

# Importance of postoperative flap care by nursing care.

## Case series

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### Case Report

Plastic Surgery



**Background:** Post-surgical care in a flap intervention for reconstructive purposes is essential because most failures in these surgeries occur in the first 48 post-surgical hours. It is necessary that any hospital where these interventions are carried out, have medical and nursery staff specifically trained in the surgical area in this way, as well as in the monitoring, follow-up, and care of the flaps, to reduce the risk of failure. We present a case series, where the own decision immediate post-surgical action by the nursing service was not adequate, leading to the loss of the flaps in all cases.

**KEYWORDS:** Microsurgical flap, flap reconstruction.

The nursing staff plays an important role in the care and monitoring of the flap. (1) Ideally, all patients undergoing flap reconstruction should be closely monitored in a special unit with nurses and physicians trained in the surgical area, as well as in flap management, care and follow-up. (2)

However, this is not always possible and there is often different of nursing staff skills.

This is particularly true in smaller microsurgery programs where nurses may found only a few patients per year and often report abnormalities directly to senior nursing staff or in their worst situation make decisions and actions on their own.

Lack of adequate nursing resources often results in the need to monitor patients within an intensive care unit, which is not synonymous with them being trained to care for microsurgical patients, this ultimately translates into higher cost of patient care, not to mention that this service and infrastructure is not always available.

Careful postoperative monitoring of the flaps for ischemic compromise, as well as early detection of thrombus, is essential to maximize the probability of successful microsurgical reconstruction. It has been described that 5-25% of free flaps require surgical re-exploration due to circulatory compromise. How often and for how long a flap should be monitored are variable with wide ranges among authors, with most reported series considering at least hourly monitoring for the first 24-48hr. (1,3)

Physical examination provides the basis for evaluation of adequate tissue perfusion. Important clinical considerations include:

- Flap color
- Tissue turgor
- Capillary return
- Temperature(2)

Most vascular complications inherent to flap surgery manifest themselves during the first 12-24hrs and failure after that period is rare. Complications occur in the first 48hrs in up to 80% of cases. Most of these correspond to arterial or venous thrombosis. (3) It has been described that the type of flap is a factor that can influence the incidence of failure. (3)

For example, in a muscular flap, there is an increased difficulty of monitoring, as well as in a perforator flap that has a limited circulation.

Some factors involved in flap failure, secondary to failure of postoperative care are:

- Monitoring by inexperienced staff
- Latex flap coverage, no visibility
- Poor placement of monitoring probes
- Poorly performed Doppler (wrong vessels, staff not trained in the use of US) or late recognition of thrombosis.
- Compression, bandages, mobilization (4)

It is imperative to exclude compression such as tension skin closure, hematoma, very tight bandage. We present a series of cases where the nursing service decided to take their own actions which were not adequate, resulting in the loss of the flap in all cases. (2,3)

### Clinical case 1

26-year-old female patient, who presents with a right subscapular tumor, is referred to the Thoracic Surgery Service for evaluation. She presented with a recurrent soft tissue tumor in the right scapular region (resections in 2018 and 2019), with fast growth and weight loss 4 months after the last resection, with fetid odor and purulent fluid. Resection was performed by the Chest Service, and we were asked for a consultation for skin coverage, so a pedicled trapezium flap of 8x10 cm was performed, observing and respecting the pedicle adequately. In the immediate postoperative period good coloration was observed, capillary filling of 2 seconds, capillary positive pinprick test and by ultrasound, audible with adequate flow. With usual indications that included no manipulation, on the 4th day the flap was completely covered by Tegaderm patches with evident pressure on the edges of the flap by nursing indication. Subsequently, there were signs of suffering and congestion, until total necrosis of the flap, and it was dismantled on the 6th day.

