

# Unusual Deviations from Standard Postoperative Instructions and Subsequent Review of Protocol

Phillip Lu BAppSc<sup>1</sup>

Gerard Sutton MBBS MD FRANZCO FRACS<sup>1,2</sup>

Chris Hodge PhD BAppSc<sup>1,3</sup>

<sup>1</sup>Vision Eye Institute, Chatswood, Australia

<sup>2</sup>Sydney Medical School, University of Sydney, Sydney, Australia

<sup>3</sup>University of Technology Sydney, Sydney, Australia

## ABSTRACT

The orthoptist plays an essential role in patient education and practice management. We present three unusual episodes of patient medication misuse, including two patients who mistakenly placed alternative liquids into their eye following surgery and a further patient who continued to use their medication after the family dog had used the bottle as a chewing device. Vision and safety outcomes varied considerably between cases. An orthoptist-driven review

of postoperative standing orders was undertaken to reduce the risk of future occurrences. Supplementary graphics of the medications were added to the information forms. Patients were further requested to return accompanied to postoperative information visits to aid recall and emphasise proper protocol. Anecdotally there has been a reduction in medication-related enquiries following the intervention and no additional cases of ocular injury.

**Keywords:** cornea, correction fluid, cyanoacrylate glue

## INTRODUCTION

Postoperative medication is essential in aiding successful surgery outcomes. Despite the clinic's best efforts, poor compliance and the misuse of medication remains a well referenced issue.<sup>1-4</sup> The outcomes can be significant. This paper reports three unusual excursions from the standard postoperative regimen and their outcomes. Combined, these cases led to a revision of the centre's postoperative instruction material and methodology.

## CASE REPORT

### Case 1:

A 58-year-old male truck driver attended the clinic investigating refractive surgery for a moderate hypermetropic astigmatic correction. He then proceeded to bilateral LASIK surgery. Surgery was uncomplicated and at day one uncorrected visual acuity was 6/9 in both eyes. Two weeks following surgery he returned complaining of reduced vision in the left eye. Uncorrected distance visual acuity (UDVA) was 6/120 improving to 6/21 with a small correction. On further questioning the patient admitted to placing correction fluid in his eye several days previously. This occurred as he mistook the bottle of correction fluid

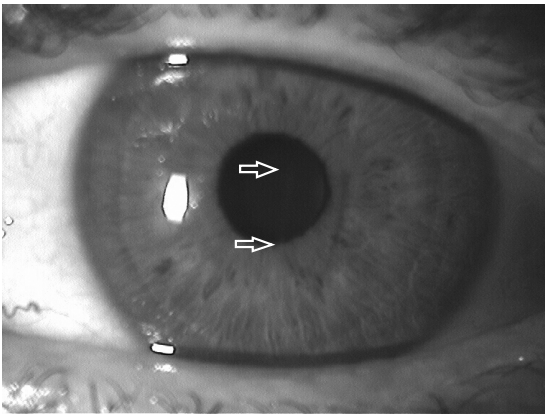
for his standard postoperative medication, both of which had been placed above the fridge (Figure 1). He attempted



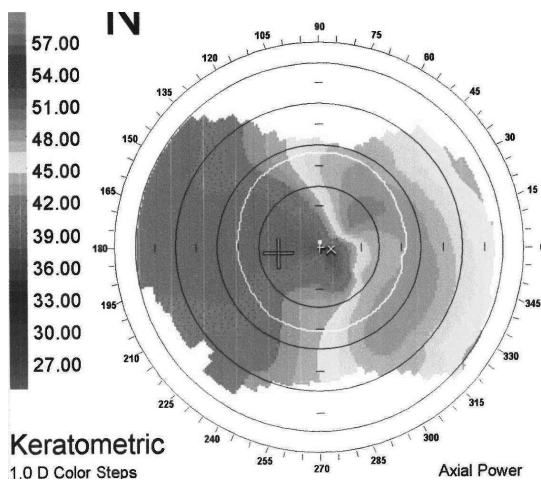
**Figure 1.** Comparison between standard correction fluid and eye drop bottles.

