Improvements relating to retractors.

Priority: 10.03.84 GB 8406333

Date of publication of application: 02.10.85 Bulletin 85/40

Publication of the grant of the patent: 10.05.88 Bulletin 89/19

Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

References cited:
US-A-1 601 035
US-A-2 564 118
US-A-2 717 582
US-A-3 490 455
US-A-3 522 800
US-A-4 037 589
US-A-4 051 844
US-A-4 412 532

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Description

This invention relates to medical retractors, and in particular concerns a retractor for holding back of the tissue of an animal or human at an aperture thereof or following the making of an incision therein.

When an incision is made in human skin, normally, because of the resilience of the tissue and skin, the incision will tend to remain closed, and for a surgeon to perform an operation through the incision it is necessary that the tissue at the edges of the incision be held back to give the surgeon access. Retractors are used for this purpose, and most usually, the retractor is held by assistants and comprise metal instruments having handle portions and hooked ends which can engage the incision edges. In another construction, by virtue of the design of the retractor, spaced separating members which engage the incision edges are held in spaced condition by spring or jack means or the like. The latter type of equipment is relatively complicated mechanically, but it does remove the need for the same number of assistants as may be required when using hand held retractors.

There has been proposed a retractor comprising a straight elongated member having a hooked end adapted specifically for catching under the eyelid to retract same to expose the eye more for performing operations on same. It is suggested that a strip of sticking plaster may be used for holding this retractor in position. It is suggested that the sticking plaster may be applied over the end of the retractor remote from the hooked end so that the ends of the sticking plaster adheres to the skin whilst the centre portion overlies and adheres to the said retractor end. This retractor and its application have a number of disadvantages. Firstly, as the sticking plaster is flexible it will tend to yield under the tensile forces which exist within the retractor when it holds back the tissue making the retractor less effective. Also, as the sticking plaster must ride over the end of the retractor, which has a finite thickness there will be a tendency for the plaster to peel away from the skin, and retraction could be lost.

Also, the application of sticking plaster over the retractor requires the use of two hands and is difficult as the retractor must be held in the retracted position, in which it is under the tension created by the tendency of the tissue to return to its natural position.

Furthermore, the sticking plaster in being applied to the skin at opposite sides of the retractor end takes up valuable working space in the aperture or incision area.

The present invention seeks to provide a simply applied retractor device enabling the holding back of tissue in the region of an incision or aperture in human or animal tissue without requiring the use of an assistant to hold the retractor whilst the surgeon or other medical practitioner works through said incision or aperture.

The invention provides a retractor for hand application comprising:

a) a body portion adapted to be gripped by the fingers of one hand;

b) a head portion at one end of the body portion comprising hook means for engaging the edge of an aperture or incision in tissue;

c) a pad portion at the other end of the body portion; characterised by a pressure sensitive adhering surface on an underside surface of the pad portion whereby the pad position may be applied by pressing the pressure sensitive adhering surface onto the skin to anchor the retractor and maintain the edge of the aperture or incision in a retracted position.

Preferably, the said pad portion has an adhering surface defined by a pressure sensitive, sterile adhesive covered by a removable release covering. Specifically, a double-sided adhesive tape may be applied to said pad surface, and the release covering may comprise a release paper or the like so that the adhesive is not exposed until the retractor is to be used.

The invention also provides a retractor for hand application comprising:

a) a body portion adapted to be gripped by the fingers of one hand;

b) a head portion at one end of the body portion comprising hook means for engaging the edge of an aperture or incision in tissue;

c) a pad portion at the other end of the body portion;

classified by a pressure sensitive adhering surface on an underside surface of the pad portion, said surface being one part of a touch and close fastener, the retractor also including the other part of the touch and close fastener, which has on its face opposite said adhering surface a pressure sensitive, sterile adhesive, whereby the other part of the touch and close fastener may be applied to the skin to form a means to which the retractor pad portion may be applied to anchor the retractor and maintain the edge of the aperture or incision in a retracted position.

The body portion is preferably a resilient, moulded plastics component, and there may be an integral hinge connecting the pad to the body of the retractor.

In a specific embodiment, the body may comprise an elongated, bowed portion at one end of which is the hook means and at the other end of which is the said pad, the bowing of said body portion permitting bunching of the retracted flesh without forcing the hook means out of engagement with the flesh and also providing spring resilience to the retractor.

