ORIGINAL RESEARCH PAPER
Volume - 15 | Issue - 08 | August - 2026 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

FIRST SUCCESSFUL REPLANTATION OF AN AMPUTATED HAND AT A TERTIARY CARE CENTRE – OUR EXPERIENCE

Plastic & Reconstructive Surgery

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ABSTRACT

Introduction Total wrist-level amputation is a limb-threatening surgical emergency requiring urgent microsurgical replantation. Successful outcomes depend on timely intervention, meticulous microsurgical technique, and coordinated perioperative care. We report the first successful hand replantation performed in our department. **Case Presentation** A 20-year-old male presented 2 hours after sustaining a sharp weapon assault resulting in complete amputation of the left hand at the wrist level. The amputated hand was transported promptly to the hospital and was deemed suitable for replantation. Emergency microsurgical replantation was performed, including skeletal fixation, arterial and venous anastomoses, tendon repair, and nerve coaptation. Postoperatively, the patient underwent close monitoring and standard postoperative care. At 3-month follow-up, the replanted hand remained viable with satisfactory wound healing, and the patient continued structured rehabilitation. **Conclusion** Timely microsurgical intervention can successfully salvage major upper-limb amputations. This case represents the first successful hand replantation performed in our department and demonstrates the feasibility of establishing replantation services in a tertiary care centre.

KEYWORDS

Hand Replantation, Wrist Amputation, Microsurgery, Limb Salvage

INTRODUCTION

Replantation refers to the reattachment of an amputated body part through restoration of skeletal, vascular, neural, and soft tissue continuity with the goal of preserving form and function. Since the first successful thumb replantation reported by Komatsu and Tamai in 1968, advances in microsurgical techniques have significantly improved outcomes in upper limb salvage procedures [1].

Hand and wrist amputations represent complex surgical emergencies requiring rapid assessment and coordinated multidisciplinary management. Replantation is considered when patients present early with a viable amputated part and favourable injury characteristics. The success of replantation depends on several factors, including ischemia time, mechanism of injury, level of amputation, patient condition, and quality of microsurgical repair. Clean-cut injuries generally demonstrate superior outcomes compared to crush or avulsion injuries because of reduced soft tissue and vascular damage [2].

Traditionally, acceptable ischemia limits for major limb replantation are approximately 6 hours of warm ischemia and 12 hours of cold ischemia [3]. Timely intervention, meticulous surgical technique, and structured rehabilitation remain the cornerstones of successful replantation.

This report describes a successful microsurgical replantation of a completely amputated hand at the wrist level. This represents the first successful hand replantation performed in our department and marks an important milestone in the development of reconstructive microsurgical services at our institution.

Case Presentation:

Patient Information

A 20-year-old previously healthy male presented approximately 2 hours after sustaining a sharp weapon assault to the left wrist resulting in complete hand amputation. The amputated hand was transported to the hospital in a clean container within 2 hours of injury. There were no associated life-threatening injuries or significant comorbidities.

Clinical Findings

Examination revealed a complete clean-cut wrist-level amputation distal to the distal radioulnar joint. The proximal stump demonstrated adequate vascularity with pulsatile bleeding from both the radial and ulnar arteries. No significant crush injury or gross contamination was present.

Diagnostic Assessment

Clinical assessment confirmed a complete wrist-level amputation suitable for replantation. Warm ischemia time was estimated at approximately 2 hours. The clean-cut mechanism of injury and timely presentation favoured successful revascularisation and tissue survival.

Figure 1: Amputated Hand

Figure 2 : Proximal Stump

Surgical Intervention

Emergency microsurgical replantation was performed under general anaesthesia.

The procedure was carried out sequentially as follows:

- Skeletal stabilization using two Kirschner wires, one across the radial column and one across the ulnar column to maintain alignment and stability of the replanted hand.

- Repair of extensor and flexor tendons.
- End-to-end arterial anastomosis of the radial and ulnar arteries using 9-0 nylon sutures.
- End-to-end venous repair of three veins (one radial and two ulnar veins) to ensure adequate venous drainage.
- Primary epineurial repair of the median, ulnar, and radial nerves.
- Systemic heparinization was administered intraoperatively and continued postoperatively according to institutional protocol.

Following completion of vascular anastomoses, satisfactory perfusion was achieved with restoration of capillary refill and Doppler signals.

The total operative duration was approximately 9 hours.

Postoperative Course

The patient was managed in a high-dependency unit with strict monitoring of limb colour, temperature, capillary refill, and Doppler signals during the immediate postoperative period.

The replanted hand remained viable with satisfactory vascularity throughout the hospital stay. Wound healing progressed satisfactorily, and the patient was discharged with instructions for regular follow-up and rehabilitation.

Follow-Up and Outcomes

At 3-month follow-up, the replanted hand remained viable with satisfactory wound healing and preservation of the limb. The patient continued structured occupational therapy and physiotherapy aimed at maximizing functional recovery and maintaining joint mobility.

Long-term follow-up has been planned to evaluate sensory and motor recovery and to assess overall functional outcomes.

DISCUSSION

Major upper limb replantation remains one of the most demanding procedures in reconstructive microsurgery. Successful outcomes depend on multiple factors including ischemia time, mechanism of injury, quality of vascular repair, skeletal stability, nerve reconstruction, and postoperative rehabilitation [4,5].

In the present case, early presentation within 2 hours of injury and the clean-cut nature of the amputation provided favorable conditions for successful revascularization. Clean-cut amputations are consistently associated with improved outcomes compared to crush or avulsion injuries because of reduced tissue destruction and a limited zone of injury [2,3].

Wrist-level replantation requires restoration of skeletal stability, vascular continuity, tendon function, and neural integrity. Stable fixation was achieved using Kirschner wires, while arterial inflow and venous drainage were restored through meticulous microsurgical anastomoses. Primary repair of the major nerves was performed to facilitate eventual neurological recovery.

The successful survival of the replanted hand highlights the importance of a coordinated multidisciplinary approach involving trauma surgeons, anaesthesiologists, microsurgeons, nursing staff, and rehabilitation specialists. Careful postoperative monitoring is essential for early detection of vascular compromise and optimization of outcomes.

This case is particularly significant because it represents the first successful hand replantation performed in our department. The establishment of replantation services requires appropriate infrastructure, microsurgical expertise, perioperative protocols, and dedicated rehabilitation support. The successful outcome of this case demonstrates that complex limb salvage procedures can be performed effectively in a tertiary care centre with adequate preparation and multidisciplinary collaboration.

Previous studies have demonstrated that successful replantation offers significant psychological, cosmetic, and functional advantages compared with prosthetic replacement, particularly in young patients with major upper-extremity amputations [5,7–9]. Continued rehabilitation remains an integral component of achieving optimal long-term outcomes following replantation.

CONCLUSION

Timely microsurgical replantation can successfully salvage complete wrist-level hand amputations when performed in appropriately selected patients. This case represents the first successful hand replantation performed in our department and demonstrates the feasibility of establishing advanced microsurgical limb salvage services in a tertiary care center. Careful patient selection, meticulous surgical technique, and multidisciplinary postoperative care remain essential for achieving successful outcomes.

Conflict of Interest

None declared.

Declaration of AI Assistance

ChatGPT (OpenAI) was used solely to assist with language editing, grammar correction, and manuscript formatting. The authors were responsible for the study design, clinical management, interpretation of data, and final content of the manuscript.

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