



Challenges in Managing an Edentulous Down Syndrome Patient: A Case Report

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<p>Abstract: Patients with Down Syndrome (DS) are caring, affectionate, and quite social. However, the prosthetic management of edentulous patients with DS depends on the level of their disability, developmental delay and neurobehavioral problems. Muscle hypotonia can affect patient gestures and handling of their prostheses. In addition, intraoral manifestations need to be taken into consideration when designing removable complete dentures, such as macroglossia and maxillo-mandibular sagittal and transverse skeletal misalignment. Dentist is asked to be consistent and to establish a gradual and an atraumatic approach based on the cooperation of the patient and his or her parents, and on the importance of follow ups in the integration of removable prostheses to improve the quality of life and the oral health of these individuals. This article presents the prosthetic treatment of an edentulous 29-year-old female patient with DS and a moderate intellectual disability.</p> <p>Keywords: Down Syndrome, edentulous, macroglossia, skeletal misalignment, teeth setting.</p>	<p>Case Report</p>
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INTRODUCTION

Down syndrome (DS) is the commonest recognizable autosomal congenital genetic disorder due to chromosomal aberrations resulting in the presence of an entire or a part of an additional third chromosome 21, identified as trisomy 21 and seen with a prevalence varies from 1 per 800–1,200 live births [1-3]. The extra chromosome is responsible for physical and developmental characteristics commonly characterized by physiological and physical growth delays, including hypothyroidism, eye problems, epilepsy, deafness and otitis, obstructive sleep apnea, heart diseases, gastrointestinal malformations and disorders, and mild to moderate intellectual deficiency [3, 4].

In addition, genetic conditions contribute to dental and oral manifestations. Among the typical and immediately recognizable features, the prevalent are brachycephaly, epicanthic fold, slanted eyes, narrowed eye slits, cataracts and strabismus, flat nasal bridge, hypotonic orofacial musculature, decreased occlusal vertical dimension, malformations and tooth structure anomalies, hypodontia, congenitally missing teeth, malocclusion, tooth wear, periodontal disease, reduced

salivary flow and a high incidence of dental caries [1, 2, 5].

The challenges associated with maintaining oral health among patients with DS stem from unregulated consumption of sugary foods and/or drinks, inadequate toothbrushing abilities, and a failure to seek assistance when identifying abnormalities in the mouth [6]. Thus, individuals with DS experience heightened severity of periodontal diseases and they are susceptible to a more generalized aggressive form of periodontitis. Consequently, this can lead to significant bone loss and the development of deep gingival pockets. If not treated and oral hygiene deficits are not compensated, the disease will lead to a comparatively poorer oral health condition and result in tooth loss [4, 7]. These manifestations usually lead to premature, partial and lately complete edentulism, resulting in certain degrees of dysphagia, difficulties in chewing and swallowing, communication and occasionally respiratory complications. Consequently, the oral health-related quality of life for these edentulous individuals may be reduced and reasonable strategies to manage these concerns and facilitate positive changes must be

developed. Therefore, prosthetic rehabilitation of edentulous DS individuals is advised in order to enhance their physical well-being, boost their self-esteem, and consequently improve their overall quality of life [8]. It should be noted that general and oral manifestations may complicate the treatment of edentulous DS patients who should be carefully assessed and treated accordingly with complete removable prostheses. Specific approaches to good conduct, additional sessions and use of specific materials and equipment have been described [5].

The aim of this paper is to illustrate the prosthetic management of an edentulous 29-year-old patient, and to highlight points of consideration in this specific medical context to improve oral health and quality of life.

CASE REPORT

A 29-year-old woman with DS referred to the prosthetic department with chief complaints of inability to chew and gastrointestinal problems due to her oral problems. Her medical history included diabetes and chronic meibomitis with dry eyes. She had a moderate intellectual disability and interacted well with dental staff. However, she was afraid of pain induced by dental treatment. The remaining teeth have been extracted due to poor periodontal prognosis.

Extraoral examination revealed a square face and concave lateral profile leading to an esthetic deficit and exaggeration of the edentulous appearance (Figures 1a-1b-1c). She had short and broad hands and fingers (Figure 1d).

Intraoral examination revealed shallow posterior ridges and buccal pouch in the maxilla.

Mandibular arch was enlarged by centrifugal resorption, with a thin, sensitive mucosa. Macroglossia was identified (Figure 2).

With the consent of the patient and her parents, decision was to fabricate complete removable dentures.

