

Surgical knife handle and knife

The present invention is concerned with a surgical knife handle and knife. More specifically, the present invention is concerned with a surgical knife handle and knife comprising a blade support structure for supporting a knife blade projecting from a blade handle.

Eye surgery, such as cataract removal is performed using specialist knives. Such knives are constructed having a handle portion for the surgeon to grip and a blade projecting therefrom to perform the incision. Generally, the handle is substantially cylindrical having a main axis. The blade projects from the handle substantially in the direction of the main axis.

Often, it is desirable to provide such a knife with separate blade and handle components. For example, the handle can be constructed from a plastics material with a root of the blade embedded therein such that a portion of the blade projects from the handle portion.

If flat blades are used, it is desirable to provide a blade with as thinner cross section as possible. Thin blades provide a cleaner cut. The problem with this is that thinner blades can flex more easily. The point at which the blade projects from the handle portion acting as a fulcrum. This flexion detrimentally affects the control that the surgeon has over the path of the blade during the incision. This is clearly undesirable.

It is an aim of the present invention to provide an improved knife blade and knife.

According to a first aspect of the present invention, there is provided a surgical knife handle comprising a handle body and a blade receiving portion defined at a first end of the handle body, which blade receiving portion comprises a blade receiving bore and a blade support extending to a first side of the blade receiving bore.

According to a second aspect of the present invention there is provided a surgical knife comprising a handle, a blade defined at a first end of the handle and a blade support extending to a first side of the blade.

- 5 By providing a blade support on a side of the blade as it projects from the handle, the blade can be supported and the amount of flexion experienced by the blade is reduced. As such, the precision with which the surgeon can make his incision is greatly increased.
- 10 An example knife handle and knife will now be described with reference to the accompanying drawings in which:-

FIGURE 1 is a perspective view of a knife in accordance with the present invention;

FIGURE 2 is a close-up view of a part of the knife of Figure 1,

- 15 FIGURE 3 is a close-up view of the underside of a part of the knife of Figure 1,

FIGURE 4 is a side view of a part of the knife of Figure 1,

FIGURE 5 is a perspective view of the handle of the knife of Figure 1 without the blade, and

FIGURE 6 is a close-up view of a part of the handle of Figure 5.

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Referring to Figure 1, a surgical knife 100 comprises a handle 102 and blade component 104.

- The handle 102 comprises a cylindrical portion 106 and a gently tapering frusto-conical portion 108 extending therefrom. The handle 102 defines a main axis A through its longitudinal centre.
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- Turning to Figure 2, at the end of the frusto-conical portion 108 opposite the cylindrical portion 106, there is provided a face 110 defined perpendicular to the axis A. As can be seen in Figure 6, the face 110 comprises a T-shaped bore 112 extending into the handle 102 parallel to the axis A. The T-shaped bore 112 comprises an elongate slot 114 and a projecting leg 116 at right angles thereto.
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The T-shaped bore 112 is provided such that the male mould tool used to form the bore 112 is structurally inflexible.

5 The handle 102 further defines a blade support member 118 projecting from the face 110, away from the frustro-conical portion 108 and in a direction generally parallel with axis A. The blade support member 118 is defined by a flat planar blade support surface 120 and a semi-conical surface 112. The blade support surface 120 extends from an edge of the elongate portion 114 of the T-shaped bore 112. It will be noted that the part of the face 110 opposite the blade support member 118 is flush with the
10 bore 112. Specifically, the blade support member 118 extends only on a single side of the blade component 104.

The blade component 104 comprises a blade root 124 which is generally rectangular and tapers into a blade neck 126 via a tapered portion 128. The narrow blade neck
15 126 assists the user's visibility in use.

The blade component 104 further comprises a cutting head 130 as shown in Figure 2. The cutting head 130 comprises a neck 132 which extends and widens from the neck portion 126. The cutting head 130 comprises a pointed tip 134, a first bevelled
20 portion 136 and a second bevelled portion 138. The second bevelled portion 138 is bevelled at a shallower angle to the axis A than the first bevelled portion 136. As such, upon insertion of the knife into the patient's cornea, once the first bevelled portion 138 has been inserted, a change in resistance can be felt by the surgeon and the angle of insertion altered in order to provide the desired cut.

