# Is eye padding routinely necessary after uncomplicated phacoemulsification?

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CLINICAL STUDY

**Abstract**

*Purpose* **To investigate the value of eye padding following uncomplicated phacoemulsification under peribulbar anaesthesia.**

*Methods* **A prospective randomised controlled study was conducted to compare the effect of a conventional eye pad and shield with that of a clear eye shield applied without a pad in 83 patients undergoing routine phacoemulsification under peribulbar anaesthesia without lid block. The primary outcome measures were corneal fluorescein staining, discomfort, diplopia and mobility.**

*Results* **Moderate or severe corneal fluorescein staining on the first post-operative day was significantly more common in the pad and shield group (39%) than in the clear shield group (19%) ($p < 0.01$). There was no significant difference in post-operative pain as measured either by visual analogue scale or by categorical pain scale. Forty per cent of the clear shield group reported transient post-operative diplopia during the immediate post-operative period compared with 7% of the pad and shield group ($p < 0.001$). There was no significant difference in reported mobility between the two groups.**

*Conclusions* **Following phacoemulsification under peribulbar anaesthesia, the use of a gauze eye pad is associated with greater corneal fluorescein staining than a clear plastic shield without pad and offers no reduction in discomfort. A clear shield protects the globe against direct trauma, is associated with reduced moderate to severe corneal staining and facilitates vision in the early post-operative period. Transient diplopia reported by some patients given a clear shield is not disabling and would not be expected to occur in patients with one seeing eye. The use of a clear shield alone is a safe alternative to eye padding and offers important advantages in patients with one seeing eye.**

*Key words* Cataract surgery, Corneal staining, Eye pad, Phacoemulsification

Eye pads are variably applied to the operated eye following small incision cataract surgery under peribulbar anaesthesia. The rationale for their use includes protection of the globe from trauma, prevention of corneal injury resulting from persistent corneal anaesthesia or exposure due to lagophthalmos, reduction of patient discomfort and prevention of post-operative diplopia resulting from akinesia. Recent evidence suggests that in patients with simple traumatic corneal abrasions or after corneal foreign body removal the use of an eye pad is associated with delayed epithelial healing,[1,2] does not offer improved comfort[2–4] and may be associated with increased discomfort.[2] Despite the widespread use of eye padding after routine phacoemulsification there is no convincing evidence to show that eye pads help to prevent corneal injury or reduce discomfort post-operatively. Eye pads have the important disadvantage of complete obstruction of vision in the operated eye. This has obvious implications for patients with one seeing eye and may significantly affect visual function in patients who are otherwise binocular. The incidence of transient diplopia after phacoemulsification under peribulbar anaesthesia has not been quantified and nor has its effect on disability in the immediate post-operative period been investigated.

An alternative to the eye pad is a clear plastic rigid eye shield. When used alone this offers mechanical protection to the globe while permitting some visual function in the operated eye.

The aim of this study was to determine the value of routine post-operative eye padding by comparing the effect of a conventional gauze pad and shield with a clear shield without pad in a series of patients undergoing phacoemulsification.

## Patients and methods

Consecutive patients undergoing uncomplicated phacoemulsification under peribulbar anaesthesia at two centres were enrolled in the study. Those with pre-existing ipsilateral corneal

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or orbital disease, and those with useful vision in only their operated eye, were excluded. Informed consent was obtained from each patient recruited.

A total of 4–6 ml of a 1:1 mixture of lignocaine 2% with bupivacaine 0.75% was injected into the inferotemporal and medial orbital compartments. No facial nerve or lid block was given. The surgery was performed using either a superior scleral tunnel or a clear corneal tunnel. Capsulorhexis and hydrodissection were followed by phacoemulsification of the nucleus by the divide-and-conquer technique, aspiration of the cortex and insertion of an intraocular lens into the capsular bag. The type of suture used, if applicable, and any intraoperative complications were recorded.

Patients were randomly assigned to receive either a conventional eye pad with paraffin gauze and shield or a clear plastic eye shield alone, the surgeon knowing the allocation only at the end of the procedure. Any induced lagophthalmos at the conclusion of the procedure was recorded before the lids were closed manually and the pad or shield applied.