to wash out the fluid but did not seek immediate medical attention. Despite prolonged treatment with corticosteroids (Maxidex, Alcon, Fort Worth, USA) and artificial tears (Systane, Alcon, Fort Worth, USA), corrected vision improved only to 6/15 with significant photophobia resulting from a central linear scar (Figure 2). Corneal topographical examination further indicated secondary irregular astigmatism (Figure 3). Options for visual rehabilitation were discussed including gas-permeable contact lenses and lamellar corneal transplantation. Due to the visual requirements for a commercial driver's licence, the patient

Corresponding author: **Chris Hodge**  
 Vision Eye Institute  
 Level 3 270 Victoria Avenue, Chatswood, NSW, 2067  
 Email: Christopher.hodge@visioneyeinstitute.com.au



**Figure 2.** Central linear scar secondary to corneal insult (arrows indicate scar).



**Figure 3.** Topography showing irregular corneal astigmatism following liquid paper insertion.

proceeded to deep anterior lamellar keratoplasty. Following final suture removal two years post-surgery, he achieved UDVA of 6/7.5. The graft appeared clear and the patient comfortable.

#### Case 2:

Approximately three weeks following LASIK surgery, a 34-year-old man mistakenly placed cyanoacrylate (superglue) in his right eye in place of the provided artificial gel lubricant. Upon realising his eyelids were bound together he attempted to flush the lids with water albeit without effect. Upon presentation the patient was prepped for immediate surgery which necessitated the removal of several eyelashes and manually separating the lids. Fortunately minimal glue had contacted the corneal surface. The eye was irrigated and the patient commenced on antibiotics. UDVA remained variable before improving to 6/6 at one month post intervention.

#### Case 3:

A 63-year-old man successfully underwent cataract removal

and intraocular lens replacement. At day one UDVA was 6/6 part. The patient was provided with postoperative instructions and booked for further review in two weeks. At the subsequent visit, he raised concern that during the interval his dog had managed to remove the antibiotic drops from the bedside table and subsequently chewed the bottle. Without thought for possible consequences, he had continued to use the drops. Fortunately slit lamp examination revealed no sign of infection. The bottle was removed from the patient and a replacement provided.

## DISCUSSION

Although we have reported relatively unusual presentations, this series emphasises several issues of relevance to the standard postoperative population.

Since first being described by Margo and Trobe in 1982,<sup>2</sup> there have been repeated accounts of patients inadvertently placing superglue and other potentially dangerous substances into their eye.<sup>3-8</sup> Most commonly this is cyanoacrylate glue which is packaged similarly to many ocular ointments<sup>9</sup> (Figure 4). Tabatabaei et al<sup>10</sup> describe a large case series of patients attending a local hospital,



**Figure 4.** Examples of available superglue bottles.

where 105 patients presented across a three-month period to emergency for treatment of superglue related injuries. Seventy-two percent of injuries occurred at home, highlighting a general lack of awareness of the potential danger for ocular injuries. As expected, the cause attributed to the majority of cases was patient carelessness (78%). In their study, poor vision was found to contribute to only 3% of cases; however others have reported a higher incidence than this. O'Hare and co-authors previously showed that up to 12% of patients may misidentify standard pharmacy labels.<sup>11</sup> Smith et al suggested up to 40% of patients may

have significant issues identifying labels thereby placing themselves at risk of inadvertent instillation.<sup>12</sup> This may be exacerbated in the immediate period following ocular surgery where it is likely that a patient's near vision is impaired. Of note, Gavin et al related a case of repeated instillation of flea drops postoperatively by the patient's carer who did not wear her reading glasses, thereby proving vigilance is essential from all concerned parties.<sup>8</sup>

Our patients demonstrated a range of outcomes from minimal ocular discomfort to corneal scarring and irregularity requiring additional surgery. The effects of inadvertent instillation of toxic substances into the eye or surrounding region appears dependent on the properties of the fluid instilled, the time in the eye and the immediate treatment. Cyanoacrylate glue will bond almost immediately however as the glue commonly only bonds to surfaces that are dry, instillation typically will only involve eyelashes or the lid margins.<sup>13</sup> Contact dermatitis, loss of eyelashes and fusion of the lids are thereby routinely noted in superglue injuries. Drops that enter the eye may lead to symptoms, including conjunctival injection, corneal epithelial defects and punctate epithelial erosions. More severe cases, due to repeated instillation or delayed treatment, may lead to corneal oedema, Descemet's folds and eventual scarring.<sup>8</sup> Correction fluid includes a combination of titanium dioxide, mineral spirits, resins and solvents making it toxic to the ocular surface.<sup>14</sup>