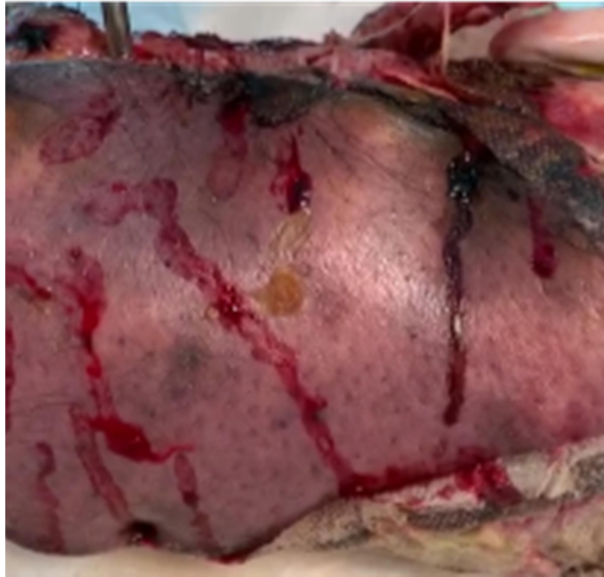


### Clinical case 2

29-year-old male patient, referred to our unit for severe polytrauma with cranioencephalic trauma, chest trauma, as well as exposed fracture of the tibia and fibula Gustilo & Anderson III B at the level of the distal third of the leg of approximately 9x15cm. Open reduction of the fracture with placement of external fixators was performed. On the 5th postoperative day it was decided to cover the skin with an anterolateral thigh flap, performing anastomosis of the lateral femoral circumflex artery to the anterior tibial with anastomosis of two veins.

Immediate postoperative period showed adequate capillary filling, audible Doppler with adequate flow, positive pinprick test and temperature similar to body temperature. Absolute rest is indicated, no bathing, immobilization of extremities. On the 4th postoperative day after the free flap, the nursing service performed bed bathing, manipulating the external fixators and pressing the flap on the bed with early mobilization of the limb. After this event, the patient presented flap congestion, with evidence of skin necrosis, so it was decided to dismantle the flap on the 7th day, showing arterial thrombosis.





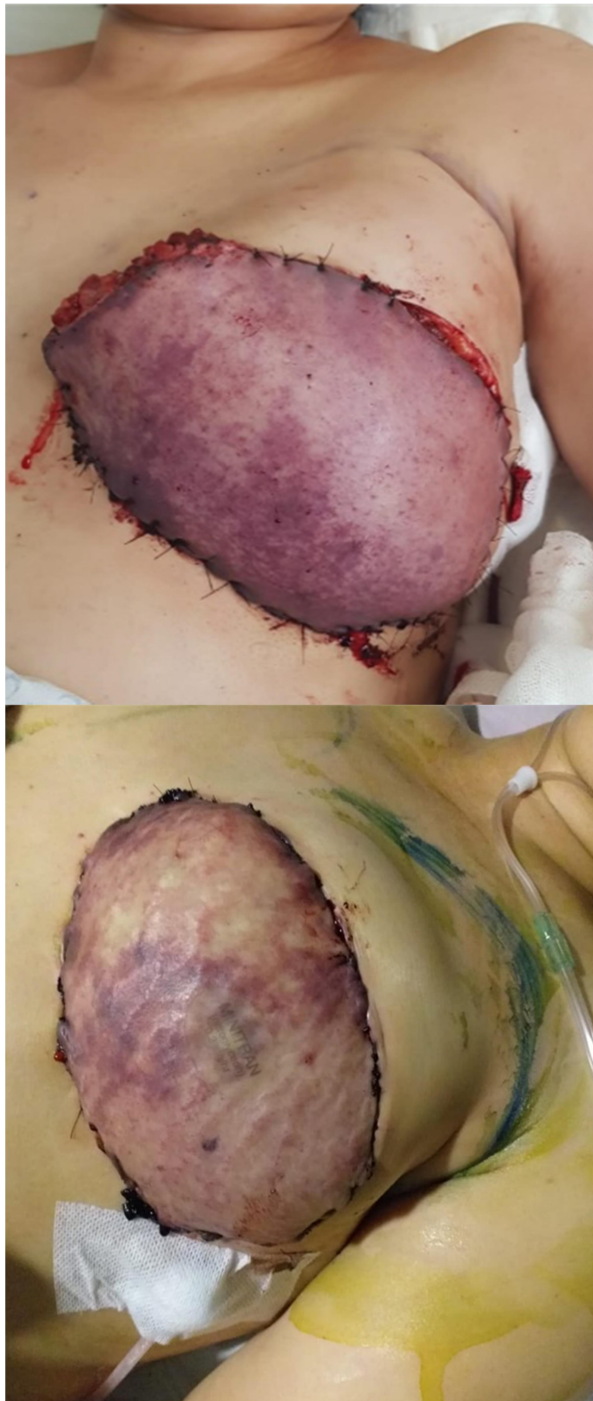
### Clinical case 3

29-year-old female patient, who presented with traumatic amputation of the 4th finger of the left hand at the level of flexor zone II (transverse diaphyseal fracture of the proximal phalanx) secondary to avulsion by a tortilla machine. Reimplantation sequence is performed, anastomosis of the two digital arteries and two venous anastomoses are performed. Immediate postoperative period with adequate capillary filling, positive pinprick test and adequate temperature. Management with antibiotic therapy, enoxaparin, analgesic. Absolute rest is indicated, total immobilization of the left hand. On the 3rd postoperative day, the nursing service mobilized the patient out of bed and bathed him in the shower. After this event, there were changes in color, decreased capillary filling, temperature and venous congestion. On the 5th day, amputation with remodeling was performed due to necrosis.



