A self-retaining retractor for use in hand surgery comprising a paddle-shaped pallet with notches around its periphery on which the hand is placed wound-side up, elastic bands for holding the fingers in place on the pallet and at least one flexible ball-and-link chain with a hook at one end which is hooked over the edge of the wound and which is fastened to the pallet edge at a predetermined point along its length by inserting one of its links into one of the pallet notches, thereby holding the wound open.

1 Claim, 8 Drawing Figures
SURGICAL RETRACTOR

BACKGROUND OF THE INVENTION

1. Field of Invention
This invention relates to a surgical retractor and particularly to a self-retaining retractor for use in hand surgery.

2. Description of the Prior Art
Two kinds of retractors are presently used in hand surgery: hand-held retractors and self-locking tongs. The hand-held retractors are simply a pair of hooks which are inserted at the desired positions under the edge of a cut or wound and held by a nurse or assistant while the surgeon operates. Aside from the additional person required to hold them, such retractors only hold the cut open at two points, unless, of course, additional people and retractors are employed.

Self-locking tongs retractors, while not requiring additional people, hold the cut open at only two opposing points. Tong retractors have hooks at the tong ends which are inserted under the cut edge. The ends of the tongs are then spread apart, thereby opening the cut. The tong hinge is fitted with a self-locking ratchet or spring mechanism to hold the wound open. One disadvantage of tong retractors is that it is easy to apply excessive stress to the skin or tissue exposed by the cut with them. Another important disadvantage is the excessive bulk of such devices in the surgical field.

SUMMARY OF THE INVENTION

The present invention is a surgical retractor which does not require assistance to operate and which may hold a wound open at a multiplicity of points and directions at a desired tension while keeping the wounded area in a fixed position.

Although this retractor will be used primarily for hand surgery it may be adapted for use on other areas of the human body as well as for veterinary surgery. Accordingly, as used herein, the term "body" is intended to include the hands and other areas of the human body as well as the bodies or portions thereof of domestic animals. The term "wound" is intended to include incisions and other cuts in the skin and other membranes. For convenience, the retractor will hereinafter be described with reference to hand surgery.

The basic parts of this unique retractor are: a pallet with notches along its periphery on which the hand is placed; means for holding the hand in place on the pallet; and at least one flexible, elongated wound-engage member with a hook at one end and means along its length for engaging the pallet notches.

The operation of this retractor is quite simple. The hand is placed on the pallet with the incisional side of the hand up and the hand holding means are attached to the hand. The hook(s) of the flexible member is then hooked over the skin at the edge of the incision or over a ligament or tendon exposed by the incision, as desired. The member(s) is then pulled in the desired direction and to the desired tension and the notch engaging means nearest the pallet edge is inserted into the notch on the pallet periphery along the line of pull. The incision may be held open in more than two directions by using more than two flexible members as described above. The tension applied to the cut edge may be varied by loosening or tightening the member.

A preferred embodiment of this invention includes means which permits the wound to be held open in the direction of the arm (proximal), which, of course, covers a portion of the pallet periphery and thus removes that portion as a site for attaching a member. It also includes an accessory with which the wound may be held open in an upwardly direction.

Accordingly, it is a prime object of this invention to provide a retractor for use in hand surgery which is simple to operate without assistance to hold a wound open in an almost unlimited number of directions at a desired tension while holding the hand firmly in place.

BRIEF DESCRIPTION OF THE DRAWINGS
FIG. 1 is a perspective view of a retractor in use.
FIG. 2 is an enlarged, top plan view of the pallet of the retractor of FIG. 1.
FIG. 3 is a sectional view taken along line 3—3 of FIG. 2.
FIG. 4 is a sectional view taken along line 4—4 of FIG. 2.
FIG. 5 is an enlarged, perspective, partial view of one of the chain elements of the retractor of FIG. 1.
FIG. 6 is a perspective view of one type of hook which may be used to restrain a tendon exposed by the incision.
FIG. 7 is an enlarged view of an accessory which is used to permit the wound to be held open in the direction of the arm (proximal).
FIG. 8 is an enlarged, perspective view of an attachment to the pallet of FIG. 1 which permits the wound to be held open upwardly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates an embodiment of the retractor of this invention being used to hold open a wound in the palm of a left hand 2 at three points. The retractor may just as easily be used to hold open a wound on the back of the left hand or on either side of the right hand at fewer than or more than three points.

