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Case report

Full thickness burns caused by cyanoacrylate nail glue: A case series

Noemi Kelemen, Eleni Karagergou, Sarah L. Jones, Andrew N. Morritt *

The Burns Unit, Sheffield Children's Hospital, Sheffield, S10 2TH, UK

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ABSTRACT

Artificial (acrylic) nails are popular cosmetic enhancements that provide the user with the appearance of manicured nails, do not chip or crack, and are generally considered very safe to apply. We report three cases where full thickness thermal burns were sustained from nail glue adhesive (cyanoacrylate) during the application of artificial nails. All three cases underwent surgical debridement and split skin graft reconstruction. We carried out an experiment to characterize the exothermic reaction between nail glue and cotton leggings. The average high temperature produced was 68 °C which was sustained for 12.2 s which is more than sufficient to cause full thickness burns on skin. We report these cases to increase both professional and public awareness of this serious potential complication associated with the application of artificial nails.

1. Introduction

Artificial nails are attached with nail glue that usually contains cyanoacrylate. Ethyl and methyl-cyanoacrylates are currently used in the beauty industry as 'nail glue' for artificial nail enhancements [1]. A single skin contact with cyanoacrylate is generally safe but repeated contact might cause dermatitis [2], irritant paronychia or allergic onycholysis [3]. However if the nail glue comes into contact with cotton a severe exothermic reaction occurs which can result in a thermal burn [1,4–6]. In some cases the heat generated can be so high that the clothing catches fire [4]. Cutaneous burns from cyanoacrylate glue are rare with only four cases reported in the literature [1,4–6] of which only two cases occurred in children [5,6] and only one of which occurred was caused by nail glue [5].

We report three cases of full thickness burns in children from cyanoacrylate nail glue, which we believe is the largest series reported to date. We report these cases to increase professional and public awareness about this potentially serious adverse effect from this commonly used product.

2. Case 1

A 15-year-old girl presented to the Pediatric Burns Unit with a full thickness burn on the right thigh. She had spilled half a bottle of nail glue onto her cotton leggings during artificial nail application ten days earlier. The glue reacted with the cotton producing an intense exothermic reaction that burnt a hole in her leggings and caused a seven by six centimeter full-thickness burn on the right anterior thigh (Fig. 1). She had no

* *Corresponding author at*: The Department of Plastic Surgery, Sheffield Children's Hospital NHS Foundation Trust, S10 2TH, UK. Tel.: +44 114 271 7000.
E-mail address: andrew.morritt@sth.nhs.uk (A.N. Morritt).

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Fig. 1 – Full thickness burn over right anterior thigh.

significant past medical history and was not taking any regular medications. She applied cold water and antiseptic cream to the area regularly but decided to present to the Burns Unit when the wound failed to heal. She underwent tangential excision and split-thickness skin graft reconstruction. The postoperative recovery was complicated by wound infection that responded to antibiotics and she had fully healed eighteen days post burn. She was placed in a pressure garment once the graft had healed. At three-month review the skin graft was maturing without hypertrophic scarring.

3. Case 2

An 11-year-old girl presented to the Pediatric Burns Unit with a full thickness burn to both inner thighs. She had spilled nail glue onto her jeans during artificial nail application. The resultant intense exothermic reaction burnt a hole in her jeans and the caused 2.5 × 2.5 centimeter full-thickness burn on both inner thighs. She had no significant past medical history and was not taking any regular medications. She underwent tangential excision of the burn and split-thickness skin graft reconstruction. The postoperative recovery was uneventful and her burns were healed in 19 days. Three months later, after continuous pressure garment treatment here scars were maturing with no evidence of hypertrophic scarring.

4. Case 3

A 16-year-old girl presented to the Pediatric Burns Unit with a three by four centimeter full thickness burn on the left lower leg (Fig. 2). She had spilled nail glue onto her cotton leggings during artificial nail application. Her past medical history included asthma and psoriasis and her medications included regular salbutamol inhalers taken as needed. She underwent tangential excision and split-thickness skin graft reconstruction. The postoperative recovery was complicated by wound infection, which responded to oral antibiotics. Due to poor patient compliance with postoperative dressings, some skin

Fig. 2 – Full thickness burn to left leg.

graft was lost and it ultimately took 25 days from the time of burn for full healing to occur. Three months later, after continuous pressure garment treatment her graft was maturing with no evidence of hypertrophic scarring.

5. Discussion

Burns from cyanoacrylate glue in children are rare with only two cases reported in the literature [5,6] and in only one of these cases was the burn caused by nail adhesive [5]. One case involved a five month old who spilled two bottles of nail adhesive onto her abdomen that her mother had left lying around after completing a manicure [5]. The child sustained mixed depth burns to the abdomen, which were managed

Fig. 3 – Legging material placed over the temperature probe – room temperature (25 °C).