Original Article

Comparison of Clinical Outcomes in Patched Versus Unpatched Patients Following Corneal Metallic Foreign Body Removal

Kashyap Thakker[1], Anvay Hingrajia[2], Pooja Shah[2], Tulsi Kashyap[2], Harshi Maheshwari[2], Saachi Singh[2]

[1]Assistant Professor, Department of Ophthalmology, MGM Medical College and Hospital, Kamothe, Maharashtra, India. [2]Residents, Department of Ophthalmology, MGM Medical College and Hospital, Kamothe, Maharashtra, India.

Abstract

Background: Metallic corneal foreign bodies are common occupational eye injuries. After removal, the epithelial defect may cause pain, photophobia, watering and foreign-body sensation. Eye patching has a plausible supportive role by reducing lid movement and shielding the injured surface during the early recovery period. Its benefit remains debated, making comparative clinical observations after metallic foreign-body removal relevant. The aim is to compare short-term epithelial healing and symptoms in patients managed with an eye patch versus no patch after removal of an uncomplicated metallic corneal foreign body. **Material and Methods:** This prospective randomized comparative study included 150 patients with a small post-removal epithelial defect, presenting within 24 hours of injury. Seventy-five patients were allocated to the patched group and 75 to the unpatched group. The source manuscript describes chloramphenicol ointment followed by patching for 18–24 hours in Group A and topical moxifloxacin 0.5% four times daily in Group B. Symptoms and fluorescein-staining defect size were assessed at baseline and after 18–24 hours; follow-up continued on Days 2 and 3. **Results:** The manuscript reports an approximate baseline defect size of 2 × 2 mm in both groups. At 18–24 hours, the reported residual defect was approximately 0.2 × 0.2 mm in the patched group and 0.5 × 0.5 mm in the unpatched group. Pain was reported in 55% versus 50% at baseline and 11% versus 15% at follow-up, respectively. Watering/photophobia decreased from 60% to 26% in the patched group and from 57% to 30% in the unpatched group. Foreign-body sensation decreased from 95% to 15% and from 92% to 18%, respectively. Complete healing in both groups was reported by Day 2. **Conclusion:** In this dataset, the reported early outcomes numerically favoured the patched group, which had a smaller residual epithelial defect and lower reported proportions of pain, watering/photophobia and foreign-body sensation at 18–24 hours. Both groups reportedly achieved complete healing by Day 2. These findings support further evaluation of short-term comfort and early healing with patching in selected uncomplicated cases. Because exact counts, inferential statistics and identical co-interventions were not available, the results should be interpreted as descriptive rather than proof of a causal or statistically significant effect.

Keywords: Corneal metallic foreign body, corneal abrasion, eye patching, epithelial healing, ocular trauma, pain, photophobia.

Received: 05 September 2026 **Revised: 30 September 2026** **Accepted: 28 October 2026** **Published: 31 October 2026**

Introduction

Corneal foreign bodies are a frequent reason for urgent ophthalmic assessment. Metallic particles are particularly relevant in occupational settings such as metal grinding, drilling, welding and industrial fabrication. The clinical spectrum ranges from a superficial foreign body with a limited epithelial defect to deeper stromal penetration, rust-ring formation, infection or an occult intraocular foreign body. A careful history of mechanism, use of protective eyewear and high-velocity exposure is therefore essential. Visual acuity, pupil assessment and slit-lamp examination with fluorescein staining help determine the extent of injury and whether urgent escalation is required.[1–4]

The corneal epithelium is densely innervated by sensory fibres derived from the ophthalmic division of the trigeminal nerve. Disruption of the epithelium exposes sensitive nerve endings and can produce pain, tearing, photophobia, blepharospasm and foreign-body sensation. Following removal of a superficial foreign body, epithelial cells migrate to cover the defect and then proliferate to restore the epithelial barrier. Small uncomplicated defects commonly re-epithelialize rapidly, although healing depends on defect size, associated stromal injury, infection, ocular surface status and adherence to treatment.[2,5–7]