Copious eye irrigation to remove the toxic substance is the essential initial treatment. In the case of superglue-related injuries, removal of patient eyelashes and manual separation of the lids may be required. Although it has been suggested that the eyelids may separate spontaneously within a week, amblyopia represents a possible sequela in young patients and is a consideration in early treatment.<sup>13</sup> There are no reports of significant amblyopia related directly to superglue injuries and subsequent tarsorrhaphy therefore this remains a theoretical issue.

The greatest concern for ophthalmology is the increasing pool of reports suggesting that previous strategies have not been effective. Industry regulation for pharmaceutical packaging has been explored without success.<sup>3,6,15</sup> The use of uniform cap sizing and colours for non-ophthalmic preparations, child-proof bottles, braille warnings, vertical ribs on

bottles as warning and different odours are some of the various suggestions offered previously.<sup>6,7</sup> As this would likely require significant change to design and manufacturing processes, it remains unlikely these changes will be driven by industry. Morgan et al highlight this issue noting that the same company often creates packaging for both the general and pharmaceutical industries and therefore will have little, if no incentive, to introduce these changes.<sup>3</sup> The responsibility will fall to healthcare professionals to continue to report these incidents to regulatory authorities and further to provide adequate patient education and information.<sup>16</sup>

Hennessy et al reported that drop administration was a particular concern for the visually impaired patient.<sup>17,18</sup> One-third of patients missed initially when applying drops

**Instructions Following LASIK Surgery**

1 <sup>st</sup> week after surgery		Use both Ciloxan, Maxidex and Systane four times a day for one week
2 <sup>nd</sup> week after surgery		Cease Ciloxan & Maxidex. Use FML eye drops and Systane three times a day for one week
3 <sup>rd</sup> week after surgery		Continue using FML eye drops and Systane twice a day for one week
Continue using Systane drops twice a day until the bottle runs out		

Shake all bottles before use.

It does not matter which drops are used first, but please wait 1 minute before using the next bottle

The goggles need to be firmly attached before sleeping, and then for a further two nights after your surgery.

Remember, as your eyes heal your vision does fluctuate. This will occur over the first 3-4 weeks. You should however always maintain a reasonable level of vision.

Please remember that you may be more light sensitive than usual; you may see halos around lights and your eye/s may feel gritty for a few days.

Initially you may find that your near and distance vision will heal differently.

**DO NOT RUB YOUR EYE/S FOR 1 WEEK.**

For one week:

- Do not wear eye makeup.
- Do not swim
- Be careful to keep all soap and water out of your eye/s when washing your face.

No body contact sports for 1 month. You can resume exercise e.g. gym, running, yoga after 1 week.

If you have any questions or difficulties, please do not hesitate to call Vision Eye Institute Chatswood on (02) 9424 9999.

**Figure 5.** Postoperative instruction sheet with supplementary graphics.

to their own eye. A further one-third of patients touched the eye with the bottle during instillation increasing the risk of contamination. Perhaps of greatest concern however, was that almost half of all patients had an inaccurate perception of their own ability to instil eye drops correctly. Patient education and instruction is therefore essential to effective practice and harm minimisation. In response to our cases, the orthoptic team led a revision of current standing orders at our practice. To assist patient recall and minimise potential errors, supplementary graphics containing the prescribed medication were added to the respective information sheets (Figure 5). In keeping with literature recommendations, specific instructions, such as to keep the medication in a consistent location were emphasised during the consultation.<sup>8,19</sup> Furthermore, patients were encouraged to bring family or friends to the postoperative consultation as an additional tool to help accurately implement the instructions. The usefulness of education programs has been described previously. Shah et al, in their meta-analysis suggested that education interventions are not effective in the prevention of eye injuries albeit this review explored a broader narrative of potential injuries.<sup>20</sup> Kendrick et al, in their analysis of child and family interventions, propose some evidence in reducing injury rates albeit they also state that widely conflicting literature exists.<sup>19</sup> As our cases represent sporadic incidents, it is impossible to evaluate the success of the intervention however the absence of further events, including an anecdotal reduction in patient medication enquiries, suggests that the revision and education program has provisionally been successful.

