©Operative Dentistry, 2014, **39-4,** 339-344

Clinical Techniques/Case Report

Esthetic Rehabilitation of a Patient With Severe Oligodontia

EG Reston • J Bervian • PF Kramer
MH Spiguel • SH Ferreira • LQ Closs

SUMMARY

Oligodontia, or the congenital absence of teeth, can occur in isolation or as part of a syndrome. This study describes a case of isolated oligodontia associated with conical teeth and large diastemas in the anterior region. The patient was treated using direct composite resin restorations. Recent improvements in adhesive restorative materials allow practitioners to offer this low-cost, conservative esthetic treatment, which has the advantage of preserving sound dental structures, to patients with missing teeth.

*Eduardo G. Reston, EBM, DDS, MSD, PhD, associate professor, Head of the Department of Restorative Dentistry, Lutheran University of Brazil, School of Dentistry, Canoas, Brazil

Juliane Bervian, DDS, MSD, PhD, Former Graduate Student, Lutheran University of Brazil, Canoas, Brazil. associate professor, Department of Pediatric Dentistry, Passo Fundo University, Passo Fundo, Brazil

Paulo Floriani Kramer, DDS, MSD, PhD, associate professor, Head of the Department of Pediatric Dentistry, Lutheran University of Brazil, Canoas, Brazil

Monica Hermann Spiguel, MSD, private practice, Porto Alegre, Brazil

Simone Helena Ferreira, MSD, PhD, associate professor, Department of Pediatric Dentistry, Lutheran University of Brazil, Canoas, Brazil

Luciane Q. Closs, DDS, MSD, PhD, associate professor, Head of the Department of Orthodontics, Lutheran University of Brazil, School of Dentistry, Canoas, Brazil

*Corresponding author: Av. Farroupilha, 8001 Prédio 59, Bairro São José, Canoas, RS 92425-900, Brazil; e-mail: ereston@dentalcore.com.br

DOI: 10.2341/12-397-S

PURPOSE

Oligodontia is defined as the absence of six or more permanent teeth due to hypodevelopment of tooth buds. It may be caused by different gene mutations or polymorphisms or may develop as a manifestation of malformative syndromes. Oligodontia is one of the most prevalent somatic aberrations involving tooth development in the general population.[1-3]

Early diagnosis and management of patients with oligodontia is important to avoid compromising such functions as mastication, phonation, and functional occlusion.[2] Moreover, according to some reports in the literature, patients with oligodontia, especially those with a large number of missing teeth, may develop psychosocial problems related to their facial esthetics.[4-6]

Dental rehabilitation usually involves a multidisciplinary approach. Recent advancements in adhesive restorative materials have allowed practitioners to provide a low-cost, simple procedure for such patients, while preserving sound dental structures and achieving great functional benefits and high rates of patient satisfaction.[7]

The present article describes the case of a patient with congenital absence of several permanent teeth and the esthetic treatment provided through direct composite resin restorations.

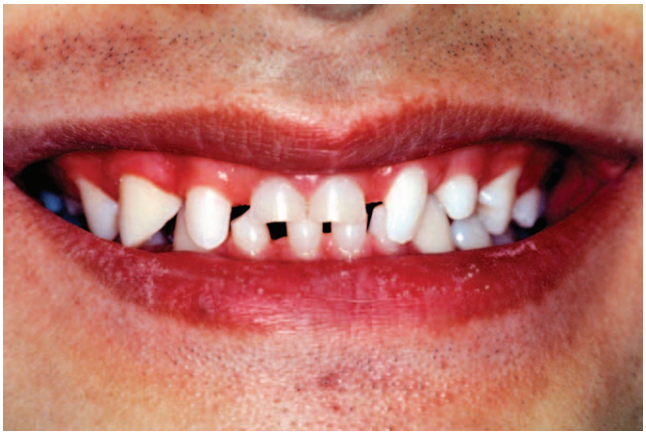

Figure 1. *Clinical appearance at baseline.*

DESCRIPTION OF TECHNIQUE

A 17-year-old male patient visited the Pediatric Dental Clinic with a chief complaint related to the esthetics of his teeth. He had large diastemas in the anterior region and tooth crowns that were not compatible in size with the dental arches (Figures 1 and 2).

The patient's health history data did not suggest the presence of any serious disease or systemic condition. Intraoral examination revealed several teeth missing (Figure 3). The deciduous teeth presented no alterations in size, shape, or structure. Permanent dentition was normal, except for the maxillary lateral conical incisors.

