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Palatoglossal arch injury caused by denture clasps in an older adult with dementia

Takuma Watanabe, Sayaka Mishima, Makoto Hirota

ABSTRACT

Introduction: Older adults frequently use dentures, and patients with dementia can have difficulty manipulating dentures. Removable partial dentures frequently have sharp clasps which can cause severe complications.

Case Report: A woman in her 80s with Alzheimer's disease was referred to our department with the chief complaint of inability to remove a maxillary partial denture. Intraoral examination revealed that the denture clasps had penetrated the right palatoglossal arch mucosa and were tightly fixed. By gently detaching the piercing clasps from the mucosa, the partial denture was retrieved.

Conclusion: Older adults with dementia and their caregivers should be regularly educated about denture accidents. If a denture causes oral mucosa injury, an oral surgeon may treat it in the Emergency Room. Knowledge of oral anatomy is essential for safe denture removal.

Keywords: Dementia, Denture clasp, Palatoglossal arch

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INTRODUCTION

Recently, with the rapid aging of the population, the number of older adults with dementia has increased in Japan [1]. In several older adults, dentures are indispensable for the maintenance of mastication [1, 2]. Older adults with mild to moderate dementia are able to insert and remove dentures without assistance; however, patients with severe dementia have difficulty recognizing the orientation of the dentures or manipulating them [1, 3], leading to complications such as trauma [3].

Removable partial dentures are a simple, cost-effective treatment option for tooth replacement in partially edentulous patients [3, 4]. However, removable partial dentures frequently have clasps for retention [3]. Sharp clasps can cause mucosal erosion, perforation, or severe complications [5, 6]. The treatment for denture clasp injury includes manual removal alone or in combination with hemostasis using sutures or topical hemostatic agents, or extraction of the abutment tooth [3].

Here, we report a unique case in which denture clasps penetrating the palatoglossal arch mucosa in an older adult with dementia were successfully removed.

CASE REPORT

A woman in her 80s was unable to remove her partial denture after eating in the evening, and her family called emergency medical services. The paramedics who arrived at the scene had noted that she was conscious and tachycardic with a heart rate of 82 beats/min and a blood pressure of 172/81 mmHg. Respiratory rate was 18/min, and oxygen saturation was 98% on room air. The patient was transported to our hospital, and referred to our department.

Based on the findings on brain magnetic resonance imaging and 123I-N-isopropyl-p-iodoamphetamine single-photon emission computed tomography, the

patient had been diagnosed with Alzheimer's disease approximately six months prior to presentation and was taking donepezil. The Mini Mental State Examination, Clock Drawing Test, and Frontal Assessment Battery scores were 18/30, 1/9, and 5/18 points, respectively. The patient also had been receiving denosumab for osteoporosis. Clinical examination revealed np cyanosis or dyspnoea. The heart rate, blood pressure, respiratory rate, and oxygen saturation on room air were 80 beats/min, 121/70 mmHg, 20/min, and 98%, respectively. Intraoral examination revealed that the maxillary partial denture clasps had penetrated the right palatoglossal arch mucosa, resulting in inability to remove the denture (Figure 1). No active bleeding was observed. The patient's family reported that she had been using an upper partial denture for several years, wearing it during the day and while eating.

Based on the clinical diagnosis of partial denture stagnation due to clasp penetration into the palatoglossal arch, we tried to remove the partial denture with penetrating clasps under anterior direct vision of the palatoglossal arch alone. However, the denture clasps were tightly fixed to the mucosal wall of palatoglossal arch and could not be easily removed. Therefore, we assumed that the palatoglossal arch was pinched between the anterior and posterior clasps, and carefully rotated the partial denture while removing the clasps that were piercing the swollen palatoglossal arch anteriorly and posteriorly. Eventually, by gently detaching the piercing clasps from the mucosa, the partial denture with clasps was retrieved from the oral cavity without local anesthesia. During the procedure, vital signs were stable, and refusal behavior was not observed. After removal, no active bleeding or remaining foreign body was observed at the penetration site (Figure 2). Furthermore, the clasps of the retrieved partial denture did not appear to be fractured (Figure 3). The maxillary alveolar ridge was relatively flat with residual root pieces (Figure 4), whereas the mandibular arch had few natural teeth (Figure 5). Amoxicillin hydrate was administered orally at 750 mg daily for five days to prevent wound infection.

