

# Functional Reconstruction of the Lower Lip With Fujimori Flap and Long-Term Follow-Up With Clinical and Electrophysiologic Evaluations

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**Purpose:** The Fujimori gate flap is an innervated flap raised from the nasolabial area for reconstruction of the lower lip. No electromyographic or clinical long-term studies have analyzed the long-term outcomes of lower lip reconstruction performed using this method. The aim of the present study was to assess the outcomes of lower lip reconstruction with the Fujimori gate flap using clinical and electrophysiologic examinations.

**Patients and Methods:** Ten patients who had been treated with this procedure were evaluated clinically and electrophysiologically. The follow-up period was 1 year for all patients, and the patients underwent regular assessments.

**Results:** All flaps survived completely, and no wound healing problems were encountered. Four patients underwent revision in the late postoperative period. The electrophysiologic studies revealed the presence of reinnervation in all 10 patients.

**Conclusions:** In the present study, we found that the Fujimori gate flap is a versatile flap for ideal reconstruction of lower lip defects. Our electrophysiologic assessments showed that the transferred muscle had undergone reinnervation and that the donor area innervation had been preserved. The findings from the serial clinical and electrophysiologic assessments indicated satisfactory results.

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Lower lip cancer has mostly been the epidermoid cell type.<sup>1,2</sup> Reconstruction of wide defects after excision of these lesions can be challenging. The aim of an ideal lip reconstruction is to restore the form and function of the lower lip. The skin cover, mucosal lining, vermilion, commissural structure, and the labial sulcus will need to be reconstructed for an ideal form. After reconstruction, patients should have comprehensible speech, without problems during feeding or drooling. They should have an

adequate mouth opening to allow the use of dentures, especially in elderly patients, and lip sensibility should be restored. Although various flap alternatives have been described for the reconstruction of lower lip defects, no technique is yet available that can fulfill all expectations. Innervated composite facial muscle flaps have been reported to provide a repair closest to the ideal.<sup>3,4</sup>

The Fujimori gate flap is an innervated flap raised from the nasolabial area for reconstruction of the

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lower lip. It can be used unilaterally or bilaterally.<sup>5-7</sup> Published studies have reported that an almost ideal lip reconstruction can be achieved with this flap. However, no studies have evaluated the innervation pattern of the muscle in the reconstructed lip, which would prove that the Fujimori gate flap is functional. Also, no long-term electromyographic (EMG) studies have shown this process.

The present study was designed to evaluate the functionality of the newly reconstructed lip using both EMG studies and clinical data. The results of long-term follow-up examinations are presented.

## Patients and Methods

A retrospective analysis of patients who had undergone excision of squamous cell carcinoma of the lower lip and reconstruction with Fujimori gate flaps from 2006 to 2008 was performed. The Diskapi Research and Educational Hospital institutional review board approved the present study, and all participants signed an informed consent agreement. Of the 10 patients, 6 were men and 4 were women, with an age range of 43 to 70 years; 2 patients had stage T1, 6 had stage T2, and 2 had stage T3 lesions. All patients had stage N0 and M0. Four patients with total lower lip defects after excision underwent reconstruction with bilateral Fujimori gate flaps. Six patients with lower lip defects involving two thirds or less of the total lower lip underwent reconstruction with unilateral Fujimori gate flaps, with 4 on the left side and 2 on the right (Table 1).

The electrophysiologic evaluation was performed by an experienced electromyographer. Motor nerve conduction studies were performed bilaterally using superficial disc electrodes. Compound muscle action potentials were obtained from the area of the orbicularis oris muscle by stimulation of the facial

nerves in the preauricular region. Needle EMG examinations were performed to assess the denervation and reinnervation process. The flap and donor area were both examined. The electrophysiologic assessment was performed at 1, 3, and 12 months postoperatively.

Clinical assessment of the flaps included an evaluation of competence, sensitivity, speech, and esthetic results. Competence was assessed by asking the patients whether they could retain fluids or had experienced drooling. Speech was also assessed by conversation with the patients and asking their relatives whether their speech was comprehensible. Sensitivity was assessed by testing superficial touch and pain sensation. Two-point discrimination was also measured. The esthetic results were evaluated by asking the patients' opinions of their reconstructed lips. The follow-up period was 1 year for all patients, and the patients were regularly assessed on postoperative day 5 and at 1, 3, and 12 months postoperatively.

## Results

All flaps developed edema soon after the operation that regressed spontaneously. All flaps survived completely, and no wound healing problems were encountered. Two patients with reconstructed total lower lip defects later developed oral incompetence from macrostomia and underwent revision 6 months after their initial operation. Two patients with unilateral flaps underwent scar revision at 9 months postoperatively. All patients could retain the fluids they drank in their mouth. Only 2 patients experienced an escape of liquid or saliva. Also, the patients could easily squirt the liquids from their mouth when asked to do so. They could also easily whistle. The speech of the patients was easily comprehensible by their families and the people around them.

**Table 1. RETROSPECTIVE ANALYSIS OF PATIENT DATA**

Pt. No.	Age/Gender	Histologic Type	T Stage	Defect	Flap Procedure	Complication	Follow-Up (mo)
1	58/F	SCC	T1	1/3	Left unilateral	Edema	23
2	52/F	SCC	T2	>2/3	Bilateral	Edema	28
3	69/M	SCC	T2	2/3	Right unilateral	Edema	24
4	65/M	SCC	T2	2/3	Left unilateral	Edema	10
5	69/M	SCC	T3	>2/3	Bilateral	Edema	6
6	70/F	SCC	T3	>2/3	Bilateral	Edema	12
7	45/M	SCC	T2	2/3	Left unilateral	Edema	26
8	43/F	SCC	T1	1/3	Right unilateral	Edema	3
9	72/M	SCC	Secondary case	2/3	Bilateral	Edema	13
10	63/M	SCC	T2	2/3	Left unilateral	Edema	20

Abbreviations: F, female; M, male; Pt. No., patient number; SCC, squamous cell carcinoma.

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