Radiographic examination revealed that the following teeth were missing: maxillary and mandibular central incisors (11, 21, 31, and 41), lateral mandibular incisors (32 and 42), maxillary second premolars (15 and 25), mandibular left second premolar (35), mandibular second molars (37 and 47), maxillary left canine (23), and maxillary and

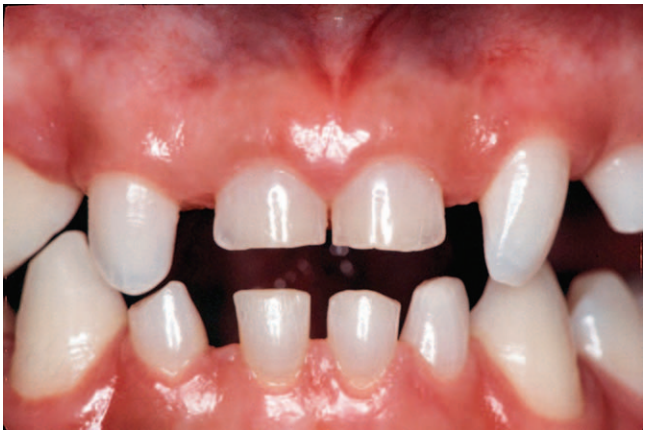

Figure 2. *Pretreatment clinical appearance.*

17 16 55 14 13 12 51	61 22 63 24 65 26 27
46 45 44 43 82 81	71 72 33 34 75 36

Figure 3. *Patient's odontogram.*

mandibular third molars (18, 28, 38, and 48) (Figures 4 and 5).

Based on the patient's history and clinical and radiographic findings, a diagnosis of isolated non-syndromic oligodontia was established. The treatment plan consisted of remodeling the crowns of anterior teeth with composite resin. The patient was given details of the limitations of the material to be used, particularly with regard to longevity and color maintenance.

The materials used for restorative treatment were a total-etch self-priming agent and a nanoreinforced resin. Treatment followed a sequence established in advance. First, prophylaxis with pumice and water was performed using Robinson brushes to remove debris from the dental structure. Occlusion was assessed and shade was determined immediately after prophylaxis. A diamond bur of medium grit was used to produce a wider area of rough surface for adhesive application. The operating field was then topically and locally anesthetized, and procedures were conducted under total rubber-dam isolation. Enamel acid etching (37% phosphoric acid for 15 seconds), thorough rinsing for 30 seconds, drying, application of the adhesive system, and polymerization were carried out according to manufacturer's instructions.

Deciduous teeth are known to have a different chemical composition from permanent teeth, so even though 15 seconds of enamel acid etching is usually enough, longer times can be found in the literature. This is usually because of the absence of prisms in the outer enamel layer, which is considered an obstacle to adequate penetration of adhesive restorative materials and could have a negative impact on esthetic-functional restorations, such as the one here described.[8-10]

In our patient, a chisel was used to remove the primless layer and thus improve acid etching results

