



Research Article

Case Report: Salvage of Right Pelvic Limb, by Free Microvascular Flap Fibula, Surgery in Collaboration Between the National Institute of Rehabilitation and the Central Military Hospital. Importance of Inter-Institutionality in Health.

Jonathan Emmanuel Ponce Hernández¹, Rodrigo Banegas Ruiz², Jorge Guillermo Ponce de León Domínguez³, Eleazar García Domínguez⁴, Paolo Chiquini Ramirez⁵, Jonathan Emmanuel Ponce Xicotencatl⁶, Erik Alejandro Torre Anaya^{7*}

¹Plastic surgeon: head of the academic coordination of the central military hospital, Mexico

²Hand surgeon attached to the traumatology service of the central military hospital, Mexico

³Traumatologist and orthopedist attached to the INR traumatology service, Mexico

⁴Orthopedic traumatologist: head of the traumatology and orthopedics division of the national rehabilitation institute, Mexico

⁵Attached to the INR traumatology department, Mexico

⁶7th semester medical student at Saint Luke's University, Mexico

⁷Medical surgeon and researcher, master in precision oncology, genetics and big data, Mexico

***Corresponding author:** Erik Alejandro Torre Anaya, Medical surgeon and researcher, master in precision oncology, genetics and big data, Mexico

Citation: Hernandez JEP, Ruiz RB, Dominguez JGPDL, Dominguez EG, Ramirez PC, et al (2023) Case Report: Salvage of Right Pelvic Limb, by Free Microvascular Flap Fibula, Surgery in Collaboration Between the National Institute of Rehabilitation and the Central Military Hospital. Importance of Inter-Institutionality in Health. Ann Case Report. 8: 1481. DOI:10.29011/2574-7754.101481

Received: 11 October 2023, **Accepted:** 16 October 2023, **Published:** 18 October 2023

Abstract

Interinstitutional work and multidisciplinary approaches are important to provide better patient care, this is necessary, since in cases such as high-energy accidents usually require supplies and qualified personnel that some institutions do not have. Our clinical case presents a 24-year-old female patient after a motorcycle accident, which required the use of a microvascular peroneal free flap due to her type of injury, so it was necessary to transfer her to the general hospital of Chilpancingo to the National Institute of Rehabilitation (INR) together with the Central Military Hospital, this in order to optimize and try to ensure the salvage of the limb, the patient presented a favourable outcome after reconstruction. The need to encourage agreements and inter-institutional participation is important to provide quality care, especially in cases such as ours.

Keywords: Fibula Free Flap; Limb Salvage; Interinstitutional Collaboration.

Introduction

This article presents an analysis of the importance of encouraging interinstitutional work and multidisciplinary approaches, in order to provide better care and obtain the best results for the patient. It is demonstrated through the presentation of a case of limb salvage, in the work of López Hernández, Daniel and collaborators in 2014, who addressed this issue as a way to improve medical care, promoting the development of institutions and improving the quality of service. The importance of making agreements from a legal point of view is mentioned in order to establish the scope of the collaboration and its purpose, whether it is for academic, research or patient care purposes. Nowadays, in different states of the republic, collaborations have been established between high specialty hospitals and the Mexican Institute of Social Security (IMSS), as is the case of Campeche, with the objective of establishing the basis for collaboration and coordination between both institutions for the medical attention of patients who require specialized services and who cannot be attended by the IMSS in the state. In various states of the Mexican Republic, collaborations have been established between high-specialty hospitals and the Mexican Institute of Social Security (IMSS), as is the case in Campeche, with the objective of establishing the basis for collaboration and coordination between both institutions for the medical attention of patients who require specialized services and cannot be treated by the IMSS in the state. Esther Gonzalez Requena's thesis addresses this issue from a teamwork perspective since studies conducted by universities and hospitals have shown that patients benefited from being treated by a team of health professionals. Examples of implementation can be seen in intensive care units and surgical areas. It is important to mention that collaboration, with the purpose of providing the best patient care, focuses not only on human resources but also on material resources. It should be noted that some conditions will require more specific supplies and equipment, and medical personnel with higher qualifications to perform treatment. In the case of high-energy accidents, which according to INEGI 2018 worldwide statistics have recorded between 20 and 50 million accidents and 1.3 million deaths due to this cause, they can lead to disability. We must remember that any accident caused at a speed greater than 40 km/h can cause high-energy injuries involving soft tissue loss, associated neurovascular compromise, and high-comminute fracture patterns. It is important to keep in mind that long bone fractures are often accompanied by vascular injuries, especially when they are high-energy, representing a risk and a public health problem, since they generate long-term disabilities, high incidence of mortality, and recurrence of amputations, due to the loss of

soft tissues, bone exposure, and contamination. In order to avoid amputation, different techniques have been developed, which aim to reconstruct the affected area. In this clinical case, the use of a free peroneal flap was chosen, as it has characteristics that make it suitable for lesions larger than 6 cm for the treatment of bone defects. It is also used in patients where the vascular bed is poor or where there are signs of osteomyelitis. This type of flap favours safe revascularization, as long as the procedure is performed by an experienced surgeon.