Referring to FIGS. 1 and 2, left hand 2 is positioned palm side up with the fingers extended on a thin, flat, paddle-shaped pallet 3. Preferably, pallet 3 is made from a stainless steel such as stainless steel. The blade portion 4 of pallet 3 is generally oval and has a major axis which is longer than the distance from the wrist to the tip of the extended middle finger. The minor axis of blade portion 4 is longer than the distance from the tip of the extended thumb to the tip of the extended little finger. The handle portion 5 of pallet 3 is generally rectangular and extends axially along the major axis of portion 4 from the wrist end thereof. It is wider than the forearm width and the lower portion of the forearm rests on it.

As seen in FIG. 2, the fingers lie on the pallet between pairs of the elongated slots 6, 7, 8, 9 and 10 which laterally flank the respective fingers. The wrist lies between another pair of elongated slots 11. As shown in FIG. 1 and 4 these slots, together with elastic finger bands 15 and wrist band 16, are the means by which the hand is held in place. Finger bands 15 extend from the underside of pallet 3 up through the slots 6, 7, 8, 9 and 10 (FIG. 4) and the fingers slip through the loops formed by the bands. Regular wide rubber bands are used by merely slipping opposite ends of the rubber bands up through the slots and inserting a finger through one of the ends and an adjacent finger through
the other end. If desired, the same finger may be slipped through both ends of the rubber band.

The use of finger bands 15 are recommended for operations on the front of the hand because of the tendency of the fingers to close and clench when the hand is laid palm-side up. When the hand is laid palm-side down, the finger cannot close but it is still desirable to use the finger bands 15 to hold the hand in place.

The use of wrist band 16 is optional. In most instances the hand is adequately held in place by finger bands 15. Wrist band 16 is laid across the wrist with its ends extending down through slots 11 and attached to the underside of pallet 3. The pallet is also equipped with a pair of spaced slots 12 which generally lie on either side of the middle of the palm. If necessary, a band may be extended across the middle of the palm using slots 12 in a like manner as wrist band 16 is employed.

Pallet 3 is merely turned over to accommodate a right hand.

The peripheries of both blade portion 4 and handle portion 5 have a series of notches 20 formed in them. Notches 20 are generally V-shaped and serve as an anchorage for one end of wound-engaging members, generally designated 19. The structure and positioning of wound-engaging members 19 are shown in Figs. 1, 3 and 5. These members consist of a ball-and-link chain 21, preferably made of stainless steel, similar to the draw chains for lamp sockets. Each member 19 has a hook 22 at one of its ends. Members 19 must be flexible so that they are readily extendable from the wound down to the edge of pallet 3. The length of a link 23 of chain 21 is longer than the thickness of the pallet and the diameter of a ball 24 is greater than the thickness of a notch 20.

FIG. 3 illustrates how members 19 are employed to hold a wound open. The hook 22 is inserted under the edge 25 of the skin exposed by the wound at a desired point and the chain 21 is extended down across the hand in the desired direction to the edge of pallet 3. A desired amount of tension is placed on edge 25 by pulling on the chin 21 and the link 23 nearest the pallet edge is slipped into a notch 20 along the line of pull thus removably locking member 19 in place. To increase tension on edge 25, member 19 is tightened by removing the engaged link 23 from the notch 20 and inserting the next link towards the wound into the notch. Member 19 may be loosened by removing the engaged link and inserting the next link away from the wound into the notch 20.