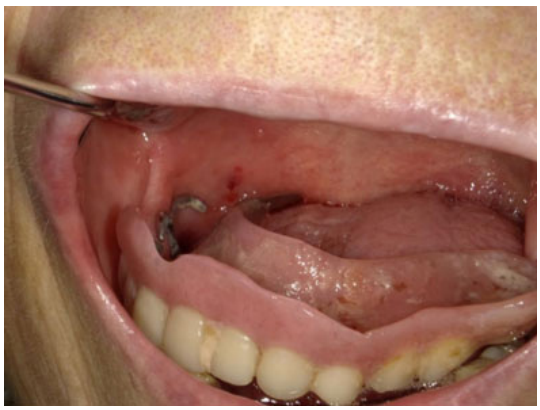

Figure 1: Intraoral photograph showing the maxillary partial denture with clasps penetrating the right palatoglossal arch mucosa.

At the follow-up visit approximately one week later, uneventful recovery without intraoral wound infection was observed, and the patient reported no problems such as dysarthria or dysphagia (Figure 6). The offending partial denture was extremely loose; hence, we recommended replacement with new denture at a private dental clinic.

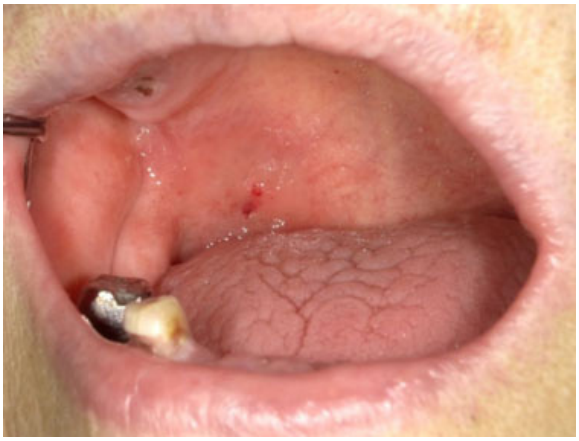

Figure 2: Intraoral photograph showing the penetrating wound in the right palatoglossal arch mucosa after denture removal.

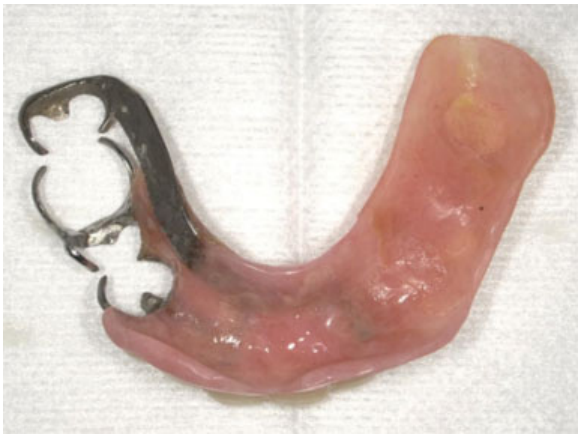

Figure 3: Photograph of the mucosal surface of the partial denture with clasps.

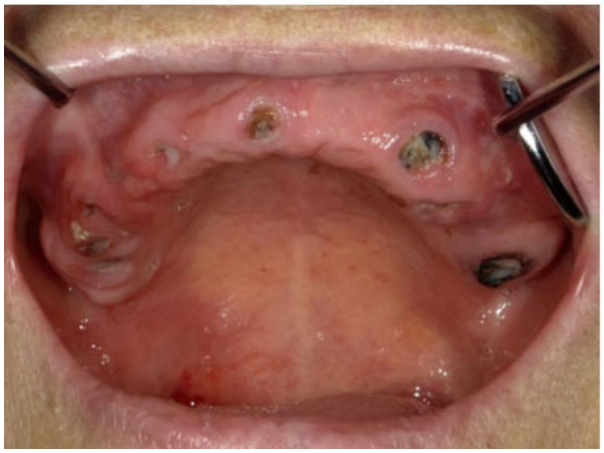

Figure 4: Intraoral photograph showing the maxillary alveolar ridge with residual root pieces.

