



Contents lists available at ScienceDirect

Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

journal homepage: www.elsevier.com/locate/jomsm

Original research

Elucidating the masticatory function and oral quality of life according to the range of mandibulectomy

Michinori Maeda^{a,*}, Marina Hirose^a, Keinoshin Wada^a, Megumi Kishimoto^b, Masaya Akashi^b, Akira Kimoto^b, Takahide Komori^b, Yasuyuki Shibuya^a

^a Department of Oral and Maxillofacial Surgery, Nagoya City University Graduate School of Medical Sciences, Nagoya 467-8601, Japan

^b Department of Oral and Maxillofacial Surgery, Kobe University Graduate School of Medicine, Kobe 450-0017, Japan

ARTICLE INFO

Keywords:

Masticatory function
Segmental mandibulectomy
Marginal resection
CAT classification

ABSTRACT

The aim of this study was to clarify the masticatory function and oral health-related quality of life (OHRQoL) for different ranges of mandibulectomy and also continuity resection of the mandible. A total of thirty one patients who underwent mandibulectomy and were classified into AT, body, and marginal resection (MR) groups according to the CAT classification were investigated. The masticatory function was evaluated using a color-changing gum, a gummy jelly, and a modified Sato's questionnaire. The OHRQoL was evaluated using the Oral Health Impact Profile (OHIP), which included seven subscales. There were significant differences between the AT group and body group in the findings from the color-changing gum and the OHIP ($P < 0.05$). There was also a significant difference between the AT group and body group regarding the degree of physical disability and psychological disability (subscales of the OHIP) ($P < 0.05$). There were no significant differences between the body and MR group in any of the tests. Consequently, the body group showed a higher masticatory function and OHRQoL than the AT group despite having the same category of mandibulectomy defect; however, the masticatory function and OHRQoL in the body and MR groups were found to be closely similar, at least, regarding the chewing performance.

1. Introduction

Since mandibulectomy is sometimes indicated in patients with oral tumors, many patients suffer from masticatory dysfunction. In particular, jaw movements and the chewing function are particularly deteriorated after segmental or hemi-mandibulectomy, as the patients lose not only dentition but also jaw bone [1,2]. After segmental or hemi-mandibulectomy, if hard tissue reconstruction is not carried out, the chewing function is deteriorated because the remaining mandible loses the bilateral fulcrums of the temporomandibular joint [3]. Since most of patients cannot bite in maximum intercuspation without hard tissue reconstruction, hard tissue reconstruction is usually necessary. While hard tissue reconstruction does require expansion of the operating field or a graft from a donor site, a difficult feat in some, patients who undergo hard tissue reconstruction after mandibulectomy can expect both sufficient recovery of the chewing function by combination with a dental implant as well as recovery of the aesthetic element [4].

However, it is difficult to predict how a masticatory disorder might develop when a certain kind of operation (i.e. different kinds of mandibulectomy or hard tissue reconstruction) is performed. Recently, a

number of methods have been developed for determining the severity of potential masticatory disorders. For example, gummy jelly has been used to test the chewing function [5]. In this test, the elution of glucose and β -carotene is measured [6]. A special gum that changes from green to red based on the amount of mastication has also been developed. This chewing gum has been specially modified to not adhere to denture materials by adding ductile glycerine fatty acid ester and microcrystalline wax; therefore, it can be easily chewed even by patients wearing dentures. The gum becomes totally red if a healthy dentate volunteer chews it 160 times [7,8]. The utility of evaluating the masticatory function in mandibulectomy subjects using this color-changing gum has been proven [9].

Sato's questionnaire is widely used to evaluate the masticatory performance in Japan [10]. This questionnaire evaluates whether it is possible to eat 20 out of 100 different types of foods including Japanese foods. Koyama et al. investigated the masticatory function in patients that underwent maxillectomy using Sato's questionnaire [11]. In addition, the Oral Health Impact Profile (OHIP) was developed in order to evaluate the oral health-related quality of life (OHRQoL) in Australia. OHIP has been shown to be useful for carrying out the OHRQoL

* Corresponding author at: 1-Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya 467-8601, Japan.
E-mail address: maeda@med.nagoya-cu.ac.jp (M. Maeda).

<https://doi.org/10.1016/j.ajoms.2018.01.004>

Received 16 November 2017; Received in revised form 17 January 2018; Accepted 18 January 2018
2212-5558/ Published by Elsevier Ltd on behalf of Asian Association of Oral and Maxillofacial Surgeons

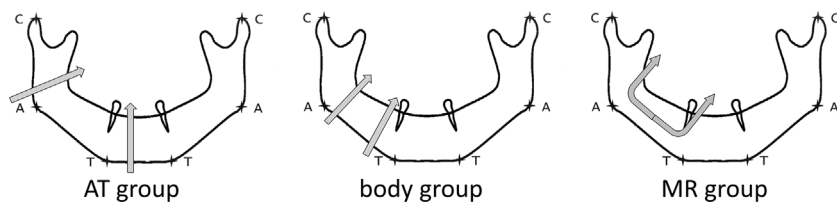


Fig. 1. Defects due to mandibulectomy classified by the CAT classification and marginal resection.

assessment of oral cancer patients [12].

In the present study, we attempted to clarify the masticatory function and OHRQoL for three types of defects following mandibulectomy (designated by the CAT classification [13].) using color-changing chewing gum, gummy jelly, the food questionnaire and OHIP.

