

Complications of Flap Fibula Osteomyocutaneous in Pediatric Patients

Larissa B Zavarez

ABSTRACT

Introduction: Defects in the mandible or maxilla are usually obtained from broad resections of advanced oral cancer, benign tumors of aggressive clinical course, or accidents. These defects require the replacement of tissue lost by similar characteristics tissue preserving the quality of life of patients through rehabilitation of function and esthetics. This flap provides a greater volume of bone tissue grafts from all bone and generates little morbidity in the donor site is capable of undergoing multiple osteotomies by modeling. This flap provides the greatest amount of bone tissue between all bone grafts; causes little morbidity in the donor area, lending itself also to modeling by osteotomies, allowing its adaptation to any defect.

Materials and methods: A retrospective study evaluating the medical records from 1995 to 2014 the medical records of nine patients undergoing reconstructive treatment with flap fibular.

Discussion: The reconstruction with microsurgical in the flap fibular technique used can progress to a partial or total loss of the flap, as well as an esthetic and functional sequel in the recipient area and donor, which varies with the flap selected, this study had no failure of clinical cases.

Results: Complications were minimal, there were four (33%) of patients.

Conclusion: Complications were minimal complexity and resolved. There was no flap fibula rejection in any case. This shows that the protocol and the results obtained by the team in reconstructive surgery with osteomyocutaneous fibular graft are within the biological and protocol standards of service.

Keywords: Flap fibular, Mandible, Reconstruction.

International Journal of Head and Neck Surgery (2020): 10.5005/jp-journals-10001-1427

INTRODUCTION

Defects in the mandible or maxilla are usually obtained from broad resections of advanced oral cancer, benign tumors of aggressive clinical course, or accidents with firearms causing grave wounds.^{1,2} These defects require the replacement of tissue lost by similar characteristics tissue preserving the quality of life of patients through rehabilitation of function and esthetics. The options for donor sites of vascular grafts for reconstruction can be skull, fibula, rib, scapula, iliac crest, and radio. They have high success rates and have the possibility of being used in patients irradiated or who will undergo radiation therapy. The main disadvantage is the high cost, for running this type of procedure requires a multidisciplinary team, and increase hospital stay and surgical time.^{3,4}

An excellent choice for the reconstruction of maxillomandibular segmental defects is the fibula; the first works dating from 1985,^{5,6} due to the availability of a long segment of bone bicortical, long vessels of the vascular pedicle of large diameter, good bone quality, and the ability of the bone contour with multiple osteotomies.⁷⁻⁹ It is a safe and reliable method for functional scope and esthetics of mandibular defect and jaw, is a versatile bone, has lower morbidity of the donor site, is easily obtained, and no interference in the growth of developing patients.^{10,11} The flap fibula is the most used for the repair of most defects of the mandibular bone. This flap provides a greater volume of bone tissue from all bone grafts and generates little morbidity in the donor site is capable of undergoing multiple osteotomies by modeling, which allows satisfactory esthetics. The fibula, formerly fibula call is a long bone in the human body dominated in width and thickness; it lies posterolaterally to the tibia, thereby constituting the side of the leg, serving to help

Department of Maxillofacial Surgery, Hospital Erasto Gaertner, Curitiba-PR, Brazil

Corresponding Author: Larissa B Zavarez, Department of Maxillofacial Surgery, Hospital Erasto Gaertner, Curitiba-PR, Brazil, Phone: +55 41 997882278, e-mail: lari_zavarez@hotmail.com

How to cite this article: Zavarez LB. Complications of Flap Fibula Osteomyocutaneous in Pediatric Patients. *Int J Head Neck Surg* 2020;XX(X):1-4.

Source of support: The Erasto Gaertner Hospital is a health institution located in Curitiba with a focus on the clinical and surgical treatment of patients with cancer and oncological diseases.