Clinical case

This is a 24-year-old female patient, with no significant medical history, who suffered a motorcycle accident at an unknown speed, with contusion in the right hemibody.



Figure 1: Radiographs of the right pelvic limb; A and B- AP radiographs of the right hip with postoperative changes due to multiple femoral fractures reduction, level of the diaphysis with osteosynthesis material (oss to femur with Centro medullary nail); C and D- AP and lateral radiographs of the right leg with postoperative changes due to multifragmented tibial plateau fracture with osteosynthesis material (oss to tibial plateau with two plates); E and F- Radiograph of the right knee with decreased intra-articular space due to tibia fracture with tibial condyle involvement and changes described in figures A, B, C, and D.

She presents a right femoral shaft fracture, and an exposed fracture of the right tibial plateau, which is surgically intervened with oss to femur with Centro medullary nail and loss to tibial plateau with two plates (Figure 1). Later on, she presents wound infection, which is the reason why surgical cleaning is performed. Subsequently, she presents a cutaneous defect in the anterolateral aspect of the knee with a diameter of 18 cm and 4 cm in its major axes. She is referred to the National Institute of Rehabilitation (INR), where interinstitutional support between the INR and the Central Military Hospital is provided, providing highly qualified

personnel for the treatment consisting of surgical cleaning, culture collection, and placement of VAC system in the first surgical act (Figure 2). In a second surgical act, surgical cleaning is performed, right tibial oss removal (Figure 3), and primary harvest of the left vascular fibula (Figure 4). In a third surgical act, oss is placed on the tibial plateau with an anatomical plate for the proximal tibia and reconstruction of the pelvic limb using the microvascular free peroneal flap in a second surgical time (Figure 5).



Figure 2: Radiographs of the right pelvic limb; A- AP and lateral radiographs of the right foot with images of multifragmented fracture of the tibial epiphysis and diaphysis in the proximal third, with an image suggestive of drainage or VAC system; B AP and lateral radiographs of the left leg showing postoperative changes for the harvest of vascularized peroneal grafts.



Figure 3: Removal of tibial oss, with extraction of the proximal tibial epiphysis, where a large cutaneous defect with exposure of osteosynthesis material and loss of the extensor system is observed.

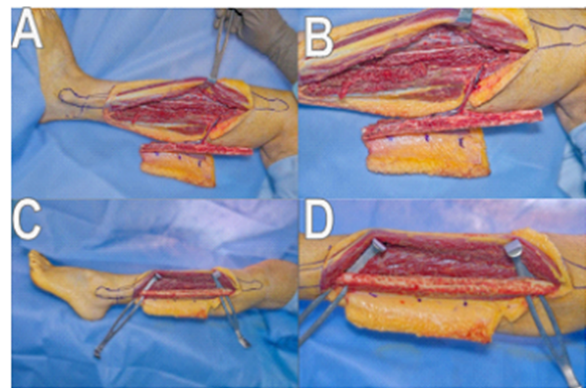


Figure 4: Primary harvest of the left fibula; A and B show a portion of the fibular diaphysis, which will be used for the free peroneal flap with the peroneal artery and vein; C and D show the dissection performed for the primary harvest of the fibula.

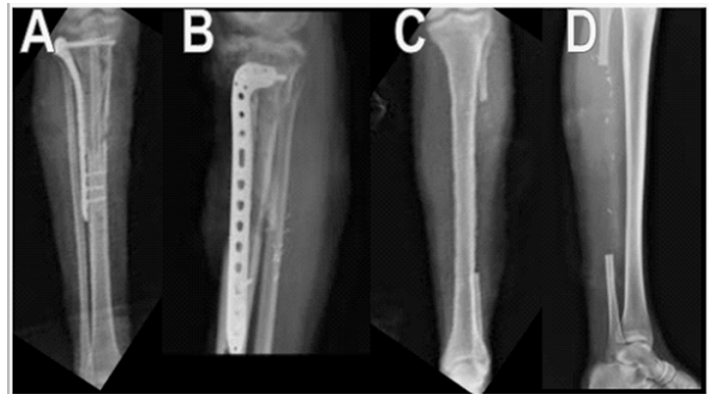


Figure 5: Radiographs of the right pelvic limb; A and B- AP radiographs of the right foot with postoperative changes due to pelvic limb reconstruction using the microvascular free peroneal flap with the use of osteosynthesis material (oss with anatomical plate on the tibial plateau); C and D- AP and lateral radiographs of the left leg with postoperative changes due to the harvest of the graft for the microvascular free peroneal flap, only the proximal and distal epiphyses of the fibula are observed.

After the surgical procedure, the patient is asymptomatic, performing plantigrade bipedal walking, non-limping, and without the use of walking aids. On physical examination directed to the right pelvic limb, surgical scars are found, eutrophic, hyperchromic, with adequate coloring in complete integration of the flap. Distal digital mobility and sensitivity preserved with capillary filling less than two seconds (Figure 6, 7, 8, and 9).



