Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
This invention relates to a custom-molded pad for relief of the symptoms of lateral epicondylitis, or "tennis elbow." Also known as tendonitis or tenosynovitis, tennis elbow is the inflammation of the tendon or tendon sheath located at the lateral epicondyle. Tennis elbow is primarily caused by continued stress on the grasping and supination muscles of the forearm. Although the backhand swing in tennis is an activity commonly associated with aggravating the onset of lateral epicondylitis, there are several other activities that can cause the condition, such as continuous use of hand tools, repetitive painting with a brush or roller, or carrying and operating a chain saw over extended periods of time. As discussed below, each of these activities require repeated use of the same muscle groups, which often leads to overuse and the inflammation and tearing associated with tennis elbow.

Although some severe or chronic cases of tennis elbow may require use of anti-inflammatory drugs or surgical intervention, the vast majority of cases are resolved using much simpler methods. Standard treatment for a typical case of tennis elbow involves little more than applying ice to and resting the affected area, and alleviating any associated pain. In many cases as disclosed in the US-5971947 patent, an external device will also be used to support the affected muscles and tendons during normal activities, thereby reducing the risk of further injury while allowing time for the damaged area to heal.

While prompt diagnosis and treatment of lateral epicondylitis can minimize the pain associated with the condition and reduce the extent of treatment needed, prior art methods available for treatment often fail to provide adequate relief. A typical external elbow wrap used to treat tennis elbow consists of nothing more than an elastic strap which extends around the forearm. This type of prior art strap does not provide concentrated support directly over the injured area. Those devices which do attempt to direct support specifically to the injured region have limited effectiveness in that they provide additional padding over the inflamed area, yet fail to provide a secure, custom fit which addresses the unique anatomical needs of the individual wearer. Furthermore, the additional padding provided is often a soft, thick foam pad, which will not conform to the shape of the forearm without applying an increased amount of pressure over the injured area to cause the foam to compress against the forearm.

US 6 106 492 discloses a carpal tunnel splint for being custom-fitted to a hand and wrist. The splint holds the wrist joint in a correct position in order to treat carpal tunnel syndrome, which is caused by compression of the median nerve that travel through the wrist.

The tennis elbow band of the present invention offers an improved alternative to conventional elastic bands and ice packs by providing a custom-fitted pad which is molded to conform to the exact shape of the anatomy of the wearer. The pad is first placed over the wearer’s forearm and cured to a custom-fitted shape, and is then secured over the inflamed area of the forearm using an adjustable strap. The strap and the pad cooperate with one another to provide a custom-fitted device that produces concentrated, radially-directed support to the injured muscles and tendons. Unlike some prior art pads, the pad of the present invention does not require the use of a thick layer of foam padding to provide adequate support to the injured area, but instead relies upon layers of rigid, resin-impregnated fabric. This results in a thin pad against which a reduced amount of radially-directed pressure must be applied to achieve a greater degree of support. This promotes blood flow to the injured area and accelerates the healing process.

The tennis elbow band of the present invention uses a moisture curable resin system to quickly and easily mold the pad to the shape of the muscles and tendons of the forearm. Upon curing, the moisture curable resin system yields a very rigid pad having a custom-fitted shape that matches the area of the forearm to which the pad was initially molded. No heat is required. A source of water is the only additional material necessary to achieve a cure. Although atmospheric moisture alone will cure the tennis elbow pad into its hardened position in a relatively short period of time, the resin in or on the pad will typically be activated by immersing the pad in water prior to fitting the pad on an individual’s forearm. Even though atmospheric moisture can activate the curing process, once a final cure is achieved, the tennis elbow pad will maintain its custom-fitted shape regardless of whether the pad is subsequently exposed to heat or moisture. The tennis elbow pad assembly is inexpensive to produce, easy to fabricate, and comfortable to wear.

Therefore, it is an object of the invention to provide a custom-molded tennis elbow pad assembly that can be quickly and easily positioned on and removed from a wearer’s forearm by the wearer.

It is another object of the invention to provide a tennis elbow pad assembly which is easy to fabricate.

It is another object of the invention to provide a tennis elbow pad having a universal size and a standard shape prior to being custom-fitted to a wearer’s forearm.

It is another object of the invention to provide a tennis elbow pad that hardens in the presence of moisture to
form a very rigid yet very lightweight protective pad.

[0011] It is another object of the invention to provide a tennis elbow pad that hardens in the presence of moisture to form a very rigid yet very lightweight protective pad.

