfer coating, such as the readily commercially available DARTEX available from Dartex Coatings Ltd. The polyurethane coated fabric sleeve covering 124 is preferably 20 mil in thickness, ±1-3 mil (0.020"±0.003"). While other fabric options could likewise be used, they should have a 4-way stretch polyester, double knit scrim and an equally elastic urethane coating on at least one side thereof.

With further reference to FIG. 3, encased within covering 124 is a dry viscoelastic polymer (ultrasoft elastomer) 126 formed from a vulcanized, cross-linked rubber material, having a durometer in the range of 52-58 Shore 00A part, Shore 00 cup. A suitable dry viscoelastic ultrasoft elastomer for use in the ball stop pad 120 set forth herein is readily commercially available from Action Products, Inc. under the registered trademark AKTON. Other viscoelastic polymers may also be suitable for use as the cushioning material and are readily commercially available from a variety of sources, such as by way of non-limiting example Medalist MD-447.

[0021] The polyurethane coated fabric sleeve covering 124 is vacuum formed to the dimples 122 of the ball stop pad 120, and shields the interior viscoelastic polymer gel 126 from direct sunlight exposure. The polyurethane coated fabric sleeve covering 124 is preferably extremely durable, abrasion resistant and waterproof, while at the same time maintaining the ability to easily stretch, which does not inhibit the ability of the underlying viscoelastic polymer gel 126 to cushion the lacrosse ball from impacts and subsequent jostling about. The surface of the polyurethane coated fabric sleeve covering 124 also has a high coefficient of friction, which aids in keeping the ball from readily moving about the pocket of the lacrosse stick. The polyurethane coated fabric sleeve covering 124 is preferably a four way stretch polyurethane, double knit scrim with an equally elastic urethane coating on its underside. Moreover, because the edges of the ball stop pad 120 are sealed, preferably with a hem transfer tool, permanently joining the polyurethane coated fabric sleeve cover 124 to a polyurethane backing, the ball stop pad 120 itself is completely sealed to water infiltration.

[0022] Optionally, and while not shown separately in FIG. 3, an adhesive layer may be applied to a polyurethane backing film on the back surface 123 of ball stop pad 120, which adhesive layer can be used to join ball stop pad 120 to the ball stop portion 108 of a lacrosse head 100. In this case, a release layer may likewise be provided over the adhesive layer, as is well known in the art, to protect the adhesive layer until the ball stop pad 120 is ready for installation. The polyurethane backing film may have a thickness of 3 mil +/-0.5 mil (0.0034+-0.0005"), and the adhesive layer may have a thickness of approximately 5 mil (0.0005"").

[0023] Next, FIG. 4 provides exemplary dimensions for ball stop pad 120 incorporating the features of the invention, which dimensions are specifically configured to provide the benefits from the inventive features described above while complying with the dimensional requirements set forth by US Lacrosse, Inc. and the Federation of International Lacrosse.

[0024] FIG. 4(a) shows exemplary dimensions for a ball stop pad 120 incorporating the features of the invention and dimensioned for use in a head 100 for a woman's lacrosse stick in this configuration, ball stop pad 120 has a length dimension L1, of preferably between 7 cm and 11 cm, and more preferably about 7.5 cm, a width dimension W1, of preferably about 5 cm, and more preferably about 4.5 cm, and a thickness dimension of preferably not more than 0.9 cm, and more preferably about 0.5 cm.

[0025] FIG. 4(b) shows exemplary dimensions for a ball stop pad 120 incorporating the features of the invention and dimensioned for use in a head 100 for a woman's lacrosse stick having a larger or deeper head than that envisioned for use with the ball stop pad 120 of FIG. 4(a). In this configuration, ball stop pad 120 has a length dimension L1, again of preferably about 7 cm, and more preferably about 6.8 cm, a width dimension W1, of preferably about 5 cm, and a thickness dimension of preferably about 0.5 cm.

