

COMPROMISED RESIDUAL DENTITION USED AS ABUTMENTS FOR IMPROVING STABILITY AND RETENTION OF COMPLETE OVERDENTURES IN A PATIENT WITH CEREBRAL PALSY

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ABSTRACT

Cerebral palsy is a common term for a group of disorders, characterized with features of a non-progressive brain injury or a lesion acquired during early childhood.

A case of a 58-year-old female patient with medical history of cerebral palsy and hypertension is reported.

After extraction of all hopeless teeth, the remaining teeth on both jaws underwent periodontal and endodontic treatment because they were used as ball attachments for tooth-supported conventional complete overdentures.

The advantages of this treatment plan are maintaining the integrity of the residual ridges, improved stability and retention of the dentures due to usage of compromised residual dentition.

This provides the patient with easier and shorter adaptation period as well as with better mastication, speech and esthetics.

Even if the abutment teeth are lost due to insufficient oral hygiene and periodontal disease the overdentures could be relined and used as conventional complete dentures.

Keywords: *overdenture, cerebral palsy, compromised residual dentition*

INTRODUCTION

Cerebral palsy is a common term for a group of disorders, characterized with features of a non-progressive brain injury or a lesion acquired during the antenatal, perinatal or early postnatal period (1,2,3).

The main classifications by motor impairment are spastic, ataxic, and athetoid/dyskinetic. Also, there is a mixed type that shows a combination of features of the other types.

Cerebral palsy is a pretty common movement disorder in children. Its ratio is about 2.1 per 1,000 live births (4).

The clinical manifestations of cerebral palsy vary greatly in the type of movement disorder, the degree of functional ability and limitation and the affected parts of the body. The usual manifestations are mental retardation, feeding challenges, epilepsy, drooling, hearing loss, visual problems and orthopedic abnormalities (hip dislocation and scoliosis) (1,2).

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Treatment of cerebral palsy is a lifelong process focused on the management of associated conditions (1).

Such patients could be a challenge for the dental team (5,6,7).

They are predisposed to periodontal problems, more teeth are affected by extensive caries and its complications, more teeth are extracted as well (8,9,10).

Dental treatment of patient with cerebral palsy is reported.

MATERIALS AND METHODS

A case of a 58-year-old female patient with **medical history** of cerebral palsy, hypertension and rare epileptic seizures is reported.

The **chief complaint** was difficulties during eating. The patient had no previous experience wearing removable dentures.

During the **clinical examination** of the patient the following was observed:

General condition: involuntary movements of the arms and increased muscle tone of the upper limbs (predominantly in the left side); coordination disorders; movement disorders; changes in muscle tone; intellectual disability and speech disorders.

Extraoral status: asymmetry in full face; reduced muscle tone of the left side; decreased lower facial height; the left corner of the mouth is lower than the right corner; while examining the lips the patient reacted with strong contraction of the lips and chaotic movement of the tongue.

Intraoral status:

- ❖ Remaining teeth on the upper jaw: (Fig. 1)
 - ❖ old partial fixed denture (metal cast bridge with acrylic veneers) with abutment teeth - 12 and 23
 - ❖ mobility of the bridge due to tooth 12 which was severely damaged
 - ❖ teeth 24, 25 and 13 - periodontally compromised
 - ❖ tooth 13 - long clinical crown (unfavorable crown-root ratio)
- ❖ Remaining teeth on the lower jaw: (Fig. 1)
 - ❖ tooth 32 - pathologic mobility III stage

