Occlusal Analysis And Management For A Patient With Neck Pain And Vertigo: A Case Report

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***Abstract*—The relationship between occlusal discrepancy and vertigo has been reported, but has not yet been generally recognized. Occlusal analysis was performed on a patient with vertigo and identifying a deviation of the habitual occlusal position (HOP) from the muscular occlusal position (MOP). The displacement of the left condyle was semi-rotatory with the right condyle as the center of rotation. Occlusal modifications of the upper dentition were performed to make the HOP coincide with the MOP. The patient's other symptoms (neck pain, headache, tinnitus and coxalgia) immediately disappeared after the occlusal modification. The vertigo has never been appeared until a half of year. The vertigo was thought to be caused by nystagmus along with the repeated semicircular shift to HOP from the MOP.**

Keywords—occlusal discrepancy, neck pain, vertigo

Introduction

The relationship between aural and other symptoms and temporomandibular disorders (TMDs) have been reported [1-7]. In these reports, there were some descriptions regarding the relationship between dental occlusion and vertigo [1-3]. It has been suggested that one of the mechanisms of vertigo is nystagmus caused by the rapid semi-rotatory motion of the jaw due to occlusal discrepancy between the habitual occlusal position (HOP) and muscular occlusal position (MOP) [3]. On the other hand, the relationship between neck pain and TMDs has also been reported [8]. The present case might be useful to understand the relationship between dental occlusion and vertigo, and neck pain.

Case presentation

A 81-year-old woman presented with a chief complaint of feeling uncomfortable on the right upper posterior teeth. The patient's medical history was resected 16 years ago with lung cancer. In addition, she received radiation therapy for uterine cancer 15 years ago and took an anticancer drug for half a year. In addition, she suffered a cerebral infarction 6 years ago, had some paralysis on the left side of her body, and is still taking antihypertensive drugs and antithrombotic drug. However, she was able to move her left hand and leg functionally. She recently became vertigo every five months and was seen at the hospital each time, but for unknown reasons she did not take any medication. She complained her right neck pain and stiff shoulder. Her other complains are summarized on Table 1. She had 31 natural teeth (including 14 restored teeth) (Fig. 1.).

Table 1. Symptom changes before and after treatment

Symptom	Before	After
TMJ sound	Left	No
Headache	Left (Lateral & Occipital.)	No
Neck pain	Right	No
Tinnitus	Right	No
Vertigo	3 times	0
Coxalgia	Left	No

Fig. 1. Lower and upper dental arches at the initial consultation

No abnormality was found on the X-ray of the patient's chief complaint of discomfort in the upper right molars (Fig. 2). The left side was affected by the cerebral infarction, so the left and right occlusal forces were measured at the first molars using a bite force meter (MPM 3000, NIHON KOHDEN, Tokyo, Japan) just in case. The maximum bite force was 7 kg on each side, respectively.

Fig.2.Roentgenogram in the right upper molars

No impairment of mouth opening and deviation of opening path. The patient reported tenderness in the right temporomandibular joint (TMJ), right masseter, right temporalis, both medial pterygoid muscles, left lateral pterygoid muscle and both trapeziuses. For diagnosis, an anterior bite plate was fabricated using clear self-curing acrylic resin. A HOP record was obtained by voluntary jaw closing using a vinylpolysiloxane bite registration material (GC, Tokyo, Japan). A MOP record was obtained during voluntary w closing after wearing the bite plate for 5 min using e same material as in HOP. To examine the ference between HOP and MOP, two-dimensional easurements were performed on a modified iculator using previous records. The position of the cording disc was approximately the same as that of e condyle of TMJ. Therefore, the shift was caused by one of the condyles. A semi-rotatory shift from the MOP to HOP centered on the right condyle was recorded on the recording disc, with 1.0 mm of the shift on the left side (Fig. 3).

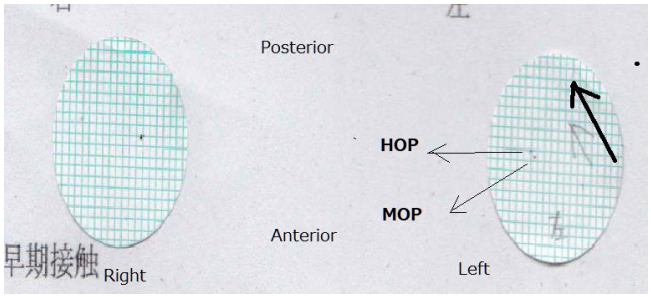

Fig. 3. Recorded the habitual occlusal position (HOP) and the muscular occlusal position (MOP). The arrow indicates the shift from MOP to HOP.

Then, MOP wax record was obtained using the registration wax material (Bite Wafer, Kerr USA, Romulus, MI, USA) in the previously described manner. The upper and lower models were mounted on an articulator with the MOP wax record (Fig. 4, on the left). After the setting of the attached plaster, the MOP wax record was removed and the upper model moved down until the teeth touched (Fig. 4, on the right).