Patients attending on the first post-operative day were asked to score any pain they had experienced since their operation both on a visual analogue score and in terms of a categorical score comprising the choices no pain, mild, moderate or severe pain. They were asked whether they had experienced any double vision and if so whether it had persisted overnight. They were also asked whether their mobility since the operation, specifically their confidence to navigate furniture and stairs, had been as good as normal, poorer or much poorer. The pad or shield was removed and any persisting induced lagophthalmos was recorded. Slit lamp biomicroscopy was performed in order to assess corneal staining by 2% fluorescein solution. The degree of staining was described as none, mild, moderate or severe by comparison with a series of schematic diagrams devised for the purpose. The intraocular pressure of the operated eye was measured by applanation tonometry.

Statistical analysis was performed using a chi-squared test for categorical variables and a Mann–Whitney test for the linear scale. We determined that to detect a difference of 1 unit with the visual analogue score, with a power of 80%, two groups of 40 patients would be required.

## Results

A total of 83 eyes of 83 patients were recruited to the study. There were 41 eyes (mean age 75 years, range 53–89 years) in the pad group and 42 eyes (mean age 77 years, range 50–90 years) in the clear shield group. In the pad group two patients had previously undergone lid surgery: one for a lower lid entropion and another for ptosis. In the clear shield group one patient had previously undergone lower lid entropion repair. No patient had corneal staining pre-operatively.

**Table 1.** *Corneal staining on the first post-operative day*

| | No. of patients (percentage of total) | |
|---|---|---|
| Corneal staining | Pad | Clear shield |
| None | 6 (15) | 14 (33) |
| Mild | 19 (46) | 20 (48) |
| Moderate | 14 (34) | 6 (14) |
| Severe | 2 (5) | 2 (5) |

**Table 2.** *Reported discomfort (categorical scale)*

| | No. of patients (percentage of total) | |
|---|---|---|
| Discomfort | Pad | Clear shield |
| None | 18 (44) | 23 (55) |
| Mild | 15 (37) | 15 (36) |
| Moderate | 7 (17) | 4 (9) |
| Severe | 1 (2) | 0 |

Intraoperative complications in the pad group included one anterior capsule tear and one posterior capsule tear without vitreous loss. In the clear shield group one patient sustained a small superior corneal abrasion, two developed chemosis following the anaesthetic, two had anterior capsule tears and there was one posterior capsule tear with vitreous loss. The sections were secured with 10/0 nylon sutures in 7 eyes of the pad group and 15 of the clear shield group. One patient in the clear shield group developed a small wound leak post-operatively but no patient in either group sustained a wound rupture in the first 24 h.

In the pad group 8 (20%) eyes had 1 mm or more of induced lagophthalmos immediately post-operatively and this persisted in 1 (2%) eye on the following day. In the clear shield group 5 (11%) eyes had lagophthalmos post-operatively, persisting in 3 (7%) on the following day.

Fourteen (33%) of the clear shield group had no corneal fluorescein staining post-operatively (Table 1) compared with 6 (15%) of the pad and shield group ($p < 0.05$). Although similar numbers of eyes had mild corneal staining, 8 (19%) of the clear shield group and 16 (39%) of the pad and shield group ($p < 0.05$) had moderate or severe corneal epithelial defects.

Moderate or severe pain was reported by 4 (9%) of the clear shield group and 8 (19%) of the pad and shield group (Table 2). The difference in post-operative discomfort as measured by both the categorical scale and the visual analogue scale was not significant. One patient reported severe post-operative pain. This patient had been allocated a pad and shield and on the first post-operative day had moderate corneal fluorescein staining, moderate anterior chamber activity ($2^+$ cells) and an intraocular pressure of 21 mmHg. Overall, there was no significant difference in intraocular pressure between the two groups ($p = 0.455$; unpaired $t$-test) and no significant correlation between intraocular pressure and post-operative pain.

Seventeen (40%) of the clear shield group and 3 (7%) of the pad and shield group ($p < 0.001$) reported post-operative diplopia. There was no significant difference in reported mobility between the two groups.