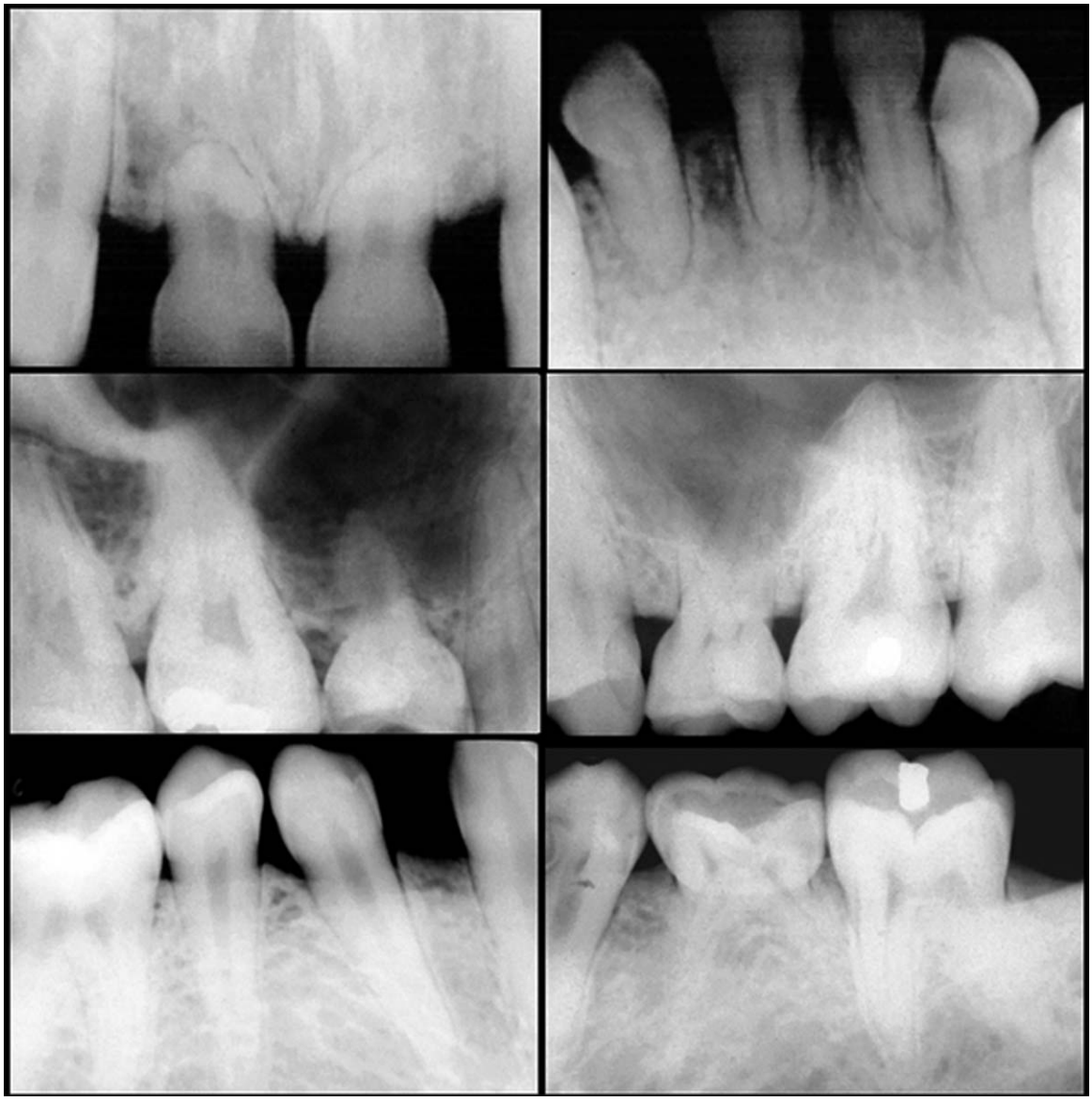

Figure 4. *Pretreatment radiograph.*

on the smooth surfaces of deciduous teeth.[11,12] Moreover, according to previous electron microscopy studies, 35% phosphoric acid produces acid-etch types I and II in Silverstone's classification after different application times, which justifies the use of 37% phosphoric acid for 15 seconds in our study.[8,13]

Because of the spaces between teeth, most of the restoration process was conducted freehand. Tooth shape was carefully contoured using flat dental brushes, which helped obtain smooth surfaces and a harmonic transition between the restorative material and natural tooth structure. Whenever necessary, dead soft matrices were used before resin application for better finishing in the cervical regions. Small layers of resin were placed against the matrices and light-cured, creating a buildup for future increments. As increments were light-cured, respecting the maximum limit of 2-mm-thick layers, they served as the basis for additional layers and shades, all applied freehand, until the buccal surface of the teeth was totally veneered. Each layer was light-cured for 40 seconds using a light-emitting diode device previously calibrated to 900 mW/cm^2; the light tip was held as close to the composite as possible without contact. After final polymerization, finishing and polishing were conducted using 12-bladed burs, finishing disks, aluminum oxide points, and a diamond paste in association with felt disks.