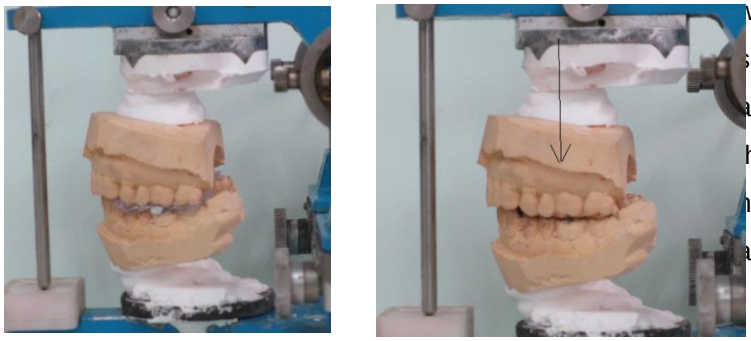

Fig. 4. Upper and lower models mounted on an articulator with MOP wax record (on the left), After removing the record, upper model is moved downward until tooth contact is made (on the right).

A premature occlusal contact was recognized on the right second molar (Fig. 5). Occlusal adjustments were performed on the dental models mounted on the articulator until the posterior teeth bilaterally made contacts according to the occlusal position correcting therapy [9].

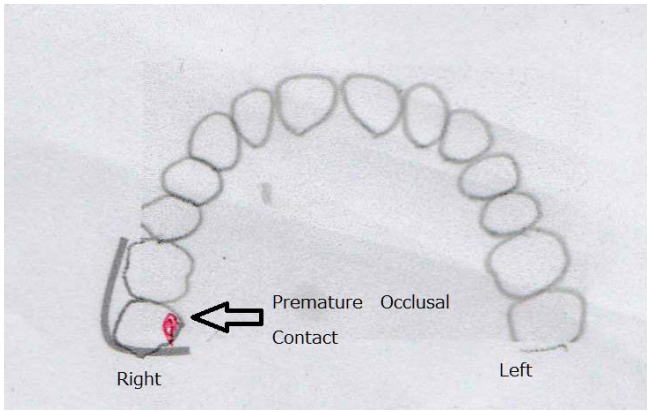

Fig. 5. Recorded premature occlusal contact on the right upper second molar

Subsequently, the occlusal adjustments in the mouth performed referring the adjusted models. The occlusal adjustment was limited to a few points for each appointment, and each time, impression taking, model making, MOP wax record taking, model articulator attachment, and occlusal adjustment on the model were performed. The adjustments were performed at 8 times until obtaining bilateral occlusal contacts (Fig. 6 and 7). The changes in symptoms one week after the completion of occlusal adjustment are shown in Table 1. The patient reported that she was able to eat, although she had not been able to eat on the left side. The patient did not complain of vertigo a half of year after the completion of occlusal adjustment.

Fig. 6. Upper dental models used in the occlusal adjustments

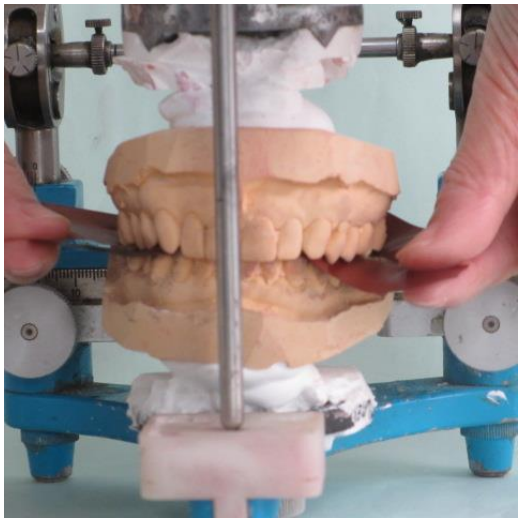

Fig. 7. Confirmation of bilateral occlusal contacts

Discussion

Hong et al. reported that degenerative changes in the cervical spine were related to altered head postures and the development of active myofascial trigger points in the cranio-cervical musculature in the elderly with myofascial TMD [8]. In the present case, it was unknown whether degenerative changes in the cervical spine existed or not. The muscles that the

patient complained of tenderness to palpation at the first visit are illustrated in Figure 8.

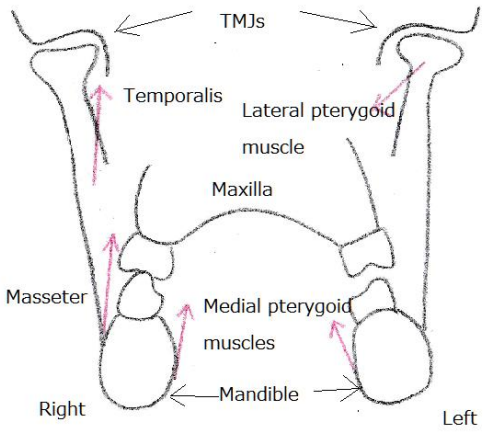

Fig. 8. The muscles that the patient complained of tenderness to palpation at the first visit are illustrated.

