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A Hinged Two-Part Partial Denture Used in Conjunction with Severely Tilted Teeth: A Case Report

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Abstract - *A two-part sectional denture can be a useful treatment option when the presence of severe hard tissue undercuts compromises the provision of a satisfactory conventional prosthesis. This article presents a case report illustrating the effective use of a hinged two-part denture in restoring a mandibular Kennedy Class IV edentulous area. A sectional denture approach was selected because of severe proximal and lingual undercuts.*

KEY WORDS: Sectional denture

INTRODUCTION

The replacement of missing anterior teeth is a major factor influencing patients to seek prosthodontic care[1]. When presented with these cases the dental practitioner has several options to restore the space, including fixed, removable, or implant based reconstructions. The choice of restoration will be largely influenced by the following [2]:-

- The length of the edentulous span
- The amount of bone height, and the width and quality of bone available
- The condition of the abutment teeth
- The patient's aesthetic concerns
- The patient's financial considerations
- The patient's oral health motivation

The use of removable partial dentures offers many advantages when restoring edentulous areas, as they may require minimal tooth preparation relative to some fixed options, and they are able to restore loss of tissue where significant alveolar bone resorption has occurred. However, there can occasionally be instances where the construction of a satisfactory removable prosthesis is hampered by the presence of two or more opposing undercuts[3]. In these cases, options such as blocking out undercuts may lead to a poor aesthetic result, potentially compromise retention, and can also cause hygiene issues.

The provision of a sectional denture utilising more than one path of insertion can be a useful and often successful alternative in these situations. There are two main types of sectional denture; the hinged- flange and the two-part design. The hinged-flange design involves two parts of a denture being hinged, and after being placed in the mouth they are locked together. Alternatively, a two-part design comprises of two individual components which engage dental or bony undercuts using differing paths of insertion. The two parts are then locked rigidly into place by devices such as split pins, locking bolts, tubes and clips, magnets, studs, and other precision attachments[4]. Juszczyk and Radford described a unique design of a two-part sectional denture incorporating a hinge mechanism in the anterior saddle region to treat mandibular Kennedy Class IV edentulous cases[5]. This article describes the successful treatment of a patient utilising a similar technique.

CASE REPORT

Examination

A 59 –year-old female was referred by her General Dental Practitioner to the Prosthetics Department of the Birmingham Dental Hospital. The patient's main complaint was that her existing conventional lower denture felt loose, making eating difficult. Her existing prosthesis had been the third unsuccessful lower partial denture, and had been repaired after fracturing. The denture was mucosa supported and inserted via a lingual path of insertion. On examination the patient had a Class II Division II occlusion, illustrated by Figures 1 and 2. The patient's oral hygiene was generally good. The lower teeth were significantly retroclined, and there was considerable resorption of the lower ridge as shown by Figure 3. The patient's current lower denture had very poor retention and stability.

Treatment planning

Surveying the lower cast revealed an unfavourable path of insertion for a conventional removable prosthesis, due to the severity of the proximal and lingual undercuts (Figures 4 and 5). There was a history of three previous failures with both mucosa supported acrylic and tooth supported cast metal conventional dentures. Therefore the main treatment options considered in this case were a sectional denture, an adhesive bridge, or implant supported prosthesis.

A sectional denture was considered as the first line approach for several reasons. Firstly, bridgework would have compromised aesthetics due to the extensive bone loss in the anterior region. In addition, the length of the

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Figure 1. *An occlusal view of the maxillary arch*