[0012] It is another object of the invention to provide a tennis elbow pad that is stored in a moisture-proof pouch until ready for application to the forearm muscles and tendons to be supported.

[0013] These and other objects of the present invention are achieved in the preferred embodiments disclosed below by providing a pad assembly comprising:

   (a) a pad capable of being hardened in to a rigid structure; and
   (b) a support that is cooperable with said pad for maintaining the pad in position; wherein said pad comprises:

(i) an initially flexible inner substrate impregnated or coated with a reactive system, said system remaining stable when maintained in substantially moisture-free conditions and hardening upon exposure to moisture to form a rigid, self-supporting structure having a shape conforming to a forearm to which the pad 11 is molded during curing; and
(ii) said substrate being positioned within a cushion layer; and,
(iii) a flexible cover enclosing said cushion layer;

the pad assembly being a tennis elbow pad assembly for use in relieving the symptoms of lateral epicondylitis; wherein
the pad is adapted for being positioned against and molded onto a forearm in the region of the elbow and the pad is hardenable into a rigid shape for lying in a closely-conforming position against the common tendon attachment and grasping and supination muscles associated with the radial-humeral joint and the lateral epicondyle of the forearm and wherein the support, in use, cooperates with the hardened pad to exert radially-directed pressure against the muscles and common tendon attachment originating at the lateral epicondyle to provide relief from the pain associated with epicondylitis.

[0014] According to another preferred embodiment of the invention, outer moisture-proof pouch is formed of a laminated structure having at least one layer of plastic film and at least one layer of aluminum foil bonded to said plastic film.

[0015] According to yet another preferred embodiment of the invention, the inner layer includes a plurality of overlaid thicknesses of fiberglass.

[0016] According to yet another preferred embodiment of the invention, the plurality of overlaid thicknesses includes at least three and no more than five thicknesses.

[0017] According to yet another preferred embodiment of the invention, the outer layer includes an innermost foam layer overlying at least one side of the substrate.

[0018] According to yet another preferred embodiment of the invention, the outer layer comprises an innermost foam layer enclosing the substrate

[0019] According to yet another preferred embodiment of the invention, foam layer is selected from the group consisting of closed-cell ethylene vinyl acetate and polyurethane.

[0020] According to yet another preferred embodiment of the invention, the outer layer also includes a flexible protective cover enclosing the foam layer. The substrate, foam layer and cover are joined together to form a unitary structure for being molded while flexible to an aspect of the forearm and elbow.

[0021] According to yet another preferred embodiment of the invention, the cover is formed of a polyester sheeting fabric.

[0022] According to yet another preferred embodiment of the invention, the reactive system includes a blended polyisocyanate, polyol, catalyst and stabilizer.

[0023] According to yet another preferred embodiment of the invention, the tennis elbow pad assembly includes a loop attached to said upper surface and adapted for receiving the strap therethrough for securing the pad against the forearm.

[0024] According to yet another preferred embodiment of the invention, the tennis elbow pad assembly includes a first fastener attached to the upper surface for cooperating with a complementary second fastener attached to the strap for holding the pad in place while being worn.

[0025] According to yet another preferred embodiment of the invention, one of the first and second fasteners is patch of looped material, and the other of the first and second fasteners is a complementary patch of hooked material.

[0026] According to yet another preferred embodiment of the invention, the first end of the strap includes a fastening ring connected thereto and adapted for receiving the second end therethrough for securing the strap around the forearm.

[0027] According to yet another preferred embodiment of the invention, the tennis elbow pad assembly product includes a third fastener attached to the second end of the strap for being releasably connected to the outer surface, thereby
permitting the strap to be secured around the forearm.

[0028] According to yet another preferred embodiment of the invention, the surface of the strap is formed from hook-and-loop material.

[0029] According to yet another preferred embodiment of the invention, the third fastener is a patch of hook-and-loop material complementary to the outer surface.

[0030] According to yet another preferred embodiment of the invention, a tennis elbow pad assembly for relieving the symptoms of lateral epicondylitis is provided. The tennis elbow pad assembly includes a pad adapted for being positioned against and molded onto a forearm in the region of the elbow for lying in closely-conforming relation against and applying radially-directed pressure to the common tendon attachment and grasping and supination muscles associated with the radial-humeral joint and the lateral epicondyle of a forearm. The pad is hardened into a rigid structure for therapeutic use, and includes an initially flexible inner substrate impregnated or coated with a reactive system. The system remains stable when maintained in substantially moisture-free conditions and hardens upon exposure to moisture to form a rigid, self-supporting structure having a shape conforming to the forearm to which the pad is molded during curing. The pad also includes a flexible cover enclosing the substrate. A support cooperates with the pad for maintaining the pad in its closely-conforming position against the forearm.

