An article of manufacture suitable for positioning a sheet of mesh material over tissue is described. In one embodiment, the article comprises a surgical tack having a hook-type material such as Velcro® material carried by the tack, e.g., secured to the top of the head thereof. A plurality of such tacks are positioned around the site of a hernia or the like and the mesh is positioned over the site and the tacks. The mesh is made of a loop-type Velcro® material or the like which allows the mesh to be releasably engaged and disengaged from the hook-type material carried by the tacks so that the mesh can be appropriately positioned over the tissue.
ARTICLE FOR POSITIONING MESH OVER TISSUE

FIELD OF THE INVENTION

This invention relates to surgical devices and, more particularly, to surgical articles used to position and fix mesh over tissue for repair of abdominal wall defects.

BACKGROUND OF THE INVENTION

Abdominal wall defects or hernias are commonly repaired using a physiologically compatible synthetic mesh such as a polytetrafluoroethylene mesh, polypropylene mesh, and the like. Tension-free mesh repair of hernias is preferred over conventional suture closure, which often results in the creation of significant tension and subsequent recurrence of the hernia. More recently, video-assisted (laparoscopic) technology has been utilized to repair the abdominal wall defects from a posterior (from inside the abdomen) position, thus offering the potential for a lower incidence of subsequent recurrence of the hernia. Where the laparoscopic technique is utilized, the synthetic mesh is typically secured against the abdominal wall using surgical tactics of various types, for example of the type disclosed in U.S. Pat. Nos. 5,728,116 and 6,036,701, and also of the Q-ring type commercially available from Omus Medical, Inc. of Hampton, NH.

One of the challenges encountered during laparoscopic hernia repair is the placement of the mesh and the tack in the precisely intended location to provide adequate overlap of the mesh with the surrounding abdominal wall tissue. With each application of an additional surgical tack, repositioning of the mesh (when necessary) becomes more and more difficult, if not impossible. In addition, during the early process of tacking the mesh to the abdominal wall, the field of view is often significantly hindered by the partially dangling piece of mesh. This limitation may reach unsafe levels in cases of large abdominal wall defects requiring large pieces of mesh, with significant potential for inadvertent injury to abdominal organs.

There is, therefore, a need for improving the existing technique of laparoscopic hernia repair through the use of a tack or the like that would allow placement of the tacks before obliteration of the view by the mesh, and subsequent near-perfect positioning and repositioning of the mesh as needed.

SUMMARY OF THE INVENTION

The present invention provides a safe and efficient means or article for the application and subsequent repositioning of synthetic mesh to the abdominal wall with minimal risk of injury to abdominal tissue and organs.

Accordingly, the invention is an article suitable for positioning a sheet of surgical mesh over tissue and comprising a mesh engaging material associated with a tack adapted to be fastened to the tissue. The mesh is releasably engaged and disengaged from the mesh engaging material associated with the tack so as to allow the positioning and subsequent repositioning and stretching of the mesh over the tissue.

In one embodiment, the tack includes a head bearing a hook-type fiber material and a tissue anchoring member which depends from the head. The tack is secured to the tissue and the mesh material is releasably engageable with the hook-type material carried by the tack. In this manner the mesh material can be positioned and repositioned over tissue as desired by the surgeon.

In another embodiment, the tack secures a piece of the mesh engaging material to the tissue. The mesh can then be pressed against the mesh engaging material secured to the tissue and is releasably held in place by the mesh engaging material.

Other advantages and features of the present invention will be more readily apparent from the following detailed description of the preferred embodiments of the invention, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings forming part of the specification and in which like numerals are employed to designate like parts throughout the same,

FIG. 1 is an enlarged, partial front elevational view of a surgical tack provided with releasable mesh engagement element;

FIG. 2 is a top plan view of a patch of surgical mesh suitable for releasable engagement to the mesh engagement element shown in FIG. 1;

FIG. 3 is a front elevational view of the entire surgical tack of FIG. 1;

FIG. 4 is a perspective view of the surgical tack of FIG. 3 provided with a slotted head;

FIG. 5 is a perspective view of a tack similar to that of FIG. 3 and provided with a head configured to receive a Torx driver;

FIG. 6 is a perspective view of a tack similar to that of FIG. 3 and configured to receive a Phillips driver;

FIG. 7 is a perspective view of a tack similar to that of FIG. 3 and configured to receive an Allen driver; and

FIG. 8 is an enlarged, fragmentary front elevational view depicting the releasable mesh engagement element held in place with a Q-ring type of tack.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention disclosed herein is susceptible of embodiment in many different forms. Shown in the drawings and described hereinbelow in detail are preferred embodiments of the invention. It is to be understood, however, that the present disclosure is an exemplification of the principles of the invention and does not limit the invention to the illustrated embodiments.

Moreover, it is understood that the specification herein does not necessarily describe the details of the surgical tack or the releasable mesh engagement element that are known in the art and that will be recognized as such by those skilled in the art. The detailed descriptions of these elements are not necessary to an understanding of the article of the present invention. Accordingly, such elements are
herein represented and described only to the degree necessary to aid in an understanding of the features of the present invention.

[0021] FIGS. 1, 3 and 4 depict a preferred embodiment of the present invention in which article 10 comprises a surgical tack 11 having a releasable mesh engagement element or member 20 attached to the top of head 12.

[0022] Head 12 has a circular, disk like figure and includes a body 14 and top and bottom radial faces 16 and 18, respectively. The top face 16 of the head 12 is covered with a circular, disk shaped releasable mesh engagement member, such as patch 20, which is preferably made of and includes hook-type Velcro® or the like latching fiber material 21. The mesh engagement member such as patch 20 may be secured to the top face 16 of the head 12 by any known means including, but not limited to, adhesive applied either directly to the top of the head 12, to the lower surface of the mesh engagement member 20, or both. A tack driver cavity, such as slot or straight slit 22, extends across top face 16 and into the body 14 of head 12. The slot 22 is configured to receive a complementary driver.

