

# Prevention of Mandible Reconstruction Plate Exposure by Costal Cartilage Wrapping

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**Summary:** After mandibulectomy in cancer surgery, reconstruction is often performed with a reconstruction plate covered with a soft-tissue free flap in patients in poor condition. However, the rate of complications for mandibular reconstruction is higher with a reconstruction plate than with vascularized bone grafts. We have developed a costal cartilage wrapping method to prevent exposure of the mandible reconstruction plate. The eighth costal cartilage was removed and split into 2 pieces to wrap around the reconstruction plate. In our case, the artificial plate wrapped with costal cartilage graft was not exposed and the skin over the plate did not become atrophic over 27 months follow-up even after irradiation. Wrapping around an artificial reconstruction plate with autologous costal cartilage grafts may be more effective than using only a flap covering to prevent exposure of the plate after tumor ablation and radiation therapy. (*Plast Reconstr Surg Glob Open* 2017;5:e1438; doi: 10.1097/GOX.0000000000001438; Published online 4 August 2017.)

**R**econstruction of composite defects of the mandible is a challenging problem in cancer surgery. Although the use of an osteocutaneous flap is generally accepted to be optimal,<sup>1</sup> reconstruction is often performed with a reconstruction plate covered with a soft-tissue free flap in poor patient's condition.<sup>2</sup> However, the rate of complications is higher for mandibular reconstruction with a reconstruction plate than with vascularized bone grafts.<sup>3,4</sup> We have developed a costal cartilage wrapping method to prevent exposure of the mandible reconstruction plate. In this article, we report a case along with a discussion of the technique and outcomes.

## SURGICAL TECHNIQUE

After applying a reconstruction plate to the mandible defect, the eighth costal cartilage was removed and split into 2 pieces to wrap around the reconstruction plate. The costal cartilage was wider than the reconstruction plate, so it was easy to cover the plate. These costal cartilages were attached to the plate using nonabsorbable sutures. This technique was applied to the anterior portion of the reconstruction plate that is not covered by the masseter muscle.

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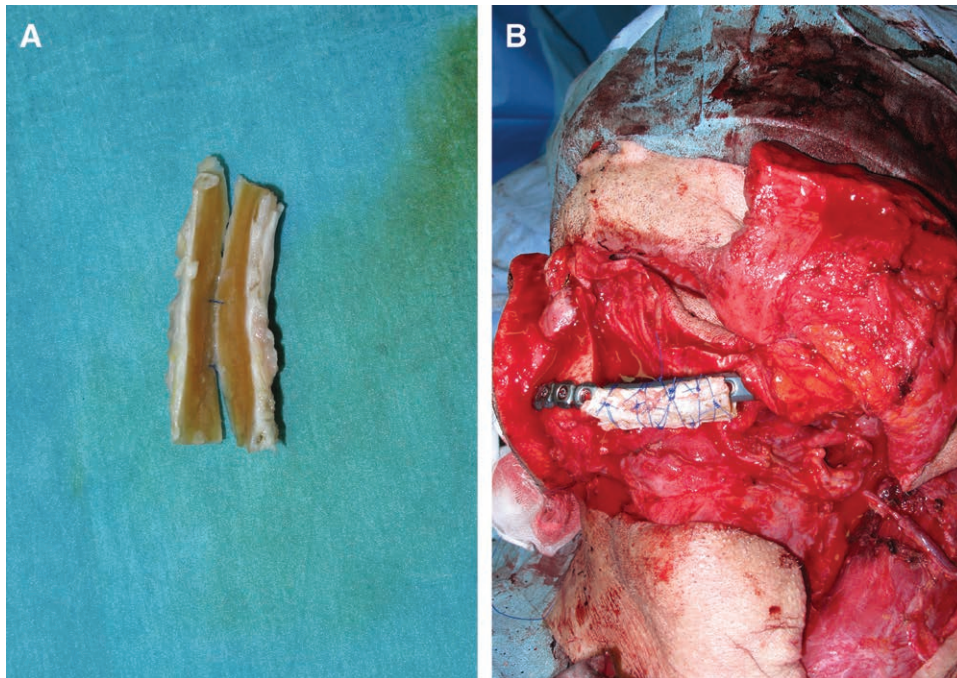
## CASE REPORT

A 71-year-old man suffered gingival mucosal squamous carcinoma on the left mandible (T4N2b M0). The tumor was removed and left mandibulectomy was performed. Left modified neck dissection was also performed. The mucosal defect was reconstructed with a free anterolateral thigh flap. The defect of the left mandible was reconstructed using an artificial reconstruction plate. Though aged costal cartilage was frangible, eighth costal cartilages were removed and could be split into 2 pieces. The plate was wrapped with split eighth costal cartilage grafts (Fig. 1). Post-operative chemoradiation therapy was performed with a dose of 50 Gy. Twenty-seven months later, the tumor recurred and the patient began to receive end-of-life care. However, the skin over the reconstruction plate did not become atrophic and thin. The contour of the reconstruction plate did not become apparent. The skin over the plate was stable and the plate was not exposed (Fig. 2).