Figure 2. *An occlusal view of the mandibular arch*

Figure 3. *Resorped lower ridge*

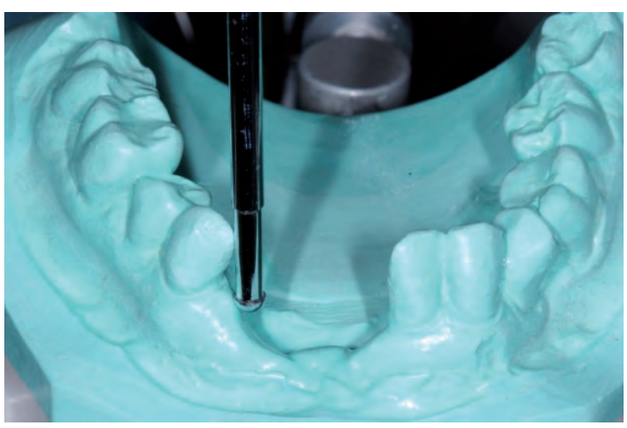

Figure 4. *Surveying the teeth*

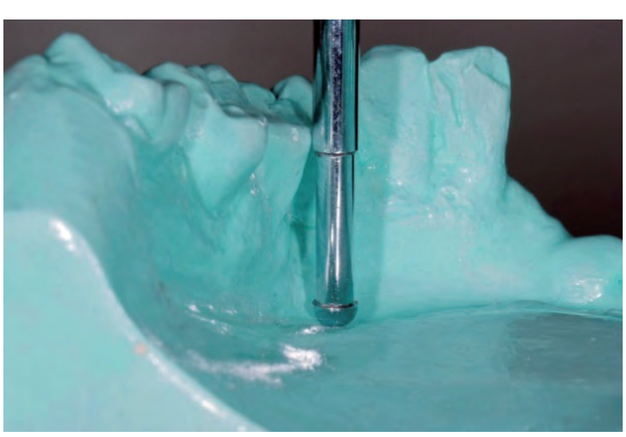

Figure 5. *Use of the analysing rod to determine the extent of the lingual undercuts*

edentulous span, and condition of the abutments were unfavourable for fixed bridgework. Implants were also considered as an option; however, there was inadequate depth and width of bone for implants without a bone graft. A sectional denture offered several advantages in this case; it enabled both hard and soft tissues to be restored, and utilised the hard tissue undercuts to optimise retention. It has also been suggested that a sectional denture may have a better prognosis in restoring lower incisor spaces, compared to other options such as adhesive bridgework.[6]

Design

The design choice was a two-part prosthesis cast from cobalt chromium incorporating a midline swing-lock hinge mechanism. The framework positioned in the mouth in a broken position and then opened to engage the lingual undercuts of the teeth. The second component had a different path of insertion into the labial undercuts and incorporated a slide attachment (Preci-Vertix) with a friction fitting device to prevent the framework lifting. The construction time for this prosthesis was eight hours.

Treatment

Rest seats were prepared occlusally on 45, 44 and 36 and an impression was taken using a monophase silicone material in a spaced custom tray. A diagnostic wax up was then utilised, prior to the framework fabrication to assess the positioning of the teeth and to ensure the patient was happy with the proposed aesthetics. The final denture provided an excellent level of retention and stability (Figures 6-8). The patient was given detailed instructions on the insertion and removal of the denture. This involved practicing chair side with a mirror to ensure she was confident handling the prosthesis. At the following review appointment the patient reported a considerable improvement in retention compared to her previous dentures. She also reported that she was able to eat a wider range of food and thus her quality of life had improved.

Figure 6. *Anterior view with sectional denture in place*

Figure 7. *Occlusal view with prosthesis in place*

Figure 8. *Components of the sectional denture*

DISCUSSION

The construction of a sectional denture does not require any extra clinical time from the dental practitioner. However, this approach will require meticulous planning. Close liaison with technical services with the appropriate skills mix will also be essential, to not only construct the prosthesis, but to also provide maintenance. These dentures require both short and long term follow-up as the matrix and patrix components have a tendency to wear over time. This can result in some looseness of the denture, although in most cases this can be readily treated by activation of the locking device. In addition, it is imperative that the patient has a high level of manual dexterity and thorough instruction is given on how to insert and remove the appliance. In this case, a great deal of time was spent at the delivery stage to help the patient adjust to her new denture. Finally, it is likely that some additional cost may be encountered; nevertheless, with excellent laboratory support this treatment modality can still be provided by the general dental practitioner.

CONCLUSION

In this case report a sectional denture was utilised as the restoration of choice due to the presence of severe opposing undercuts. Sectional dentures have also been used to increase retention where adequate retention cannot be provided by a conventional removable denture, and can be used in various complex clinical scenarios as many kinds of designs can be employed[4]. An increased awareness of this prosthesis will help overcome some of the challenges encountered when treating the partially dentate patient.

MANUFACTURER'S DETAILS

- Preci-Vertix, CEKA, Waregem, Belgium

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