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**Shailendra Vaijinathrao Chaudhari**

Senior Specialist Registrar,  
Department of Anaesthesia,  
Rashid Hospital and Trauma  
Center, Dubai, United Arab  
Emirates

**Hany Fawzi W. Greiss**

Consultant and HOD,  
Department of Anaesthesia,  
Rashid Hospital and Trauma  
Center, Dubai, United Arab  
Emirates

**Osama Sami Maki Al Ani**

Consultant, Department of  
Anaesthesia, Rashid Hospital  
and Trauma Center, Dubai,  
United Arab Emirates

**Mansour Yousef A Nadhari**

Director, Consultant and CEO,  
Department of Anaesthesia,  
Rashid Hospital and Trauma  
Center, Dubai, United Arab  
Emirates

**Khalid Alawadi**

Consultant Plastic and Hand  
Surgeon Director of Surgery,  
Rashid Hospital and Trauma  
Center, Dubai, United Arab  
Emirates

**Chaitanya Dodakundi**

Senior Specialist Registrar,  
Hand Surgery Unit,  
Rashid Hospital and Trauma  
Center, Dubai, United Arab  
Emirates

**Corresponding Author:**

**Shailendra Vaijinathrao Chaudhari**

Senior Specialist Registrar,  
Department of Anaesthesia,  
Rashid Hospital and Trauma  
Center, Dubai, United Arab  
Emirates

## Successful reimplantation and nerve catheter analgesia in a pediatric thumb amputation case

**Shailendra Vaijinathrao Chaudhari, Hany Fawzi W Greiss, Osama Sami Maki Al Ani, Mansour Yousef A Nadhari, Khalid Alawadi and Chaitanya Dodakundi**

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### Abstract

Thumb amputation is a traumatic injury that poses significant challenges, particularly in pediatric patients. This case report details the successful reimplantation of a nearly totally amputated right thumb in a 20-month-old infant. The procedure was performed by a team of skilled hand surgeons under general anesthesia, and continuous local anesthesia infusion was administered via a supraclavicular peripheral nerve catheter. The post-operative course was uneventful, with intact vascularity, capillary refill, and motor function observed. This case highlights the importance of prompt surgical intervention, multimodal pain management, and close post-operative monitoring in achieving favorable outcomes for such cases.

**Keywords:** Amputation, catheter, anaesthesia, capillary, paediatric

### Introduction

Pediatric traumatic thumb amputations are rare but require immediate medical attention and precise surgical skills. This case presents a successful reimplantation procedure in a 20-month-old baby with a nearly totally amputated right thumb. Continuous local anesthesia infusion was utilized to manage postoperative pain and enhance recovery.

### Case Presentation

A 20-month-old baby was brought to the emergency room with a nearly total amputation of the right thumb, presenting no vascularity at the proximal phalanx. The patient was promptly taken to the operating room (OT) for reimplantation, which was performed by experienced hand surgeons under general anesthesia.

### Procedure

In preparation for the surgery, a supraclavicular peripheral nerve catheter was inserted under ultrasound guidance to facilitate continuous local anesthesia infusion. A bolus of 0.2% Ropivacaine (3 ml) was injected through the catheter, and a continuous infusion of Ropivacaine 0.2% (1 ml/hr) was initiated. This provided effective pain management for the patient throughout the postoperative period.

Thumb vascularity was successfully restored during the reimplantation procedure. The patient underwent wound inspections in the operating room on multiple occasions to monitor the healing process and assess the viability of the reattached thumb.

After eight days, following discussions with the surgeon, the supraclavicular catheter was safely removed. Capillary refill in the reattached thumb remained intact throughout this period.



**Fig 1:** Clinical photograph of Reimplantation of Right thumb

### Outcome

Following the removal of the catheter, the child exhibited movement in the right arm and fingers, and sensory function appeared normal according to the mother's report. The reimplanted right thumb displayed good capillary refill, indicating successful revascularization and viability.

### Discussion

Both anaesthesiologists and surgeons acknowledge the advantages associated with peripheral nerve catheters (PNCs). Administering local anaesthesia by continuous infusion near a peripheral nerve or plexus has been found to result in a reduced occurrence of systemic side-effects compared to intravenous opioids [1, 2, 3]. Additionally, this approach has been associated with higher levels of patient satisfaction following surgery and the potential for accelerated functional recovery of the affected limb. In recent times, there has been an observed correlation between the usage of intra-articular and subacromial pain pump catheters and the occurrence of glenohumeral joint chondrolysis. As a result, peripheral nerve catheters (PNCs) have gained increased significance in the realm of pain management following orthopaedic surgical procedures [4, 5]. Despite the numerous advantages and extensive use of continuous peripheral nerve catheters (PNCs), there is a paucity of research pertaining to the avoidance of problems associated with PNC insertion, administration, and removal. Ideally, peripheral nerve catheters (PNCs) are successfully inserted on the initial try, minimising patient discomfort, and effectively delivering surgical anaesthetic, postoperative analgesia, or a combination of both. In the context of clinical practise, it might be challenging to identify the nerve, navigate the catheter, or ensure optimal dissemination of the local anaesthetic. In addition, healthcare professionals may encounter unintended vascular puncture, production of a hematoma, or a combination of both. Both neurostimulation and ultrasound-guided approaches have demonstrated great success rates in the implantation of percutaneous nerve catheters (PNCs). The occurrence of vascular puncture during percutaneous needle catheterization (PNC) implantation is often observed. In a study conducted, the incidence of vascular puncture was found to be 5.7% for femoral catheters and 6.6% for sciatic

catheters [9]. There have been documented instances of arterial puncture and intravascular catheter migration occurring in other peripheral nerve catheter (PNC) placements as well. Recent research indicates that there is potential for the United States to reduce the likelihood of unintentional vascular puncture. Infrequent occurrences of significant haemorrhaging and severe consequences resulting from arterial puncture have been seen. In a research conducted on a sample of 405 individuals who had axillary percutaneous needle catheterization (PNC), it was shown that just a single patient experienced the occurrence of a hematoma. Notably, this particular patient was getting heparin treatment [6, 9]. In a like manner, a patient who had neglected to report their use of aspirin medication experienced retroperitoneal hematoma and subsequent quadriceps paralysis generated by pressure following the implantation of a femoral nerve catheter [8].

This case underscores the significance of immediate surgical intervention in pediatric thumb amputation cases, even in very young patients. Successful reimplantation of the thumb was achieved with meticulous surgical technique. The use of a supraclavicular peripheral nerve catheter for continuous local anesthesia infusion provided effective pain management, contributing to the child's comfort and early recovery.

### Conclusion

Pediatric thumb amputations necessitate prompt surgical reimplantation and comprehensive pain management strategies. This case report demonstrates the successful restoration of a nearly totally amputated right thumb in a 20-month-old child, highlighting the importance of skilled surgical intervention and innovative pain management techniques for optimal outcomes in such cases.

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