

# Free Jejunal Patch to Reconstruct Oral Scar Contracture Following Caustic Ingestion

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Reconstruction of oral scar contracture is often a challenging problem due to the complex structures and functions of the oral cavity. This report describes the treatment of a patient who sustained extensive oral scar contracture following caustic liquid soda ingestion. Surgical release of the scar contracture formed an S-shaped, thin, long defect that was difficult to cover with a conventional flap or skin graft. A jejunal segment was transferred microsurgically as a patch to reconstruct the defect. It sustained a sufficient oral space to provide full opening of the mouth and good movement of the tongue. A free jejunal flap, used occasionally for reconstruction following oral cancer resection, has significant advantages for restoration of function after release of an oral scar contracture.

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The ingestion of chemical agents can cause serious damage to the oral mucous membranes, lips, and tongue followed by oral scar contracture. However, to the best of our knowledge little has been written about reconstruction of oral scar contractures. The majority of reports regarding caustic ingestion appear to be concerned with return of function to the strictured esophagus and stomach.<sup>1</sup>

The oral cavity has complex and important structures, including the movable tongue, soft palate, and the fasciomusculomucosal walls. These components are critical for airway protection, swallowing, and speech. Therefore, treatment of oral scar contracture, especially in severe

cases, has challenged the ingenuity of generations of surgeons.

Free jejunal flaps have been proposed to offer thin, pliable tissue suitable for reconstruction of oropharyngeal defects after resection of intraoral cancer.<sup>2-4</sup> No previous reports have demonstrated free jejunal patch flaps to reconstruct oral scar contracture resulting from caustic ingestion. This article presents the treatment of a patient and a discussion of problems with respect to reconstruction of the oral cavity using this technique.

## Patient Report

A 61-year-old man was referred to us for treatment of extensive oral scar contracture. He attempted suicide by ingesting caustic liquid soda 4 months previously. The hypopharynx and esophagus had not been injured because he spit out the caustic soda without swallowing.

Examination revealed a severely constricted oral cavity. He could open his mouth only 2.5 cm. A severe contracture of the right buccal mucosa extending to the ipsilateral commissure especially restricted mouth opening. The anterior two thirds of the tongue was completely adhered to the floor of the mouth, and its movement was quite limited although the intralingual muscle seemed to be preserved (Fig 1).

Under general anesthesia with a tracheotomy, contracted scar tissue was incised from the right commissure to the buccal mucosa, thus creating accessibility to the oral cavity. The incision was elongated along the retromolar region to the crest of the mandibular alveolar ridge to free the tongue from the floor of the mouth (Fig 2). The



*Fig 1. Preoperative view. The patient could open his mouth only 2.5 cm. Severe contracture in the right commissure to the right buccal mucosa restricted mouth opening. The tongue adhered to the floor of the mouth.*

entire incision resulted in a thin, long, S-shaped defect that was 15 × 5 cm (Fig 3A).

A jejunal segment harvested by a second team was split and trimmed to form a 15 × 5-cm rectangular patch (Fig 3B). The defect was covered with the jejunal segment as a patch with its mucous surface outside. The mesenteric artery and vein were then anastomosed to the facial artery and vein respectively under the microscope (Fig 3C).

Although an endotracheal catheter was extubated on the eighth postoperative day (POD), the respiratory tract was obstructed by the tongue base on POD 11 while the patient was asleep. Therefore an endotracheal catheter was reinserted. Final extubation was as late as POD 43, when we could confirm the intraoral swelling was reduced enough so as not to induce respiratory tract obstruction.

The patient has been followed for 16 months since reconstructive surgery and has been functioning very well. The transferred jejunal segment sustained a sufficient oral space to provide

full opening of the mouth and good movement of the tongue. His speech recovered remarkably and he can manage a soft diet without aspiration (Fig 4).