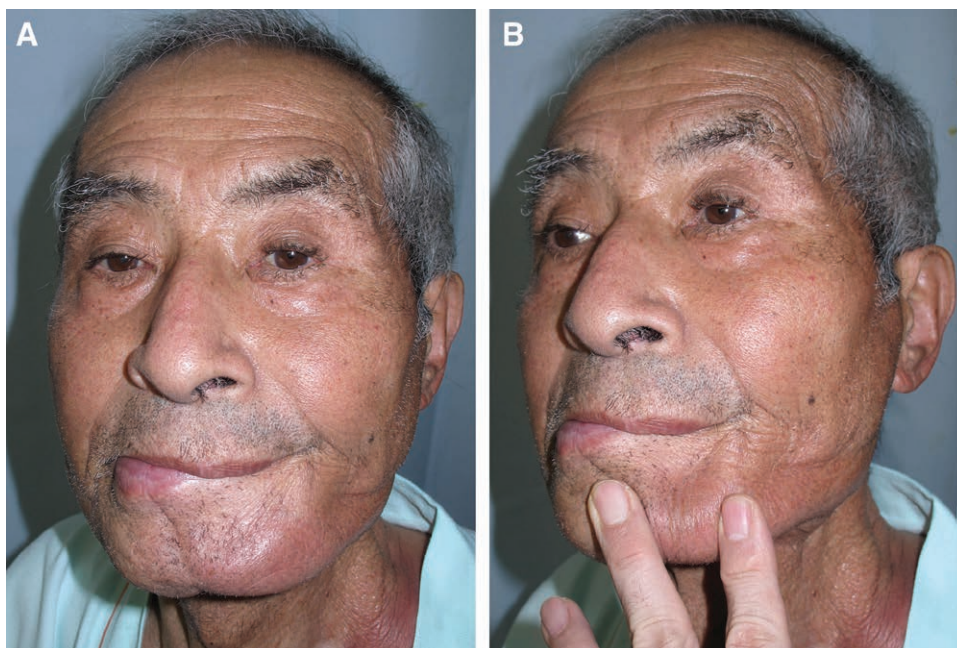
## DISCUSSION

Use of a reconstruction plate after mandibulectomy is sometimes a useful reconstructive option, especially in patients who cannot tolerate transfer of a vascularized bone graft. However, Fanzio et al.<sup>5</sup> reported that even if the reconstruction plate was covered with a well-vascularized free soft-tissue flap, the incidence of plate exposure was 37.7% (49/130) at follow-up over a mean follow-up period of 2.4 years. Wei et al.<sup>6</sup> reported plate exposure in

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**Fig. 1.** A, Split costal cartilages. B, Anterior portion of reconstruction plate was wrapped around with costal cartilages after left mandibulectomy.



**Fig. 2.** A, After 27 months, the skin over the plate was stable and the plate was not exposed (B).

30 of 65 patients over an average follow-up period of 22 months following operation with a plate and soft-tissue free flap. These reports suggested that reconstruction using artificial material remains insufficiently predictable, and the skin over the operated area is liable to break down over time. Several authors<sup>2,3,5</sup> have pointed out that a significant risk factor for plate exposure was radiation therapy and crossing the midline of the mandible. There were no remarkable differences between types of flap.

On the other hand, autologous costal cartilage grafting has been used in total ear reconstruction. Autologous costal cartilage is accepted as a safe and stable material because of its unique properties. Chen et al.<sup>7</sup> reported satisfactory total ear reconstruction with costal cartilage graft in a geriatric microtia patient. They showed that aged costal cartilage of the 67-year-old male patient retained its properties after 2-year follow-up. In our case, the patient was 71 years old. Though aged costal cartilage

was frangible, eighth costal cartilages were removed and could be split into 2 pieces. The artificial plate wrapped with costal cartilage graft was not exposed, and the skin over the plate did not become atrophic over 27 months follow-up even after irradiation. Wrapping of autologous costal cartilage grafts around an artificial reconstruction plate may be more effective than using only a flap covering to prevent exposure of the plate after tumor ablation.

### CONCLUSION

The method described in this article is a promising means of maintaining a reconstruction plate for a longer postoperative period even in geriatric patients.

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### PATIENT CONSENT

*The patient provided written consent for the use of his images.*

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