[0026] FIG. 4(c) shows exemplary dimensions for a ball stop pad 120 incorporating the features of the invention and dimensioned for use in a Goalie's lacrosse head of typical design. In this configuration, ball stop pad 120 has a length dimension L1, of preferably about 5-6 inches, a width dimension W1, of preferably about 1-2 inches, and a thickness dimension of preferably about 1/4 inch.

[0027] Further, FIG. 4(d) shows additional exemplary dimensions for a ball stop pad 120 incorporating the features of the invention and dimensioned for use in a head 100 for a man's lacrosse stick, which conforms to current specification as set by the NCAA and NFHS. In this configuration, ball stop pad 120 has a length dimension L1 of preferably about 2 inches, a width dimension of preferably about 1 1/8 inches, and a thickness dimension of preferably about 1/4 inch.

[0028] Still further, FIG. 4(e) shows additional exemplary dimensions for a ball stop pad 120 incorporating the features of the invention and dimensioned for use in a head 100 for a woman's lacrosse stick of commonly current use. In this configuration, ball stop pad 120 has a length dimension L1, of preferably about 10 cm, a width dimension W1, of preferably about 5 cm, and more preferably about 4.7 cm, and a thickness dimension of preferably about 0.5 cm.

[0029] Likewise, FIG. 4(f) shows additional exemplary dimensions for a ball stop pad 120 incorporating the features of the invention and dimensioned for use in a head 100 for a woman's lacrosse stick also of currently common use. In this configuration, ball stop pad 120 has a length dimension L1, of preferably about 10 cm, a width dimension W1, of preferably about 4 cm, and a thickness dimension of preferably about 0.5 cm.

[0030] Again, these dimensions can change according to updated parameters as set by the governing bodies of the sport, and as may be desirable to fit any particular lacrosse head configuration that a user might wish to use, without departing from the spirit and scope of the invention.

[0031] While not shown in FIGS. 4(a)-4(f), it is noted that each of the ball stop pads 120 shown in such Figures would incorporate the same general configuration of the ball stop pad 120 of FIGS. 2 and 3, including dimples 122, fabric covering 124, gel 126, etc. all as described above with reference to FIGS. 2 and 3.

[0032] Next, as shown in FIG. 5, ball stop pad 120 may optionally have a greater thickness than that discussed above, and by way of example having an additional thickness of approximately 2-4 mm, which additional padding will further reduce the rebound effect of the ball. However, so as to keep the configuration within the guidelines of the regulatory lacrosse entities, such additional thickness should be received within the body of ball stop portion 108 of lacrosse head 100. In this case, a shallow cavity 130 may be provided on the inner face of ball stop portion 108 having a perimeter that matches the perimeter of the ball stop pad 120, and having a depth that matches the portion of the thickness of ball stop pad 120 that is greater than the approved thickness of 0.5 cm. In this manner, only 0.5 cm of the ball stop pad 120 will remain above the surface of ball stop portion 108 of lacrosse head 100, but ball stop pad 120 will provide even greater shock absorbing ability.

[0033] With any of the foregoing configurations, ball stop pad 120 incorporating the features set forth herein provides a significant improvement over previously known ball stop pads, providing enhanced ball retention within the lacrosse head during play while maintaining conformance with the dimensional requirements set forth by US Lacrosse, Inc. (USL), the Federation of International Lacrosse (FIL), the National Collegiate Athletic Association (NCAA), and the
National Federation of State High School Associations (NFHS), so as to ensure that such inventive benefits may be enjoyed by all players of the sport.

[0034] Having now fully set forth the preferred embodiments and certain modifications of the concept underlying the present invention, various other embodiments as well as certain variations and modifications of the embodiments herein shown and described will obviously occur to those skilled in the art upon becoming familiar with said underlying concept. It should be understood, therefore, that the invention may be practiced otherwise than as specifically set forth herein.