## Discussion

The rationale for the use of pads following cataract surgery includes prevention of exposure of the anaesthetised cornea by maintaining lid closure. In this study, however, the eyes given a clear shield had significantly less corneal fluorescein staining on the first post-operative day. Although there was no difference in mild corneal staining, which was observed in approximately half the patients in both groups, the eyes given a pad and shield developed significantly greater moderate and severe corneal epithelial defects than eyes given a clear shield. It is possible that in some cases an eye pad can fail to maintain lid closure effectively and may actually cause corneal abrasions by direct apposition of the pad to the inferior exposed cornea. This possibility is especially plausible in the context of corneal anaesthesia without lid block where eye opening under a pad could cause repeated abrasions.

Corneal epithelial defects can occur during cataract surgery and in one study were reported in 41 (5.2%) of 796 eyes.[5] In our study 1 (1%) patient sustained a corneal abrasion intraoperatively. Epithelial defects are more common in the presence of pre-existing corneal epithelial disease[6] and predispose to sterile corneal ulceration and infective keratitis.[7,8] In view of the incidence of epithelial defects and their possible sequelae it may be argued that pads should be used routinely after cataract surgery. Recent evidence suggests, however, that in patients with simple traumatic corneal abrasions or after corneal foreign body removal the use of an eye pad is associated with delayed epithelial healing.[1,2] It is reasonable to suggest that abrasions sustained during cataract surgery behave similarly and that routine eye padding is not indicated for this reason alone.

No patient in either group sustained a wound rupture in the first 24 h. It is likely that the protection of the globe against trauma provided by the clear shield is similar to that provided by a pad and shield.

Eye pads may be applied in the attempt to minimise post-operative discomfort. In patients with simple traumatic corneal abrasions or after corneal foreign body removal, however, the use of an eye pad does not offer improved comfort[2–4] and has been associated with increased discomfort.[2] There are theoretical reasons why padding after cataract surgery may cause increased post-operative pain. This study highlights the increased incidence of moderate to severe corneal epithelial defects in padded eyes. In addition, cooling of the eye after cataract surgery by an ice-cold eye mask applied over gauze is known to increase comfort[9] and it is possible that increased temperature of the outer eye associated with padding may lead to increased discomfort. Our study, however, demonstrates no significant difference in reported post-operative discomfort on the first post-operative day between patients given a pad and shield or a clear shield alone. There was no suggestion in this study that post-operative discomfort was caused by raised intraocular pressure; there was no correlation overall and the one patient who reported severe pain had moderate corneal fluorescein staining but an intraocular pressure of 21 mmHg.

The obstruction of vision by an eye pad has obvious implications for patients with one seeing eye. It is also possible that eye padding has a significant effect on visual function in otherwise binocular patients. Apart from any loss of visual field and stereopsis, episodes of momentary loss of vision have been reported in the uncovered eye in patients given an eye pad.[10] This phenomenon is thought to result from alternate cortical suppression of images from each eye. Patients given a clear shield reported significantly greater post-operative diplopia. This was presumably the result of the recovery of visual function before recovery of eye movements in some patients. As an estimation of disability during the first 24 h post-operatively we recorded the patients' perceptions of their own mobility. Although this measure gave no indication of the effect of visual function on fine motor skills, we felt that the ability to navigate safely was perhaps the most important function during the immediate post-operative period. Despite the increased incidence of diplopia in patients given a clear shield there was no significant difference in reported mobility between the two groups. Although the results of this study apply to phacoemulsification under peribulbar anaesthesia, diplopia would not be expected in patients with one seeing eye or following phacoemulsification under subconjunctival or topical anaesthesia.

## Conclusion

This study suggests that following phacoemulsification under peribulbar anaesthesia, the use of a gauze eye pad is associated with greater corneal fluorescein staining than is the use of a clear plastic shield with no pad, and offers no reduction in discomfort. Eye padding prevents the possibility of transient diplopia in binocular patients but has obvious implications for patients with one seeing eye. A clear shield protects the globe against direct trauma, is associated with reduced moderate to severe corneal staining and facilitates vision in the early post-operative period. Transient diplopia reported by some patients given a clear shield after peribulbar anaesthetic is not disabling and would not be expected in patients with one seeing eye.

The use of a clear shield alone is a safe alternative to eye padding, and offers important advantages in patients with one seeing eye. Its use may additionally help to demystify cataract surgery in patients for whom the removal of a pad at their first post-operative visit can be the focus of unnecessary anxiety.

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