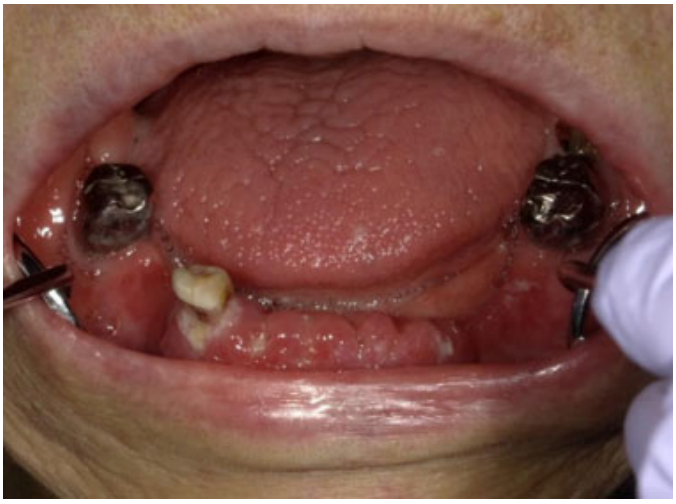

Figure 5: Intraoral photograph showing the mandibular arch with few natural teeth.

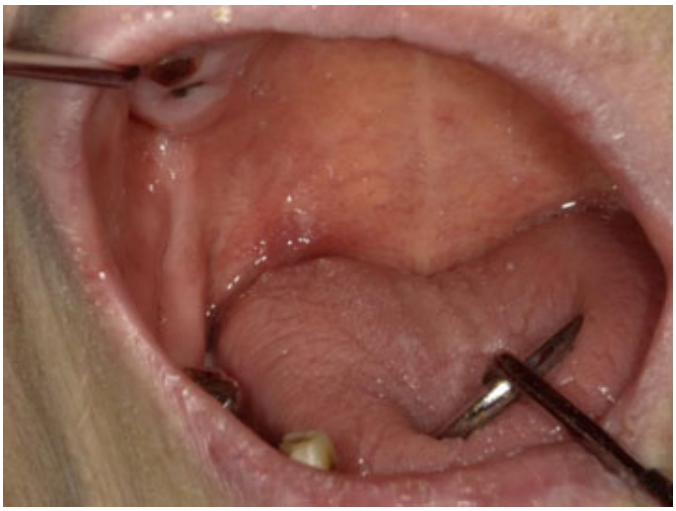

Figure 6: Intraoral photograph at follow-up shows that the penetrating wound in the right palatoglossal arch mucosa has almost completely healed.

DISCUSSION

The findings in this patient provided important clinical learnings. Regarding denture trauma, although several cases of clasp injury to the tongue have been reported [3], clasp penetration into the palatoglossal arch can also occur, particularly in older adults with dementia. Because release of clasps with specific structure which penetrate the palatoglossal arch are challenging in the confined environment of the oral cavity, careful maneuvers are required to avoid further trauma.

Older adults sometimes experience difficulty inserting and removing dentures [3, 7]. The ability of dependent older adults to use dentures is associated with their physical and mental capacities [8–11], and dementia is associated with denture handling difficulties [1, 3]. Previous studies have reported that denture adaptability and inability to use dentures were associated with dementia or a lower level of activities of daily living [8–11]. Dentures may become loose after prolonged use [12, 13] or when the abutment teeth anchoring the clasp become loose or are extracted [6, 13]. In addition, in older adults, the oral mucosal sensation can be reduced and motor control of the laryngopharynx can be poor [14, 15]. Loose dentures are relatively easy to dislodge and accidentally swallow [12, 13, 16]. Moreover, older adults may find using removable partial dentures difficult, especially the handling of the clasps [7], and partial denture clasps may traumatize the oral mucosa. Specifically, sharp and curved clasps can easily penetrate and embed into the soft tissue [17]. Clasp-penetration injuries are reported to occur frequently in the evening, potentially due to a greater number of opportunities for removing dentures at night after eating and before going to bed [3]. However, clasp-penetration injuries of the oral mucosa are significantly more common in the tongue, and mandibular free-end saddle dentures with premolar or canine clasps are the most frequently involved [3]. Our patient had dementia and continued to use an old and ill-fitting partial denture after loss of the right maxillary molar crowns. Consequently, when the denture was removed after eating in the evening, the denture clasps penetrated the right palatoglossal arch. Although small dentures without clasps usually travel through the alimentary tract after accidental ingestion [14], in our patient, a large partial denture with clasps was stuck in front of the pharynx due to clasp penetration. Palatoglossal arch injury caused by the molar clasps of the maxillary partial denture is rare. However, the situation can be considered fortunate because the denture was not accidentally swallowed.

