IS ARTIFICIAL NAIL APPLICATION SAFE FOR ADOLESCENT CHILDREN? (P010)

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**Introduction:** Artificial (acrylic) nails (ethyl and methyl-cyanoacrylates) recently became a popular cosmetic enhancement and are generally considered very safe to apply (1). A single skin contact with cyanoacrylate is generally safe but repeated contact might cause dermatitis (2), irritant paronychia or allergic onycholysis (3). Cutaneous burns from cyanoacrylate glue are rare, however if the nail glue becomes in contact with a piece of clothing a severe exothermic reaction occurs and results in a severe contact thermal burn of the underlying skin (4).

**Methods:** Herein we report three cases of severe full thickness thermal burns sustained from nail glue adhesive (cyanoacrylate) during artificial nails application.

**Results:**

**Case 1.** A 15-year-old female spilled half bottle nail glue on her cotton leggings during artificial nail application, resulting in an intense exothermic reaction that burnt a hole in her leggings and subsequently caused a 7x6 cm full-thickness burn on the right anterior thigh. She required tangential excision and reconstruction with split-thickness skin graft with 18 days healing time.

**Case 2.** An 11-year-old female spilled nail glue on her jeans during artificial nail application, resulting in an intense exothermic reaction that burnt a hole in her jeans and caused 2.5x2.5 cm full-thickness burn on both inner thighs. She underwent tangential excision of burn and reconstruction with split-thickness skin graft with 19 days healing time.

**Case 3.** A 16-year-old female spilled nail glue onto her cotton leggings during artificial nail application. This caused 3x4 cm full-thickness burn on the left inner thigh (Fig.1). Subsequently she required tangential excision and reconstruction with split-thickness skin graft and required 25 days healing time.

**Conclusion:** Cyanoacrylate [CH₂=C(CN)CO₂R] is a monomer, which is formed by the reaction of formaldehyde with alkyl cyanoacetate. This molecule is readily subjected to exothermic polymerization (hydroxylation) on contact with hydroxyl groups (-OH). The polymer chains form strong resins that effectively join in closely spaced surfaces. In presence of cotton fibers, which are abundant in cellulose and hydroxyl (-OH) groups, the above exothermic polymerization accelerates, resulting in a rapid, powerful reaction that can cause thermal burn injury when in direct contact with underlying skin.

Information on safe use of this product is crucial in order to avoid the above accidental injuries. In our cases, there was neither warning at the back of the glue tube nor supplementary information leaflet regarding its potential hazard when in contact with cotton or wool. We suggest the education of parents, public and primary healthcare professional to raise awareness of the potential hazards occurring during nail glue usage of adolescent children. Also all contact with cotton or wool must be avoided during the usage of this product.
References:

2. Shelley ED and Shelley WB. Chronic dermatitis simulating small-plaque parapsoriasis due to cyanoacrylate adhesive used on fingernails. JAMA 1984; 252(17):2455-6

Figure 1