Conflict of interest: None

in fixing muscles and the skeleton has no supporting function. It is divided morphologically into the head, body, and lateral malleolus. The head of the fibula found the insertion of knee ligament called the lateral collateral ligament and the insertion of the tendon of the biceps femoris muscle; important to report that even having a close connection with the knee, does not participate in this movement. The muscles that are in contact with the bone are later and superiorly the soleus muscle on the medial side of the posterior tibial muscle; on its front side houses the extensor digitorum longus, extensor hallucis, and still the third fibular muscle that can be found because it is an anatomical variation. The anterolateral portion houses the peroneus longus muscles and short and the rear face the flexor hallucis longus.¹¹

Complications related to reconstruction are often minimal as the loss of the mandibular labial groove and hypertrophy,^{12,13} contour inappropriate, incorrect placement of screws and

pressure prosthesis can result in complications, such as prolonged inflammatory reaction, bone exposure, necrosis, excessive bone resorption, infection; reduced amount or absence of keratinized tissue and bone exposure. Complications in the donor area have low morbidity that usually disappears over time as ankle instability, weakness in the leg and residual pain,¹⁴⁻¹⁶ bleeding, bruising, temporary numbness, fracture, swelling, infection, fistulas, partial or complete loss of the flap, dehiscence, venous or arterial thrombosis, nonunion, bone resorption, and osteoradionecrosis.

Preoperative Complications

It is a phase that begins when surgical intervention is decided and ends when the patient is on the operating table. Presence of fistula, other comorbidities, and medications, patient’s general condition that contraindicates surgery.¹⁷

MATERIALS AND METHODS

Conducted a retrospective study evaluating the medical records from 1995 to 2014 the medical records of patients undergoing reconstructive treatment with fibular flap in the maxillomandibular region of Oral and Maxillofacial Surgery Department of Traumatology Erastus Gaertner Hospital in Curitiba—Paraná, through a specific form with consistent data to the study, thus excludes the need for a confidentiality agreement for the patient. It included 12 patients aged 7–16 years, undergoing immediate reconstruction with microvascularizado retail fibula and using titanium mini-plates and screws for bone synthesis.

Patients with loss of the segment of regular consultations were excluded, i.e., those patients who were absent on the scheduled appointments, resulting in the inability to continue with the treatment, this occurred due to the own will, death because they think they are clinically well and lack of psychosocial conditions, and other adverse causes. Data were recorded in specific forms, and then compiled and submitted to descriptive statistics. The data presented in the collection form were: the study number; the medical record number; the underlying disease; the date of the first service; sex, color, age, smoker, drinker, the type of surgery performed, the date of the start of treatment, the type of treatment carried out, the preoperative complications, both transoperative and postoperative the donor site as the receiver, changes in the examination of pre- and post-image processing and the status of the patient.

The data were submitted to simple statistics only because it is a sample with a relatively low number of patients to the application

of descriptive statistics, as the test “Levene” requires at least a number of 30 patients.

RESULTS

All fibular flaps survived and their viability was confirmed by imaging studies, when available, and the outpatient follow-up of at least 6 months and a maximum of 15 years (mean 69 months). Of these 42% (mean age 11.7 years) were female and 58% (mean age 13.2 years) were male, all did not use tobacco and alcohol. As for the color nine (90%) white and one (10%) black.

The indications for mandibular and maxillary resection were ameloblastoma in two cases, two cases Ewing’s sarcoma, osteosarcoma fibroblast in two cases, juvenile ossifying fibroma, fibroma desmoplastic, simple bone tumor, fibrous dysplasia, myxoma, and cementoblastoma, each of these with only one case.

Of these patients, 10 (83%) remain alive without disease manifestation, 1 (8.5%) had local recurrence, and 1 (8.5%) died after the end of chemotherapy. Of the 12 patients evaluated, 9 (73%) underwent prophylactic surgery followed by fibular flap, 2 (18%) were still undergoing radiotherapy, and 1 treatment (9%) to chemotherapy.

Of the 12 patients evaluated, 9 (73%) underwent prophylactic peroneal flap surgery followed by 2 (18%) who were still undergoing radiotherapy treatment and 1 (9%) to chemotherapy.

Analyzing the results we had a 25% rate of postoperative complications, and 40% of orocutaneous fistula, and infection at the receiving area of 20%, sore donor site seroma 20%, and a rate of 20% as well. There were four (33%) of patients with complications, a similar rate found in the literature of 32 to 48%,¹⁸⁻²¹ preoperative complication, plaquetopenia, and the other three were postoperative complications; two orocutaneous fistulas in the receiving area and seroma in the donor area, one infection and suture dehiscence on the lower limb (Table 1).

All patients with complications were a total of four male patients (100%).

