SWAN-NECKED, ANGLED, AND GROOVED FORCEPS*†

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THE purpose of this paper is mainly to describe swan-necked grooved forceps which have been constantly in use for about 6 years in suturing cataract sections, corneal grafts, corneal wounds, scleral flaps, and also mucosal flaps in dacryocystorhinostomy. Angled, blocked suture-tying forceps are also described and illustrated.

Fig. 1 shows the general pattern of the forceps. The handles are those of the St. Martin's forceps. The swan neck displaces the handles and the operator's fingers from his field of view. It is important that the terminal part of the forceps make an angle of about 20–25° with the axis of the handles so that the latter can be held comfortably in the fingers while the terminal parts can form a right angle with, say, the limbus (see Fig. 1 and also Fig. 2, 12 o'clock position). Furthermore, this "right-angled grip" at the limbus can be achieved for sutures placed at other positions such as 10.30 and 1.30 o'clock with less than usual movement of the operator's position by holding of forceps as shown in Fig. 1 (opposite) or with the forceps rotated through 180° (see Fig. 2, opposite). This minimizing of body movement is helpful when the operating microscope is being used, especially for corneal grafts.

Grooved Ends (Fig. 1B).—These obtain a good grip even of a narrow lip of limbal tissue at the base of a reflected conjunctival flap, in contrast to the puncture wounds produced by toothed forceps (Fig. 1A), although the latter are indeed useful for some purposes. The grooved ends are about 0.5 mm. broad, *i.e.* deliberately not fine-pointed; this minimizes slewing of the tissue when needles are being inserted.

The tissue is actually gripped by opposing ends; these tend to function less well when they become more rounded through constant use. A grooved forceps has been used by Zorab (1958) for grasping the lips of cataract sections although the ends of his instrument were broader than the ones shown here. A very much less deep groove may well be better, as in the new Dermot Pierse-Hoskin forceps (1966): a modified pair of these with a swan neck and broader ends is being tried.

After some practice the need to rotate the forceps 180° from time to time becomes less irksome: the operator learns to anticipate. Suture-tying cannot, however, be efficiently done with these forceps because the groove seems to have an attraction for the suture! If the opposing ends are too coarse or have become rounded off through use, it is difficult to grasp the posterior lip of a bevelled section in a cataract operation.

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FIG. 1. (A and B).—Swan-necked forceps. (A) Toothed and blocked. (B) Grooved and blocked. (C) Angled suture-tying forceps.

Note that, when the swan-necked forceps are held comfortably in the hand, the terminal shaft will engage tissues at right-angles. (A straight forceps held comfortably in the hand would engage the tissues obliquely.)

FIG. 2.—Swan-necked grooved forceps in use for placing three sutures in a cataract section. Note that the angle between the axis of the handles and the terminal shaft allows the operator to minimize his body movements (by rotating the forceps 180° in his fingers) while grasping the edges of the wound at right-angles.

Angled Suture-Tying and Suture-Holding Forceps (Fig. 1C)

A piece of suture "standing up" at right-angles to sclera or cornea can be slightly difficult to grasp in blocked *straight* forceps held in the usual way because the axis of the forceps is practically parallel with the suture. An angled end (about $20-25^\circ$) allows the forceps to be held comfortably in the hand while the blocked ends are at right-angles to the suture. Rotated through 180° the points can approach at right-angles a suture lying on the surface of the tissue, trapped by capillary attraction; however, a straight forceps is not significantly

disadvantageous in this situation. A swan neck is probably unnecessary in these forceps since displacement of the handles and the operator's hand is less necessary than in the case of forceps used to grasp tissues.

There is a particularly useful application of these forceps in combination with a scleral-fixation suture (see Fig. 3). This suture is routinely used to achieve absolute fixation of the globe for the making of limbal grooves, scleral flaps (for iris inclusion), and especially for the limbal incision in peripheral iridectomy. The suture is more convenient and safer than a scleral hook. The suture should be placed between the insertions of the muscles to the operator's left (if right-handed), the needle being inserted from behind forwards (see Fig. 3). A single tie is made to lie about 2 mm. from the sclera and the angled suture-tying forceps are made to grasp the suture *as close to sclera as possible*. (In Fig. 3 the ends of the forceps are shown orientated antero-posteriorly for clarity; they would usually be held so that the ends lie parallel to the limbus.)

FIG. 3.—For limbal incisions a scleral fixation suture and angled blocked forceps will achieve a fixation of the eyeball which is as firm as with a scleral hook and safer. Note that the suture should be grasped as near as possible to the sclera. The single tie about 2 mm. from the sclera makes it easier to grasp the suture.

Summary

Swan-necked forceps are useful for fine suturing in many situations. The swan neck displaces handles and fingers from the field of view; an angle of about 20–25° between the axis of the handles and the tips allows suturing of cataract sections and corneal grafts with minimal shifting of the operator's position. Grooved, rather broad ends grasp the tissues without making the puncture wounds produced by toothed forceps.

Angled, blocked forceps make suture-tying easier. A particularly useful application is for a scleral fixation suture (Fig. 3).

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