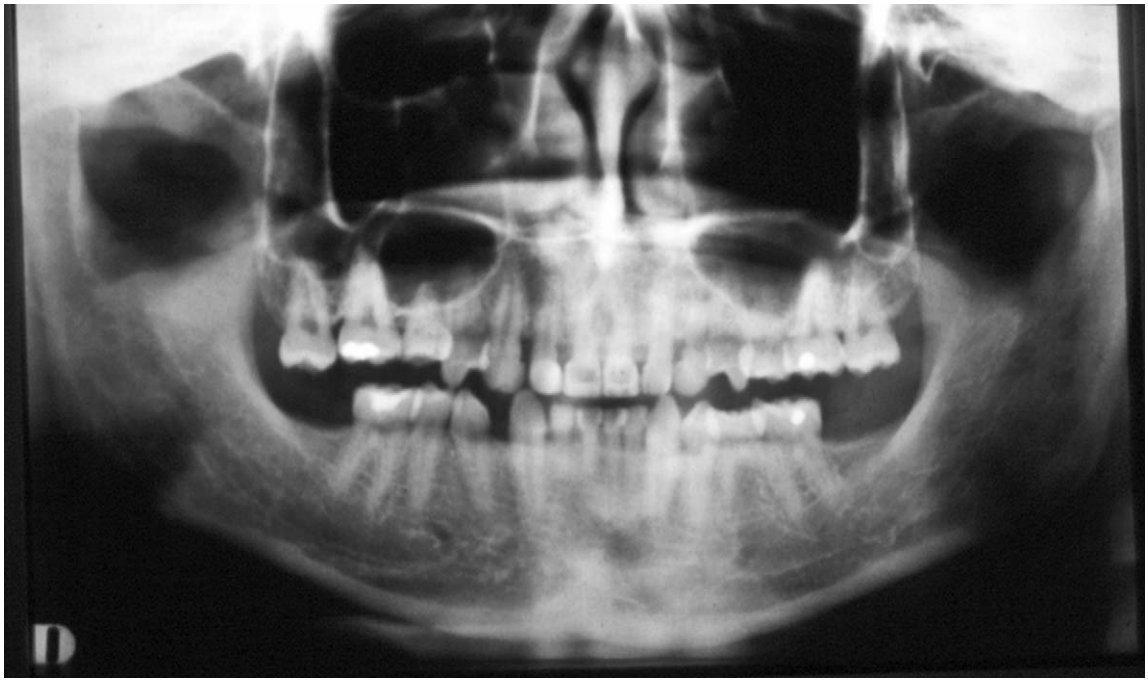

Figure 5. *Panoramic radiograph.*

Final occlusion was adjusted using high-speed diamond burs under water cooling and focused on centric relation as well as anterior and canine guidance, so as to restore the patient's bite and protect both natural tooth structure and restorations.

Treatment results were considered esthetically pleasing by the patient and his family members, both immediately after treatment completion (Figure 6) and six months later (Figures 7 and 8). The patient was scheduled for regular preventive maintenance visits so as to keep an adequate clinical and radiographic follow-up.

LIST OF MATERIALS USED

- 35% phosphoric acid gel (3M ESPE Dental Products, St Paul, MN, USA)
- Scotch Bond Multipurpose adhesive system (3M ESPE Dental Products)
- Filtek Z350, shades P, A2, A3, and B2 (3M ESPE Dental Products)
- Sof-Lex Pop-On polishing discs (3M ESPE Dental Products)
- 12-bladed burs (Sybron Kerr, Orange, CA, USA)
- Aluminum oxide points (Enhance, Dentsply, Konstanz, Germany)
- Diamond paste (Diamond R, FGM, Joinville, Brazil)
- Felt disks (Diamond Flex, FGM)
- Flat dental brushes (X, Hot Spot Design, Curitiba, Brazil)

POTENTIAL PROBLEMS

The ideal treatment approach in cases of oligodontia should take into consideration the esthetic appearance of anterior teeth and provide posterior indirect full-coverage restorations with ceramics in order to restore the vertical dimension of occlusion. However, the hardness of ceramic materials may impose major stress on periodontal tissues, potentially leading to accelerated root resorption in deciduous teeth. Moreover, in our patient, the long time needed for