DISCUSSION

The mandibular reconstruction should, whenever possible, seek bone structural contribution. The employment of different techniques vary according to local defect but always follow anatomy and biology. However, the combination that best meets the complex esthetic and functional requirements of the region is

Table 1: Patients undergoing surgery with microvascularizado reconstruction fibula flap and its complications or flap loss

<i>Study number</i>	<i>Preoperative complications</i>	<i>Intraoperative complications</i>	<i>Postoperative complications</i>	<i>Fibular flap loss</i>
1	No	No	No	No
2	No	No	No	No
3	Thrombocytopenia	No	No	No
4	No	No	Orocutaneous fistula and sore in the lower limb	No
5	No	No	Cutaneous fistula and seroma	No
6	No	No	No	No
7	No	No	No	No
8	No	No	No	No
9	No	No	No	No
10	No	No	No	No
11	No	No	Infection and wound dehiscence on lower limb	No
12	No	No	No	No



the use of microvascularized retail, complete with osseointegrated dental implant for rehabilitation when possible.¹¹ Among these grafts, the flap fibula is the best suited to replace the mandible bone.^{3,4} The reconstruction with microsurgical technique use can progress to a partial or total loss of the flap, as well as an esthetic and functional sequel in the recipient area and donor,¹³ which varies with the flap selected, this study had no failure of clinical cases. The flap fibula presents great reliability and adaptability to reconstruct the mandibular defects due to its length, about 20–27 cm, the presence of the vascular pedicle, the possibility to perform multiple osteotomies, besides having a rich periosteal blood supply, favorable diameter implant placement, and quality of the cortical.^{5,7}

The microsurgical flap fibula imposes fewer postoperative complications at the donor site and recipient.^{18,19} According to Momoh and employees, the rate of complications occurred in 31.2% of patients in a study of 157 cases.^{20,21}

The literature description of long-term complications in the donor region as gait, claw toes, and deficits in the dorsal extension of the hallux, sensory deficits calf, and feet.^{21,22}

From what we found, we can infer that may be the age of the patients a positive factor for the recovery and growth factor of our pediatric patients compared with patients in adulthood.

Complications arising from reconstructions occur more frequently according to the complexity of the technique and the clinical condition of the patient. Can be systemic, such as cardiopulmonary or locoregional problems such as exposure and fracture of synthesis material, infection, absence of osseointegration, deformities donor, and fistulas areas.

Complications were minimal probably due to the correct indication associated with the technical skill of the team. Thus, it is important to consider that the statement and the completion of treatment complied with the standard protocol and technical and care for the patient.

CONCLUSION

Complications were minimal complexity and resolved. There was no flap fibula rejection in any case. This shows that the protocol and the results obtained by the team in reconstructive surgery with osteomyocutaneous fibular graft are within the biological and protocol standards of service.

It indicates that the team has experience in the indication and treatment of patients in need of reconstruction in the maxillofacial area.

CLINICAL SIGNIFICANCE

Resection of the maxillomandibular region in treating tumors to great extent promotes esthetic and functional changes relevant to the quality of life of patients and requires a multidisciplinary team with head and neck surgeon, maxillofacial surgeon, and plastic surgeon microsurgery. The field of reconstruction of the middle and lower third of the face has evolved considerably in recent years, and the reconstruction of bone and its complex three-dimensional soft tissue is of great importance in rehabilitation. The reconstruction of maxillofacial mandibular defects with microvascular flaps from the fibula became the gold standard, with low complication rates, excellent esthetic and functional results, and low bone resorption after a long period.

ACKNOWLEDGMENTS

We acknowledge the people who are part of the Maxillofacial Surgery Department of Head and Neck Surgery Department and the Department of Plastic and Microsurgery in the Erasto Gaertner Hospital, Curitiba—PR—Brazil.