Primary impressions were made with an extra-fast alginate with a pleasant aroma. (Figures 3a-3b) Final impressions were made using polysulfides. (Figures 3c-3d) After occlusion record, analysis revealed that maxillary arch was reduced transversely and an inversion of frontal inter-arch relationship was noted. The choice of teeth led to small triangular incisive and semi-anatomical molars with reduced cuspidal angulation. Reducing the dental formula and adapting the dimensions of occlusal surfaces to the reserved anatomical-physiological context were necessary to control the prosthetic length, obtain $\frac{1}{2}$ inter-dental relationships and reduce sagittal and frontal occlusal curves. A vertical orientation of the mandibular posterior teeth and a slightly exaggerated ad-vestibulum orientation of maxillary molars were necessary to resolve the problem of frontal arch offset (Figure 4).

Facial appearance, with teeth-mounting in place, was validated by the patient, who expressed her admiration and comfort to the teeth choice and set.

Finished prostheses were delivered after occlusal adjustments (Figure 5a). Oral hygiene and use instructions were given. The presence of a companion during mouth-fitting procedure and initial prosthetic integration period was required. Regular check-ups were carried out and the patient was very satisfied with esthetic and functional results (Figure 5b).

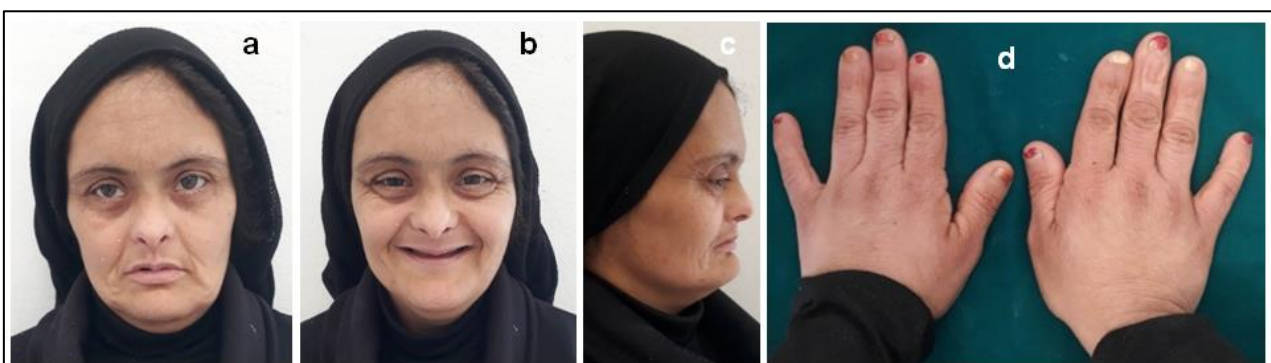


Figure 1: Pretreatment extraoral views. a: frontal facial view, b: smile view, c: profile facial view, d: Specific digital aspect of the patient

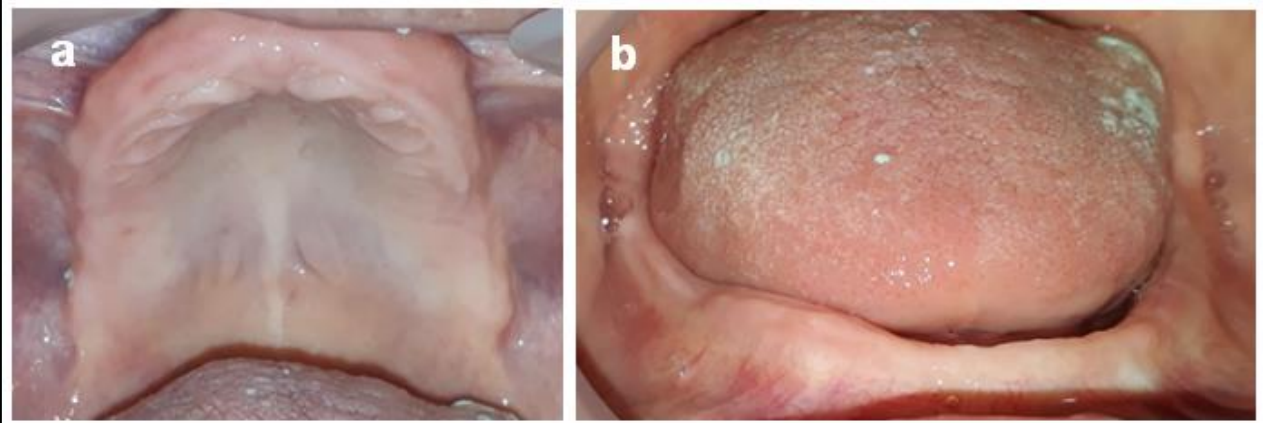


Figure 2: Pretreatment intraoral views. a: maxillary arcade, b: mandibular arcade