## Discussion

Ingestion of caustic material, either accidentally or intentionally, may result in tissue and organ destruction leading to a wide range of complications, including loss of ability to eat and speak. In general, alkalis are particularly destructive because of their lytic action on tissues.<sup>5</sup>

Of interest is the correlation of the type of lye ingested with the distribution of chemical burns. Solid alkalis cause deep burns where they adhere to the oral mucosa, but they tend not to be swallowed and are usually spit out. In contrast, liquid lye is easily swallowed, and it enters the esophagus before pain is felt, causing less injury within the mouth. Liquid alkaline agents quickly cover the surface of the esophagus and move on to the stomach. They produce liquefaction necrosis, which exposes progressively deeper layers of tissue to the caustic agent and produces much more extensive injuries.<sup>1,6-8</sup>

With the increased use of household products (e.g., drain cleaners), liquid alkali became the most common agent in caustic ingestion.<sup>1</sup> Therefore, the majority of previous reports have been concerned with esophageal and stomach injuries. Only a few reports describe reconstruction of the oral cavity following caustic ingestion.<sup>8,9</sup> Our patient held a liquid alkali in his mouth but spit it out without swallowing. This behavior resulted in an unusual situation in which the patient suffered severe oral scarring and contracture without an esophageal injury.

Reconstruction of the oral cavity has never been definitive or precise because of the complex structure and function of the oropharynx. Skin grafts have been one reconstructive choice, but they often slough, and secondary contracture inevitably occurs.<sup>9</sup> Although techniques using skin flaps have been a standard procedure, transplanted skin shows insufficient adaptation to the functional needs of oral mucosa. Patients suffer from cicatricial indurations, impaired mucus secretion, and continual desquamation of the epidermal layer that

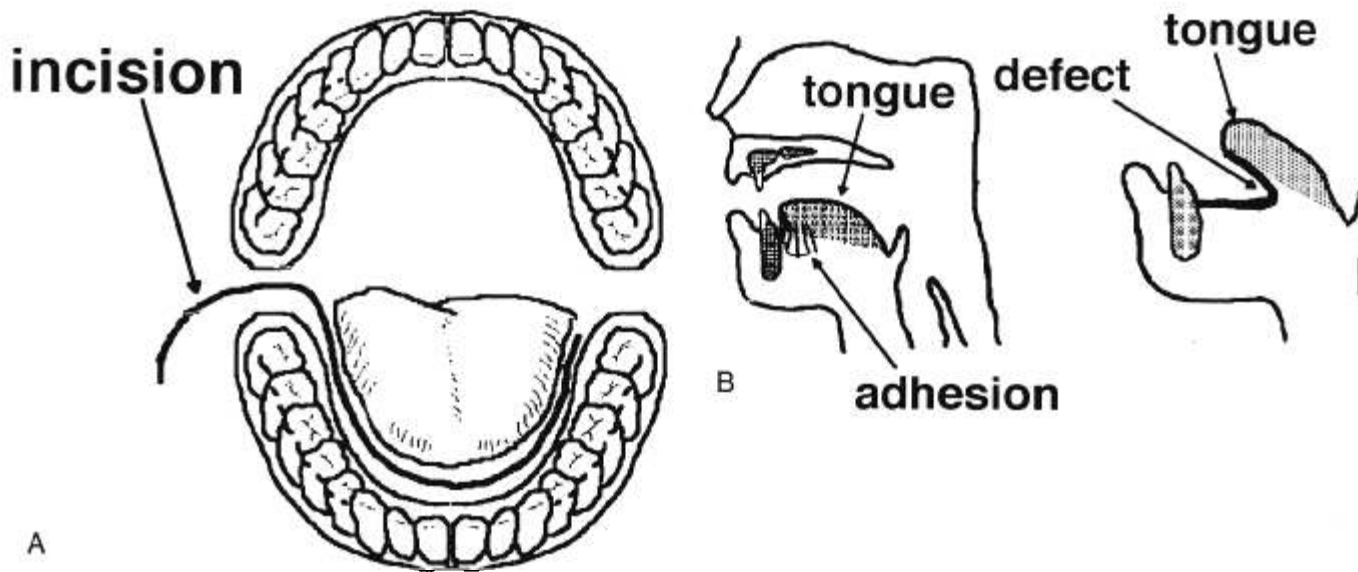


Fig 2. (A) Incision line in the mouth. The contracted buccal mucosa was incised. The incision was elongated along the retromolar region to the floor of the mouth. (B) The adhered tongue was released from the floor of the mouth.