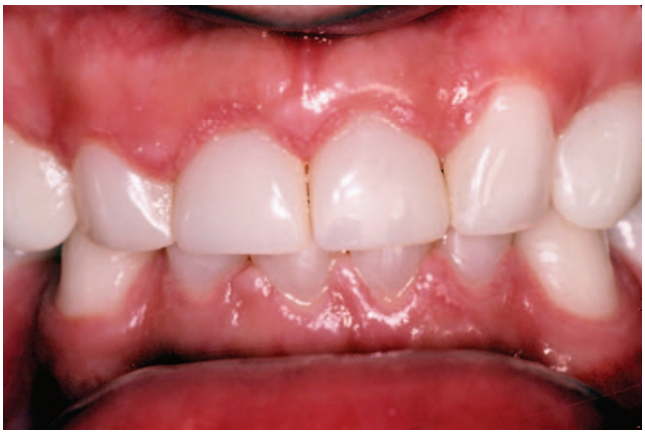

Figure 6. *Final clinical appearance.*

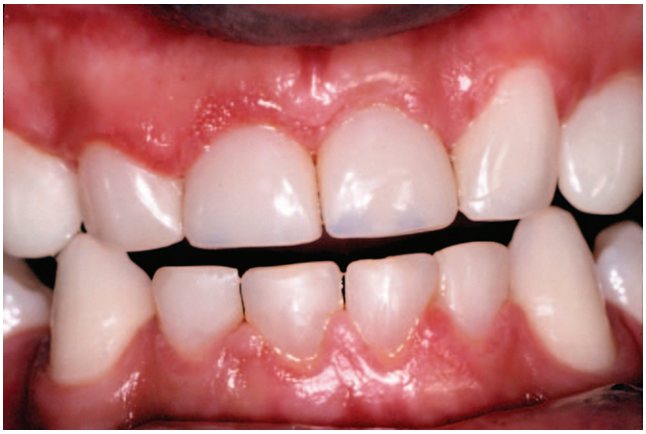

Figure 7. *Clinical appearance six months after treatment completion.*

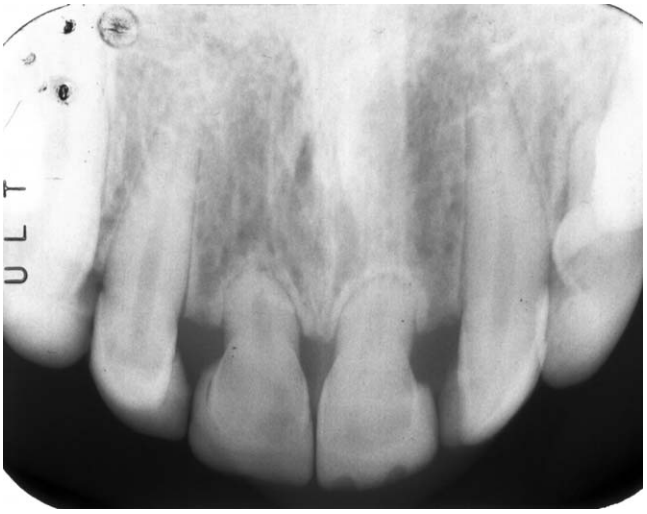

Figure 8. *Radiographic appearance six months after treatment completion.*

a full mouth reconstruction was not acceptable, as he was eager for esthetic improvements. Therefore, as an alternative approach, and with the patient's consent, we decided to remodel the crowns of anterior teeth only, using composite resin and maintaining the original vertical dimension of occlusion.

SUMMARY OF ADVANTAGES AND DISADVANTAGES

According to the literature, oligodontia may present alone or in association with a syndrome.[3,14,15] When associated with syndromes, in addition to a large number of missing teeth, the patient usually presents other abnormalities of ectodermal origin, affecting such structures as the skin, hair, and nails.[15,16] In the present case, the patient presented with congenital absence of several permanent teeth but no involvement of other ectodermal structures. In addition, his medical history did not reveal any previous diagnosis of serious diseases or systemic conditions. As a result, a clinical diagnosis of isolated nonsyndromic oligodontia was established. Previous studies by Stimson and others[14] and Brook[17] have suggested a genetic basis for this abnormality, even though its manifestation may be modified by environmental factors.

Stimson and others[14] emphasized the importance of being aware of the psychological status of patients with congenitally missing teeth. The treatment strategy adopted in this case aimed to preserve the deciduous teeth still present in the oral cavity while at the same time providing functional and esthetic rehabilitation to the dental structures.

The recent improvements in adhesive materials have motivated several authors to recommend similar treatment approaches.[4,14,18,19] According to Erridge,[4] for example, reconstruction of retained deciduous and conical teeth with composite resin is a simple treatment, associated with reduced chair time—a very important aspect of the management of younger patients. According to Prati,[7] the evolution of adhesive restorative materials has made it possible to offer more conservative functional and esthetic rehabilitation therapies.

In summary, the treatment strategy described in this study offers a simple, conservative solution for a major esthetic problem that is often associated with low self-esteem and social withdrawal. The current state of the art of adhesive restorative materials offers a low-cost, simple treatment option for patients with missing teeth while preserving sound dental structures, characteristics that usually attract and please patients. Finally, treatment is effective and repairable in case of fracture. Regular preventive recalls are important for maintaining dental restorations and assessing the stability of retained deciduous teeth.