In this case, considering the situation before treatment, when the patient occludes, the right molars first come into contact, and the right masseter, temporalis and medial pterygoid muscles strongly contract to come into contact with the premolar teeth on the right side. Furthermore, the left lateral and medial pterygoid muscles strongly contract to come into contact with the left teeth. As a result, these muscles strongly attract the mandible jaw to the upper right. As a result, the premature contact tooth on the right side was strongly compressed, which seems to have been related to the discomfort of the right molar tooth, which is the chief complaint of the patient. On the other hand, when occluded, the right temporomandibular joint is strongly pressed against the mandibular condyle through the disc, but the left temporomandibular joint has a loose relationship between the disc and the mandibular condyle. When the mouth is opened, the mandibular condyle could not synchronize with the disc, and a sound is generated. Torii reported the relationship between headache and occlusion [5]. He described that fascial pain in the lateral and medial pterygoid muscles appears as headache as referred pain. In the present case, it was thought that the myofascial pain of the left lateral and medial pterygoid muscles appeared as the left headache. Regarding neck pain of this case, it is considered that the right trapezius muscle contracts strongly to fix the head in order to attract the mandible to the upper right when occluded. Therefore, it seems that the fascial pain of the right trapezius muscle appeared as the right neck pain. Regarding tinnitus, Rubinstein performed extensive studies of TMD and tinnitus and made the following conclusions: (1) 46 % of the patients who had received stomatognathic treatment reported no tinnitus or reduced tinnitus a few months after treatment [4]. Torii reported that the side affected by TMD coincides with the side affected by tinnitus and described that tinnitus related to TMD may be caused by spasmodic synkinesis of the tensor tympani and the stapedial muscle with muscle spasm of the masticatory muscles (including relative muscles) [6]. In this case, it is probable that muscle spasm occurred due to muscle fatigue due to abnormal muscle activity of the right temporal muscle, masseter muscle, and medial pterygoid muscle, and spasmodic synkinesis occurred in the right tensor tympani muscle, causing tinnitus.

Myrhaug reported that his patient had been suffering from vertigo for nine years, but after restoration of the bite, the vertigo disappeared completely [1]. Torii reported a case of vertigo with a semi-rotatory shift of 2 mm from MOP to HOP on both sides. He described that the semi-rotatory shift would be recognized as the rotatory movement and would cause nystagmus, thereby giving the patient had an illusion of rotation and resulting in vertigo [3]. In this case, it is considered that the semi-rotatory shift centered on the right condyle was recognized as the rotational movement and caused nystagmus, and the patient had vertigo due to the illusion of the rotational movement.

Torii reported a case of TMD with coxalgia. He described that since TMD patients have an occlusal discrepancy, and the posture of the mandible, head and neck may be imbalanced. Accordingly, iliopsoas and quadriceps femoris muscles may compensate to maintain body posture. Continuous action of quadriceps muscle on articulation coxae may cause coxalgia [7]. Coxalgia of the patient in the present case may have resulted from this aforementioned mechanism.

The symptoms of the present case are diverse, and this information should be shared not only with dentistry but also with the various clinical departments.

Acknowledgement

Written consent was obtained from the patient prior to the publication of this study.

The author would like to thank Mrs. Yuki Chiba who drew the illustration.

Competing and conflicting interests

The author declares no competing interests.

References

1. Myrhaug H. The incidence of ear symptoms in case of malocclusion and temporomandibular joint disturbances. Br J Oral Surg 1964;2:28-32.

2. Torii K, Chiwata I. Occlusal management for a patient with aural symptoms of unknown etiology: a case report. J Med Case Rep 2007;1:85.

3. Torii K. Occlusal analysis and management for a patient with vertigo: a case report. Clin and Med Invest 2016;2:1-3.

4. Rubinstein B. Tinnitus and craniomandibular disorders – is there link? Swed Dent J Suppl 1993;95:1-46.

5. Torii K. Occlusal analysis and management for a patient with headache and temporomandibular joint sound: a case report. Clin Case Rep Rev 2020;6:1-4.

6. Torii K. Tinnitus and temporomandibular disorders, In: Up to Date on Tinnitus, Fayez B Jr ed. Rijeka In Tech 2011:15-32.

7. Torii K. Coxalgia and temporomandibular disorders: a case report. Int Arch Med 2016;9:294.

8. Hong SW, Lee JK, Kang JH. Relationship among cervical spine degeneration, head and neck posture, and myofascial pain in masticatory and cervical muscles in elderly with temporomandibular disorder. Arch Gerontol Geriatr. Mar-Apr 2019;81:119-128.

9. Torii K. Occlusal position correcting therapy for temporomandibular disorders. EC Dental Science 2018;17:168-176.