LETTERS TO THE EDITOR

'Cutting hook' modification of a standard 19 gauge green needle

SIR,—Tight sutures tend to 'cheese wire' into the cornea with time in such a way that they become difficult to pick up and then cut in a controlled manner during their removal with a standard green needle. A modification is described below in which a conventional needle is fashioned into a cutting hook to facilitate the removal of such sutures.

The anterior portion of the bevel of a standard green needle is bent until the tip makes an angle of approximately 30° with the line of the shaft. This can be done using needle holding forceps. Alternatively, the tip of the needle may simply be compressed against its plastic sheath to fashion the shallow hooked profile required.

The blunt convexity of the hooked bevel is used to compress to cornea immediately proximal to the suture, allowing the point of the needle to slide beneath without snagging the adjacent stroma. Now resting in the crutch of the hook, the suture is lifted clear. A gentle to-and-fro motion is then employed to tease the suture clear of the epithelium along the full length of its superficial portion, before inclining the sharp edge and cutting so as to leave a convenient proud end ready to be grasped with fine blocked forceps.

While it is not difficult to remove loose or broken stitches with conventional methods, tight sutures causing refractive problems tend to 'cheese-wire' into the cornea with time, becoming less accessible. Although a tight suture will sink through the corneal epithelium, the stromal layers are merely compressed (in the straightforward case where stromal integrity is not affected by any melting process). Hence the superficial portion of a tight suture comes to lie in a furrow of compressed stroma. To undermine such a suture a straight needle must be inclined downwards into the cornea, and will thus tend to 'snag' the stroma on the other side of the stitch (Fig 1).

This has several disadvantages. Primarily, the stitch cannot be picked up cleanly. The needle must either be forced through the stroma or retracted so that the suture rests on its very tip. This often leads to the suture being cut prematurely without leaving a convenient proud end, in the latter case because an attempt is made to elevate the suture on the sharp point of the needle; whereas with the former approach the force required to disrupt the snagged stroma is such that the elastic recoil of the needle's shaft, once the stroma is breached, will flick the bevel through the suture – again leaving the cut ends partly buried in the epithelium and difficult to grasp.

By compressing the furrowed stroma immediately proximal to a tight suture with the blunt convex aspect of a needle bent at its tip as described above it is possible to undermine the suture with the point of the needle inclined tangentially or away from the globe (Fig 2).

Figure 1 A schematic illustration of the unmodified needle snagging the stroma distal to the suture being undermined.

Figure 2 The tendency for stromal snagging is minimised by using the blunt convexity of the modified needle to compress the furrowed stroma proximally before sliding beneath the tight suture with needle's tip inclined tangentially or away from the globe.

The tendency to snag the stroma distally is thus minimised, allowing the stitch to be picked up cleanly. As it is elevated safely in the crutch of the 'hook', the tendency to cut the suture prematurely is also minimised.

Conventional straight needles were not designed specifically with a view to cutting corneal sutures. A simple modification, a shallow bend in the tip of the bevel to fashion a 'cutting-hook,' facilitates a better controlled and less traumatic execution of this task.

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Safety of intraocular lenses

SIR,—Your editorial, 'How safe are intraocular lenses',¹ was extremely interesting and timely. It is ironical, however, that another severe complication of intraocular lenses in diabetics, namely rubeotic glaucoma, was reported in the same issue² and received no editorial comment.

These two cases, reported by Prasad *et al*, point out the potential for disastrous results in patients with diabetes and non-proliferative retinopathy. Whereas there may not be an epidemic of bullous keratopathy on the way, even a few sporadic cases of neovascular glaucoma after posterior chamber intraocular lens implantation deserve our special attention.

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- 1 Smith R. How safe are intraocular lenses? *Br J Ophthalmol* 1990; 74: 257.
- 2 Prasad P, Setna PH, Dunne JA. Accelerated ocular neovascularisation in diabetics following posterior chamber lens implantation. *Br J Ophthalmol* 1990; 74: 313–4.

** I am obliged to Professor Kreiger for his comments on my editorial. I should explain that editorial comment in the *BJO* is usually directed to one particular paper. For logistical reasons we are not always sure that another paper somewhat in the same general area as the one being written about will appear in the same issue. We only comment on a group of papers if they are closely related to one another, in which case we deliberately arrange for them to be published together. In the case in question, the safety of intraocular lenses, the paper by Prasad *et al*, mentioned by Professor Kreiger on rubeosis following cataract extraction did not seem to us to be close enough to the paper

dealing with corneal endothelial changes to warrant its inclusion in the editorial comment. It is well known that rubeosis can follow cataract extraction in diabetics, and I see no evidence in the paper by Prasad *et al* that the IOL played a leading role. However, I entirely agree with Professor Kreiger that the paper reminds us that, although rubeosis is more likely to follow intracapsular than extracapsular extraction, nevertheless the latter technique, whether an IOL is implanted or not, is clearly not 100% safe as far as rubeosis is concerned. —REDMOND SMITH.

Drop sizes of commonly used topical β blockers

SIR,—Drop size may be an important determinant of systemic adverse reactions to topical β blockers, since the volume of drops is large in relation to tear volume. Drop size is said to be about 50 μ l, whereas the volume of tears is typically about 7 μ l; 1 μ l in the precorneal tear film and 3 μ l in each of the tear menisci. The excess passes rapidly down the nasolacrimal duct,¹ where it can be rapidly absorbed across the nasal mucosa into the systemic circulation, avoiding first pass metabolism in the liver. It has been shown that small concentrated drops maintain equivalent tear film concentrations despite containing a smaller total amount of the active ingredient.¹ Drop size is mainly determined by the dimensions of the dropper tip. A nozzle with a wide bore and a thick wall produces bigger drops than one with a narrow bore and a thin wall.²

Drop size was determined by squeezing 10 drops on to the pan of an electronic top pan balance. This was repeated five times for each bottle, and for each β blocker tested two different bottles were used. It is assumed that the density of the drops is the same as water, so that weight in milligrams can be converted into volume in microlitres. Since they are only very dilute solutions this is likely to be true.

Mean drop sizes are as follows (SD in parentheses):

Glauline 0.3%	25.6 (0.9) μ l
Glauline 0.6%	26.1 (0.4) μ l
Glauline 0.1%	27.7 (0.7) μ l
Timolol 0.25%	32.6 (0.8) μ l
Timolol 0.5%	34.0 (0.9) μ l
Teoptic 1.0%	33.4 (0.4) μ l
Betagan 0.5%	40.0 (2.2) μ l
Glauline 0.6% in a Betagan bottle	32.5 (1.0) μ l

Betagan (levobunolol) produced the largest drops. This may be related to its formulation in Liquifilm, which makes it more viscous and thus increases drop size. In keeping with this, when the Betagan bottle was filled with Glauline 0.6% the drops were smaller.

These figures are an estimate only, but at present are the best information available. Manufacturers should state drop size on the bottle and hopefully compete to produce bottles which consistently deliver smaller drops combined with ease of use.

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- 1 Shell JW. Pharmacokinetics of topically applied drugs. *Surv Ophthalmol* 1982; 26: 207–18.
- 2 Brown RH, Hotchkiss ML, Davis BE. Creating smaller eye drops by reducing eye dropper tip dimensions. *Am J Ophthalmol* 1985; 99: 460–4.