### Clinical case 4

53-year-old female patient with a background of left mastectomy secondary to breast cancer. Bilateral free DIEP flaps were performed without complications. Nursing starts liquid diet at 4 hours post-surgery despite fasting instructions. She presented nausea, vomiting and color changes to the flap. She was re-explored at 8 hours presenting venous thrombosis without being able to revert it. It was decided to dismantle and primary closure.



### Clinical case 5

45-year-old female with background of breast cancer, left mastectomy and immediate reconstruction with DIEP flap, without complications. During postoperative period, despite indications for absolute rest, the nurse decided to mobilize the patient and she accidentally tractioned the drainage. She presented color changes and venous congestion. On examination, a compressive hematoma was found, which caused a non-reversible obstruction. It was decided to dismantle and primary closure.



### Discussion

Accurate evaluation of free or pedicle flap perfusion has always been a challenge for surgeons and nursing staff. The complexities of flap microcirculation are often difficult to evaluate, despite currently available techniques.

It has been known that ischemia becomes irreversible after a short period of time. The "no reflow phenomenon" described in 1978 was a significant confirmation that reversibility is closely related to the time of ischemia, with the hope of flap salvage after only a couple of hours (8-12 hrs) of microvascular thrombosis and tissue ischemia. The use of clinical monitoring, follow-up, care and treatment in the postoperative period has demonstrated salvage of compromised flaps with rates ranging from 70-80% salvage.

Most surgical complications after tissue transfer surgery are related to vascular thrombosis, which usually occurs within the first 48 hours post-surgery. Creech and Miller summarize the essential criteria for flap monitoring, stating that the technique should be:

- Harmless to the patient and the flap.
- Rapid, repeatable, reliable, fast-response
- Accurate and inexpensive
- Objective, applicable to all types of flaps
- Equipped with a simple monitor that can alert inexperienced staff to vascular compromise.

Clinical monitoring is the monitoring technique that meets the most essential criteria, which makes it the current standard for flap monitoring, being used by all microsurgical units, with reported salvage rates of 80-99%. (5)

In any hospital where reconstructive surgeries are performed by means of pedicled and/or free flaps, it is imperative to have clinically trained staff ready to detect immediate postoperative complications, as well as to have the notion of basic care in this type of interventions in order to reduce the incidence of surgical failures in this field of reconstructive surgery. In this observational study, it is evident that having unqualified nursing staff to monitor, follow up, care and treat the postoperative evolution in a microsurgical intervention, has the imminent risk of failure and loss of the flap. (6)

It is well documented that the nursing staff that has monitored more flaps, and not more years of hospital experience, has a better capacity to detect immediate anomalies, to inform the medical staff early and not to take actions or decisions of their own, to be able to act in time and to improve the success rate of any flap. (7)

Even with monitoring protocols with shorter periods than those described in high microsurgical volume centers (schedules for the first 24-48hr, then every 4hr until discharge) due to lack of medical resident staff, it has been seen that the flap survival rate is not altered; therefore it can be concluded that such close monitoring is not necessary if the staff is trained and sufficient to detect anomalies.

Limitations for this study are the low microsurgical volume per year. The lack of surgical nursing staff, not to mention microsurgery trained nurses. The high turnover rate of nursing staff between different services indiscriminately, as well as the poor training in all areas of nursing in a 3rd level hospital in a third world country.

We do not consider that new evidence is needed to support the conclusions reached in this document, since they are more than clear and

reproducible in multiple hospitals in Latin America, among others.

It is recommended that a microsurgical education program be introduced, specifically in post-surgical management, care, monitoring and treatment, as well as the implementation of technologies that allow adequate monitoring with adequate sensitivity to reintervention requirements, in any hospital that has the staff and infrastructure to perform this type of surgery.

## Conclusions

Close monitoring, in any hospital that performs this type of surgery. Continuous and extensive education of the nursing staff in charge is imperative to nursing staff ensure and improve the success rate of any microsurgical intervention.

## Conflicts of interest

The authors have no conflicts of interest to declare.

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