

# 学位論文の要旨

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学位論文名 Safety and Efficacy of Secondary Mandibular Reconstruction Using a Free Osteo-cutaneous Fibula Flap After Segmental Mandibular Resection: A Retrospective Case-control Study

発表雑誌名 BMC Surgery  
(巻, 初頁~終頁, 年) (21, 189, 2021)

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## 論文内容の要旨

### INTRODUCTION

Free osteocutaneous fibula flap (FFF) is currently considered the best option for segmental mandibular reconstruction; however, access to microsurgical procedures for reconstructive surgery can be difficult due to various limitations such as the shortage of skilled plastic surgeons, insufficient surgical instruments, and lack of educational activities for patients, especially in rural areas. In such situations, mandibular bridging with nonvascular bone grafting or a reconstruction plate must be selected for mandibular continuity. Such reconstruction methods often involve early removal of the reconstruction material due to complications such as infection or chronic osteomyelitis with fistula formation. Thus, secondary mandibular reconstructions using FFF are required, however these patients requiring secondary reconstruction tend to have physical and psychological problems due to repeated surgeries. Therefore, secondary mandibular reconstruction requires reliable flap survival, as well as good functional and esthetic results, even in challenging situations. However, there are only a few reports comparing secondary with primary reconstructions using FFF. This study aimed to evaluate the safety and efficacy of secondary mandibular reconstruction using FFF when compared with primary mandibular reconstruction.

### MATERIALS AND METHODS

From October 2018 to February 2020, patients who underwent mandibular reconstruction using FFF after segmental mandibulectomy were retrospectively reviewed. Patients who underwent primary reconstruction for mandibulectomy had either benign or malignant tumors or

osteonecrosis of the mandible. All patients who underwent secondary mandibular reconstruction had undergone primary mandibulectomy at another institution for benign or malignant conditions and had developed associated complications. The demographic characteristics, including sex, age, body mass index (BMI), primary disease, history of radiation therapy, and history of lymph node dissection (including lymph node dissections in primary reconstruction cases) were evaluated. The comorbidities were classified based on the Charlson Comorbidity Index; a grading system based on 16 medical conditions associated with inpatient survival. The size and location of the mandibular defect, the segment length and number of osteotomies in the fibula, types of the mandibular plating system, kinds and laterality of the recipient vessels were recorded from the surgical notes. Flap survival, duration of nasogastric tube use, and implant installation after reconstruction were recorded as postoperative evaluation indices. In secondary reconstruction cases, the interval between the primary and secondary surgeries, type of reconstruction in the primary surgery, number of surgeries performed after the primary but before the secondary reconstruction, and complications from the first operation were also investigated. The study protocol was approved by the Research Ethics Committee of Shimane University.

## **RESULTS AND DISCUSSION**

Twelve patients underwent mandibular reconstruction using FFF during the study period. There were no significant differences in demographic characteristics other than BMI between the primary (n = 8) and secondary (n = 4) reconstruction groups. No significant differences were observed in the size and location of defects, the segment length and number of osteotomies in the fibula, and the types of mandibular plating system. There was no significant difference in the kinds of recipient vessels; however, the laterality of recipient vessels was ipsilateral in all cases of primary reconstructions and contralateral in all cases of secondary reconstructions. Three out of eight patients with primary FFF reconstruction developed partial flap necrosis. Four patients in the secondary FFF reconstruction group achieved complete flap survival. The duration of use of the nasogastric tube and implant installation after reconstruction was comparable between the two groups. In secondary reconstruction cases, the mean interval between primary surgery and secondary surgery was 3.4 years, ranging from 2.1 to 5.0 years. Concerning the types of reconstruction in primary surgery, two patients had undergone reconstruction using the sternocleidomastoid flap and reconstruction plate, one patient had undergone reconstruction using the FFF, and one patient had undergone no rigid reconstruction of the mandible. The mean number of surgeries performed after the primary but before the secondary reconstruction was four, ranging from two to six. Regarding the complications from the first operation, three of the four patients presented with an infected fistula. One of them who had undergone reconstruction using FFF had developed primary failure. The fourth patient had tumor recurrence and an

unacceptable facial deformity.

Although our database allowed us to analyze the demographic differences between primary and secondary mandibular reconstructions using FFF, the present study had several limitations. First, it was retrospective in design with its inherent defects. Second, the sample size was small because it was a relatively infrequent surgery. Due to these major limitations, real causalities could not be demonstrated from a statistical point. Finally, it was a single-center study. To reduce bias observed in long-term studies, reconstructive surgery performed by the same surgeon in a short period of time was targeted. A multicenter prospective study would be required to overcome these limitations even though there could be potential inconsistencies in surgical techniques.

### CONCLUSION

This clinical case study encourages that secondary mandibular reconstruction is feasible using FFF. Taking advantage of the relatively long vascular pedicle of FFF, performing contralateral side vascular anastomosis seemed useful for safe and effective secondary mandibular reconstruction using FFF.