The said body portion may be in the form of a curved strip, and the hook means may comprise a portion of the strip turned sharply towards the opposite end of the strip, and at the said end there may be short, spaced, triangular teeth for impaling the tissue.
For holding back the tissue surrounding any particular incision or aperture, several of the said retractors may be used. The retractors according to the invention have the considerable advantage that hooking the edge of the flesh with the hook means, retracting the flesh and anchoring the retractor can take place in a continuous operation and can be performed swiftly and efficiently amounting simply to a hooking, pulling and a pressing action. In the majority of cases, the retractors will be provided with adhesive surfaces which are applied directly to the skin. The retractors may come in a wide variety of sizes to suit different operations, but they all provide the significant advantage that it is not necessary to have an assistant continuously on hand to hold back the incision or aperture edges whilst the surgeon operates therethrough. Therefore these devices will be useful to general medical practitioners who cannot afford to have medical assistants holding retractors.

The retractors according to the invention furthermore provide considerable advantage over the other type of retractor described herein where the end of the retractor has a sticking plaster applied thereover because the retractor cannot be applied swiftly and in the single continuous motion, but the surgeon must hold the retractor back with one hand whilst he applies the sticking plaster with the other hand. Also, he must prepare the sticking plaster and leave it in a position where it will not become contaminated whilst he makes the incision and applies the retractor and holds the same the retracted position. With the retractor of the preferred embodiment of the present invention however he simply hooks, pulls and presses in a continuous operation.

Another advantage of the preferred retractor of the present invention as compared to that using sticking plaster is that it is essentially simple to re-position the retractor if this is required of the surgeon whereas with the prior art arrangement using a sticking plaster, the sticking plaster must be removed and reapplied, and as the sticking plaster takes up space, which could be valuable in the case of an operation through a small incision, re-positioning of the prior art type using sticking plaster if there are already a number of retractors engaging the incision, could be difficult or impossible.

The embodiment of the present invention using an intermediate touch and close fastener as described enhances the repositioning capability, because prior to the making of the incision, the part of the touch and close fastener not applied to the retractor could be pre-applied to the skin, and the retractor can be adjusted in position in relation thereto as long as there is sufficient overlap between the respective parts of the touch and close fasteners to provide an anchorage.

Upon completion of the surgeon’s work or examination through the incision or aperture, the retractors are simply removed and the incision repaired.

There is furthermore considerable advantage in providing the retractor with the bowed body portion mentioned if that bowed body portion is of sufficient resiliency to cause an inherent tension in the retractor when it is applied. The bowed portion operates in this manner. When the hooked end is engaged in the tissue and the retractor pulled, the bowed portion tends to flatten somewhat under the tension pulling forces, and after the adhering surface is applied anchoring the retractor, the bowed portion remains in this more flattened out condition, but constantly by virtue of its resilience it tends to return to the bowed position, which creates the internal tension applied to the tissue which limits the tendency of the hooked end to spring out during the surgeon's work.

The springiness furthermore in the bowed portion also ensures that there will be no unnecessary damage to the tissue as a result of the application of the retractor.

Any adhesive selected for the retractor, and which is to be applied directly to the skin will require to be such as to give good adhesive to the skin without causing any invasion of the skin over the period, typically several hours, during which the retractor will be applied to the skin, but there are several suitable adhesives sold as double-sided tape, for this purpose, and such adhesives include the following:

- Acrylic based hypo allergenic adhesives such as that used in the radiation tolerant, 3 mm polyethylene double coated medical tape sold by the 3M company under number 1509.

Instead of using a touch and close fastener arrangement, two members which interlock can be used, one of which is applied to the skin at the aperture or incision and the other of which is formed as part of the retractor. Also, the retractor end may be provided with spring clip means using as spring jaws adapted to clip resiliently onto the tissue for anchoring the retractor. Such jaws may be formed integrally with the retractor.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

- Fig. 1A is a perspective concept view of an embodiment of the invention;
- Fig. 1B shows a perspective view of a specific design of retractor based upon the embodiment of the invention shown in Fig. 1A;
- Fig. 2 is a perspective underneath view of the portion of the retractor of Fig. 1B showing removal of the release covering paper;
- Fig. 3 is a plan view showing two retractors as shown in Fig. 1B in use;
- Fig. 4 is a sectional elevation of the arrangement as shown in Fig. 3, the section being taken on the line IV—IV in Fig. 3;
- Figs. 5, 6 and 7 respectively show a plan, a part-sectional elevation, and an underneath plan of the retractor shown in Fig. 1;
- Fig. 8 is a sectional elevation taken on the line VIII—VIII in Fig. 6;
- Fig. 9 is a perspective elevation of a portion of a modified retractor; and
Towards the end of the bowed portion 12 where it meets the pad 18 are finger gripping edges 24 to enable the holding and manipulation of the retractor in the application of same as will be explained herein.