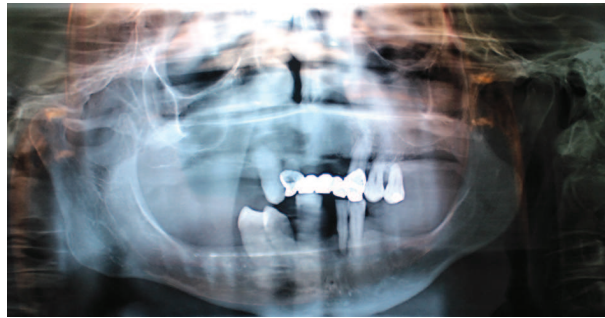


Fig. 1. Panoramic radiograph

- ❖ tooth 43 - severe buccal inclination and pathologic mobility stage III
 - ❖ teeth 33 and 44 - periodontally compromised, pathologic mobility stage II, unfavorable crown-root ratio
 - ❖ Masticatory mucosa: thick and flexible on the hard palate and thin on lower the alveolar ridge
 - ❖ Residual alveolar ridges: oval arch form for both jaws, rounded maxillary ridge contour and knife-edge mandibular ridge contour
 - ❖ Severe resorption of the lower residual ridge, muscular and frenal attachments close to the crest of the ridge, the floor of the mouth is near the crest
 - ❖ Hard palate - V-shaped, high-arched and narrow, the primary support area was covered with thick oral mucosa showing low resistance to compression
 - ❖ An enlarged tongue
 - ❖ An exaggerated gag reflex
 - ❖ Tartar, dental plaque and inflammation of marginal gingiva
 - ❖ Pathologic occlusion, no correct occlusal contacts between opposite teeth
 - ❖ Changes in mastication, speech and esthetics
- There are several options of treatment plan in this case:
1. Implant-supported overdentures
 2. Conventional complete dentures after extractions of all teeth
 3. Removable partial dentures with wrought wire or acrylic clasps on abutment teeth 13, 23, 33 and 44 (including root canal treatment and full coverage crowns of the abutment teeth)

4. Tooth-supported overdentures- abutment teeth 13, 23, 33 and 44 (endodontic treatment and ball attachments)

The patient was consulted with her general practitioner as far as teeth exactions were necessary and there was a possible risk of allergic reactions to local anesthetics or hemorrhage.

All the advantages and disadvantages of the different options of the offered treatment plans were discussed with the patient and her relative.

Tooth-supported overdentures on ball attachments were chosen as a treatment plan.

RESULTS

A tooth-supported overdenture is described as “a dental prosthesis that replaces the lost or missing natural dentition and associated structures of the maxilla and/or mandible and receives partial support and stability from one or more modified natural teeth” (11).

Clinical procedures were done as follows:

1. Removal of the old upper bridge (abutment teeth 12 and 23, pontic - 11, 21, 22) and surgical extractions of all teeth with hopeless prognosis- 12, 24, 25, 32 and 43 under local anesthesia
2. The remaining teeth were 13, 23, 33, 44 (Fig. 2).



Fig. 2. The remaining teeth after extractions - 13, 23, 33 and 44

Tartar and dental plaque were cleaned as part of the initial periodontal therapy.

The crown-root ratio of all four abutment teeth was unfavorable so they were endodontically treated (Fig. 3, Fig. 4), the crowns were cut at the level of the