## CONCLUSION

The orthoptist plays an important role in patient education and practice management. Revision of standard postoperative protocols may represent a simple yet effective tool to help patients avoid unnecessary treatment-related errors.

## REFERENCES

1. Waterman H, Evans JR, Gray TA, et al. Interventions for improving adherence to ocular hypotensive therapy. *Cochrane Database Syst Rev* 2013;(4):CD006132.
2. Margo CE, Trobe JD. Tarsorrhaphy from accidental instillation of cyanoacrylate adhesive in the eye. *JAMA* 1982;247(5):660-661.
3. McLean CJ. Corneal injury caused by correction fluid. *Eye (Lond)* 1997;11(4):564-565.
4. Steinemann TL, Brown MF. Inadvertent instillation of nonophthalmic antiseptic drops due to packaging similarity. *Arch Ophthalmol* 1998;116(9):1246.
5. Morgan SJ, Astbury NJ. Inadvertent self administration of superglue: a consumer hazard. *Br Med J (Clin Res Ed)* 1984;289(6439):226-227.
6. DeRespinis PA. Cyanoacrylate nail glue mistaken for eye drops. *JAMA* 1990;263(17):2301.
7. Knight IJ. Mistaken eye drops and subsequent instillation of superglue. *Eye (Lond)* 2001;15(5):663.
8. Gavin E, Morris B, Shuttleworth G. Beware of the bottle. *Eye (Lond)* 2006;20(8):940-941.
9. Good AM, McCabe SE. Superglue accidents and the eye--causes and prevention. *Br J Ophthalmol* 1994;78(10):802.
10. Tabatabaei SA, Modanloo S, Ghiyasvand AM, et al. Epidemiological aspects of ocular superglue injuries. *Int J Ophthalmol* 2016;9(2):278-281.
11. O'Hare F, Jeganathan VS, Rokahr CG, et al. Readability of prescription labels and medication recall in a population of tertiary referral glaucoma patients. *Clin Exp Ophthalmol* 2009;37(9):849-854.
12. Smith SJ, Drance SM. Difficulties patients have at home after cataract surgery. *Can J Ophthalmol* 1984;19(1):6-9.
13. McLean CJ. Ocular superglue injury. *J Accid Emerg Med* 1997;14(1):40-41.
14. Rubbermaid Natural. Material Safety Data Sheet liquid paper correction fluid. 2015: IL, USA. [Updated May 2015, cited 2016 1st Dec] Available from: [http://msdsop.newellrubbermaid.com/downloads/Papermate%20Liquid%20Paper%20Correction%20Pen%20Fluids\\_201237.pdf](http://msdsop.newellrubbermaid.com/downloads/Papermate%20Liquid%20Paper%20Correction%20Pen%20Fluids_201237.pdf).
15. Desai SP, Teggihalli BC, Bhola R. Superglue mistaken for eye drops. *Arch Dis Child* 2005; 90(11):1193.
16. Yusuf IH, Patel CK. A sticky sight: cyanoacrylate 'superglue' injuries of the eye. *BMJ Case Rep* 2010;2010. pii: bcr11.2009.2435. doi: 10.1136/bcr.11.2009.2435.
17. Hennessy AL, Katz J, Covert D, et al. Videotaped evaluation of eyedrop instillation in glaucoma patients with visual impairment or moderate to severe visual field loss. *Ophthalmology* 2010;117(12):2345-2352.
18. Hennessy AL, Katz J, Covert D, et al. A video study of drop instillation in both glaucoma and retina patients with visual impairment. *Am J Ophthalmol* 2011;152(6):982-988.
19. Kendrick D, Young B, Mason-Jones AJ, et al. Home safety education and provision of safety equipment for injury prevention (Review). *Evid Based Child Health* 2013;8(3):761-939.
20. Shah A, Blackhall K, Ker K, Patel D. Educational interventions for the prevention of eye injuries. *Cochrane Database Syst Rev* 2009(4):CD006527.