Management generally includes complete removal of the foreign body and any clinically significant rust, topical antibiotic prophylaxis when indicated, appropriate analgesia, counselling and reassessment when needed. Contact lens wear, contaminated or vegetative material, a central or large defect, reduced vision, infiltrate, persistent pain or suspected penetration warrant particular caution and may require closer follow-up or specialist management.[1–4,8]

Address for correspondence: Dr. Kashyap Thakker, Assistant Professor, Department of Ophthalmology, MGM Medical College and Hospital, Kamothe, Maharashtra, India.
E-mail: kashyap.eyedoctor@gmail.com

DOI:
10.21276/amit.2026.v13.i3.1157

How to cite this article: Thakker K, Hingrajia A, Shah P, Kashyap T, Maheshwari H, Singh S. Comparison of Clinical Outcomes in Patched Versus Unpatched Patients Following Corneal Metallic Foreign Body Removal. Acta Med Int. 2026;13(3):837-841.

Patching has traditionally been used after corneal abrasion or foreign-body removal to limit eyelid movement and provide a physical shield during the early healing period. By reducing repeated mechanical stimulation and exposure to light or environmental irritants, occlusion may improve comfort for some patients. However, patching also temporarily impairs binocular vision and may interfere with daily activities. Published trials and reviews have not shown a consistent benefit for routine patching of all uncomplicated abrasions, although results vary by study design, patient selection and treatment protocol.[9–16] The question remains clinically relevant in patients with occupational metallic foreign bodies, particularly when short-term comfort is an important outcome.

The published evidence is not entirely uniform. Differences in abrasion size, injury mechanism, antibiotic regimens, outcome definitions and study quality complicate comparisons. A study focused on metallic foreign-body removal is clinically relevant because these patients commonly present after occupational exposure and may have a residual epithelial defect following instrumentation. The present manuscript compares short-term symptoms and epithelial defect measurements in patched and unpatched patients treated at a tertiary eye-care setting in Maharashtra.

Aim and Objectives

Aim: To compare clinical outcomes following removal of uncomplicated metallic corneal foreign bodies in patients treated with eye patching versus no patching.

1. To compare the residual corneal epithelial defect size between patched and unpatched groups at 18–24 hours after foreign-body removal.
2. To compare the change in pain, watering and photophobia from baseline to the first follow-up in the two groups.
3. To compare the change in foreign-body sensation from baseline to the first follow-up in the two groups.
4. To document the time to complete epithelial healing and any reported complications during follow-up through Day 3.

Review of Literature

Corneal epithelial injury and healing: A superficial corneal epithelial defect triggers migration of neighbouring epithelial cells over the denuded surface, followed by cell proliferation and restoration of epithelial architecture. The corneal surface is highly innervated, explaining why even small abrasions may cause disproportionate pain and reflex tearing. Fluorescein staining is commonly used to identify and document epithelial defects. Clinical reassessment is guided by defect size, symptoms, visual acuity and concern for infection or deeper injury.[2,5–7]

Metallic foreign bodies and clinical assessment: Metallic foreign bodies may leave a rust ring, particularly when retained in the cornea. The history should establish whether the injury involved high-velocity metal-on-metal work, because a small external wound does not exclude penetration or an intraocular foreign body. Slit-lamp examination, assessment of anterior chamber depth and pupil shape, and appropriate imaging when penetration is suspected are important parts of safe assessment. Suspected open-globe injury requires avoidance of pressure on the eye and urgent specialist management.[1,3,4,8]

Published evidence and rationale for patching: Evidence regarding eye patching after corneal abrasion is mixed. Some randomized trials and systematic reviews have found no consistent advantage for routine patching, and some have reported similar or faster healing without a patch.[9–13] These findings caution against assuming that every abrasion requires occlusion. They do not, however, negate the value of evaluating patching in a specific clinical context, such as metallic foreign-body removal, where symptom burden, defect characteristics, medication regimen and patient comfort may differ across settings.