REFERENCES

1. Regezi JA, Sciubba JJ. *Patologia Bucal, Correlações Clínico-patológicas*. 1st ed., Rio de Janeiro: Guanabara Koogan; 1991.
2. Wei FC, Seah CS, Tsai YC, et al. Fibula osteoseptocutaneous flap reconstruction of composite mandibular defects. *Plast Reconstr Surg* 1994;93(2):294–304. DOI: 10.1097/00006534-199402000-00009.
3. Lee H, Ercoli C, Fantuzzo JJ, et al. Oral rehabilitation of a 12-year-old patient diagnosed with a central giant cell granuloma using a fibula graft and an implant-supported prosthesis: a clinical report. *J Prosthet Dent* 2008;99(4):257–262. DOI: 10.1016/S0022-3913(08)60057-8.
4. Gerhardt E. Use of the fibula free flap in the oral and maxillofacial complex: a report of two cases. *Rev Cir Traumatol Buco-Maxilo-Fac, Camaragibe* v.5, n. 4 2005. 23–30. outubro/dezembro.
5. Puricelli E, Chem RC, Rinaldi S. Mandible reconstruction using the fibule. In: 8th Congress of European Association for Maxillofacial, Madrid, Espanha, Sept, 1986.
6. Hidalgo DA. Fibula free flap: a new method of mandible reconstruction. *Plast Reconstr Surg* 1989;84(1):71–79. DOI: 10.1097/00006534-198907000-00014.
7. Mendonça JCG, PaGliarelli PRS, Bento LA, et al. Ameloblastoma letal de maxila: relato de caso. *Rev Bras Cir Craniomaxilofacial* 2009;12(2):85–88.
8. Ariel L, Takamori ER. Reabilitação oral de pacientes com sarcoma indiferenciado em mandíbula utilizando-se enxerto de fíbula e prótese sobre implante. *Innov Implant, Biomater Esthet SP* 2009. v 4, n. 1 69–74.
9. Neville BW, Damm DD, Allen CM, et al. *Patologia Oral Maxilofac*. 2a ed., Rio de Janeiro: Guanabara Koogan; 2008. pp. 586–594.
10. Sassi LM, Oliveira BV, Radaelli RL, et al. Oral rehabilitation post mandible tumor excision with titanium osseointegrated implants in a microvascularized fibula graft. *Inter J Oral Maxillofac Surg* 2001;30(suppl A):S15.
11. Silva JB, Martins ODE, Roman JA, et al. Reconstrução do segmento ósseo mandibular; comportamento dos implantes ósseos integrados nos retalhos vascularizados de crista ilíaca e fíbula. *Soc Brasileira de Cirurgia Plástica* 2005;20(3):176–181.
12. Mark L, Smith MD, Emily Clarke-Pearson MD, et al. Fibula osteo-adipofascial flap for mandibular and maxillary reconstruction. *Head Neck* 34(10):1389–1394. DOI: 10.1002/HED.
13. Fujiki M, Miyamoto S, Sakuraba M, et al. A comparison of perioperative complications following transfer of fibular and scapular flaps for immediate mandibular reconstruction. *J Plast Reconstr Aesthet Surg* 2013;66(3):372–375. DOI: 10.1016/j.bjps.2012.10.003.
14. Hidalgo DA, Pusic AL. Free flap mandibular reconstruction: a 10 year follow up study. *Plast Reconstr Surg* 2002;110(2):438–449. DOI: 10.1097/00006534-200208000-00010.
15. Prein J. *Manual of Internal Fixation in the Cranio-facial Skeleton*. Berlin: Springer-Verlag; 1998.
16. Ferri J, Piot B, Ruhin B, et al. Advantages and limitations of the fibula free flap in mandibular reconstruction. *J Maxillofac Surg* 1997;55(5):440–448. DOI: 10.1016/S0278-2391(97)90685-6.
17. Machado ER, Portinho CP, Vasconcelos RAT, et al. Extremity reconstruction using a free fibula flap after oncological resection. *Rev Bras Cir Plást* 2012;27(3):461–465. DOI: 10.1590/S1983-51752012000300023.

18. Portinho CP, Russano M, Sbal Chiero JC, et al. Complicações da área doadora pós-fibulectomia para reconstrução microcirúrgica de mandíbula. *Rev Bras Cir Craniomaxilofac* 2010;13(3): 153–155.
19. Momoh AO, Yu P, Skoracki RJ, et al. A prospective cohort study of fibula free flap donor-site morbidity in 157 consecutive patients. *Plast Reconstr Surg* 2011;128(3):714–720. DOI: 10.1097/PRS.0b013e318221dc2a.
20. Shindo M, Fong BP, Funk GF, et al. The fibula osteocutaneous flap in head and neck reconstruction: a critical evaluation of donor site morbidity. *Arch Otolaryngol Head Neck Surg* 2000;126(12):1467–1472. DOI: 10.1001/archotol.126.12.1467.
21. Sieg P, Taner C, Hakim SG, et al. Long-term evaluation of donor site morbidity after free fibula transfer. *Br J Oral Maxillofac Surg* 2010;48(4):267–270. DOI: 10.1016/j.bjoms.2009.07.019.
22. Aydin A, Emekli U, Erer M, et al. Fibula free flap for mandible reconstruction. *Kulak Burun Bogaz Ihtis Derg* 2004;13(3-4):62–66.