

Entropion correction by fornix-based suture placement: use of the Quickert–Rathbun technique in ten dogs

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Abstract

The objective of this study was to evaluate fornix-based suture placement as a method for entropion correction in the dog. Lower eyelid entropion with resultant trichiasis was corrected in 10 dogs using fornix-based suture placement similar to that employed in the Quickert–Rathbun technique used in man. A double-ended suture was placed originating at the deepest extent of the fornix and exiting the lid 1–2 mm from the eyelid margin. Degree of correction was assessed visually immediately after surgery and at re-examination with a follow-up period of up to 6 months. Fornix-based suture placement led to immediate eversion of the eyelid in each case and thus amelioration of the trichiasis in all dogs. In two cases eyelid eversion initially appeared over-corrected and in two cases exposure of conjunctival tissue was evident initially at the palpebral margin. In all cases, however, such complications were transient with long-term results giving an acceptable apposition between ocular surface and eyelid margin in all adult dogs. In three juvenile dogs on which the technique was used, further surgical treatment was required as the puppies grew. Fornix-based suture placement is a novel approach to entropion correction in the dog which yields acceptable results in the majority of suitable cases without recourse to incisional surgery.

Key Words: dog, entropion, eyelid, fornix-based suture correction

INTRODUCTION

Correction of entropion and trichiasis by suture placement has been reported since the time of Hippocrates, with treatment at that time particularly related to lesions occurring in what is assumed to be trachoma.¹ At the turn of the last century several techniques were used for eyelid eversion by suture placement, most notably those of Snellen and Arlt (Fig. 1).² The lack of requirement for general anesthesia made such techniques preferable to incisional surgery prior to safe routine general anesthetic practice. In veterinary medicine suture placement for entropion has, to date, involved the use of vertical mattress sutures for temporary correction of entropion associated with excess facial skin in young puppies,³ particularly in the SharPei breed.⁴ Most entropion correction in the adult dog, however, uses the Hotz-Celsus technique excising an ellipse of skin near the eyelid edge⁵ although other techniques have been described for various eyelid defects resulting in lid in-turning.^{6–8} Current ophthalmic surgical technique in man uses fornix-based suture placement for the correction of entropion in a substantial number of cases, as reported first in recent ophthalmic literature by

Quickert & Rathbun.⁹ The technique is particularly useful in elderly patients with involutional entropion in whom it can be used without the need for general anesthesia (Fig. 2).¹⁰

Here the technique was assessed in 10 dogs with lower eyelid entropion with various presentations and etiologies.

MATERIALS AND METHODS

Ten dogs with entropion of various etiologies were included in the study. Signalment and details of eyelid changes are detailed for each case in Table 1. General anesthesia was induced in all dogs with propofol (Schering-Plough Animal Health, Welwyn, UK) and maintained, after intubation, with isoflurane (Schering-Plough Animal Health). The eye was prepared with 0.5% povidone iodine solution, and the eyelid everted to allow adequate visualization of the fornix. A double-ended suture of 4/0 vicryl was placed using a standard unsuaged needle long enough to allow placement originating in the fornix and with both ends exiting just below the eyelid margin, as illustrated in diagrammatically in Fig. 3 and photographically from case 1 in Fig. 4. The suture was tied using moderate tension, this resulting in eyelid margin

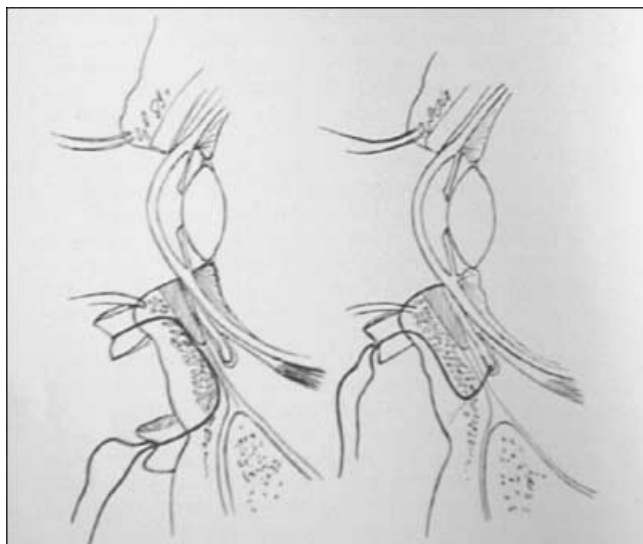


Figure 1. Snellen's (right) and Arlt's (left) sutures for entropion correction in man. From Beard.¹

eversion as shown diagrammatically in Fig. 3(b) and photographically in Figs 5–7. Dogs were examined postoperatively during a follow-up period of up to 6 months.