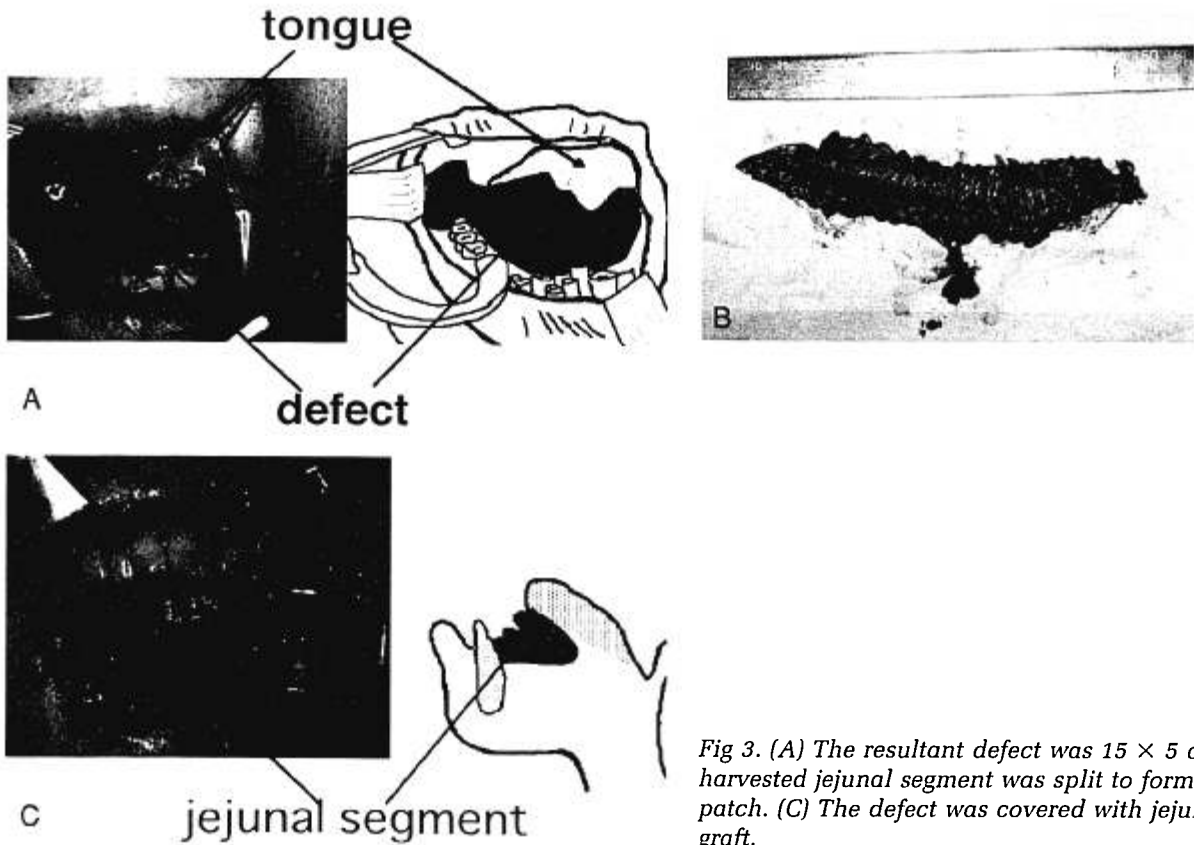


Fig 3. (A) The resultant defect was 15 × 5 cm. (B) The harvested jejunal segment was split to form a rectangular patch. (C) The defect was covered with jejunal patch graft.

may impair chewing, swallowing, speaking, and breathing.<sup>3</sup>

To overcome these problems, the jejunum has been proposed as a suitable tissue for reconstruction of oral cavity and pharyngeal defects.<sup>2-4,10</sup> Several significant advantages of the jejunal flap include mucous secretion (which cleans the sur-

face) as well as sufficient flexibility. Furthermore, there is an unlimited transplant supply to suit the complex three-dimensional defects. Because of the abundant blood supply, good wound healing is expected. Release of the scar contracture in our patient formed an S-shaped, thin, long defect that was difficult to cover even with a flap such as the

