

# USE OF MODIFIED TENSION BAND SUTURES FOR FINGERNAIL DISRUPTIONS

H. S. PATANKAR

*From the Patankar's Hand & Limb Reconstruction Clinic, Chembur, Mumbai, Maharashtra, India*

**A series of 66 patients, aged between 1 and 70 years, with 70 disruptive injuries to finger nails was reviewed. The injuries were treated by cleaning of the finger, evacuation of haematoma and anatomical replacement of the nail plate, or a substitute, which was secured with a modified dorsal tension band suture without formal repair of the nail bed. K-wire fixation of the distal phalanx was employed only in the event of displaced fracture of the distal phalanx, complete absence of the nail plate and laceration extending to the distal pulp. This simple method, which bypasses the injured and friable, but vital nail structures resulted in uncomplicated re-formation of the normal nail plate in all of the cases. Removal of the nail plate and formal repair of the nail bed is not necessary in any age group with finger nail disruptions.**

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Finger tip injuries can result in varying degrees of disruption of the nail plate and/or nail bed. The recommended treatment of injuries of the nail is a meticulous repair of the nail bed after removal of the nail plate. This is preceded by stabilisation of any distal phalangeal fracture and may also include repair of the finger pulp. Lastly, the nail plate, or a stent substitute is repositioned anatomically in the nail fold and sutured to the hyponychium and the proximal nail fold (Al Qattan et al., 2003; Bindra, 1996; Elbeshbeshy and Rettig, 2002; Green and Rowland, 1991; Richards et al., 1999; Rosenthal, 1983; Stevenson, 1992; Zacher, 1984; Zook and Brown, 1993).

In this paper, a series of 66 patients with 70 fingertip disruptions were treated by anatomical reposition of the nail plate, or a stent substitute, under the nail fold and securing it with a modified dorsal tension band suture without formal repair of the nail bed.

## PATIENTS AND METHODS

Between February 1999 and September 2005, 70 fingertip injuries including injury to the nail bed in 66 patients were treated. The injuries included 55 cases of partial nail avulsion, seven cases of complete nail avulsion of which six patients had no available nail, and four cases of sharp injury to the nail plate. Nine fractures had occurred at the level of the middle or proximal third of the distal phalanx and the remaining 61 were tuft fractures. The patients included 18 women and 48 men of mean age 22.9 (range 1–70) years. The patients were followed up for a mean of 15 (range 4–36) months.

Cases of subungual haematoma without nail avulsion, or disruption, and those with distal tissue loss, i.e. amputations, were excluded from the study.

## SURGICAL TECHNIQUE

The patient was anaesthetised using general anaesthesia in children and local anaesthesia in adults. A tourniquet was applied after elevation of the hand. The hand was thoroughly cleaned and draped.

In cases in which the nail was not completely avulsed but just dislocated from the proximal nail fold, the nail was not removed from its residual attachment to the nail bed. Haematoma was completely evacuated and the visible undersurface of the nail was irrigated with a jet of saline from a syringe. The undersurface of the nail was not scraped free of tissue. The nail fold was cleaned and opened gently with a small blunt elevator and the nail plate repositioned anatomically and secured in place with a modified dorsal tension band suture technique (Fig 1a) using 4–0 to 6–0 non-absorbable, unbraided Ethilon (Ethicon, Division of Johnson and Johnson Ltd., Aurangabad, India) on an atraumatic cutting needle. Proximally, a suture was placed at least 6 to 8 mm proximal to the nail fold in order to avoid injury to the germinal matrix. The suture was passed transversely through the skin, superficial to the repositioned nail plate and the underlying germinal matrix. The needle is then carried distally crossing the midline of the finger dorsally. The distal pass of the suture was made transversely through the finger pulp just distal to the nail hyponychium. With an assistant maintaining the reduction of the nail plate, or stent, the suture was then tensioned to just short of skin blanching and tied resulting in a dorsal Figure-of-8 loop (Fig 1b). This dorsal tension band suture results in adequate approximation of any fracture of the distal phalanx, the nail bed and the skin edges on either side of the nail, avoiding the use of additional sutures through the crushed soft tissues of the nail bed, the hyponychium and the proximal nail fold. The replaced nail plate is