RESULTS

In all dogs suture placement was achieved readily in between 1 and 5 min under a routine general anesthetic. In five cases sutures were removed and replaced during surgery to obtain optimal placement; ensuring that the initial placement is deep enough in the fornix is essential to obtaining adequate eyelid margin eversion as is the necessity for the suture to exit the eyelid \approx 1–2 mm from the eyelid margin. In all dogs immediate eversion of the eyelid edge was evident as shown in Figs 4–7. Exposure of conjunctiva was evident 1 day postoperatively in two dogs (cases 2 and 3) but this had resolved in all dogs 1 week after surgery. In two dogs (cases 7 and 8) slight overcorrection was evident 1 week after surgery but this had resolved after a further 2 weeks. In cases 3, 5 and 6

where the technique was used in young dogs the resolution of eyelid inversion was not maintained indefinitely and further surgery was necessary as the animal grew; at 16 weeks after surgery in case 3 and 2 months in case 5 when definitive Hotz-Celsus surgery was used, and after 3 and 5 months in case 6 when future suture placement was used followed by definitive Hotz-Celsus surgery after 10 months. In cases other than these three, the technique produced good long-term results, with up to 6 months follow-up (Table 2). In case 10 the technique was used to achieve eyelid eversion in a dog that presented with an overly long lower lid. A modified Kuhnt-Szymanowski technique was performed as previously reported¹¹ but entropion was still present at the end of surgery and thus suture placement was used to evert the eyelid and prevent ongoing trichiasis.

DISCUSSION

The Quickert–Rathbun technique is widely used in human ophthalmic surgery, particularly for correcting involuntal entropion under local anesthetic in older patients for whom a general anesthetic is not appropriate. Figure 2 shows the results of the technique in a human patient. Our study demonstrates that the technique is applicable in cases of entropion in the dog with short-term alleviation of entropion-associated trichiasis in all cases and long-term correction of eyelid in-turning in the majority of cases.

The key elements of successful surgery are, first, the precise placement of sutures originating in the extreme depths of the conjunctival fornix and exiting the eyelid 1–2 mm from the eyelid margin. Second, the amount of eyelid eversion depends on the degree of tension applied when the suture is tightened. This can be difficult to gauge while the animal is under general anesthetic but it has not been found that the amount of eyelid manipulation required for correct placement of the sutures is possible in the canine subject under anything less than full general anesthetic. With some experience the correct degree of suture tightening can be assessed and, in any case, some initial overcorrection is not detrimental and resolves within a short time.

Table 1. Dogs enrolled in the study and surgery performed

Case	Breed	Age (year)	Gender	Problem at presentation	Surgery performed
1	Rotweiler	2	Me	severe lower eyelid entropion with peripalpebral dermatitis rendering incisional surgery unacceptable	two sutures placed in both lower eyelids
2	Flat-Coat Retriever	1.5	Fe	lower eyelid entropion with severe trichiasis	one suture placed in both lower eyelids
3	Labrador Retriever	0.25	Me	lower eyelid entropion with trichiasis	one suture placed in both lower eyelids
4	Bull Mastiff	2	Me	lower eyelid entropion with mild trichiasis	one suture placed in both lower eyelids
5	Labrador Retriever	0.66	Fe	lower eyelid entropion	one suture placed in both lower eyelids
6	SharPei	0.04	Fe	unilateral entropion associated with excess skin folds	one suture placed in lower eyelid
7	Cross-Bred	2	Mn	lower eyelid entropion with trichiasis	two sutures placed in both lower eyelids
8	Flat-Coat Retriever	1	Fe	lower eyelid entropion with trichiasis	one suture placed in both lower eyelids
9	Cocker Spaniel	1.25	Fn	lower eyelid entropion	one suture placed in both lower eyelids
10	Golden Retriever	1	Me	entropion associated with overlong lower eyelid	one suture placed to correct residual entropion after Khunt-Szymanowski procedure

Figure 2. Use of the Quickert–Rathbun technique in man. Appearance presurgery appearance, immediately post surgery and at 2 months follow-up. From Wright *et al.* 1999.¹⁰

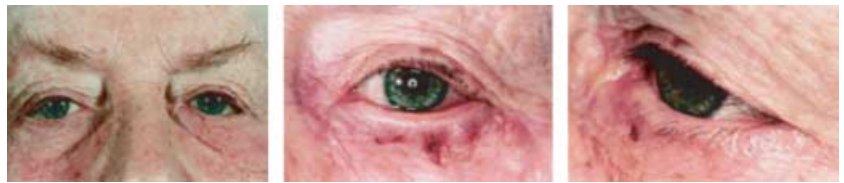


Figure 3. Quickert–Rathbun suture for entropion correction. (a) Diagram of entropic eyelid prior to suture placement. (b) Diagram of eyelid after suture placement. (c) Diagram of eyelid eversion after suture tightening – arrows indicate vector forces giving lid eversion through suture placement.