The Cochrane reviews by Turner and Rabiu and by Lim and colleagues concluded that routine patching does not reliably improve healing or pain outcomes across the available trials.[12,13] The evidence base was heterogeneous, and reporting of larger defects, complications and patient-centred comfort outcomes was limited. Therefore, the evidence is best interpreted as not supporting universal patching, rather than as establishing that patching can never be useful for selected patients. Studies should assess both objective epithelial healing and short-term symptoms.

Other comparative studies, including reports focused on corneal foreign-body removal and clinical settings outside the largest trials, have described differing outcomes.[14–16] The present study contributes local descriptive data: the patched group had lower reported symptom proportions and a smaller residual epithelial defect at 18–24 hours. Since the patched and unpatched groups received different antibiotic regimens, these findings may reflect the combined treatment approach and cannot be attributed to patching alone.

Rationale for the present study: The rationale for this study was to examine whether short-duration patching after removal of a small metallic corneal foreign body was associated with better early comfort and epithelial-defect measurements in routine clinical practice. The results are particularly relevant to the first 18–24 hours after removal, when pain, watering, photophobia and foreign-body sensation may affect patient comfort. The study findings should be interpreted alongside the limitations of the available data and the wider literature.

Materials and Methods

Study design and setting: The study is a prospective randomized controlled comparative study conducted at an eye-care hospital in Maharashtra. The institution is MGM Medical College and Hospital, Kamothe, Maharashtra, India.

Study population and sample size: A total of 150 patients were included, with 75 assigned to the patched group (Group A) and 75 to the unpatched group (Group B).

Eligibility criteria

Inclusion criteria were: (i) corneal foreign body with a post-removal epithelial defect up to approximately 2 × 2 mm; (ii) presentation within 24 hours of injury; and (iii) a cooperative patient willing to attend follow-up.

Exclusion criteria were: (i) penetrating ocular injury; (ii) corneal infection; (iii) previous ocular surgery; and (iv) contact lens use. The source manuscript does not specify age limits, pregnancy-related criteria or other ocular-surface exclusions.

Group allocation and interventions: Patients were reportedly randomized into two equal groups. The method of sequence generation, allocation concealment and blinding was not described. Group A received topical chloramphenicol ointment followed by a sterile eye pad/patch for 18–24 hours. Group B received topical moxifloxacin 0.5% eye drops four times daily without patching. Patients in the patched group were instructed to keep the patch dry and not to reapply it after removal. The groups therefore differed in both patching and topical antibiotic regimen; this is an important limitation when interpreting the observed differences.

Procedure and clinical assessment: A detailed history and ocular examination were performed, including visual-acuity assessment and slit-lamp examination. Topical proparacaine 0.5% was instilled, and the metallic foreign body with surrounding crust was removed using a sterile 26-gauge needle, as described in the source manuscript. Fluorescein staining was used to assess the epithelial defect. The exact method for measuring defect dimensions, examiner training, calibration and whether the same examiner performed all assessments were not reported.

Symptoms recorded included pain, photophobia, watering, foreign-body sensation and comfort. Baseline assessment was performed at the initial visit. Follow-up was reported at 18–24 hours, with patch removal and repeat slit-lamp/fluorescein examination in Group A. Further follow-up occurred on Day 2 and Day 3 until complete epithelial healing. The source manuscript does not provide a validated pain scale, a predefined comfort scale, operational definitions for symptom presence, or a detailed adverse-event reporting procedure.

Study outcomes

The outcomes described are: (i) residual epithelial defect size at 18–24 hours; (ii) presence of pain at baseline and follow-up; (iii) watering and photophobia, reported together; (iv) foreign-body sensation; and (v) complete epithelial healing by Day 2.

Statistical analysis: The data reports rounded percentages and approximate defect dimensions only. No individual-level dataset, exact event counts, measures of dispersion, confidence intervals, hypothesis tests or p-values were provided. Therefore, the present revision reports descriptive comparisons only and does not claim statistical significance.

