

Technical note

New video fluoroscopic chewing examination for patients who use dentures after mandibular reconstruction

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We have developed a new video fluoroscopic examination in which patients chewed on pancakes containing barium sulphate in their habitual pattern to allow observation of the manner in which boluses of food were broken down in the oral cavity. This test made it possible to observe objectively what kind of changes occur in masticatory function after mandibular reconstruction in patients either with or without their dentures.

The study involved patients who, since 2011 have taken a new chewing test after mandibular reconstruction. Subjects included patients who had been fitted with lower dentures after mandibular reconstruction (using an autologous bone graft after segmentectomy) to treat carcinoma.

We prepared pancakes that contained 3 ml of barium sulphate solution (“barium solution”), about 4 g of barium jelly, and about 4 g of pancake (Fig. 1). After mandibular reconstruction, they were instructed to chew the barium pancakes in their habitual chewing pattern while wearing and not wearing mandibular dentures. Video fluoroscopic images were analysed in the anteroposterior position to observe how the food boluses were being chewed (Fig. 2).

One patient was a 64-year-old man with cancer of the right gingiva who had had a vascularised fibular graft after mandibular segmentectomy (Fig. 3). A vestibuloplasty was done 12 months after mandibular reconstruction, and then a dental prosthesis was inserted (Fig. 4). We made the examina-



Fig. 1. Barium pancake.

tion one month after he had started wearing dentures (Video 1. A, B, supplemental information, online only).

According to previous reports, methods of examining chewing after mandibular reconstruction include: testing using occlusal force¹; testing the path of movement of the mandible²; and investigating the formation time of the food bolus while wearing and not wearing dentures.³ They also include testing on food mixing ability⁴; and testing with Manly's method using peanuts.⁵ No reports, however, have visually confirmed how chewing is actually done.

First, we did a video fluoroscopic swallowing examination using barium, which is done conventionally on patients

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Fig. 2. Video fluoroscopic examination of chewing in the anteroposterior position.



Fig. 3. Panoramic radiograph at three years postoperatively.



Fig. 4. A denture in place.

who have had mandibular reconstruction. This allowed us to observe whether food boluses tended to be chewed on the reconstructed or non-reconstructed side. The barium pancakes had appropriate hardness; they could not be crushed easily; they had appropriate liquidity; and could be reliably examined with video fluoroscopy. The results showed that the patients had a tendency to avoid chewing on the reconstructed side regardless of whether the conventional dentures were worn. In the future, we plan to use this method to observe changes in chewing function after mandible reconstruction

objectively in a larger group of patients with different types of dentures.

Ethics statement/confirmation of patients' permission

Ethics approval not applicable. The patient's permission was obtained.

Conflict of interest

We have no conflicts of interest.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.bjoms.2019.05.014>.

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