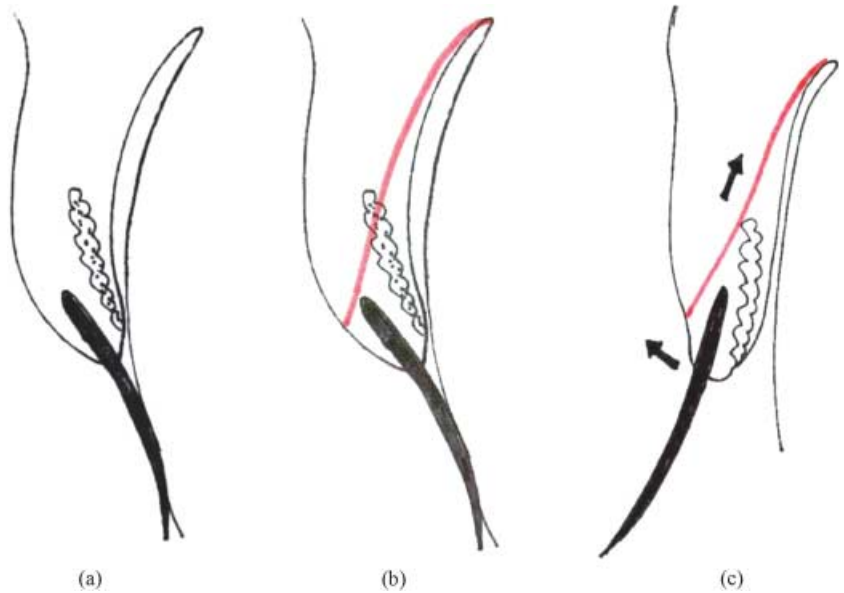


Figure 4. Intraoperative photographs of the Quickert–Rathbun procedure in case 1.



Figure 5. Case 2 before and 3 days after suture placement.



Figure 6. Case 3 before (left) and immediately after (right) suture placement.

Figure 7. Case 4 with trichiasis before surgery (left), immediately after surgery showing correction of entropion and 2 months after suture placement.



Table 2. Results of surgery

Case	Short-term result	Long-term result
1	good eyelid eversion	correction maintained during 6 months of follow-up
2	good eyelid eversion but with conjunctival exposure at 3/7	conjunctival exposure resolved after 2/52 with continued normalization of eyelid position for 4 months of follow-up
3	good eyelid eversion with slight conjunctival exposure immediately postoperatively	conjunctival exposure resolved after 1/52 but entropion recurred with continued growth after 16/52, requiring definitive Hotz-Celsus surgery
4	good eyelid eversion	normalization of eyelid position maintained over 6 months of follow-up
5	good eyelid eversion	normalization of eyelid position maintained over 2 months of follow-up but entropion returned requiring definitive Hotz-Celsus surgery
6	good eyelid eversion	further suture placement required after 3/12 and 5/12 as puppy grew. Definitive correction performed after 10/12
7	slight overcorrection of eyelid eversion at 1/52	eyelid position normalized by 3/52 and maintained through period of 4 months follow-up
8	slight overcorrection of eyelid eversion at 1/52	eyelid position normalized by 2/52 and maintained through period of 4 months follow-up
9	good eversion of eyelid	normalized eyelid position maintained over follow-up period of 4 months
10	good eversion of eyelid when suture used in conjunction with shortening of lower eyelid	normalized eyelid position maintained over follow-up period of 5 months

The technique can be used for short-term eversion of an entropic lower eyelid in a growing puppy or as a permanent procedure in a more mature dog. As is shown by case 7, the technique can be readily used to evert the eyelid edge as a supplementary procedure in cases where other techniques such as an eyelid-shortening technique have failed to give adequate immediate resolution of eyelid in-turning.

In use in man, one recent study reported complications or recurrence with requirement for further surgery in 8% of cases,¹² while another found recurrence in only 2% of lids.¹³ Clearly, the same technique in different hands with a different group of patients yields different results. The same might well be said of this study; further research will be necessary to define exactly in which cases the technique is an optimal management strategy and there is clearly a learning curve in using the technique to best effect.

This study describes use of the technique in lower eyelid entropion alone and only in dogs. Indeed it may be argued that this report offers a small number of cases with a relatively short follow-up period. It cannot be considered as a definitive study on the use of a new technique in veterinary ophthalmic surgery as was Stades' report of his technique for entropion and trichiasis with its 55 cases and prolonged follow-up.^{14,15} Nevertheless, it is presented here as a preliminary report of a technique widely used in human ophthalmology, which may be found to be of use in the dog. More research is required to increase numbers of animals treated, the better to define the cases for which use of suture placement is particularly appropriate and also to determine whether the technique is worthwhile for treatment of upper eyelid entropion and of entropion in other species such as the cat.

CONCLUSION

While further work is necessary to evaluate the long-term success of this novel procedure for canine entropion, this

report documents short-term success when eyelid in-turning is corrected by eyelid eversion occasioned by fornix-based suture placement. The technique can be performed rapidly, requires limited surgical equipment and provides immediate eyelid eversion and thus relief from the discomfort of trichiasis associated with entropion.

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