

Paper submission

Denture repair with the application of a magnetic attachment to the inner crown of a telescopic crown: A 3-year follow-up case

A. Izumida

Department of Comprehensive Dentistry, Tohoku University Hospital

Introduction

The cone crown telescope, a type of retainer developed by Korber, K.H., is a retainer representing the so-called rigid support¹⁾. The cone crown telescope consists of a tapered frustoconical inner crown and an appropriate outer crown. The retentive force depends on the frictional force or wedge effect due to contact between the inner and outer crowns and the metal elasticity of the outer crown, but it can be adjusted by the cone angle of the inner crown axial surface. Although it is difficult to adjust the retentive force when making a denture using the cone crown telescope, the retentive force is stable after adjustment. The cone crown telescope is also widely used in clinical practice because it has excellent support and bracing functions. However, in prosthetic treatment using the cone crown telescope, troubles such as detachment of the inner crown and fracture of the abutment tooth have been observed in the course of operation. When the inner crown is detached, an attempt is often made to rebuild it with the outer crown, but it should be noted that easy repairs may have poor prognoses²⁾.

On the other hand, due to their versatility, magnetic attachments are widely used in various clinical situations, such as copings, magno-telescopic crowns (MT crowns), and extra-coronal restorations. Therefore, it is worth considering applying a magnetic attachment even when repairing a denture. However, there have been few reports on prognoses when dentures have been repaired using a magnetic attachment.

One of the inner crown of a cone telescope denture used for 14 years was removed from the abutment in order to treatment a root canal. As a prosthodontic treatment after a root canal, I used the abutment teeth and dentures to the fullest and repaired the dental prosthesis using the magnetic attachment to the inner crown of the cone crown telescope. This case is reported three years after the denture repair.

From the case

The circumstances from the patient's first visit for denture repair using an MT crown are as shown in the previous report³⁾, but the outline is described below. The patient is a 74-year-old female. In December 2000, the inner crowns of conical telescopic crowns on the maxillary right central incisor, left first premolar, and left second premolar were produced for three tooth defects of the central incisor, lateral incisor, and cuspid on the maxillary left side. A removable denture equipped with outer crowns conforming to those inner crowns was then set. In November 2014, acute apical

periodontitis occurred on the maxillary right central incisor that was one of the abutment teeth. After the inner crown of the tooth was removed, a root canal treatment was performed. Following prosthetic treatment, a magno-telescopic crown (MT crown) was fabricated for the maxillary right central incisor and adapted to the corresponding outer crown. In July 2015, the dental prosthesis was repaired using a magnetic attachment (GIGAUSS C 300, GC, Japan) for the existing outer crown (Fig.1).



Fig.1 Intraoral view and the denture at the denture repair (2015.7.24)³⁾

Specifically, as a method of manufacturing the MT crown, the root canal part of the maxillary right central incisor tooth was waxed according to the metal core production, and the approximate shape was prepared using a room temperature polymerized resin as a pattern from the cervical portion to the crown. Then, using the denture temporarily borrowed from the patient, the wax pattern of the MT crown was fabricated while directly conforming to the inner surface of the outer crown. At the same time, a space for mounting the magnetic attachment inside the outer crown was secured. The keeper was manufactured by the cast-joining method. The magnetic attachment was attached at the next medical treatment after the patient wore the MT crown. At that time, the facing hard resin of the outer crown was removed, and it was newly built up.

Follow-up of the case

Denture repair was completed in July 2015. Thereafter, this case shifted to one of maintenance and recall. In the meantime, as a restoration, the bridge of the maxillary right molar section was remade due to desorption. Panoramic X-ray photographs taken three years and two months after the denture repair are shown in Figure 2, and Figure 3 shows the periodontal pocket of the abutment tooth at the time of wearing the denture in December 2000, repairing the denture, and three years after the repair of the denture. While continuing to use not only the maxillary right central incisor tooth with the MT crown attached but also the maxillary left first premolar tooth and the maxillary left second premolar tooth, the periodontal tissue has been generally well preserved. In addition, there was no detachment of the magnetic attachment or the other inner crown by the room temperature-polymerized resin in the outer crown. As of today, the patient is highly satisfied with

using the repaired denture (Fig.4).