Brief Description of the Drawings

[0031] Some of the objects of the invention have been set forth above. Other objects and advantages of the invention will appear as the invention proceeds when taken in conjunction with the following drawings, in which:

- Figure 1 is an environmental perspective view of a tennis elbow pad assembly according to one embodiment of the invention showing the manner in which the tennis elbow pad is releasably secured around a forearm;
- Figure 2 is a perspective view of the bones and joints of the right elbow of a human during flexion of the elbow;
- Figure 3A is a cut-away perspective view of the right elbow and forearm of a human showing the muscles and tendons connected thereto and affected by lateral epicondylitis;
- Figure 3B is a cut-away perspective view of the elbow shown in Figure 3A illustrating the inflamed tendons and muscles affected by lateral epicondylitis;
- Figure 4 is a top plan view of the tennis elbow pad assembly;
- Figure 5 is a top plan view of the tennis elbow pad shown in Figure 4 with the strap removed;
- Figure 6 is a cut-away perspective view of the tennis elbow pad shown in Figure 5 showing the layers of substrate and other materials from which the pad is fabricated;
- Figure 7 is a cross-sectional side view of the tennis elbow pad showing the substrate layers and other materials of the pad bonded together;
- Figure 8 is a top plan view of a tennis elbow pad product according to another embodiment of the invention;
- Figure 9 is a perspective view of the tennis elbow pad product shown in Figure 8 showing the tennis elbow pad being removed from a moisture-impervious pouch by opening the pouch immediately prior to initiating the curing and custom-fitting process;
- Figure 10 illustrates activation of the moisture-curable resin in the tennis elbow pad;
- Figure 11 is an environmental perspective view showing the tennis elbow pad assembly being custom-fitted to the forearm of a wearer; and
- Figure 12 is a cutaway environmental perspective view showing the tennis elbow pad assembly in use after the curing process has been completed.

Description of the Preferred Embodiment and the Best Mode

[0032] Referring now specifically to the drawings, a tennis elbow pad assembly is illustrated in Figure 1 and shown generally at reference numeral 10. The assembly 10 includes a pad 11 which, as is described in detail below, is custom-fitted to a wearer's forearm "F", and is held in place by an elongate strap 12. The pad 11 has an upper surface 13 to which the ends of a relatively narrow strap loop 14 are sewn. The loop 14 extends across the pad 11 and maintains the strap 12 in place around the forearm "F". The pad 11 is preferably formed of a narrow length of woven or knitted material having surfaces formed from a loose fibrous covering 15. A D-ring 16 is secured to a first end 17 of the strap 12, and a first patch of hook material 18 is sewn, glued, or otherwise connected to a second end 19. The strap 12 is formed into a loop around the forearm "F" by passing the strap 12 through the D-ring 16. The pad 11 is then secured against the forearm "F" by pulling the strap 12 so that the pad 11 fits closely against the forearm "F" and securing the patch of hook material 18 to the fibrous covering 15 at the desired position.

[0033] Referring now to Figures 2, 3A and 3B, the anatomy affected by lateral epicondylitis is shown. Figure 2 shows the underlying bone and joint structure of a right elbow of a human during flexion. The elbow is formed by the junction...
of the capitulum "C", medial epicondyle (not shown) and lateral epicondyle "LE" of the humerus "H" with the head "HD" and olecranon "O" of the radius "R" and ulna "U", respectively. The points at which the radius "R", ulna "U" and humerus "H" meet form three joints: the radio-humeral joint "RHJ", the humero-ulnar joint "HUJ", and the radio-ulnar joint "RUJ". As is shown in Figure 3A, lateral epicondylitis arises from the degeneration and tearing of the superficial muscles along the common tendon attachment "T" where the muscles originate at the lateral epicondyle "LE". These muscles include the extensor carpi radialis longus "ERL", the extensor carpi radialis brevis "ERB", the extensor digitorium "ED", the extensor digiti minimi "EDM", and the extensor carpi ulnaris "ECU". The supinator longus and brevis (not shown), which also originate at the lateral epicondyle, are likewise vulnerable to the degeneration and tearing associated with lateral epicondylitis.

