

# In a Flash- A Case Report of Magic Paper Burns

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## Introduction

"Flash Paper" is a nitrocellulose paper commonly used in magician's routines and accessible in magician supply stores. The intrinsic nitrate concentration determines its pyrotechnic characteristics, and this form of nitrocellulose is classified as an explosive.<sup>1</sup>

This is a case report of a thirteen year old admitted to a quaternary children's hospital in Brisbane, Australia with burns sustained when a roll of Flash Paper ignited on his lap while experimenting with friends. This mechanism for a flame burn is to date unpublished, triggering this report with the view to educate and warn the community of the dangers involved with the easily accessible form of nitrocellulose.

### **Case Presentation**

The 13 year-old patient was on his family's property in regional south east Queensland at the time of the injury, experimenting with a roll of nitrocellulose paper that was purchased by a family member from eBay. The patient and his friends were tearing off and lighting small pieces of the paper when an ember fell onto the roll of nitrocellulose paper that was sitting on his lap, igniting the roll. He was wearing shorts that were also ignited. His clothing was immediately removed and adequate first aid (twenty minutes of cold running water) was administered. His burns were initially treated at a local emergency department and wound care clinic. A referral was made to the Paediatric Burns service four days post injury at which time he was advised to present to Lady Cilento Children's Hospital for review.

The thirteen year-old was reviewed at Lady Cilento Children's hospital four days post injury. His wounds were debrided with opioid and nitrous oxide analgesia. Partial thickness burns were documented involving bilateral medial thighs, the left side of the face and left pinna as well as mild conjunctival burns to his left eye with an estimated TBSA of 8%. The depth of the burns was mixed with central areas of mid dermal depth burns surrounded by superficial partial thickness burns with multiple small areas of mid dermal thickness burns. The burns to his face were superficial partial thickness burns. The burns to bilateral medial thighs were dressed with standard burns dressings.

Opthalmology review documents inflammation of the left conjunctiva consistent with a mild thermal burn without any epithelial defect. Treatment involved chloromycetin ointment twice daily and Celluvisc lubrication every one to two hours with outpatient Opthalmology review.

Upon review as an outpatient, re-epithelialisation had occurred to the majority of his wounds including his conjunctival burn by Day 9. On follow up at Day 12 and Day 16, there was complete re-epithelialisation of all wounds and scar management was not required.

#### Discussion

Nitrocellulose is a chemical compound formed by the nitration of cellulose, through exposure of cellulose to a mixture of nitric and sulfuric acids.<sup>2</sup> The intrinsic nitrate concentration in each sample of nitrocellulose is the primary determinant of its pyrotechnic characteristics, with any formulation of nitrocellulose exceeding 12.6% nitrogen content classified as an explosive.<sup>1</sup> The instability and volatility of nitrocellulose can be attributed to its autocatalytic tendency and low activation energy required (174kJmmol<sup>-1</sup>) to reach the compound's critical ignition temperature, <sup>3</sup> where it can decompose and burn without the presence of oxygen due to intrinsically sufficient oxygen concentrations.<sup>4</sup> 4.

Nitrocellulose is currently employed in the munitions industry, as a smokeless gunpowder (Peak, 1980), the medical industry, as a key ingredient in cutaneous wound sealants<sup>1,5</sup> and the entertainment industry, in the form of fast disappearing "Flash Paper". "Flash Paper" is commonly used in magician's routines, whereby the performer ignites a palm-sized piece of nitrocellulose with a hidden ignition source, giving the illusion of "throwing" fire. When done correctly, the stunt causes no injury to the magician, however, improper use of the material has the potential to cause serious injury, burning at a maximum temperature of approximately 209°C, over an extremely short duration of one second.<sup>3,6</sup> As a result, serious precautions must be taken in order to ensure the safety of novice magicians employing this easily obtainable form of nitrocellulose.

# Conclusion

This case report of a flash burn caused by the ignition of a roll of nitrocellulose "Flash Paper" obtained from an international seller via the online marketplace has triggered a report and review by the ACCC (Australian Competition and Consumer Commission). The clinicians involved in this case at the Pegg Leditschke Burns Centre at Lady Cilento Children's Hospital felt that the unusual mechanism for this burn warranted publication to inform and educate the broader community about the dangers associated with nitrocellulose products marketed as magic supplies.

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Photos of burns upon initial review at Lady Cilento Children's Hospital 4 days post injury





Right medial thigh Left medial thigh



Written and verbal consent for the presentation and publication of this case was obtained from the patient and his family including the use of clinical photographs.



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