Fig.2 Panoramic X-ray photographs of three years and two months after the denture repair (2018.9.11)

	#11	#24	#25	#11	#24	#25	#11	#24	#25
m	0	0	0	0	0	0	0	0	0
B	3 2 3 3 2 3 3 2 3 4	3 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4
P	3 2 3 3 2 3 3 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4	2 3 3 2 3 2 2 3 4
	wearing the denture in December 2000			repairing the denture in July 2015			three years after the repair of the denture		

Fig.3 Periodontal pocket depth of the abutment teeth



Fig.4 Intraoral view and the denture taken three years and two months after the denture repair(2018.9.11)

Discussions

In this case, the right central incisor of the maxilla developed acute apical periodontitis after 14 years of wearing the denture. As the dental prosthesis was designed for three teeth defects of the central incisor, lateral incisor, and cuspid on the maxillary left side, only the three teeth of the maxillary right central incisor tooth, the maxillary left first premolar, and the maxillary left second premolar tooth were set as abutment teeth. From this point of view, there was concern from the beginning of overloading the right central incisor on the maxilla. However, the maxillary right central incisor tooth and the maxillary right lateral incisor tooth are in close proximity. When the maxillary right lateral incisor tooth is included as the abutment tooth, cleaning efficiency is reduced, and a pulpectomy is necessary for securing the parallelism between the abutment teeth. In addition, the patient strongly requested the minimal prosthetic treatment, which led to the design in this case. However, in manufacturing, the denture was carefully prevented from concentrating the occlusal force transiently at the intercuspal position and lateral movement. As a result, it seems that the occlusal force kept the burden on the right central incisor of the maxilla, and microleakage at the abutment tooth caused acute apical periodontitis. However, the patient in this case seems to have functioned for 14 years with defects of the minority teeth, vertical stoppings of the bilateral molar teeth, and with manufacturing considerations.

Because the patient strongly hoped to use the present denture as a prosthodontic treatment after a root canal treatment, I presented a design that included the maxillary right lateral incisor as an

abutment tooth. Therefore, the prosthetic treatment was directed to the right central incisor tooth section of the maxillary. The method of prosthetic treatment was conceived as a method of manufacturing the inner and outer crowns so as to be parallel with other inner and outer crowns, cutting the maxillary right central incisor tooth of the existing denture and soldering the newly manufactured outer crown. However, with this method, I was concerned that adjustment of the retentive force would be difficult, and the burden would be overloaded. As a method of solving this problem, there was some freedom with respect to the parallelism between the abutment teeth, and the use of an MT crown was presented as a method that is less burdensome on the abutment teeth. The patient selected this method, and I carried out subsequent prosthetic treatment.

The goal of prosthodontic treatment in this case was to make full use of existing dentures. In order to achieve this goal, the maxillary right central incisor was replaced with an MT crown instead of the inner crown, and the magnetic attachment was attached to the outer crown. Since the maxillary right central incisor tooth was originally a vital tooth, the outer crown was larger than the ideal size, so it was easy to secure the space for the magnet structure, which worked favorably at the time of manufacture. By applying a magnetic attachment to only one of three abutment teeth, the MT crown and inner crown were combined in one prosthetic device. However, as of now, there has been no detachment of the inner crown or fracture of the abutment teeth, and the periodontal tissue is also well maintained. Since the patient also uses it without discomfort, it is considered to have been a reasonable denture repair.

Conclusions

One of the inner crowns of the abutment tooth of a cone telescope denture used for 14 years was removed to treat acute apical periodontitis. In a subsequent prosthetic treatment, denture repair using a magnetic attachment took maximum advantage of the existing denture. Three years have passed since the denture repair, and regular maintenance and recall have been performed. As a result, even if the MT crown and inner crown coexisted in one prosthetic device, a good prognosis was obtained. Therefore, prosthodontic treatment with an MT crown is considered to be an effective method at the time of the re-prosthesis of a cone telescope denture's inner crown repair.

References

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