[0034] Figure 3B shows a detailed view of the tearing which occurs along the common tendon attachment "T" as a result of lateral epicondylitis. Without proper diagnosis and treatment, the pain initially felt by the stressed and torn tendons can be exacerbated by subperiosteal hemorrhage, periostitis, calcification, and spurformation on the lateral epicondyle. Such complications may be avoided through early diagnosis and treatment that incorporates the tennis elbow band assembly 10 of the present invention.

[0035] Referring now to Figure 4, the manner in which the strap 12 is attached to the pad 11 is shown. A second patch of hook material 20 is attached to the center of the pad 11, and cooperates with the fiberous covering 15 to releasably attach the strap 12 to the pad 11. Using the patch of hook material 20 permits the pad 11 to be custom-fitted to a wearer's forearm prior to connecting the strap 12 to the pad 11.

[0036] Referring now to Figures 5 and 6, the materials used to construct the pad 11 are shown. Figure 5 shows the pad 11 prior to being custom-fitted around a wearer's forearm and with the strap 12 removed. An outer layer 21 of the pad 11 is formed from a fabric casing to which the loop 14 is sewn. Although any suitable fabric may be used, the outer layer 21 is preferably formed from polyester sheeting.

[0037] As is shown in Figure 6, a flexible cushion layer 22 is provided for being placed closest to the forearm. Cushion layer 22 is preferably laminated, four pound ethylene vinyl acetate ("EVA") micro-perf closed cell foam having a thickness of ½ inch. The cushion layer 22 provides a padded, comfortable surface next to the skin, with the EVA being flexible enough to bend easily with the other components of the pad 11. An initially flexible inner layer 23 is positioned within cushion layer 22. The inner layer 23 is preferably formed from fiberglass fabric layers 23A, each of which is impregnated with a moisture-curable resin that hardens upon curing to form a rigid structure which retains the shape of the muscles and tendons of the forearm onto which the pad 11 has been molded. Although any suitable number of fabric layers 23A may be used, the inner layer 23 preferably includes three to five fabric layers 23A. The embodiment of the invention shown in Figure 6 includes five fabric layers 23A. Figure 7 shows the inner layer 23 sandwiched between the cushion layer 22 and the outer layer 21 after the pad 11 has been assembled.

[0038] Each fiberglass fabric layer 23A is impregnated or coated with a moisture-curable resin such as polyisocyanate. This resin is described in full in the present Applicant's U.S. Patent No. 4,770,299. The resin is synthesized using a reactive system that remains stable when maintained in substantially moisture-free conditions, yet hardens upon exposure to sufficient moisture to form a rigid, self-supporting structure. A typical formation of the reactive system is as follows:

Typical Formulation

[0039]

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isonate 143L or Mondur CD</td>
<td>50.0% polyisocyanate</td>
</tr>
<tr>
<td>Rubinate X1168</td>
<td>50.0% polyisocyanate</td>
</tr>
<tr>
<td>Pluracol P1010</td>
<td>46.6% polyol</td>
</tr>
<tr>
<td>DC-200 Silicone</td>
<td>0.30% defoaming agent</td>
</tr>
<tr>
<td>Benzoyl Chloride</td>
<td>0.10% stabilizer</td>
</tr>
<tr>
<td>Thancat DM-70</td>
<td>3.0% catalyst</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

[0040] The polyisocyanate resin remains in a viscous state as long as the resin is not exposed to moisture. This permits the substrate to remain flexible and moldable so long as the resin is not exposed to moisture, and for a short period of time after such exposure occurs. The rate at which the resin cures can be controlled to some extent by the quantity of water to which the resin is exposed. Briefly immersing the resin in water will cause the resin to rapidly cure. In contrast, merely exposing the resin to open air will result in a curing process having a significantly slower reaction rate which will be proportional to the amount of moisture in the air to which the resin is exposed.
The individual fiberglass fabric layers 23A are preferably die-cut to shape. In addition, while each fabric layer 23A preferably has the same width, a different width may be used for each layer 23A. The degree of overlap and non-overlap resulting from the varying widths provides a variable thickness across the pad 11 after curing, with a relatively thick predetermined area where increased rigidity is desired and a relatively thin area where increased flexibility is desired. The manner of varying the widths of the fabric layers 23A is described in detail in Applicant's prior U.S. Patent No. 5,755,678.