A previous study evaluated the utility of newly developed denture placement and removal devices and revealed that the device was effective in the elderly [7]. On the other hand, nonmetal clasp dentures offer better aesthetics since their clasps are made of the same material as the prosthetic base, which helps increase patient's acceptance [18]. To prevent clasp injury during denture placement and removal, the use of these devices or application of nonmetal clasp dentures, which do not require the use of sharp metal clasps, may be an option.

Regarding the treatment for the clasp-penetration injuries, the injuries are typically minor, with manual removal alone being the most common intervention [3]. Regarding denture impaction in the esophagus, in the absence of sharp clasps, endoscopic removal can be attempted; however, for dentures with sharp clasps, surgical removal is the first-line treatment to prevent esophageal injury by the clasps during the procedures [14]. Impacted dentures should be removed as soon as the diagnosis is made, because edema from local trauma tends to fix the denture more firmly making later manipulation increasingly difficult [13]. Moreover, since the clasps tend to pierce and embed into the surrounding tissues, forceful attempts at removal may exacerbate tissue injury and bleeding [3]. Regarding the pharyngeal anatomy, the soft palate is composed of several muscles:

palatopharyngeus, palatoglossus, levator veli palatini, tensor veli palatini, and musculus uvulae [19]. The palatoglossus is an extremely thin muscle that makes up the palatoglossal arch [19]. The glossopharyngeal nerve travels anteriorly along the lateral surface of the pharynx in the palatoglossal arch [20]. Several approaches to block the glossopharyngeal nerve are used to adequately anesthetize the pharynx [20]. The least invasive approach involves placing cotton pledgets soaked with local anesthetic solution in the inferior-most portion of the soft-tissue fold that makes up the palatoglossal arch [20]. In addition, local anesthetic paste placed on a tongue depressor or solution provided as a gargle may be used for topical anesthesia [20]. In our patient, the sharp clasps for maxillary right first and second molars penetrated the anterior and posterior surfaces of the palatoglossal arch, respectively; thus, the arch was pinched anteroposteriorly and inflammatory edema occurred. Considering the orientation of the two sharp clasps relative to each other, we believed that the clasp was trapped in the palatoglossal arch and was difficult to release. Performing local infiltration anesthesia would have caused further edema, making clasp removal even more difficult and causing further tissue damage. Although the patient had dementia, she cooperated with our procedure; therefore, local or topical anesthesia was unnecessary. Eventually, based on the knowledge of the pharyngeal anatomy and denture structure, we could successfully remove the partial denture by safely detaching the penetrated clasps from the mucosa without local anesthesia.

CONCLUSION

Older adults with dementia who use dentures and their caregivers must be regularly educated about denture accidents. Caregivers should always consider the possibility of denture accidents and accurately evaluate the patient's condition. Clinicians should carefully explain to patients how to remove dentures without pinching the soft tissue. Additionally, regular oral examinations, including denture adjustments, would likely prove helpful. Patients with clasp-penetration injury to the oral mucosa involving removable partial dentures may be treated by oral surgeons in the Emergency Room. Knowledge of the oral anatomy and denture structure is required for the safe release of clasps and denture removal.

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Author Contributions

Takuma Watanabe – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Sayaka Mishima – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Makoto Hirota – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.