2. Methods

A total of 31 patients, who underwent mandibulectomy because of mandibular tumors after excluding edentulous cases without implant supported dentures, were enrolled in this study. All patients underwent mandibulectomy at Nagoya City University Hospital or Kobe University Hospital between 1982 and 2017 and consented to participate in this study were recruited. This study was approved by the Medical Ethics Committee of Nagoya City University (No.46-14-0013 2015) and Kobe University (No.1762 2015). All of the data described below were obtained more than 3 months after the completion of oral rehabilitation.

The defect range after segmental mandibulectomy was classified according to the CAT classification (Fig. 1) [13]. Cases with a defect range including the mandibular body, angle and mental tubercle of the diseased side without mental tubercle of the unaffected side were classified into the AT group. Cases with a defect range including the mandibular body without the mandibular angle or mental tubercle of the diseased side were classified into the body group. Cases with a marginal resection were classified into the MR group.

Seven patients were classified into the AT group, including six cases reconstructed with an fibular osteocutaneous flap and one reconstructed with a combination of a reconstruction plate and a musculocutaneous flap. Twelve patients were classified into the body group, including ten cases reconstructed with a fibular osteocutaneous flap and two reconstructed with a combination of a reconstruction plate and a musculocutaneous flap. Twelve patients were classified into the MR group, including a case with reconstruction by a musculocutaneous flap and eleven cases without reconstruction. The distribution of the Eichner classes in all patients is shown in Table 1.

2.1. OHIP-49

The OHIP consists of 49 questions organized into 7 dimensions: “functional limitations (9 questions)”, “physical pain (9 questions)”, “psychological discomfort (5 questions)”, “physical disability (9 questions)”, “psychological disability (6 questions)”, “social disability (5 questions)” and “handicap (6 questions)”. Each question has 5 response categories, ranging from “never (score 0)” to “very often (score 4)”. A high OHIP is considered to indicate a low OHRQoL.

2.2. Color-changing gum

Masticatory Performance Evaluating gum XYLITOL® (30 mm × 20 mm × 1 mm, 3.0 g) was obtained from LOTTE Co., Ltd. (Tokyo, Japan). The subjects were instructed to chew the gum continuously for 3 min on the usual occluding side, at about one stroke per second. The chewed gum bolus was placed between two glass plates and pressed to a thickness of approximately 1 mm. It was then covered with a clear film marked with a 2-mm square pattern, and the color within each square was classified into five categories: green (1 point), yellow (2 points), light pink (3 points), pink (4 points) and red (5

points). The mean score was then calculated.

2.3. Gummy jelly

The masticatory function was also tested using a gummy jelly. This was performed in accordance with the method of Shiga et al. A cylindrically shaped gummy jelly (diameter 15 mm, height 10 mm, weight 2.0 g) was obtained from GC Co., Ltd. (Tokyo, Japan). The subjects were instructed to chew the gummy jelly for 20 s. After chewing, the subjects were directed to rinse their mouths with 10 ml of distilled water and to expectorate the water and gummy jelly into a cup with a filter paper as thoroughly as possible. The filtrate was collected, and the concentration of dissolved glucose was measured using a blood glucose meter (Glucosensor GS-1; GC Co., Ltd.).

2.4. Modified Sato's questionnaire

The questionnaire used was based on Sato's questionnaire of 100 foods, which are classified into five categories in accordance with their chewing index. Category 1 comprises the softest foods and category 5 the hardest. Four favorite foods were selected for each category. One point was then given for each food that the patient felt they could eat in their usual manner, 0.5 points for foods they could eat in an abnormal manner, and 0 points for foods that they felt they could not eat.

2.5. Statistical analyses

All of the data were analyzed with a statistical software program (Microsoft Excel 2010/XLSTAT-Pro. Version 2014.4.08, Addinsoft, Inc., Brooklyn, NY, USA). Comparisons were performed by Steel-Dwass test. A *P*-value of < 0.05 was considered to indicate statistical significance.

3. Results

Sixteen subjects were male, and fifteen were female. The mean age was 68.1 years, with a range of 52–89 years at the time of surgery. The primary diseases were lower gingival cancer (28 cases), intra-osseous carcinoma (2 cases), ameloblastoma (1 case).

The mean OHIP-49 score of the AT group was 79.0, that of the body group was 47.7, and that of the MR group was 46.3. With regard to subscales, the mean score for functional limitations was 19.9 in the AT group, 15.3 in the body group, and 11.2 in the MR group; that for physical pain was 10.7 in the AT group, 8.2 in the body group, and 7.3 in the MR group; that for psychological discomfort was 9.3 in the AT group, 6.1 in the body group, and 5.2 in the MR group; that for physical disability was 17.9 in the AT group, 8.3 in the body group, and 11.5 in the MR group; that for psychological disability was 8.1 in the AT group, 4.0 in the body group, and 4.7 in the MR group; that for social disability was 5.6 in the AT group, 2.1 in the body group, and 2.3 in the MR group; and that for handicap was 6.1 in the AT group, 3.8 in the body group, and 4.3 in the MR group. There was a significant difference between the AT groups and the body group for OHIP-49, the subscale of physical disability and psychological disability (*P* < 0.05). There was a significant difference between the AT group and the MR group for the subscale of functional limitations (*P* < 0.05) (Fig. 2).

The mean score for the color-changing gum in the AT group was 3.5, that in the body group was 4.8, and that in the MR group was 4.7. There

Download English Version:

<https://daneshyari.com/en/article/8700573>

Download Persian Version:

<https://daneshyari.com/article/8700573>

[Daneshyari.com](https://daneshyari.com)