Although the fabric layers 23A are preferably formed from fiberglass, the inner layer 23 may alternately be formed from a fabric woven or knitted from polypropylene yarns. Such fabric is somewhat more flexible than fiberglass fabric after hardening, and offers some cost savings during production of the pad assembly 10.

Referring again to Figure 5, the fabric outer layer 21 and the cushion layer 22 are joined around the perimeter by overedge sewing stitches 24. Although the outer fabric layer 21 and cushion layer 22 may be sewn together using an overedge or serging seam, because the outer layer 21 and cushion layer 22 have thermoplastic properties, the outer layer 21 and cushion layer 22 may alternatively be bonded together around the edge using radio-frequency ("RF") welding. RF welding is a particularly efficient method of bonding because it permits tight corners and angles to be formed in the pad 11, some of which cannot be formed using conventional sewing techniques. The inner layer 23 may alternately be enclosed between the cover 12 and pad 13 using ultrasonic sealing or other suitable adhesives.

Referring now to Figure 8, a tennis elbow pad product is illustrated and shown generally at reference numeral 30. The pad product 30 includes an outer moisture-impervious foil and laminated pouch 31 in which the pad 11 is sealed in the absence of moisture. The pouch 31 is preferably formed from a 0.5 mil aluminum foil sheet sandwiched between two layers of low density polyethylene film. Each layer of film preferably has a thickness of 2 mils. The pouch 31 may also include an outermost layer of laminated 60 gauge, bi-axially oriented nylon film. When the pouch 31 is properly sealed, this laminate structure will prevent moisture from entering the pouch indefinitely.

Referring now to Figure 9, the moisture-impervious pouch 31 may be opened with scissors or a knife so that the pad 11 can be removed from the pouch 31. Figure 10 shows the pad 11 after removal from the pouch 31 being immersed in water "W" to activate the curing process.

As is shown in Figure 11, the pad 11 is then positioned on the forearm over the inflamed area and the strap 12 is attached to the patch of hooked material 20. The strap 12 is wrapped around the forearm "F" and loosened or tightened as needed to ensure a correct fit. The forearm "F" is then overwrapped with an elastic bandage 34, which remains around the forearm "F" for a period of time sufficient to allow the resin in or on the pad 11 to harden and form the pad 11 into the desired shape.

Figure 10 shows the pad 11 after removal from the pouch 31 being immersed in water "W" to activate the curing process.

As is shown in Figure 11, the pad 11 is then positioned on the forearm over the inflamed area and the strap 12 is attached to the patch of hooked material 20. The strap 12 is wrapped around the forearm "F" and loosened or tightened as needed to ensure a correct fit. The forearm "F" is then overwrapped with an elastic bandage 34, which remains around the forearm "F" for a period of time sufficient to allow the resin in or on the pad 11 to harden and form the pad 11 into the desired conformation against the forearm "F". The patient must be advised not to attempt to flex or extend the elbow during the curing process to ensure that an accurate custom fit is achieved. Once the curing process is completed, the elastic bandage 34 is removed. Figure 12 shows the fully cured tennis elbow pad assembly 10 positioned around the forearm "F", with the custom-fitted pad 11 cooperating with the strap 12 to exert radially-directed pressure against the muscles and common tendon attachment "T" originating at the lateral epicondyle to provide relief from the pain associated with lateral epicondylitis.

Throughout this specification, the tennis elbow pad assembly 10 is described for use in relieving the symptoms of lateral epicondylitis. However, the pad assembly 10 may alternatively be used to relieve the symptoms of medial epicondylitis, or "golfer's elbow", by custom-fitting the pad 11 over the muscles and tendons originating at the medial epicondyle.

One preferred embodiment of the tennis elbow pad assembly 10 has the following specifications:

- Length of pad 11: 5 cm (2 inches)
- Width of pad 11: 5 cm (2 inches)
- Length of loop 14: 3.8 cm (1.5 inches) seam-to-seam
- Diameter of patch of hooked material 20: 1.3 cm (5 inch)
- Width of strap 12: 5 cm (2 inches)
- Length of strap 12: 43 cm (17 inches)
- Outer layer 21: Polyester sheeting
- Cushion layer 22: 0.6 cm (.25 inch)
- Number of fiberglass layers 23A: microperf EVA closed cell foam 5
A tennis elbow pad assembly is described above. Various details of the invention may be changed without departing from its scope. Furthermore, the foregoing description of the preferred embodiment of the invention and the best mode for practicing the invention are provided for the purpose of illustration only and not for the purpose of limitation—the invention being defined by the claims.