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When the knife 100 is assembled, the root 124 of the blade 104 is inserted into the T-shaped bore 112 such that a bottom face of the tapered portion 128 and the neck 126 abuts the blade support surface 120. The blade is secured in the handle in a known fashion (e.g. adhesive).

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As mentioned above, in use the surgeon often needs to change the angle of the knife blade relative to the user's eye. In order to prevent flexion of the blade, and hence inhibition of the feedback required in the transition from the first to the second

bevelled portion of the cutting head 130 of the blade 104, the blade support member inhibits flexion to allow better control.

5 It will be noted that the tapering of the blade support member 118 allows it to remain obscured by the blade 104 as shown in Figure 2. Therefore the blade support member 118 does not obscure the surgeon's view when looking down on their knife as viewed in Figure 2.

10 It will also be noted that the reaction force required by the blade support member approaching its tip decreases because the distance to the fulcrum (at the point at which the blade component 104 projects from the surface 110) is increasing. Therefore, tapering the blade support member 118 provides the optimum use of material in supporting the blade.

15 It will be noted that the handle 102 can be used with a variety of blades which can be inserted into the bore 112.

Variations of the above embodiment will fall within the scope of the present invention.

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The above advantages can be achieved with a single piece handle and blade (e.g. machined from metal block material).

25 The surface 122 of the blade support member need not be frustro-conical. The surface may be flat, polygonal, or any other appropriate shape. The blade support member may not be tapered, however, this is not preferred as a non tapered support member would not be as mechanically efficient and may obscure the surgeon's view.

Claims

1. A surgical knife handle comprising:
5 a handle body, and,
a blade receiving portion defined at a first end of the handle body,
which blade receiving portion comprises a blade receiving bore and a blade support extending to a first side of the blade receiving bore.
- 10 2. A surgical knife handle according to claim 1 in which the blade receiving portion comprises a first part of the handle body defined on a first side of the blade receiving bore and a second part of the handle body defined on a second side of the blade receiving bore, and,
the blade support is defined by the first part extending further from the blade
15 receiving bore than the second part.
3. A surgical knife handle according to claim 2 in which the second part of the handle body is substantially flush with the blade receiving bore.
- 20 4. A surgical knife handle according to any preceding claim in which the blade support tapers away from the blade receiving bore.
5. A surgical knife handle according to claim 4 in which the blade support defines a blade support surface and a semi-frustroconical surface opposite the blade support
25 surface.
6. A surgical knife handle according to any preceding claim in which the blade support defines a flat, planar blade support surface.
- 30 7. A surgical knife handle according to claim 6 in which the blade receiving bore is defined by a perimeter, and the flat, planar blade support surface extends from the perimeter.

8. A surgical knife handle according to any preceding claim in which the handle defines a main axis, the blade receiving portion defines a planar surface at an angle to the main axis and the blade receiving bore is defined in the planar surface.
- 5 9. A surgical knife handle according to claim 8 in which the planar surface is perpendicular to the main axis.
- 10 10. A surgical knife comprising:
a handle,
a blade defined at a first end of the handle, and,
a blade support extending to a first side of the blade.
- 15 11. A surgical knife according to claim 10 in which
the blade joins the handle at a blade root,
the handle comprises a first part defined on a first side of the blade root and a
second part defined on a second side of the blade root, and,
the blade support is defined by the first part extending further from the blade
root in the direction of the blade than the second part.
- 20 12. A surgical knife according to claim 11 in which the blade support tapers away
from the blade root.
- 25 13. A surgical knife according to claim 12 in which the blade support defines a
semi-frustoconical surface opposite the blade.
14. A surgical knife according to any of claims 11 to 13 in which the blade support
defines a flat, planar blade support surface proximate the blade.
- 30 15. A surgical knife according to any of claims 11 to 14 in which the blade defines a
cutting edge on a first bevelled portion and a second bevelled portion, wherein the
bevelled portions are bevelled at different angles.

16. A surgical knife according to claim 15 in which the second bevelled portion is closer to the handle than the first bevelled portion and is bevelled at a shallower angle to a central axis of the handle than the first bevelled portion.
- 5 17. A surgical knife according to any of claims 11 to 13 in which the blade support is integral with the blade.