In some instances it is desirable to bend a finger back to expose a wound on the knuckle or first joint. This may be accomplished by inserting the hook 22 of a member 19 through the edge of the fingernail, extending the member in the desired direction and inserting a link thereof into an appropriate pallet notch.

Pallet 3 has four semi-spherical legs 17 on each of its sides which elevate it slightly when it is placed on a flat surface to facilitate locking the chains in the notches (FIG. 3).

FIGS. 3 and 6 show an accessory hook 26 which may be used to retract a tendon exposed by the wound. The end 27 of accessory hook 26 is shaped like a flat, dull blade for slipping around the tendon. The other end has a hole 29 into which the free end of hook 22 fits. A member 19 with accessory hook 26 on it is operated identically as one with hook 22.

FIG. 7 shows a wrist accessory, generally designated 29, which is used to permit the wound to be held open in the general direction of the arm (proximal). Accessory 29 is shown in operation in FIG. 1. It includes a ball-and-link chain 32 identical to chain 21, and one or more toboggen-shaped member(s) 33 which is attached to chain 32 by a ring 34. The rear end of member 33 has a hole 35 for receiving ring 34. Its front end has a notch 36 which serves the same function as notches 20 around the periphery of pallet 3. A member 33 may be moved to any point along chain 32 to vary the direction in which the wound is held open. A flat plate 37 is attached around the last link at each end of chain 32 to keep member 33 from sliding off chain 32.

As illustrated in FIG. 1, chain 32 is strapped snugly around the wrist by inserting appropriate links of it into a notch 20 on either side of handle portion 5 of pallet 3. The wound is held open in the direction of the wrist by extending a wound-engaging member 19 from the cut to member 33 and inserting an appropriate link of that member 19 into notch 36. A specific direction across the wrist may be achieved by adjusting the position of member 33 along chain 32.

FIG. 8 illustrates an accessory generally designated 38, by which the wound may be held open at an upward angle. Accessory 38 is a thin plate with a flange 39 at its lower end which is slid snugly onto the edge of pallet 3 at a desired position. The upper end of accessory 38 has a notch 40 which functions the same as notches 20, 36. The wound is held open in an upwardly direction using accessory 38 by extending a wound-engaging member 19 (shown in phantom in FIG. 8) from the wound to accessory 38 and inserting an appropriate link of that member 19 into notch 40.

Various modifications of the embodiment shown in the drawings will be apparent to those skilled in the art. For instance, other means such as straps with buckles might be used to hold the hand in place on the pallet or a solid rubber rod with notches in it could be employed in place of a ball-and-link chain. Also, the pallet need not be oval, although an oval shape is preferred. Means other than notches along the pallet edge might be employed as an anchorage for the wound-engaging members. For instance short posts positioned along the pallet periphery and around which the wound-engaging members are wrapped might be used. These and other obvious modifications are intended to be included within the scope of the following claims.

I claim:

1. A retractor for use in hand surgery comprising:
   a. a paddle-shaped pallet with an oval blade portion on which an incised hand is adapted to be positioned and a handle portion in which the forearm is adapted to be positioned;
   b. a plurality of notches along the periphery of the oval blade and along the side edges of said handle portion;
   c. a multiplicity of pairs of elongated slots in the oval blade extending so as to be laterally along each side of each finger in use;
   d. a flexible band extending up through each pair of elongated slots for receiving a finger therethrough thereby holding said fingers in place on the pallet;
   e. a flexible, elongated member which is adapted to extend transversely across the forearm and has notch-engaging means at its ends engaging the
notches along the periphery of the handle portion and a notch therein intermediate its ends;
f. a plurality of elongated ball-and-link chains in which the links are longer than the pallet thickness and the ball diameters are longer than the width of the notches along the periphery of the pallet; and
g. a hook on one end of each said chain which is adapted to be hooked into said incision, the other ends thereof being inserted in the notches along the periphery of the pallet or the intermediate notch of said member, whereby the incision may be held open at a desired tension and a desired direction.

* * * * *