RESULTS

A total of 150 patients were reported: 75 in Group A (patched) and 75 in Group B (unpatched). The following tables reproduce the approximate values in the source manuscript. Percentages are not converted into patient counts because the source reports rounded estimates and the exact numerators were not provided.

Table 1: Corneal epithelial defect dimensions

Group	Baseline defect	At 18–24 hours	Interpretation
Patched (n=75)	Approximately 2 × 2 mm	Approximately 0.2 × 0.2 mm	Smaller residual defect reported in the patched group.
Unpatched (n=75)	Approximately 2 × 2 mm	Approximately 0.5 × 0.5 mm	Residual defect reported as larger than in the patched group.

Interpretation: The reported baseline defect dimensions were similar in both groups. At 18–24 hours, the patched group had a smaller reported residual defect (0.2 × 0.2 mm) than the unpatched group (0.5 × 0.5 mm). This numerical pattern favours the patched treatment approach for early defect reduction.

Table 2: Pain at baseline and 18–24 hours

Group	Baseline pain	Pain at 18–24 hours	Descriptive change
Patched (n=75)	55%	11%	Decrease of 44 percentage points
Unpatched (n=75)	50%	15%	Decrease of 35 percentage points

Interpretation: Pain was reported less frequently at follow-up in the patched group (11%) than in the unpatched group (15%), despite improvement in both groups. This descriptive result favours the patched group for short-term pain symptoms.

Table 3: Watering and photophobia

Group	Baseline	At 18–24 hours	Descriptive change
Patched (n=75)	60%	26%	Decrease of 34 percentage points
Unpatched (n=75)	57%	30%	Decrease of 27 percentage points

Interpretation: The combined proportion reporting watering and/or photophobia decreased in both groups and was lower at follow-up in the patched group (26%) than in the unpatched group (30%). This pattern is consistent with better short-term symptom relief in the patched group, although watering and photophobia are not recorded as separate outcomes.

Table 4: Foreign-body sensation

Group	Baseline	At 18–24 hours	Descriptive change
Patched (n=75)	95%	15%	Decrease of 80 percentage points
Unpatched (n=75)	92%	18%	Decrease of 74 percentage points

Interpretation: Foreign-body sensation decreased substantially in both groups and was reported less frequently at follow-up in the patched group (15%) than in the unpatched group (18%). This descriptive difference favours patching for short-term comfort.

Table 5: Reported epithelial healing by follow-up

Time point	Patched group	Unpatched group	Interpretation
18–24 hours	Residual defect reported	Residual defect reported	Both groups showed improvement; complete healing was not reported for all participants at this point.
Day 2	Complete healing reported	Complete healing reported	The manuscript states that both groups had complete healing by Day 2.
Day 3	Follow-up planned/performed	Follow-up planned/performed	Group-specific Day 3 counts and complications were not provided.

Interpretation: The data states that complete healing was seen in both groups by Day 2.

Comparative Study

The below mentioned study reports results similar to our study

Hulbert MFG. Efficacy of eyepad in corneal healing after corneal foreign body removal. Lancet. 1991.

In this 150-patient comparison, both groups improved during the first 18–24 hours after metallic foreign-body removal, and complete healing by Day 2 was reported in both groups. Across the recorded early outcomes, the patched group showed a smaller reported residual epithelial defect and lower follow-up proportions for pain, combined watering/photophobia and foreign-body sensation. Taken together, these observations suggest that the patched treatment approach may offer a short-term comfort advantage in this dataset while maintaining rapid healing.

The findings are biologically plausible: an eye pad may limit repeated eyelid movement across the healing epithelium and provide a temporary barrier against light and environmental irritants. These mechanisms could contribute to improved comfort during the initial recovery period. At the same time, small superficial epithelial defects can heal rapidly through natural epithelial migration and proliferation, which may explain why both groups reportedly achieved complete healing by Day 2. Because Group A received chloramphenicol ointment and a patch whereas Group B received moxifloxacin drops, the study evaluates two treatment approaches rather than isolating the effect of patching alone.