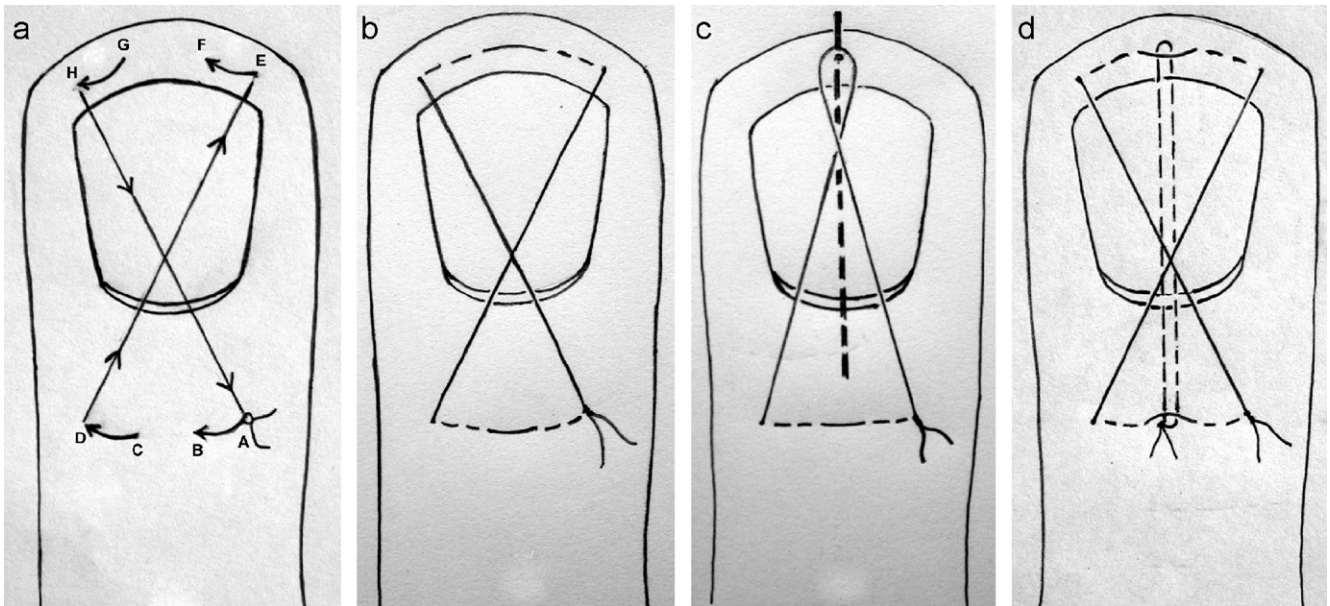


Fig 1 (a) Suture method: The needle is passed through the skin proximally at two sites entering at point A and exiting at point B and entering again at point C and exiting at point D. Similarly, the needle is placed distally at E to F and at G to H. The thread is thus visible on the dorsum of the finger between B and C and between F and G. The thread is brought back from the point H to the point A and tied. (b) Completed suture: Note the visible thread proximally and distally in the midline for additional tension banding. (c) Method of securing the nail plate with K-wire fixation of the distal phalanx: This technique is used in the presence of complete avulsion of the nail plate, displaced fracture of the tuft or shaft of the distal phalanx, lacerated finger tip and absence of intact skin bridge on the volar aspect. (d) Additional tension band suture taken through the thread visible in the midline.

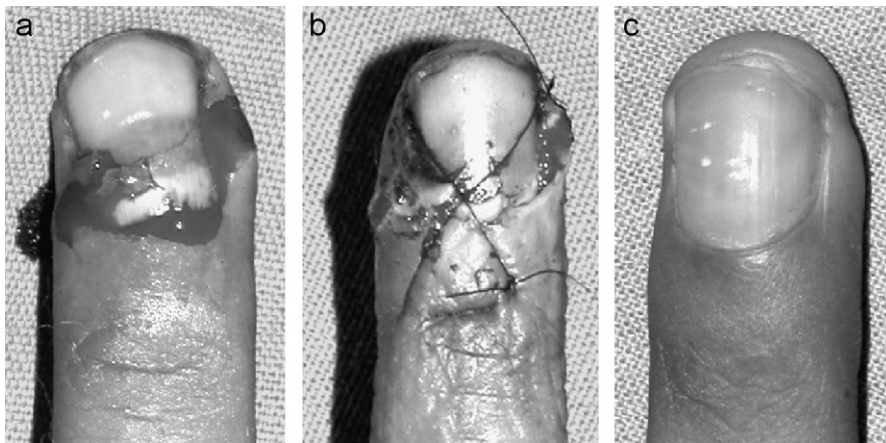


Fig 2 (a) Proximal nail plate avulsion with laceration of the nail fold in a 10 year-old girl. (b) Tension band suture maintaining the repositioned nail plate. (c) Complete reformation of the nail plate with normal finger tip at 18-month follow-up.

believed to prevent adhesion of the nail fold to the proximal nail bed (Fig 2).

In cases of severe injury, the finger nail may be completely avulsed with laceration of the nail bed, lateral nail fold and finger pulp and fracture of the tuft, or shaft, of the distal phalanx. In these cases, the fracture was reduced and stabilised with a K-wire, the position of which was verified with a C-arm image intensifier. The

nail bed was palpated for sharp spikes of bone, which were reduced when present. The lacerated ends of the nail bed were gently spread out with a blunt instrument such as the proximal end of the knife handle and positioned as anatomically as possible over the dorsum of the distal phalanx. However, no attempt was made to suture them. The nail plate (if available) and the nail fold were washed and cleaned. The nail plate, or a stent, was

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