



## Patching in Corneal Abrasions in Children

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### ABSTRACT

**Introduction:** Traumatic corneal abrasion is one of the most common eye conditions presenting in the ophthalmic emergency rooms. Traditionally, traumatic corneal abrasions were managed by using pressure patching and antibiotic ointment or drops with or without mydriatic eye drops. However, there are no evidences that their use is of much benefit. **Materials and methods:** To conduct this review, a search strategy was developed that included all associated terminology and the potential synonyms, scientific search engines were targeted including PubMed, Cochrane Database and google scholar. **Discussion:** Most of the studies reviewed favored not to apply pressure patch for cases of traumatic corneal abrasion, most of the studies were conducted on adults, only two studies were performed on children, both also favored not to patch. **Conclusion:** Although there is no agreement on the best way of managing traumatic corneal abrasions in general and in children specifically. Author's recommendation in not to patch corneal abrasions in kids. Further studies upon pediatric population are still needed.

**Keywords:** Corneal abrasion – patching – corneal epithelial defect

### INTRODUCTION

Traumatic corneal abrasion or corneal epithelial defect is one of the most common eye conditions presenting in the ophthalmic emergency rooms, as well as the ophthalmology clinics; it represents about 10-20% of new admissions in ophthalmic emergency units<sup>1,2</sup>. However there is a lack of consensus in managing this problem<sup>3</sup>. Traditionally, traumatic corneal abrasions were managed by using pressure patching and antibiotic ointment with or without mydriatic eye drops. However, there is no evidence that their use is of much benefit. Pressure patching has been used for decades as routine. Although its

exact mechanism of action has not been studied, it was assumed that it can reduce pain and fasten healing by preventing blinking, thus reducing the friction between the lid and the healing corneal epithelium<sup>4</sup>. However, its use is not without disadvantages, the main risk being infection especially in contact lens wearers<sup>5</sup>. Moreover, lid closure reduces corneal oxygenation<sup>6</sup>, leading to decreased production of energy required for vital corneal functions, as well as increasing corneal temperature which could slow epithelial healing and predispose to secondary infection<sup>5</sup>. This is in addition to the sudden loss of binocular vision during

the time of patching<sup>4</sup>, causing a form of acute monocularly. If patching is prolonged for few days, this may lead to occlusion amblyopia, especially in infants<sup>7</sup>. Previous studies have been performed to evaluate the value of patching in treating corneal abrasion. In the literature, almost all these studies were conducted on adult population. Only one published paper was conducted on children<sup>8</sup>.

#### **MATERIALS AND METHODS**

To conduct this review, a search strategy was developed that included all associated terminology and the potential synonyms. Scientific search engines were targeted including PubMed, Cochrane Database and google scholar to capture academia reports. Listed articles and reports were then filtered based on its relevance, date and affiliation. Selected articles were downloaded and reviewed meticulously. Findings from the retrieved articles were categorized into domains with a special focus on sample size, study design and treatment modalities, etc. the hierarchy of evidence was given to meta-analysis, then to clinical trials and if not then to longitudinal studies.

#### **DISCUSSION**

In the Cochrane review in 2016<sup>9</sup>, 259 records were found, yet after excluding duplication and non-relevant studies, it reached 12 main studies to be evaluated where meta-analysis was performed on them; only one study was on children<sup>8</sup>. Regarding the summary of the main results of the reviewed articles; it was mentioned that there was little evidence of demonstrable differences across primary and secondary outcomes for both patched and non-patched groups. Primary outcomes were complete healing after a specific period of time like 24, 48 or 72 hours, or number of days to complete healing or changes in

corneal abrasion dimension size. Secondary outcomes studied included pain, discomfort, use of analgesia impact on quality of life. The review mentioned that little evidence may have been attributable in part to a high attrition rate in some studies, which may affect eventual analyses. The review mentioned that therefore it is reasonable to conclude that patching of the eye is not useful for the treatment of simple, traumatic corneal abrasions. Here I would highlight the most important studies, some of them were reviewed in that Cochrane review<sup>9</sup>. One interesting study published by Calder and co-workers<sup>3</sup>. It was a questionnaire to study the practice patterns of Canadian emergency physicians with respect to the management of traumatic corneal abrasions. The authors randomly surveyed 470 members of the Canadian Association of Emergency Physicians, 301 responded, responses showed lack of consensus in the management of traumatic corneal abrasions. Patching was performed by only 21.6% of respondents, regarding pain management it included oral analgesics (82.1%), cycloplegics (65.1%) and topical non-steroidal anti-inflammatory drugs (NSAIDs) (52.8%), topical antibiotics prescribed by (71.2%), particularly for contact lens wearers and patients with ocular foreign bodies. Interestingly two-thirds of the respondents provided tetanus toxoid if a foreign body was present, and 46.2% did so even if a foreign body was not present<sup>3</sup>. In a study published by Kaiser<sup>4</sup> in 1995, that was a comparative study between patch and no patch groups; it showed significant difference between the 2 groups where no patch group showed less pain & faster healing, it included patients post foreign body removal as well as those with simple corneal abrasions, what was unique in this study also is that the