The wider literature does not establish a consistent benefit for routine patching of every uncomplicated corneal abrasion.[9–13] Nevertheless, published results vary, and the available evidence has limitations in relation to patient selection, co-interventions and patient-centred outcomes. The current dataset shows a numerical pattern favouring the patched group for early defect size and reported symptoms. This finding is worth reporting as a context-specific observation and supports further well-controlled research on short-duration patching after metallic foreign-body removal, rather than a universal conclusion for or against patching.

Important limitations remain: the randomization method and allocation concealment were not described; no sample-size calculation was supplied; outcome definitions and measurement procedures were incompletely specified; symptom percentages were approximate; and p-values, confidence intervals and exact healing counts were unavailable. Watering and photophobia were combined, preventing separate analysis. Patient satisfaction, functional limitations and adverse events were not reported numerically. These limitations mean the apparent advantages should be described as numerical trends, not statistically proven effects.

Future studies should use the same antibiotic regimen in both groups so that the effect of patching can be evaluated more directly. A prespecified randomization process, standardized defect measurements, validated pain and comfort scales, separate symptom outcomes, exact event counts and a predefined statistical plan would strengthen the evidence. Recording patient satisfaction, visual function, adverse events and healing at fixed intervals would clarify whether short-duration patching offers a meaningful early comfort benefit for selected patients with metallic foreign bodies.

Limitations

- The research contains approximate percentages and defect dimensions rather than a complete participant-level dataset.
- No statistical tests, confidence intervals or p-values were reported; statistical significance cannot be inferred.
- Antibiotic treatment differed between the groups, creating potential confounding.
- Randomization sequence generation, allocation concealment and blinding were not described.
- Watering and photophobia were reported as a combined outcome.
- No exact healing counts by day, validated pain scores, adverse-event table or detailed patient-flow data were provided.
- Ethics approval, consent details, recruitment dates and trial registration details were absent from the supplied manuscript and require verification.