1. A ball stop pad comprising:
   a fabric sleeve dimensioned to fit within a ball stop region of a lacrosse stick head, said fabric sleeve having a top surface and a bottom surface;
   a cushioning polymer on an interior of said fabric sleeve between said top surface and said bottom surface; and
   a plurality of raised, circular dimples on said top surface positioned for contacting a lacrosse ball when a lacrosse ball is positioned within a ball stop region of a lacrosse stick head, said dimples being positioned with respect to one another so that at least a portion of an outer perimeter edge of each dimple is approximately in contact with a portion of an outer perimeter edge of another dimple.

2. The ball stop pad of claim 1, said ball stop pad having a length dimension, a width dimension, and a height dimension, wherein said length dimension is at least sixty percent larger than said width dimension, and wherein said width dimension is at least nine-hundred percent larger than said height dimension.

3. The ball stop pad of claim 2, wherein each said dimple has a diameter of no greater than approximately 6 mm.

4. The ball stop pad of claim 2, wherein each said dimple has a height of approximately 1 mm.

5. The ball stop pad of claim 2, wherein said height dimension does not exceed 5 mm.

6. The ball stop pad of claim 1, wherein said cushioning polymer further comprises a dry viscoelastic polymer.

7. The ball stop pad of claim 1, wherein said fabric sleeve further comprises a stretchable polyester fabric.

8. The ball stop pad of claim 7, further comprising an elastic urethane coating on at least one side of said fabric sleeve.

9. A ball stop pad comprising:
   a fabric sleeve dimensioned to fit within a ball stop region of a lacrosse stick head, said fabric sleeve having a top surface and a bottom surface;
   a cushioning polymer on an interior of said fabric sleeve between said top surface and said bottom surface; and
   a plurality of raised, circular dimples on said top surface positioned for contacting a lacrosse ball when a lacrosse ball is positioned within a ball stop region of a lacrosse stick head, each of said dimples having a diameter of no greater than approximately 6 mm and being spaced such that a center of adjacent dimples are at a distance of approximately 7 mm.

10. The ball stop pad of claim 9, wherein said dimples are positioned with respect to one another so that at least a portion of an outer perimeter edge of each dimple is approximately in contact with a portion of an outer perimeter edge of another dimple.

11. The ball stop pad of claim 9, said ball stop pad having a length dimension, a width dimension, and a height dimension, wherein said length dimension is at least sixty percent larger than said width dimension, and wherein said width dimension is at least nine-hundred percent larger than said height dimension.

12. The ball stop pad of claim 11, wherein each said dimple has a diameter of no greater than approximately 6 mm.

13. The ball stop pad of claim 11, wherein each said dimple has a height of approximately 1 mm.

14. The ball stop pad of claim 11, wherein said height dimension does not exceed 5 mm.

15. The ball stop pad of claim 9, wherein said cushioning polymer further comprises a dry viscoelastic polymer.

16. The ball stop pad of claim 9, wherein said fabric sleeve further comprises a stretchable polyester fabric.

17. The ball stop pad of claim 16, further comprising an elastic urethane coating on at least one side of said fabric sleeve.

18. A lacrosse stick head comprising:
   a scoop portion;
   side walls on opposite sides of said scoop portion;
   a throat portion extending between said side walls;
   a ball stop portion at a center of said throat portion; and
   a ball stop in said ball stop portion, said ball stop further comprising:
   a fabric sleeve dimensioned to fit within said ball stop portion, said fabric sleeve having a top surface and a bottom surface;
   a cushioning polymer on an interior of said fabric sleeve between said top surface and said bottom surface; and
   a plurality of raised, circular dimples on said top surface positioned for contacting a lacrosse ball when a lacrosse ball is positioned within said ball stop portion, said dimples being positioned with respect to one another so that at least a portion of an outer perimeter edge of each dimple is approximately in contact with a portion of an outer perimeter edge of another dimple.

19. The lacrosse stick head of claim 18, said ball stop portion further comprising a cavity extending into a face of said ball stop portion, wherein said ball stop is positioned within said cavity.

20. The lacrosse stick head of claim 19, wherein said cavity extends into said face of said ball stop portion to a depth of between 2 mm and 4 mm.