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<th>Case report of difficult dental prosthesis insertion due to severe gag reflex.</th>
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Abstract
Susceptibility to the gag reflex may render insertion of removable dentures very
difficult. The use of intravenous sedation in such cases allows for the fabrication of
dentures with decreased discomfort to the patient. When the completed dentures are
inserted, however, discomfort may still occur as the effects of the gag reflex will again
be felt. We report a case of an edentulous maxillary patient who was unable to insert his
dentures due to the gag reflex. A denture with a smaller than usual plate area was created
so as to prevent anxiety occurring during insertion with subsequent triggering of the
gag reflex. The dentures reached as far as the premolars. At first, long-term wear was
difficult due to gagging at immediately after insertion. Full-time wear became possible,
however, after approximately one and a half months. Hereafter, masticatory function
will be enhanced through extension of the denture base and addition of artificial teeth
in stages.
Key words: Gag reflex — Removable denture — Edentulous maxilla —
Undersized denture — Esthetic problem

Case Report

The patient was a 60-year-old man who
first visited our department in August, 2011.
His chief complaint was difficulty in inserting
dentures due to a hyperactive gag reflex.
Moreover, he was self-conscious about how
this looked and wanted to be able to eat with
less discomfort. His medical history revealed
that he had experienced the gag reflex on
tooth-brushing from childhood. As a result, the patient only rarely attended dental clinics. The patient had originally begun to receive dental treatment when he was in his 20’s, with conservative treatment and numerous extractions rendered difficult due to this problem. He had been fitted with maxillo-mandibular partial dentures 15 years earlier. These had never been used, however, as they triggered an emetic reflex. The patient still retained his front teeth, so there was little esthetic impairment. He was, however, able to use the mandibular denture, despite some discomfort. From then on, the patient gradually lost teeth, and presented with an edentulous maxilla in 2007. A complete maxillary denture and partial mandibular denture were created in the usual manner in January, 2008. While the patient received subsequent treatment, including impression-taking and maxillo-mandibular registration, he had to suppress the urge to vomit. The maxillary denture was a complete denture which covered the entire palatal surface on insertion, triggering severe gagging within seconds and preventing retention.

The patient attempted to accustom himself to the denture over a period of one year, but with no success. He was able to insert and retain the partial mandibular denture as it only elicited weak gagging. Thus, on presenting at our hospital, the patient had only been using the partial mandibular denture.

As the patient was able to eat meals without a maxillary prosthesis, he has done so, although people had remarked on the esthetic conditions of his dentition. The patient had subsequently become self-conscious of this problem, prompting him to visit his local dental clinic in January 2010 with the objective of having the maxillary prosthesis replaced. The patient was referred to our hospital for prosthetic treatment due to his specialized condition, although he only presented in August 2011 due to anxiety regarding treatment.

Examination revealed moderate resorption in the edentulous maxillary ridge and an impression left by contact with the mandibular teeth in the posterior ridge (Fig. 1a). In addition, several bone tori were observed in the labial region located more anteriorly than the premolars. Palpation around the maxillary alveolar ridge, particularly in the

Fig. 1 State of oral cavity state at first visit
a: evidence of bone tori in maxilla along with impression from contact with mandibular teeth in molar region, b: oral hygiene in mandible was very poor, c: mandibular denture used and irregular occlusal plane observed.
mid-palatal and molar regions, resulted in severe gagging, which was noted to be weaker in the anterior than in the premolar region.

The residual teeth in the mandible were #33, 35 (stump), 37, 42, 43, and 47, where extreme gingival recession and mobility were observed (Fig. 1b). Although a partial denture was placed in the defective region, the occlusal plane was extremely irregular due to denture settling and occlusal wear of artificial teeth (Fig. 1c).

Tooth loss was noted to have caused impairment of masticatory function. No symptoms deserving of special mention were observed, however, during mandibular opening and closing movements, in the temporomandibular joint or in the masticatory muscles. The patient’s oral hygiene was poor as he had avoided brushing due to the gag reflex.

The patient was highly anxious regarding the insertion of dentures due to previous experience of severe gagging and was torn between resignation and the desire to use dentures.

Taking these points into consideration, it was decided to create an anterior denture with a reduced plate area which would facilitate quick insertion and which was only intended to improve esthetics, not morphological functionality. It was believed that this would allow the patient to become accustomed to denture insertion. The concept was that this would serve as an intermediary stage during which the gag reflex would gradually abate and masticatory function would improve. After that, the denture base could be extended and artificial teeth added in stages.

Moreover, any reduction in retention caused by the smaller than usual denture base would be compensated for through the use of a denture fixative. For the time being, however, the patient continued to use the existing partial mandibular partial denture due to anxiety about maxillary denture insertion.

We offered to perform the treatment under intravenous sedation in order to ameliorate the gag reflex. The patient refused, however, as he was somewhat uneasy about the use of hypnotic medication.

The initial examination was performed in August, 2011, at which time an attempt was made to reduce the patient’s anxiety by engaging him in general conversation or talking to him about the possibility of prosthetic therapy involving no intraoral treatment. A similar effort to reduce anxiety was made at each subsequent appointment.

Impression taking was performed in October, 2011. The creation of the maxillary denture was initiated at the request of the patient, who had gained enough self-confidence for treatment to be commenced.

It was decided to take the final impression using a single (snap) impression. This is accomplished using a ready-made mesh tray and an alginate impression material to reduce burden on the patient. The patient developed severe gagging during the trial of a standard-size ready-made tray, rendering tray use difficult.

The gag reflex is less likely to develop in the anterior palatal region, so a child-size tray (Fig. 2, left) was then used, resulting in no gagging. An impression was then taken by mixing an alginate impression material with less water than usual to avoid posterior flow.