Claims

1. A tennis elbow pad assembly (10) for reducing or relieving pain associated with tennis elbow, the assembly comprising:
   (a) a pad (11) capable of being hardened in to a rigid structure; and
   (b) an elongate strap (12) releaseably attached to the pad such that the strap cooperates with said pad (11) to maintain pad (11) positioning on a user; wherein the strap has substantially the same width as the pad when fitted and viewed in the length direction of the strap and wherein said pad (11) comprises:
   (i) an initially flexible inner substrate (23) impregnated or coated with a reactive system that remains stable in substantially moisture-free conditions and hardens upon exposure to moisture to form a rigid, self-supporting structure having a shape conforming to a forearm to which the pad (11) is molded during curing;
   (ii) said substrate (23) being positioned within a cushion layer (22); and,
   (iii) a flexible cover (21) enclosing said cushion layer;

   wherein
   the pad is adapted for hardening into a rigid shape for lying in a closely-conforming position against the common tendon attachment and grasping and supination muscles associated with the radial-humeral joint and the lateral epicondyle of the user’s forearm and wherein the elongate strap (12), in use, cooperates with the hardened pad (11) to exert radially-directed pressure against the muscles and common tendon attachment originating at the lateral epicondyle thereby reducing or relieving pain associated with tennis elbow.

2. The tennis elbow pad assembly (10) according to claim 1, wherein said elongate strap (12) having an outer surface (15) and first (17) and second (19) ends, wherein said first end (17) of the strap (12) is releasably attached to an upper surface (13) of the pad (11), thereby permitting the strap (12) to extend circumferentially around the pad and forearm to secure the pad (11) in the closely conforming configuration against the forearm.

3. The tennis elbow pad (10) assembly according to claims 1 or 2, wherein said substrate (23) comprises a plurality of overload thicknesses of fibreglass.

4. The tennis elbow pad assembly (10) according to claims 2 or 3, and including a loop (14) attached to said outer surface (15) and adapted for receiving the strap (12) therethrough for securing the pad (11) against the forearm.

5. The tennis elbow pad assembly (10) according to claim 4, and including a first fastener (20) attached to the outer surface for cooperating with a complementary inner surface (18) of the strap (12) for holding the pad (11) in place on the forearm while being worn.

6. The tennis elbow pad assembly (10) according to claim 3, wherein said cushion layer comprises microperf EVA closed cell foam.

7. The tennis elbow pad assembly (10) according to claim 6, wherein the substrate (23), cushion layer (22) and cover (21) are joined together to form a unitary structure for being molded while flexible to an aspect of the forearm and elbow.

8. A tennis elbow pad assembly product (30) for reducing or relieving pain associated with tennis elbow, comprising:
(a) an outer pouch (31) formed of a moisture-impervious material;
(b) a pad (11) positioned in said pouch (31) in substantially moisture-free conditions and sealed therein against entry of moisture until use; and
(c) an elongate strap (12) releasably attached to the pad such that the strap cooperates with the pad (11) to maintain pad (11) positioning on a user, wherein the strap has substantially the same width as the pad when fitted and viewed in the length direction of the strap;

characterised in that
the pad (11) and elongate strap (12) form a pad assembly (10) as claimed in any of claims 1 to 7.

9. The tennis elbow pad assembly product (30) according to claim 8, wherein said outer pouch (31) is formed of a laminated structure having at least one layer of plastic film and at least one layer of aluminium foil bonded to said plastic film.

Patentansprüche

1. Tennisarmkissenanordnung (10) zur Reduzierung oder Linderung von in Verbindung mit einem Tennisarm auftretenden Schmerzen, wobei die Anordnung Folgendes umfasst:

(a) ein Kissen (11), das in eine starre Struktur gehärtet werden kann; und
(b) einen Verlängerungsgurt (12), der lösbär an dem Kissen angebracht ist, so dass der Gurt mit dem Kissen (11) zusammenwirkt, um die Positionierung des Kissen (11) auf einem Anwender beizubehalten; wobei der Gurt bei Anpassung und Ansicht in Längenrichtung des Gurtst im Wesentlichen die gleiche Breite aufweist wie das Kissen und wobei das Kissen (11) Folgendes umfasst:

(i) ein anfänglich elastisches Innensubstrat (23), das mit einem Reaktionssystem imprägniert oder beschichtet und welches unter im Wesentlichen feuchtigkeitsfreien Bedingungen stabil bleibt und bei Einwirken von Feuchtigkeit in eine starre, selbsttragende Struktur aushärtet, die eine Form aufweist, welche einem Vorderarm entspricht, an dem das Kissen (11) während des Aushärtens anmodelliert wird;
(ii) wobei das Substrat (23) innerhalb einer Polsterschicht (22) positioniert wird; und,
(iii) eine elastische Deckschicht (21), welche die Polsterschicht umgibt;

wobei

das Kissen dafür konzipiert ist, in eine starre Form auszuhärten, um in einer eng sitzenden Position an dem gemeinsamen Sehnenansatz und an den Greif- und Drehmuskeln, die mit dem radialen Oberarmgelenk und dem seitlichen Gelenkhöcker des Vorderarms des Anwenders zusammenhängen, zu liegen und wobei der Verlängerungsgurt (12) während des Gebrauchs mit dem ausgehärteten Kissen (11) zusammenwirkt, um radialgerichteten Druck gegen die Muskeln und den gemeinsamen Sehnenansatz, welche am seitlichen Gelenkhöcker beginnen, auszuüben, wodurch in Verbindung mit einem Tennisarm auftretende Schmerzen reduziert oder gelindert werden.

2. Tennisarmkissenanordnung (10) nach Anspruch 1, wobei der Verlängerungsgurt (12) eine Außenfläche (15) sowie erste (17) und zweite (19) Enden aufweist, wobei das erste Ende (17) des Gurts (12) lösbär an einer Oberseite (13) des Kissen (11) angebracht ist, wodurch der Gurt (12) in Umfangsrichtung um das Kissen und den Vorderarm verlaufen kann, um das Kissen (11) in einer eng sitzenden Konfiguration gegen den Vorderarm zu sichern.

3. Tennisarmkissenanordnung (10) nach den Ansprüchen 1 oder 2, wobei das Substrat (23) eine Vielzahl von Glasfaser-Überdicken aufweist.

4. Tennisarmkissenanordnung (10) nach den Ansprüchen 2 oder 3, die eine Schlaufe (14) umfasst, die an der Oberseite (13) angebracht und dafür konzipiert ist, dass dadurch hindurch der Gurt (12) zum Sichern des Kissen (11) an den Vorderarm gesichert werden kann.

5. Tennisarmkissenanordnung (10) nach Anspruch 4, die ein erstes Befestigungselement (20) umfasst, das an der Oberseite angebracht ist, um mit einer komplementären Innenfläche (18) des Gurts (12) zusammenzuwirken, um das Kissen (11) während des Tragens am Vorderarm an Ort und Stelle zu halten.

6. Tennisarmkissenanordnung (10) nach Anspruch 3, wobei die Polsterschicht geschlossenzellige Mikroperf-EVA-
7. Tennisarmkissenanordnung (10) nach Anspruch 6, wobei das Substrat (23), die Polsterschicht (22) und die Abdeckung (21) miteinander verbunden werden, um eine einheitliche Struktur zu bilden, die, solange sie elastisch ist, an einem Gesichtspunkt von Vorderarm und Ellenbogen anmodelliert wird.

8. Tennisarmkissenanordnungsprodukt (30) zur Reduzierung oder Linderung von in Verbindung mit einem Tennisarm auftretenden Schmerzen, das Folgendes umfasst:

   (a) eine Außentasche (31), die aus einem feuchtigkeitsundurchlässigen Material geformt ist;
   (b) ein Kissen (11), das in der Tasche (31) unter im Wesentlichen feuchtigkeitsfreien Bedingungen positioniert wird und darin gegenüber einem Eindringen von Feuchtigkeit bis zum Gebrauch versiegelt ist; und
   (c) einen Verlängerungsgurt (12), der lösbare an dem Kissen angebracht ist, so dass der Gurt mit dem Kissen (11) zusammenwirkt, um die Positionierung des Kissens (11) auf einem Anwender beizubehalten, wobei der Gurt bei Anpassung und Ansicht in Längenrichtung des Gurt im Wesentlichen die gleiche Breite aufweist wie das Kissen;

dadurch gekennzeichnet, dass das Kissen (11) und der Verlängerungsgurt (12) eine Kissenanordnung (10) wie in einem der Ansprüche 1 bis 7 beansprucht bilden.