Fig. 3. Endodontic treatment of abutment teeth on upper jaw



Fig. 4. Endodontic treatment of abutment teeth of lower jaw

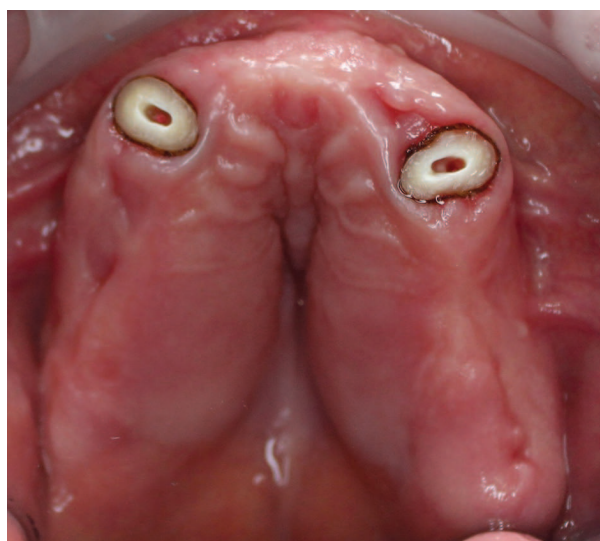


Fig. 5. Crown reduction of the upper abutments



Fig. 6. Crown reduction of the lower abutments

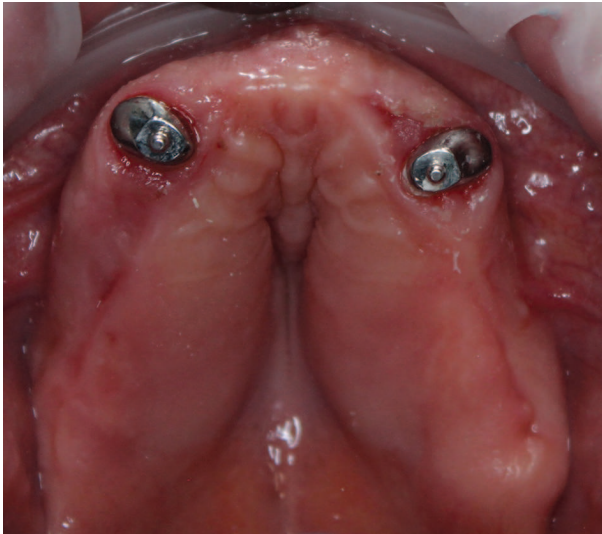


Fig. 7. Upper ball attachments were fabricated and cemented



Fig. 8. Lower ball attachments were fabricated and cemented

marginal gingiva (Fig. 5, Fig. 6) and they were restored with ball attachments on both jaws (Fig. 7, Fig. 8).

The fabrication steps of overdentures are similar to those used in conventional complete denture fabrication. We chose to make the maxillary overdenture with a cast metal framework because of the



Fig. 9. The cameo surface of maxillary overdenture



Fig. 10. The cameo surface of mandibular overdenture

specific shape of the hard palate and the very thick and flexible masticatory mucosa which covered it.

We had some difficulties during the taking of conventional impressions for both ball attachments and overdentures (especially on the mandible) due to the patient's mental status, increased muscle tone of the lips and gag reflex but we managed to overcome them.

The cameo and impression surfaces of both overdentures are shown on Fig. 9, Fig. 10, Fig. 11 and Fig. 12.

The intraoral view of the maxillary and mandibular overdentures with ball attachments on teeth 13,23, 33 and 44 as well as the achieved occlusion are presented on Fig. 13, Fig. 14, Fig. 15, Fig. 16 and Fig. 17.



Fig. 11. The impression surface of maxillary overdenture



Fig. 12. The impression surface of mandibular overdenture



Fig. 13. Maxillary overdenture

The esthetics was significantly increased with restoring the correct vertical dimensions of the lower third of the face and supporting the lips with the new dentures (Fig. 18, Fig. 19, Fig. 20).



Fig. 14. Mandibular overdenture



Fig. 15. Occlusion - left side



Fig. 16. Occlusion - front view

The mastication was more efficient because the occlusion was restored. Having in mind that the speech was disturbed not only by the oral condition but also due to cerebral palsy, we believed that after the adaptation period the patient would be satisfied with her sound pronunciation and articulation.

There were no problems on the follow-ups on the next day and 3 days after the insertion of the new



Fig. 17. Occlusion - right side



Fig. 18. Full face of the patient after the prosthetic treatment with two overdentures

dentures. The patient showed positive attitude and willingness for successful adaptation.

The patient and her relative were informed about the importance of maintaining hygiene of the oral cavity and dentures as well as regular recall visits. The final result was prosthetic treatment which provided better retention and stability for a patient with cerebral palsy. The prognosis was considered good.

DISCUSSION

Although the implant-supported overdentures are more stable and comfortable for the patients (12, 13, 14), this first option of the treatment plan was re-



Fig. 19. Side view of the patient after the prosthetic treatment with two overdentures



Fig. 20. Smile line

jected by the patient and her relative due to the necessity of more extensive oral surgery and higher cost.

The second option (conventional complete dentures) was discarded because of the specific shape of the hard palate, severe resorption of the lower jaw, increased muscle tone of the lower lip as well as enlarged tongue and exaggerated gag reflex. We expected slower and more difficult adaptation of the patient who had never used removable dentures.