A flexible integral hinge 26 connects the bowed portion 12 and the pad 18 which facilitates the manufacture of the retractor, which manufacture will indeed be by injection moulding.

Use of the retractor is simple in that, as shown in Fig. 2 when the retractor is to be used the release paper 28 covering the adhesive surface 30 is removed. The release paper may be larger than the adhesive surface and may overlap the pad 20 so that the overlap provides a thumb grip enabling the paper to be gripped and peeled away easily. In the next stage, referring to Fig. 3, after say an incision 32 is made in the animal or human body in relation to which an operation is to be carried out, the hooked end 14 of the retractor is placed in the incision 32 and the teeth 16 are impaled in the tissue defining the hole of the incision as shown at 34, and the retractor is then pulled in the direction of arrow 36 in Fig. 3 pulling the flesh to the retracted position 38. This is facilitated by virtue of the bowing of portion 12 and proceeding the portions 24. It is to be noticed as shown in Fig. 4 that the flesh in the area of the retracted edge 34 piles up in bunches as shown at 40, and the bowing of the portion 12 provides the advantage of accommodating this bunch without giving rise to the forces from the flesh in the region 40 which might tend to wedge the teeth 16 out of the flesh edge 34. Fig. 3 shows that two retractors are used to retract opposite sides of the incision 32 in order to open up the incision to enable the surgeon to have a working aperture, and the dotted lines also indicate that as many retractors as are required can be used for the opening of the incision to the required extent. The surgeon or assistant applying the retractor holds same by the ledges 24 with the forefinger and thumb as the tissue is pulled back, and this has the effect of somewhat flattening or straightening out the bowing of portion 12 from the more convex shape shown in dotted lines by reference 42 in Fig. 4. When the tissue has been retracted to a sufficient extent, the person applying the retractor by manipulation of the hand simply presses the pad 18 down firmly onto the skin with the top of the middle finger whilst still gripping ledges 24 so that the adhesive 30 will be applied thereto and will form an anchorage point for the retractor, keeping the flesh retracted as shown in Figs. 3 and 4. When the retractor is in this condition, the bowed portion 12 will in fact be strained by the tension in the retractor, and will tend to return to the dotted line position shown at 42 in Fig. 4, which has the effect of keeping a tensile force on the tissue in the region of the edge 34 of the portion 40 ensuring a firm and secure holding of the tissue.

Figs. 5, 6 and 7 show the retractor of Fig. 1B in more detail and are to scale.

Fig. 8 is useful in illustrating the form of the
alone who is in need of a retractor must have a means which he can handle and apply quickly and easily, and the retractor of the invention provides such a means in that the device can be applied simply by removing the release paper then manipulating the hand in a continuous movement to hook pull and apply the device by pressure application. The bowing of the front end of the retractor ensures the effective holding and tensioning of the retractor.

It is to be appreciated that the retractor will require to be sterile in being used in surgical operations, and that any adhesive which is used for sticking direct to the skin must be of a nature not to invade the skin. It is recognised however that the retractor can be used in a fashion which involves applying a locking portion of the retractor directly to a means previously applied to or over the skin which can form an anchoring point, and in this case if an adhesive is used and does not touch the skin, then it may not require to be sterile.

Other constructions are possible within the scope of the present invention. Thus, the hooking end of the retractor need not be claw shaped, but could simply be provided with a bent portion or a ridge or any other means which will provide a grip or hold on the edge of the incision or aperture. Although it is preferred that the retractor should be made in plastics material and should be disposable, it is also possible to provide retractors according to the invention in metal which can be re-used after appropriate sterilisation.

The retractor according to the invention, appropriately sized, is useable in virtually any application involving an incision, but a number of specific applications where the retractor can be used with considerable advantage are as follows:

Accident and emergency work where the operator is often single handed.
Small orifice procedures for biopsy of glands and organs.
Emergency procedures, intra-venous cut-down, tracheotomy.
Renal dialysis, where personnel involved in surgical procedures need to be at a minimum.
It finds a particular use in small delicate procedures where accurate fixation of the operating field would hitherto have been provided by sutures, e.g., microsurgery, opthalmic surgery, hypospadius repair, blepharoplasty and nerve and tendon repair.