Conflict of Interest

The authors of this manuscript certify that they have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

(Accepted 15 July 2013)

REFERENCES

1. Silverman NE, & Ackerman JL (1979) Oligodontia: the study of its prevalence and variation in 4032 children *ASDC Journal of Dentistry for Children* **46(6)** 470-477.

2. Marianetti TM, Azzuni C, Moro A, Cervelli D, Gasparini G, Boniello R, & Pelo S (2011) Case report of oligodontia: long term stability of orthognathic surgery and prosthetic rehabilitation *Minerva Stomatologica* **60(3)** 139-147.
3. Schalk-Van der Weide Y, Steen WH, & Bosman F (1992) Distribution of missing teeth and tooth morphology in patients with oligodontia *ASDC Journal of Dentistry for Children* **59(2)** 133-140.
4. Erridge PL (1980) Restorations of the teeth in a case of oligodontia *Journal of Dentistry* **8(2)** 132-134.
5. He X, Shu W, Kang Y, Li Z, Zhang J, Kari K, & Meurman JH (2007) Esthetic and functional rehabilitation of a patient with nonsyndromic oligodontia: a case report from China *Journal of Esthetic and Restorative Dentistry* **19(3)** 137-142.
6. Worsaae N, Jensen BN, Holm B, & Holsko J (2007) Treatment of severe hypodontia-oligodontia—an interdisciplinary concept *International Journal of Oral and Maxillofacial Surgery* **36(6)** 473-480.
7. Prati C (1998) In vitro and in vivo adhesion in operative dentistry: the review and evaluation *Practical Periodontics and Aesthetic Dentistry* **10(3)** 319-327.
8. Silverstone LM, Saxton CA, Dogon IL, & Fejerskov O (1975) Variation in the pattern of acid etching of human dental enamel examined by scanning electron microscopy *Caries Research* **9(5)** 373-387.
9. Shimada Y, Senawongse P, Harnirattisai C, Burrow MF, Nakaoki Y, & Tagami J (2002) Bond strength of two adhesive systems to primary and permanent enamel *Operative Dentistry* **27(4)** 403-409.
10. Song LY, & Wang J (2010) The effect of different etching time on enamel lesions of deciduous teeth *Scanning* **32(6)** 375-382.
11. Feldens CA, Souza MAL, & Araújo FB (1989) Acid etching in deciduous tooth: study under scanning electronic microscope *Revista da Associação Paulista de Cirurgiões Dentistas* **43(1)** 27-30.
12. Moyaho-Bernal Á, Vaillard-Jiménez E, Soberanes-de la Fuente E, Franco-Romero G, Montiel-Jarquín AJ, & Martínez-Fernández RG (2011) A comparative study between two different techniques for retention of pit and fissure sealants *Revista Médica del Instituto Mexicano del Seguro Social* **49(1)** 13-16.
13. Hallett KB, Garcia-Godoy F, & Trotter AR (1994) Shear bond strength of a resin composite to enamel etched with maleic or phosphoric acid *Australian Dental Journal* **39(5)** 292-297.
14. Stimson JM, Sivers JE, & Hlava GL (1997) Features of oligodontia in three generations *Journal of Clinical Pediatric Dentistry* **21(3)** 269-275.
15. Li D, Liu Y, Ma W, & Song Y (2011) Review of ectodermal dysplasia: case report on treatment planning and surgical management of oligodontia with implant restorations *Implant Dentistry* **20(5)** 328-330.
16. Rai P, Kumar G, & Chaudhary M (2010) Psoriatic triad in a patient presenting with oligodontia *Journal of the Indian Society of Pedodontics and Preventive Dentistry* **28(4)** 297-301.
17. Brook AH (1984) A unifying aetiological explanation for anomalies of human tooth number and size *Archives of Oral Biology* **29(5)** 373-378.
18. Tosun G, & Elbay U (2009) Rapp-Hodgkin syndrome: clinical and dental findings *Journal of Clinical Pediatric Dentistry* **34(1)** 71-75.
19. Gunbay T, Koyuncu BO, Sipahi A, Bulut H, & Dundar M (2011) Multidisciplinary approach to a nonsyndromic oligodontia patient using advanced surgical techniques *International Journal of Periodontics and Restorative Dentistry* **31(3)** 297-305.