Revendications

1. Bandage (10) pour épicondylite destiné à réduire ou soulager les douleurs associées à une épicondylite, le bandage comportant :

   (a) un tampon (11) pouvant être durci en une structure rigide ; et
   (b) une bande (12) allongée fixée de manière libérable au tampon de telle sorte que la bande coopère avec le tampon (11) pour maintenir le positionnement du tampon (11) sur un utilisateur ; dans lequel la bande a sensiblement la même largeur que le tampon une fois mis en place et visualisés dans le sens de sa longueur de la bande et dans lequel le tampon (11) comporte :

   (i) un substrat (23) interne initialement souple imprégné ou revêtue d’un système réactif qui reste stable dans des conditions sensiblement exemptes d’humidité et durcit lorsqu’il est exposé à l’humidité pour former une structure rigide autonome d’une forme se conformant aux contours d’un avant-bras par rapport auquel le tampon (11) est moulé au cours du durcissement ;
   (ii) ledit substrat (23) étant positionné à l’intérieur d’une couche (22) formant coussin ; et,
   (iii) une couverture (21) souple enfermant ladite couche formant coussin ;

dans lequel le tampon est apte à durcir en une forme rigide afin de reposer dans une position se conformant étroitement aux contours contre la fixation commune des tendons et les muscles de préhension et de supination associées à l’articulation radio-humérale et à l’épicondyle latéral de l’avant-bras de l’utilisateur et dans lequel la bande (12) allongée, lors de son utilisation, coopère avec le tampon (11) durci pour exercer une pression dirigée radialement contre la fixation commune des tendons et des muscles prenant naissance au niveau de l’épicondyle latéral, réduisant ou soulageant ainsi les douleurs associées à une épicondylite.

2. Bandage (10) pour épicondylite selon la revendication 1, dans lequel ladite bande (12) allongée présente une surface (15) extérieure et des première (17) et seconde (19) extrémités, dans lequel ladite première extrémité (17) de la bande (12) est fixée de manière libérable à une surface (13) supérieure du tampon (11), permettant ainsi à la bande (12) de s’étendre circonférentiellement autour du tampon et de l’avant-bras afin d’immobiliser le tampon (11) contre l’avant-bras dans la configuration se conformant étroitement aux contours de celui-ci.
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3. Bandage (10) pour épicondylite selon les revendications 1 ou 2, dans lequel le dit substrat (23) comporte une pluralité d’épaisseurs de surcharge de fibres de verre.

4. Bandage (10) pour épicondylite selon les revendications 2 ou 3, et comprenant une boucle (14) fixée à ladite surface (13) supérieure et apte à recevoir la bande (12) à travers celle-ci pour immobiliser le tampon (11) contre l’avant-bras.

5. Bandage (10) pour épicondylite selon la revendication 4, et comprenant une première attache (20) fixée à la surface supérieure destinée à coopérer avec une surface (18) interne complémentaire de la bande (12) destinée à maintenir le tampon (11) en place sur l’avant-bras lorsqu’il est porté.

6. Bandage (10) pour épicondylite selon la revendication 3, dans lequel ladite couche formant coussin comporte une mousse à cellules fermées Microperf EVA.

7. Bandage (10) pour épicondylite selon la revendication 6, dans lequel le substrat (23), la couche formant coussin (22) et la couverture (21) sont joints ensemble pour former une structure unitaire destinée être moulée alors qu’elle est souple sur un aspect de l’avant-bras et du coude.

8. Produit (30) de bandage pour épicondylite destiné à réduire ou soulager les douleurs associées à une épicondylite, comportant :

(a) une poche (31) extérieure formée d’un matériau imperméable à l’humidité ;
(b) un tampon (11) positionné dans ladite poche (31) dans des conditions sensiblement exemptes d’humidité et scellé à l’intérieur de celle-ci de manière à empêcher l’entrée d’humidité jusqu’à son utilisation ; et
(c) une bande (12) allongée fixée de manière libérable au tampon de telle sorte que la bande coopère avec le tampon (11) pour maintenir le positionnement du tampon (11) sur un utilisateur, dans lequel la bande a sensiblement la même longueur que le tampon une fois mis en place et visualisés dans le sens de sa longueur de la bande ;

caractérisé en ce que
le tampon (11) et la bande (12) allongée forment un bandage (10) selon l’une quelconque des revendications 1 à 7.

9. Produit (30) de bandage pour épicondylite selon la revendication 8, dans lequel ladite poche (31) extérieure est formée d’une structure stratifiée présentant au moins une couche d’une pellicule de plastique et au moins une couche d’une feuille d’aluminium liée à ladite pellicule de plastique.
REFERENCES CITED IN THE DESCRIPTION

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