Case Report

Ossification of vascular pedicle in fibula free flap: a case report

Ossificação do pedículo vascular de um retalho livre de fíbula: relato de caso

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ABSTRACT

Introduction: The use of fibula flaps for the reconstruction of craniomaxillofacial defects has many advantages, including the low morbidity of the donor area, good bone quality for use of osseointegrated implants, and the possibility to include a skin island, when indicated. During the dissection of the flap, a muscle "cuff" and a periosteal strip are usually included near the region of the vascular pedicle. The osteogenic potential of the transplanted periosteum has been the object of studies. **Case report:** A 15-year-old male patient underwent microsurgical reconstruction using a fibula flap for a mandibular defect caused by the resection of a bone sarcoma. He developed increased volume and bone consistency in the cervical region next to the area where a cervicotomy was performed for vascular anastomosis. Imaging examinations showed the characteristics of the bone mass. He then underwent a new cervicotomy and mass exploratory surgery because bone tissue formation was observed at the site of vascular anastomosis. Anatomopathological examination of the specimen showed bone tissue formation next to the periosteal flap. **Discussion:** During fibula flap dissection, osteotomy is performed a few centimeters from the knee joint to facilitate the dissection of the vascular pedicle in the region of the popliteal fossa. Then, the vascular pedicle is surrounded by a muscle cuff and periosteal strip. This maintains its osteogenic capacity, which can be activated according to the stimulus of the area. Although periosteal ossification of the vascular pedicle in fibula free flaps is a rare event, it has been reported in different centers.

Keywords: osteogenic capacity; fibula free flaps; ossification.

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RESUMO

Introdução: Várias são as vantagens da utilização de retalhos fibulares para as reconstruções de defeitos craniomaxilofaciais, incluindo a baixa morbidade da área doadora, boa qualidade óssea possibilitando a realização de implantes osteointegrados quando indicados, além da possibilidade de inclusão de uma ilha de pele quando indicado. Durante a dissecção do retalho, próximo à região do pedículo vascular, normalmente inclui-se um cuff muscular e uma faixa de periósteo. O potencial

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osteogênico do periósteo transplantado tem sido objeto de estudo. **Relato de caso:** paciente de 15 anos, submetido à reconstrução microcirúrgica com um retalho fibular para um defeito mandibular pós-ressecção de um sarcoma ósseo. Evoluiu com aumento de volume, de consistência óssea na região cervical próximo à cervicotomia realizada para anastomose vascular. Exames de imagem mostravam características ósseas da massa. Foi então submetido à nova cervicotomia e exploração da massa, sendo observada uma formação de tecido ósseo no local da anastomose vascular. Exame anatomopatológico da peça mostrava formação de tecido ósseo adjacente ao retalho periostal. **Discussão:** Durante a dissecção do retalho fibular, a osteotomia é realizada a alguns centímetros da articulação do joelho, isto a fim de facilitar a dissecção do pedículo vascular na região do oco poplíteo. O pedículo vascular fica então envolto por uma cuff muscular e por uma tira de periósteo. Este mantém sua capacidade osteogênica, que pode ser ativada de acordo com o estímulo do local. A ossificação do periósteo do pedículo vascular de retalhos livres de fíbula permanece um evento raro, porém relatado por centros diferentes.

Descritores: Capacidade osteogênica; Retalho livre de fíbula; ossificação.

INTRODUCTION

The use of fibula free flaps is a procedure of choice for the reconstruction of large mandibular defects, especially those involving the anterior mandibular region and occurring after a large tumor resection. Its bone length and rich vascularization allow jaw remodeling by using multiple osteotomies[1,2].

The use of fibula flaps for the reconstruction of craniomaxillofacial defects has many advantages, including the low morbidity of the donor area, good bone quality for use of osseointegrated implants, and the possibility to include a skin island, when indicated, in addition to the possibility of having two surgical teams working simultaneously[3].

During the dissection of the flap, a muscle "cuff" and a periosteal strip are usually included next to the region of the vascular pedicle. The osteogenic potential of the transplanted periosteum has been the object of several studies[3,4]; however, its clinical observation in fibula osteomyocutaneous flaps has been described as a rare event[5].

The objective of this study is to relate a case of periosteal ossification of the vascular pedicle in a fibula flap and present a brief literature review.

CASE REPORT

A 15-year-old male patient underwent microsurgical reconstruction with a fibula flap for a mandibular defect caused by resection of a bone sarcoma.

Nine months after surgery, the patient developed increased volume and bone consistency in the cervical region next to the area where a cervicotomy was performed for vascular anastomosis. Imaging examinations showed the characteristics of the bone mass. Then, he underwent a new cervicotomy and mass exploratory surgery because bone tissue formation was observed at the site of vascular anastomosis. Anatomopathological examination of the specimen showed bone tissue formation next to the periosteal flap.

DISCUSSION

Although periosteal ossification of the vascular pedicle in fibula free flaps is a rare event, it has been reported to occur in different centers. It was initially reported in 2003[6], and four more cases were reported in 2008[7].

During fibula flap dissection, osteotomy is performed a few centimeters from the knee joint to facilitate the dissection of the vascular pedicle in the region of the popliteal fossa. This osteotomy is performed after periosteal detachment, to preserve the longitudinal vascularization along the flap (vascularization through the periosteum)[8]. Then, the vascular pedicle is surrounded by a muscle cuff and periosteal strip. This maintains its osteogenic capacity[3], which can be activated according to the stimulus of the area.

The ability of the periosteum to regenerate a new bone can be observed especially in younger patients and in revascularized flaps. This characteristic, combined with direct contact with the bone, allows the formation of a new bone along the pedicle. Therefore, it becomes necessary to modify the surgical technique while reducing excess fibula bone, removing the periosteum with the bone to avoid the complication described above[7].

In cases in which the primary disease is a tumor, the diagnosis can be confused with recurrence. Depending on the area of the pedicle and ossification, the patient may present symptoms or be completely asymptomatic[9].

The osteogenic potential of the periosteum exists with fibula free flap transfer and, depending on the location, it may have significant consequences such as intense pain, increased local volume, and even trismus[6]. Ossification of the vascular pedicle is unusual and probably underdiagnosed. The

complications are rare, and the surgical removal of ossification should be reserved for patients with symptoms[10].

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