Claims

1. A retractor for hand application comprising:
a) a body portion (b, 12) adapted to be gripped by the fingers of one hand;
b) a head portion (c, 14) at one end of the body portion comprising hook means (d, 14) for engaging the edge of an aperture or incision in tissue;
c) a pad portion (a, 18) at the other end of the body portion;
characterised by a pressure sensitive adhering
surface (e, 30) on an underside surface of the pad portion whereby the pad portion (a, 18) may be applied by pressing the pressure sensitive adhering surface (e, 30) onto the skin to anchor the retractor and maintain the edge of the aperture or incision in a retracted position.

2. A retractor according to claim 1, characterised in that the pad portion adhering surface (e, 30) comprises a pressure sensitive sterile adhesive (30) covered by a removable release covering (28).

3. A retractor for hand application comprising:
   a) a body portion (b, 12) adapted to be gripped by the fingers of one hand;
   b) a head portion (c, 14) at one end of the body portion comprising hook means (d, 14) for engaging the edge of an aperture or incision in tissue;
   c) a pad portion (a, 18) at the other end of the body portion, characterised by a pressure sensitive adhering surface on an underside surface of the pad portion, said surface being one part (50) of a touch and close fastener, the retractor also including the other part (52) of the touch and close fastener, which has on its face opposite said adhering surface a pressure sensitive, sterile adhesive (30), whereby the other part of the touch and close fastener may be applied to the skin to form a means to which the retractor pad portion may be applied to anchor the retractor and maintain the edge of the aperture or incision in a retracted position.

4. A retractor according to any preceding claim, characterised in that the retractor body portion (b, 12) is a resilient, moulded plastics component.

5. A retractor according to claim 4, characterised in that the said pad portion (a, 18) is connected to the body portion (b, 12) of the retractor by means of an integral hinge (28).

6. A retractor according to any preceding claim, characterised in that the body portion (b, 12) comprises an elongated, bowed portion at one end of which is the hook means (d, 14) and at the other end of which is the said pad portion (a, 18), the bowing of said bowed portion (b, 12) permitting bunching of the retracted tissue without forcing the hook means (d, 14) out of engagement with the tissue and also providing spring resistance to the retractor.

7. A retractor according to claim 6, characterised in that the bowed portion (b, 12) is in the form of a curved strip and the hook means (d, 14) is a portion of the strip turned sharply towards the opposite end of the strip, and the end of the portion has short, spaced triangular teeth (16) for impaling the flesh.

Patentansprüche

1. Ein Wundhaken zur Handanwendung mit:
   a) einem Körperteil (b, 12), ausgelegt, um mit den Fingern einer Hand zu griffen zu werden;
   b) einem Kopfteil (c, 14) an einem Ende des Körperteils mit einer Hakeneinrichtung (d, 14) zum Eingreifen in den Rand einer Gewebsöffnung oder eines Schnittes;
   c) einem Bodenplattenteil (a, 18) an dem anderen Ende des Körperteils;
   gekennzeichnet durch eine druckempfindliche, klebende Oberfläche (e, 30) auf einer Unterseitenoberfläche des Bodenplattenteils, wobei der Bodenplattenteil (a, 18) durch Pressen der druckempfindlichen, klebenden Oberfläche (e, 30) auf die Haut angeordnet werden kann, um den Wundhaken zu befestigen und um den Rand der Öffnung oder des Schnittes in einer zurückgezogenen Stellung zu halten.

2. Ein Wundhaken nach Anspruch 1, dadurch gekennzeichnet, daß die klebende Oberfläche (e, 30) des Bodenplattenteils einen druckempfindlichen sterilen Kleber (30) umfaßt, der abgedeckt wird durch eine entfernbares Schutzbodendeckung (28).

3. Ein Wundhaken zur Handanwendung mit:
   a) einem Körperteil (b, 12), ausgelegt, um mit den Fingern einer Hand zu griffen zu werden;
   b) einem Kopfteil (c, 14) an einem Ende des Körperteils, mit einer Hakeneinrichtung (d, 14) zum Eingreifen in den Rand einer Gewebsöffnung oder eines Schnittes;
   c) einem Bodenplattenteil (a, 18) an dem anderen Ende des Körperteils;
   gekennzeichnet durch eine druckempfindliche, klebende Oberfläche auf einer Unterseitenoberfläche des Bodenplattenteils, wobei die Oberfläche einen Teil (50) eines bei Berühren schließenden Verschlusses bildet, der Wundhaken ebenfalls den anderen Teil (52) des bei Berühren schließenden Verschlusses umfaßt, welcher auf seiner Stirnseite gegenüber der klebenden Oberfläche einen druckempfindlichen, sterilen Kleber (30) aufweist, wobei der andere Teil des bei Berühren schließenden Verschlusses auf der Haut angeordnet werden kann, um eine Einrichtung zu bilden, an welcher der Bodenplattenteil des Wundhakens angeordnet werden kann, um den Wundhaken zu befestigen und den Rand der Öffnung oder des Schnittes in einer zurückgezogenen Stellung zu halten.