[0023] The tack 11 additionally comprises an elongate spiral screw member or base 24 which extends generally away from the bottom radial face 18 of the head 12. The spiral screw member 24 terminates in a distal tissue piercing tip 26.

[0024] FIGS. 5-7 depict alternate respective article embodiments 100, 200 and 300 similar in structure to the article 10 except that the respective heads 112, 212 and 312 of the tacks 111, 211 and 311 respectively incorporate cavities 122, 222 and 322 structured and shaped to accept Torx, Phillips or Allen drivers for driving and securing the tacks into tissue for the purposes described in more detail below.

[0025] The article 10 of the present invention is suitable for use in a variety of surgical procedures including, but not limited to, the repair of ventral hernias. In connection with the repair of ventral hernias, an incision is first made into a patient’s abdominal cavity in order to access the site of the hernia (i.e., abdominal wall defect) using conventional surgical techniques. After the site has been prepared using conventional surgical techniques, several tacks capable of releasably holding a surgical mesh are secured around the perimeter of the abdominal wall defect using conventional tacking devices such as, for example, a surgical grasper, a tack driver, or alternatively, a tacking gun which has been pre-loaded with a predetermined number of the surgical tacks.

[0026] The tacks 11 are advantageously secured to the tissue around the abdominal wall defect sought to be repaired prior to the insertion of any mesh material into the abdominal cavity, and with the full view of the abdominal wall defect and surrounding internal organs. Thereafter, an appropriately sized sheet or patch of the biocompatible surgical mesh, for example, such as the sheet of mesh material 28 depicted in FIG. 2, is inserted through the incision and positioned over the site of the hernia with the peripheral edges thereof overlying the tacks. The mesh material is then pressed into abutting contact against the tacks 11 and, more specifically, against the heads 12 thereof so as to cause the loop-type material comprising the fabric of the mesh 28 to become releasably intertwined, latched and engaged with the hook-type material 21 of tack 11 as shown in FIG. 1. The mesh 28 may then be selectively disengaged or released from tack 11, and then subsequently selectively stretched and re-attached or re-engaged with the latching fiber material until the optimal positioning and stretching of the mesh 28 over the tissue site has been achieved.

[0027] Once the desired mesh placement has been accomplished, any one of a number of conventional tacking devices may be used to apply conventional surgical tacks to further secure and maintain the mesh 28 over the site of the hernia. The hernia repair procedure is then completed in a conventional manner and the incision in the wall of the abdominal cavity is closed using conventional surgical sutures.

[0028] The foregoing description is to be taken as illustrative, but not limiting of the scope of the present invention. Still other variants within the spirit and scope of the present invention will readily present themselves to those skilled in the art such as, for example, the alternate article 500 shown in FIG. 8 where a patch or strip 520 including Velcro® type hook material 521 is positioned against the tissue 522 and a Q-ring type tack 511 of the type manufactured by Opux Medical, Inc. of Hampton, NH is driven through the patch 520 and into the tissue 522 to fasten the patch 520 to the tissue. It is understood, of course, that a plurality of patches such as patch 520 are positioned around the hernia site, and that a plurality of the tacks 511 are driven through the patches 520 respectively. The mesh 528 is then releasably securable to the aforesaid plurality of patches in the same manner as that described above with respect to the tacks 11.

1. An article of manufacture suitable for positioning a sheet of mesh over tissue comprising a tack adapted to be fastened to the tissue and mesh engaging material carried by the tack for releasable engagement of the mesh.
2. The article of manufacture in accordance with claim 1 wherein the tack has a base for fastening the tack to the tissue and a head which supports the mesh engaging material.
3. The article of manufacture in accordance with claim 2 wherein the mesh engaging material is a hook-type fiber material adhesively attached on the top of the head of the tack and the mesh is a loop-type fiber material adapted for releasable engagement with the hook-type fiber material.
4. The article of manufacture in accordance with claim 1 wherein the mesh engaging material is carried by a Q-ring type tack.
5. The article of manufacture in accordance with claim 4 wherein the engaging material is a hook-type fiber material and the mesh is a loop-type fiber material adapted for releasable engagement with the hook-type material.
6. A surgical tack for use in positioning and repositioning a sheet of mesh material over tissue, the tack comprising:
   a head having hook-type fiber material disposed thereon;
   and
   a tissue piercing and engaging member extending away from a bottom face of the head, whereby the tack is adapted to be secured to the tissue and the mesh material is releasably engageable with the hook-type material.
7. The surgical tack of claim 6 wherein the tissue piercing and engaging member comprises a spiral coil member terminating in a piercing tip.

8. The surgical tack of claim 6 wherein the head defines a cavity adapted to accept a driver for fastening the tack into the tissue.

9. The surgical tack of claim 6 wherein the strip of hook-type fiber material is adhesively secured to the head.

10. A method of positioning and securing a sheet of mesh material over tissue comprising the steps of:

(a) securing a plurality of tacks to the tissue, each of the tacks having a mesh engagement element associated therewith;

(b) positioning the sheet of mesh material over the tissue and the tacks;

(c) pressing the sheet of mesh material against the tacks and the mesh engagement elements thereon; and

(d) adjusting the position of sheet of mesh material over the tissue by releasably engaging and disengaging the sheet of mesh material from the mesh engagement elements.

11. The method of claim 10 wherein step (a) includes positioning a plurality of the mesh engagement elements to the tissue and then driving a plurality of the tacks through the mesh engagement elements and into the tissue.

12. The method of claim 10 further comprising the step (e) of fastening the sheet of mesh material to the tissue following step (d).

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