Figure 3 shows the intraoral model. Positioning the tray in the maxilla so as to prevent the gag reflex allowed an impression to be taken. This was slightly easier in the right posterior region than in the left.

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Fig. 2 Ready-made mesh tray for maxilla
Right side: minimum size of standard tray,
left side: child-size tray.
A compact occlusal plate reaching from the premolars to the anterior region was created for maxillo-mandibular registration in the beginning of November, 2011. The mandibular position was determined as that which enabled natural and stable occlusion. At this time, it was suggested that extension of the occlusal plate on the left side was difficult due to the gag reflex.

In the middle of November, 2011, artificial teeth were set up as far as the first molar on the right side and the second premolar on the left side of the base plate. This arrangement was then used in the wax denture trial (Figs. 4a–d).

The patient was able to insert the wax denture for about 2 min with only mild discomfort. The mandibular position was stable and mild mobility during tapping was observed. Insertion of the maxillary denture was performed in the beginning of December.

Fig. 3 Upper and lower jaw model
Right side of maxilla slightly expanded posteriorly.

Fig. 4 Wax denture with arrangement of artificial teeth
a: front view, b: view of occlusal surface, c: view of right side — arrangement as far as first molar, d: view of left side — arrangement as far as second premolar.
2011. There was no pain during chewing with good adaptation. As in the trial, however, the gag reflex developed after several minutes, making retention over a longer period difficult (Figs. 5a and b).

Sufficient adaptive or occlusal examination was impossible, so the patient was instructed to remove the denture without attempting to become accustomed to it if the gag reflex or pain occurred. However, he was instructed to attempt to insert it as frequently as possible.

The first adjustment was performed in the middle of December, 2011. For the first 5 days, the gag reflex occurred after only a few minutes, making longer retention impossible. Thereafter, the patient gradually grew accustomed to insertion of the denture, and use of a denture fixative allowed insertion for a maximum of 5 hrs, which was enough to cover from after the patient had eaten dinner to retiring to bed (Fig. 6).

The denture could not, however, yet be used while conversing or eating. Although adaptive examination was difficult at this time, premature contact was observed in the anterior teeth, leading to occlusal equilibration.

The use of a compact denture intended for esthetic enhancement allowed insertion for several hours, leading to a decrease in the patient’s anxiety and the desire for insertion of a complete denture.

The second adjustment was performed in the end of December, 2011. Although insertion time gradually increased, the denture could still frequently not be inserted due to the development of severe gagging, which varied according to the patient’s general

Fig. 5 Completed new, undersized upper denture
a: front view, b: view of occlusal surface.

Fig. 6 Front view with denture inserted
physical condition.

Cuspal interference was observed between teeth #11, 12, and 13 and teeth #42 and 43 during right lateral and anterior movements, leading to occlusal equilibration. The patient was instructed to remove the denture during periods of increased discomfort.

The third adjustment was performed in January, 2012. At this point, the patient could not yet eat meals, but could engage reasonably well in conversation using the denture. The patient was also now able to keep the denture inserted throughout the entire day.

A suitability test revealed a slight decrease in adaptation around the border of the denture plate. The patient made no complaint, however, so enhancement of denture adaptation by relining was planned for the subsequent visit or thereafter.

At this point, an impression was taken to determine the size and shape of the artificial teeth and inclination of the dental axis. The patient’s original teeth were large and protruded slightly. The patient requested that artificial teeth be provided during extension of the denture.

This patient had initially failed to insert and subsequently abandoned the use of dentures, yet had esthetic demands. It was therefore highly important that his feelings of anxiety regarding dentures be overcome.

Discussion

Treating patients highly prone to the gag reflex presents the dental surgeon with a number of problems, including how to reduce the burden of stress to the patient. Intravenous sedation may be particularly useful for such patients requiring plate prostheses, as it reduces the discomfort caused during intraoral impression-taking and bite registration, which are required for denture fabrication. Completed dentures, however, are inserted while the patient is awake. Therefore, as in this case, it is the denture itself that causes the gag reflex. This leaves no option but to find some way to suppress the gag reflex.

The gag reflex may originate from physiological or psychological causes, of which the former includes intraoral contact stimulation of the soft palate or lingual dorsum. Psychological causes include unpleasant previous experiences or a sense of anxiety. Attempts have been made to suppress physiologically initiated gagging through reduction of contact stimulation. This is achieved by removing the plate portion in maxillary dentures so that they are plate-less, or by instructing the patient to simulate contact with their own oral mucosa in order to gradually grow accustomed to the sensation. When the gag reflex is psychological in origin, adequate communication with the patient is essential if anxiety regarding dental treatment and denture fitting is to be reduced.

In the present case, before coming to us, the patient had failed to insert his dentures due to anxiety, eventually abandoning their use entirely. This patient’s hyperactive gag reflex may have been caused by the patient forcibly training himself to insert the denture while withstanding the physiological gag reflex. The gag reflex was being triggered by mechanical stimulation from the normal-sized complete denture set, which extended back to the molars. In addition, the patient also exerted psychological pressure on himself to become accustomed to complete dentures.

Therefore, it was decided that a compact denture would reduce the likelihood of the gag reflex occurring, making insertion easier. This facilitated practice and prevented further stress on the patient. The patient was also instructed to avoid attempting to forcibly insert the denture while suppressing the gag reflex, resulting in denture insertion being possible for longer periods of time.

In addition, it was believed that the patient’s feelings towards denture insertion and artificial teeth would improve as the esthetic benefits they brought became apparent, this being his main motive in seeking treatment in the first place.

Treatment is currently being continued.
and masticatory function will be recovered and enhanced through extension of the plate and the addition of artificial teeth.

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**References**


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