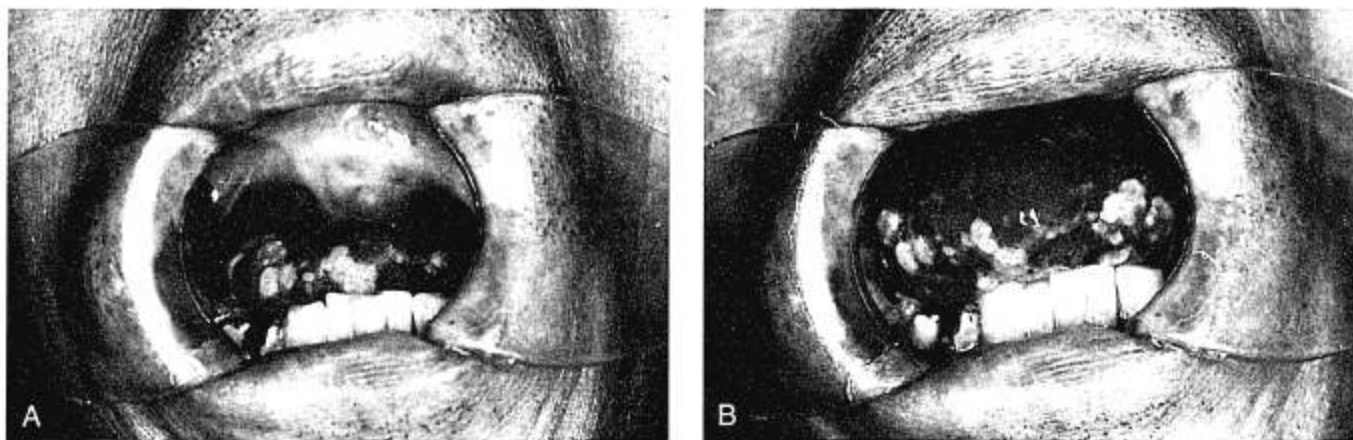


Fig 4. Postoperative view. (A) The patient can open his mouth fully. (B) The tongue exhibits good range of motion.

forearm flap. A jejunal flap was an excellent and almost exclusive option that adapted complex configuration without preventing tongue movement.

Disadvantages of this flap are friability of the mucosa, leading to inadvertent bleeding<sup>10</sup> and excess mucus secretion. These symptoms have not been problematic in our patient. However, the respiratory tract was obstructed by ptosis of the tongue base due to swelling of the transferred jejunum. This risk may be significantly higher in a case of oral scar contracture than in that of malignant tumor because reconstruction of contracture yields excellent mobility of the tongue. Careful extubation is necessary after reconstructive surgery.

In conclusion, we treated a rare case of severe scar contracture in the oral cavity following caustic liquid soda ingestion. A free jejunal patch flap, used occasionally for reconstruction following oral cancer resection, has significant advantages for restoration of function after release of oral scar contracture.

## References

- 1 Shikowitz MJ, Levy J, Villano D, et al. Speech and swallowing rehabilitation following devastating caustic ingestion: techniques and indicators for success. *Laryngoscope* 1996;106:1-12
- 2 Haughey BH. The jejunal free flap in oral cavity and pharyngeal reconstruction. *Otolaryngol Clin North Am* 1994;27:1159-1170
- 3 Kornfehl J. Autotransplanted jejunum in head and neck cancer. *Eur J Cancer B Oral Oncol* 1994;30B:16-22
- 4 Sakamoto H, Uematsu M, Morihana T, et al. [Reconstruction of oral defects using free revascularized jejunum transfer]. *Gan No Rinsho* 1985;31:908-913
- 5 Ochi K, Ohashi T, Sato S, et al. Surgical treatment for caustic ingestion injury of the pharynx, larynx, and esophagus. *Acta Otolaryngol Suppl (Stockh)* 1996;522:116-119
- 6 Hawkins DB, Demeter MJ, Barnett TE. Caustic ingestion: controversies in management. A review of 214 cases. *Laryngoscope* 1980;90:98-109
- 7 Meredith JW, Kon ND, Thompson JN. Management of injuries from liquid lye ingestion. *J Trauma* 1988;28:1173-1180
- 8 Rubin MM, Jui V, Cozzi GM. Treatment of caustic ingestion. *J Oral Maxillofac Surg* 1989;47:286-290
- 9 Takato T, Harii K, Ebihara S, et al. Oral and pharyngeal reconstruction using the free forearm flap. *Arch Otolaryngol Head Neck Surg* 1987;113:873-879
- 10 Banis Jr JC, Swartz WM. Refinements in free flaps for head and neck reconstruction. *Clin Plast Surg* 1990;17:673-682