author analyzed a subgroup with large abrasion more than 10mm<sup>2</sup>, and it showed faster healing in patch group but the difference was not statistically significant. Another study by Menghini and co-workers<sup>10</sup>, compared prospectively between 3 options in managing corneal abrasions occurred from a superficial corneal foreign body; first group applied pressure patching with ofloxacin ointment, second group received therapeutic contact lens with ofloxacin eye drops and the third received ofloxacin ointment alone. Number of patients was 18, 20 and 28 respectively. Primary outcome of the study was to measure the difference of the mean corneal abrasion area between the three groups at 3 different time points (baseline, day 1 and day 7). Results of this study showed that the differences in corneal abrasion area at any time point were not statistically significant between the 3 groups. Jennifer and co-workers<sup>11</sup>, published a review regarding evaluation and management of corneal abrasions. It highlighted the evidence rating of different treatment option; putting a grade of “A” for not applying pressure patch, “A” represents consistent good-quality patient-oriented evidence, that level of evidence was based on 2 papers, the first of Flynn and co-workers<sup>12</sup>, and the other is the Cochrane review the edition of 2006<sup>13</sup>. Remarkably, almost all the studies recorded were on adult patients, 2 studies included children were published; a study by Campanile and co-workers<sup>14</sup>, who randomized 31 patients to the patch group and 33 patients to the no patch group, of whom 17 patients were younger than 18 years of age, their study demonstrated improved healing in the no patch group, but no separate analysis for pediatric patients was performed. The other study, which is the only study published

found to evaluate the corneal abrasions only in children; J Michael and co-workers<sup>8</sup>, performed this randomized clinical trial of patients aged 3 to 17 years who were diagnosed with isolated corneal abrasion. A total of 37 patients were enrolled, 17 received an eye patch and 18 with no eye patch, abrasion was documented using digital photographs and/or an eye template diagram, results showed 86% of patients had 95% or more healing at the follow-up examination, and there was no difference between patch and no patch groups in mean percent healing, including when adjusted for age or abrasion size, there was no difference between groups for number of pain medication doses required, yet among measurements of interference with 10 activities of daily living (ADL), only the difficulty walking score was found to be significantly different between groups, being affected in patch group. Although that study was a well randomized trial, its sample size was small; only 37 patients, and its authors recommended further studies with bigger sample size<sup>8</sup>. Lastly, there was one unpublished study done on children<sup>15</sup>, this study was done by the author of this article and two colleagues, its results were presented in the World Ophthalmology Congress in 2012, that study was a randomized, comparative clinical trial on 80 consecutive patients, from 3 to 14 years old, presenting with acute traumatic corneal abrasion, patients were randomized to 2 equal groups; 40 patients each. Patients in the no patch group received medical treatment only, while in the patching group received, in addition to the same medical treatment, a double patch. Patients were followed daily till healing, documenting healing, pain and photophobia. Pain was assessed using Wong Baker faces scale for children<sup>16</sup>. Results showed 62

patients completed the daily follow up till healing. Average time till healing show a clinically significant difference, for the No-patch group was 1.45 days, and for the Patch group was 1.79 days ( $P= 0.020$ ). Mean Pain scale in the No-Patch group in the initial visit, first and second days were 4.8, 1.81, 0.15 respectively, while in Patch group 6.35, 2.68, 0.78 and in the third day 0.67 (insignificant), photophobia (assessed by asking the child or guardian if present or no) showed also no statistical difference between the two groups. This study again favors not to patch<sup>15</sup>. What can explain the findings of favoring not to patch may be due to the expected decreasing oxygenation which occurred under pressure patch, which could delay the healing process<sup>6</sup>. In addition to the expected complications of the patch, as risk of infection<sup>5</sup>, inducing amblyopia in children<sup>7</sup>, and the status of acute monocularly which affects the daily life activities<sup>8</sup>, all these factors favors not to use the pressure patch.

## CONCLUSION

Still there is no agreement on the best way of managing traumatic corneal abrasions in general and in children specifically. Author's recommendation in not to patch corneal abrasions in kids, because of lack of any evidence that patching the affected eye is beneficial, whether in rate of healing or amount of pain, adding to consideration the proved risks of the patch, as inducing amblyopia and the acute monocularly effects. Further studies upon pediatric population is still needed.

## FINANCIAL DISCLOSURE

The author declares no financial interests to disclose.

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