Discussion & Conclusion

In this study of 150 patients following removal of uncomplicated metallic corneal foreign bodies, the reported early outcomes numerically favoured the patched group. At 18–24 hours, the patched group had a smaller residual epithelial defect and lower reported proportions of pain, combined watering/photophobia and foreign-body sensation. Complete epithelial healing by Day 2 was reported in both groups, suggesting that patching was not associated with an obvious delay in healing in this dataset. These observations support considering short-duration patching as a possible option for early comfort in selected cases and justify further controlled study. However, because the available results are approximate, statistical testing was not reported, and antibiotic regimens differed between groups, the findings do not establish a statistically significant causal benefit or justify a universal recommendation for routine patching.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Kanski JJ, Bowling B. Clinical Ophthalmology: A Systematic Approach. 8th ed. Edinburgh: Elsevier; 2016.
2. American Academy of Ophthalmology. Basic and Clinical Science Course: External Disease and Cornea. San Francisco: AAO; current edition.
3. Kuhn F, Morris R, Witherspoon CD, Mester V. The Birmingham Eye Trauma Terminology system (BETT). J Fr Ophtalmol. 2004;27(2):206-210.
4. Guier CP, Stokkermans TJ. Corneal Foreign Body Removal. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; updated 2023 Jul 19.
5. Klyce SD, Beuerman RW. Structure and function of the cornea. In: The Cornea. 2nd ed. New York: Raven Press; 1997.
6. Hulbert MFG. Efficacy of eyepad in corneal healing after corneal foreign body removal. Lancet. 1991. (Verify volume, issue and page range from the original article before submission.)
7. Wilson SE, Mohan RR, Mohan RR, Ambrósio R Jr, Hong J, Lee J. The corneal wound healing response: cytokine-mediated interaction of the epithelium, stroma, and inflammatory cells. Prog Retin Eye Res. 2001;20(5):625-637.
8. Wipperman JL, Dorsch JN. Evaluation and management of corneal abrasions. Am Fam Physician. 2013;87(2):114-120.
9. Corneal Abrasion Patching Study Group; Kaiser PK. A comparison of pressure patching versus no patching for corneal abrasions due to trauma or foreign body removal. Ophthalmology. 1995;102(12):1936-1942. doi:10.1016/S0161-6420(95)30772-5.
10. Le Sage N, Verreault R, Rochette L. Efficacy of eye patching for traumatic corneal abrasions: a controlled clinical trial. Ann Emerg Med. 2001;38(2):129-134. doi:10.1067/mem.2001.115443.
11. Flynn CA, D'Amico F, Smith G. Should we patch corneal abrasions? A meta-analysis. J Fam Pract. 1998;47(4):264-270.
12. Turner A, Rabiu M. Patching for corneal abrasion. Cochrane Database Syst Rev. 2006;(2):CD004764. doi:10.1002/14651858.CD004764.pub2.
13. Lim CHL, Turner A, Lim BX. Patching for corneal abrasion. Cochrane Database Syst Rev. 2016;7:CD004764. doi:10.1002/14651858.CD004764.pub3.
14. Agostini RM, Rocha GMS, Miranda JC, Aguiar DV, Netto JA. Comparative study between eyepad and no eyepad in the treatment of corneal abrasion secondary to removal of corneal foreign body. Arq Bras Oftalmol. 2004;67(1). doi:10.1590/S0004-27492004000100019.
15. Deka B, Dutta SK, Deb S, Goswami H, Ahmed T, Kumar D. Effectiveness of patching and non-patching in treatment of corneal abrasion: a comparative study. Indian J Clin Exp Ophthalmol. 2020;6(4):616-621.
16. Michael JG, Hug D, Dowd MD. Management of corneal abrasion in children: a randomized clinical trial. Ann Emerg Med. 2002;40(1):67-72. doi:10.1067/mem.2002.124757.
17. Arbour JD, Brunette I, Boisjoly HM, Shi ZH, Dumas J, Guertin MC. Should we patch corneal erosions? Arch Ophthalmol. 1997;115(3):313-317. doi:10.1001/archopht.1997.01100150315001.
18. Mendelsohn A, Pokeza N, Bunya VY, et al. Removal of Corneal Foreign Bodies. EyeWiki. American Academy of Ophthalmology. Available from: https://eyewiki.aao.org/Removal_of_Corneal_Foreign_Bodies. Accessed October 10, 2026.
19. Guier CP, Stokkermans TJ. Corneal Foreign Body Removal. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK554478/. Accessed October 10, 2026.
20. Campanile TM, St Clair DA, et al. The evaluation of eye patching in the treatment of traumatic corneal epithelial defects. J Emerg Med. 1997. (Verify full bibliographic details from the original article before submission.)
21. Kaiser PK, Pineda R 2nd. A study of topical nonsteroidal anti-inflammatory drops and no pressure patching in the treatment of corneal abrasions. Ophthalmology. 1997. (Verify volume, issue and page range from the original article before submission.)
22. Szucs PA, Nashed AH, Allegra JR, Eskin B. Safety and efficacy of diclofenac ophthalmic solution in the treatment of corneal abrasions. Ann Emerg Med. 2000. (Verify volume, issue and page range from the original article before submission.)
23. Patterson J, Fetzer D, Krall J, Wright E, Heller M. Eye patch treatment for the pain of corneal abrasion. South Med J. 1996;89(2):227-229. doi:10.1097/00007611-199602000-00015.
24. Mendelsohn A, Pokeza N, Bunya VY, et al. Managing corneal foreign body injuries in a primary eye care setting. Clin Exp Optom. 2025. (Verify final volume, issue, pages and DOI from the publisher before submission.)
25. Yanoff M, Duker JS, editors. Ophthalmology. 5th ed. Edinburgh: Elsevier; 2019.