4. Ein Wundhaken nach irgendeinem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Körperteil (b, 12) des Wundhakens ein elastisches gegossenes Kunststoffteil ist.

5. Ein Wundhaken nach Anspruch 4, dadurch gekennzeichnet, daß der besagte Bodenplattenteil (a, 18) mit dem Körperteil (b, 12) des Wundhakens durch ein integriertes Gelenk (26) verbunden ist.

6. Ein Wundhaken nach irgendeinem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Körperteil (b, 12) einen verlängerten gebogenen Teil umfaßt, dessen Ende die Hakeneinrichtung (d, 14) ist und dessen anderes Ende der besagte Bodenplattenteil (a, 18) ist; und daß das Bluten des besagten gebogenen Teils (b, 12) der Nachsorge des zurückgezogenen Gewebes erlaubt, ohne die Hakeneinrichtung (d, 14) aus dem Eingriff mit dem Gewebe zu zwingen und außerdem dem Wundhaken Federspiel ermöglicht.

7. Ein Wundhaken nach Anspruch 6, dadurch gekennzeichnet, daß der gebogenen Teil (b, 12) in der Form eines gekrümmten Streifens ist und die
Hakenschnitt (d, 14) ein Teil des Streifens ist, der scharf zum entgegengesetzten Ende des Streifens gebogen ist und das Ende des Teils kurze, räumlich getrennte, dreieckförmige Zähne (16) zum Eingreifen in das Fleisch aufweist.

Revendications

1. Ecarter d’application manuelle comprenant:
   a) un élément de corps (b, 12) adapté de façon à être saisi par les doigts d’une main;
   b) un élément de tête (c, 14) à une extrémité de l’élément de corps comprenant des moyens d’accrochage (d, 14) pour s’accrocher dans le tissu au bord d’une ouverture ou d’une incision;
   c) un élément de coussin (a, 18) à l’autre extrémité de l’élément du corps;
   caractérisé par une surface adhérante sensible à la pression (e, 30) située sur une surface inférieure de l’élément de coussin par lequel l’élément de coussin (a, 18) peut être appliqué en appuyant la surface adhérante sensible à la pression (e, 30) sur la peau pour fixer l’écarter et retenir les bords de l’ouverture ou de l’incision en position écartée.

2. Ecarter, selon la revendication 1, caractérisé en ce que la surface adhérante (e, 30) de l’élément de coussin comprend un adhésif stérile sensible à la pression (30) recouvert par une enveloppe détachable (28).

3. Ecarter d’application manuelle comprenant:
   a) un élément de corps (b, 12) adapté pour être saisi par les doigts d’une main;
   b) un élément de tête (c, 14) à une extrémité de l’élément de corps comprenant des moyens d’accrochage (d, 14) pour s’accrocher dans le tissu au bord d’une ouverture ou d’une incision;
   c) un élément de coussin (a, 18) à l’autre extrémité de l’élément de corps;

4. Ecarter selon l’une des revendications précédentes, caractérisé en ce que l’élément de corps (b, 12) de l’écarter est un composant en plastique moulé et élastique.

5. Ecarter, selon la revendication 4, caractérisé en que ledit élément de coussin (a, 18) est relié à l’élément de corps (b, 12) de l’écarter au moyen d’une charnière intégrée (26).

6. Ecarter selon l’une des revendications précédentes, caractérisé en ce que l’élément de corps (b, 12) comprend une partie courbée et allongée dont l’une des extrémités forme les moyens d’accrochage (d, 14) et l’autre, l’élément de coussin (a, 18), la courbure de ladite partie courbée (b, 12) permettant de loger le tissu écarté sans former les moyens d’accrochage (d, 14) hors de leur prise dans le tissu et propulsant également une résistance à ressort à l’écarter.

7. Ecarter selon la revendication 6, caractérisé en ce que l’élément courbé (b, 12) a la forme d’une bande bombée et les moyens d’accrochage (d, 14) sont un élément de la bande courbée tournée brutalement vers l’extrémité opposée de la bande, et l’extrémité de l’élément a de courtes dents (16) triangulaires et espacées pour piquer la chaise.