Figure 6: Radiographs of the right pelvic limb, postoperative control; A and B- AP radiographs of the right foot with postoperative changes due to pelvic limb reconstruction using the microvascular free peroneal flap, with the use of osteosynthesis material (oss with anatomical plate on the tibial plateau); C and D- AP and lateral radiographs of the left leg with postoperative changes due to the graft harvest for the microvascular free peroneal flap, only the proximal and distal epiphyses of the fibula are observed.



Figure 7: Radiographs of the right leg, postoperative control for pelvic limb reconstruction using the microvascular free peroneal flap, with the use of osteosynthesis material (oss with anatomical plate on the tibial plateau) in the consolidation process.



Figure 8: Final result of the right pelvic limb reconstruction.

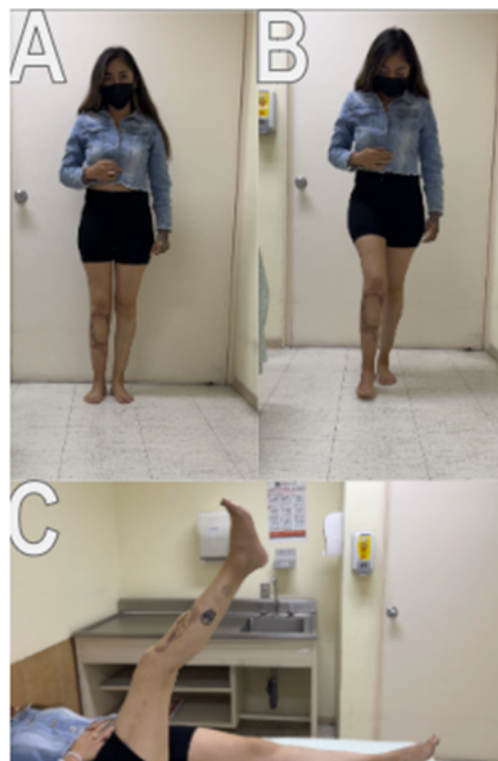


Figure 9: Review in an external consultation, where we can see the functional result of the affected limb; A and B patient in a bipedal stance without the need for mechanical aids, C mobilization of the limb with preserved strength.

Discussion

The microvascular free peroneal flap is the most viable option for lesions larger than 6 cm, as in our case, providing a better functional outcome, especially in high-energy accidents

Citation: Hernandez JEP, Ruiz RB, Dominguez JGPDL, Dominguez EG, Ramirez PC, et al (2023) Case Report: Salvage of Right Pelvic Limb, by Free Microvascular Flap Fibula, Surgery in Collaboration Between the National Institute of Rehabilitation and the Central Military Hospital. Importance of Inter-Institutionality in Health. *Ann Case Report*. 8: 1481. DOI:10.29011/2574-7754.101481

due to vascular injuries [1-6]. Therefore, it is necessary to have qualified personnel and necessary supplies for its realization. If the patient is in a hospital where these supplies or qualified personnel are not available, agreements for transfer should be made or, if the transfer cannot be carried out, mobilization of personnel from some high-specialty institute or service should be made to provide the best patient care.

Conclusion

Interinstitutional care is the best option for timely and better-quality treatment of the patient, as in this way, both high-specialty centres collaborate to form a team capable of providing optimal and reproducible results in highly complex cases. In cases of high-energy accidents with bone lesions greater than 6 cm, the microvascular free peroneal flap is the best option. If a patient who suffered a high-energy accident or is suspected of it is taken to a hospital that does not have the necessary resources, it will be necessary for that hospital to have the necessary agreements with another institution, either for prompt transfer or transfer of materials and qualified personnel.

References

1. Lopez Hernandez D, Del Dew Thompson Bonilla M, Brito Aranda L, De La Luz Lopez Hernandez M, et al. Correspondence. (2013) *Convention_Yucat_NAME-IMSS_CAMPECHE_2013*.
2. Esther Gonzalez Requena. Collaborative Practice Among Health System Professionals; Thesis; University Of The Balearic Islands; 2014 A 584: 1-7.
3. "Statistics For The Purpose Of World Day In Remembrance Of Traffic Accident Victims (November 18)."
4. War JJ, Inn-Then JC, Giraldo-Salazar OL. (2018) Morbimortality Of High-Energy Orthopedic Trauma: A Descriptive Retrospective Study. *Journal National Faculty Of Public Health*. 36:28–36.
5. Jimenez CE, April C, Randial L, Arias C. (2018) Vascular Injuries Associated With Motorcycle Accidents. Series Of Cases. *Colombian Journal Of Orthopedics And Traumatology*. 32:167–77.
6. De La Parra-Marquez M, Zorola-Tellez O, Cardenas-Rodriguez S, Rangel-Flores JM, Sanchezterrones G. (2016) Versatility Of The Peroné Microvascular Flap In Extremity Reconstruction. *Cir Cir*. 84:213–9.