

## PhotoVignette

### Hair-thread tourniquet syndrome: a case report and review of treatment

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## Abstract

Hair-thread tourniquet syndrome (HTTS) is caused by circumferential constriction of an appendage, usually by hair or thread, leading to obstruction of circulation and ischemia. Although not rare, this entity is not discussed extensively in the Dermatology literature. We present a case of HTTS and discuss the demographics and etiology, and review the most current treatment methods.

**Key words:** hair-thread tourniquet syndrome, hair tourniquet

## Case synopsis

An otherwise healthy 6-month-old boy presented with a swollen, violaceous right fourth toe that his father noted after arriving home from daycare. His father denied any abnormalities of the digit prior to attending daycare. The infant showed no signs of distress and was interacting appropriately with his father. On examination, his right fourth toe was edematous and violaceous, with a sharp demarcation at the base (Figures 1a,b). The rest of his right foot was unaffected, including his other digits. Upon closer inspection, a strand of blonde hair was found to be wrapped around the base of the digit, causing circumferential constriction and laceration. The hair was immediately removed using scissors and improvement of the edema and color was noted almost immediately. Brisk capillary refill was demonstrated and the infant was moving the digit appropriately. Following a brief period of observation in the clinic with continued improvement, the patient was discharged with topical mupirocin ointment to be applied to the denuded areas. The father was instructed to seek immediate attention should the affected digit show any recurrence of symptoms or signs of vascular compromise. Three days later at follow-up, the site of laceration had fully reepithelialized and only mild erythema, edema, and fine desquamation were noted.



**Figures 1A and 1B.** An edematous and violaceous fourth toe caused by constriction by a strand of hair. The hair has been removed prior to photography, but note the laceration left behind.

## **Discussion**

Hair-thread tourniquet syndrome (HTTS) is a term coined by Barton et al in 1988 to describe circumferential constriction of an appendage, usually by hair or thread, causing obstruction of circulation and ischemia [1]. This rare entity has been recognized as early as the 1600s and other names include toe tourniquet syndrome and hair tourniquet syndrome. The most commonly affected structures are the toes and the penis, followed by the fingers and external female genitalia. There are also rare reports of involvement of structures in the oral cavity, neck, and distal leg [2].

Infants are most commonly affected, followed by young children, but cases have been reported in patients aged up to the ninth decade [2]. The presentation is usually acute, as in our patient, but may also be chronic, depending on the severity of the constriction and impeded blood flow. For infants, the presenting sign is often simply irritability and crying, so a high index of suspicion is needed to identify the swelling and discoloration of the appendage [3]. This condition can be misdiagnosed as an infection or trauma and delayed intervention can lead to serious sequelae including neurologic impairment, gangrene, infection, and autoamputation. Other conditions in the differential diagnosis include arthropod assault, contact dermatitis, palmoplantar keratoderma, ainhum, or congenital constriction band [3]. Diagnosis may be difficult if the free ends of the hair or thread have broken off or if the fiber has cut through the tissues and reepithelialization has occurred. Therefore, close examination with magnification should be performed in any suspicious cases.

It is still unclear exactly how the hair or fiber is able to wrap so tightly around a structure and cause strangulation, but the human hair's high tensile strength and ability to stretch when wet and contract when dry make it an ideal tourniquet [4]. Although most cases are accidental, child abuse has been implicated and a thorough history should be taken. Some authors suggest that multiple or recurrent hair tourniquets and the discovery of knots in the material may raise suspicion, but consensus is lacking. There are some cultures that tie hair around digits for religious reasons and others that wrap hair around the penis to prevent nocturnal enuresis. There has also been a link to maternal telogen effluvium [2,4].

Treatment involves prompt removal of the offending fiber to reestablish vascular perfusion. In some cases, this is as simple as unwinding it manually, but may require using scissors, a scalpel, or needle to clip the fiber. Some physicians advocate the use of depilatory creams to dissolve the hair to induce less trauma if there is no immediate vascular compromise. Specifically, in one report, an over-the-counter depilatory cream (active ingredient: calcium thioglycolate) was applied over the digit and left for thirty minutes, after which the cream was gently rubbed off and the digit washed in warm water [5]. However, edema and reepithelialization may hinder the methods described above and a surgical intervention may be required under local or general anesthesia. The excision is preferably placed over the dorsal digit, longitudinally, to avoid injury to the nerves and vessels located on the medial and lateral aspects. Although injury to the extensor tendons is possible, the parallel nature of the incision has not been shown to cause any functional impairment [6]. It is important to note that more than one strand of hair or thread can be present so any suspicion of persistent constriction should prompt further investigation, including surgical exploration under general anesthesia if necessary. After decompression, the sites are managed conservatively to prevent infection and additional ischemia. Prognosis depends on the degree and duration of ischemia and may range from full recovery to amputation. Involvement of the toes generally has a better prognosis compared to fingers or genitalia [7].

In conclusion, it is important for a dermatologist to be aware of and recognize this condition because early treatment may prevent the loss of appendages and further complications. Often, a clear history cannot be elicited because most of those affected are either infants or individuals with cognitive deficits, so physicians should be prepared to investigate the possibility of this diagnosis. Patient education may also be of value. Patients may be instructed to launder their children's clothing inside out and to check the insides of garments for stray threads or hairs. Again, it is important to emphasize that more invasive exploration is indicated if there is any suspicion of persistent strangulation.

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