The third option included periodontal, endodontic and prosthetic treatment of the abutment teeth 13, 23, 33 and 44. It was necessary to restore them with full coverage crowns to achieve correct occlusal plane and jaw relations. The expected lower esthetic effect of partial removable dentures with wrought wire or acrylic clasps and the risk of

faster loss of the abutment teeth were considered serious enough to reject this option.

If no treatment was done, we expected the problems with mastication, speech and esthetics to become aggravated. Also, problems with the temporomandibular joint could occur, as well as faster loss of the remaining teeth and faster resorption of the residual ridges.

The fourth option of the treatment plan (tooth-supported overdentures) was considered as the best choice in this clinical situation.

The advantages of this option are maintaining the integrity of the residual ridges, improved stability and retention of the dentures and easier adaptation and better comfort for the patient.

Even if the abutment teeth are lost due to lower oral hygiene and periodontal disease the overdentures could be relined and used as conventional complete dentures (11).

CONCLUSION

The successful dental treatment of patients with both intellectual and physical disabilities (in this case - cerebral palsy) depends on the proper selection of a treatment plan which could meet their special needs and the patients' compliance in terms of good oral hygiene and regular recall visits (14).

The case was solved with tooth-supported conventional overdentures on ball attachments because the use of compromised residual dentition improves the stability and retention of the complete dentures and provides the patient with easier and shorter adaptation period as well as better mastication, speech and esthetics (15).

REFERENCES

1. Jan MMS. Cerebral palsy: Comprehensive Review and Update. *Ann Saudi Med*, 2006; 26, 2:123-132.
2. Graham HK, Rosenbaum P, Paneth N, Dan B, Lin JP, Damiano DL et al. Cerebral palsy. *Nat Rev Dis Primers*. 2016;7;2:15082
3. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, Damiano D et al. A report: the definition and classification of cerebral palsy. *Dev Med Child Neurol Suppl*. 2007; Feb;109:8-14.
4. Oskoui M, Coutinho F, Dykeman J, Jetté N, Pringsheim T. An update on the prevalence of cerebral palsy: a systematic review and meta-analysis. *Dev Med Child Neurol*. 2013; 55(6):509–519.
5. Dougherty NJ. A Review of Cerebral Palsy for the Oral Health Professional. *Dent Clin North Am*. 2009; 53(2):329–338.
6. Stiefel DJ. Dental care considerations for disabled adults. *Spec Care Dentist*. 2002;22(3 Suppl):26-39.
7. Raducanu AM, Cristea I, Feraru VI. Oral manifestations of cerebral palsy – The spastic tetraparesis type: A literature review and clinical cases. *Timisoara Medical Journal*. 2008; 58(1):91–97.
8. Torabinejad M, Richardson PL. Endodontic treatment of 20 teeth in a patient with cerebral palsy. *Journal of Endodontics*. 1979;5(3):91–93.
9. Moreiraa RN, Alcântaraa CEP, Mota-Veloso I, Marinhob SA, Ramos-Jorgec ML, Oliveira-Ferreirad F. Does intellectual disability affect the development of dental caries in patients with cerebral palsy? *Res Dev Disabil*. 2012;33(5):1503–1507.
10. Alhammad NS. Tooth wear, enamel hypoplasia and traumatic dental injuries among cerebral palsy children of Riyadh city. *King Saud University Journal of Dental Sciences*. 2011;2(1-2):1–5.
11. Nallaswamy D. Textbook of Prosthodontics. Section 1: Complete Dentures. Jaypee Brothers Medical Publishers(P) Ltd; 2008. p.4-262.
12. Abadjiev M. Treatment of complete edentulism with implant-supported fixed and removable dentures. *MU-Varna*; 2016, ISBN 978-619-7137-94-1 (in Bulgarian)
13. Rogers JO. Implant-stabilized complete mandibular denture for a patient with cerebral palsy. *Dental Update*.1995;22:23–26.
14. Diz P, Scully Ch, Sanz M. Dental implants in the medically compromised patients. *J Dent*. 2013; 41:195-206.
15. Georgieva K, Abadjiev M. Mastication, phonetics and esthetics as a final result of partial or complete denture treatment. *Journal of IMAB - Annual Proceeding (Scientific Papers)*. 2015; 21(3): 846-848.