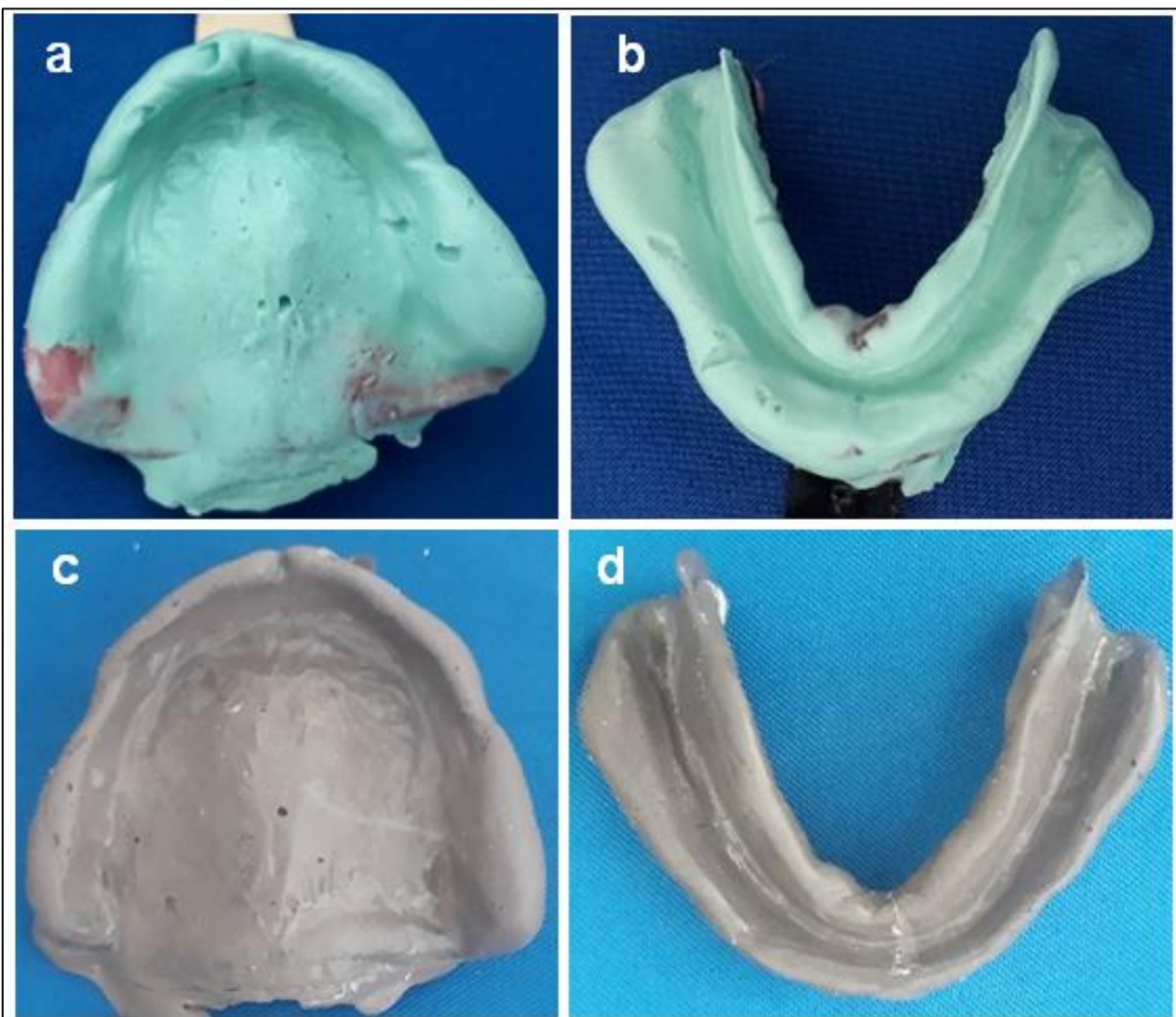


Figure 3: Prosthetic impressions. a: maxillary primary impression, b: mandibular primary impression, c: secondary maxillary impression, d: secondary mandibular impression

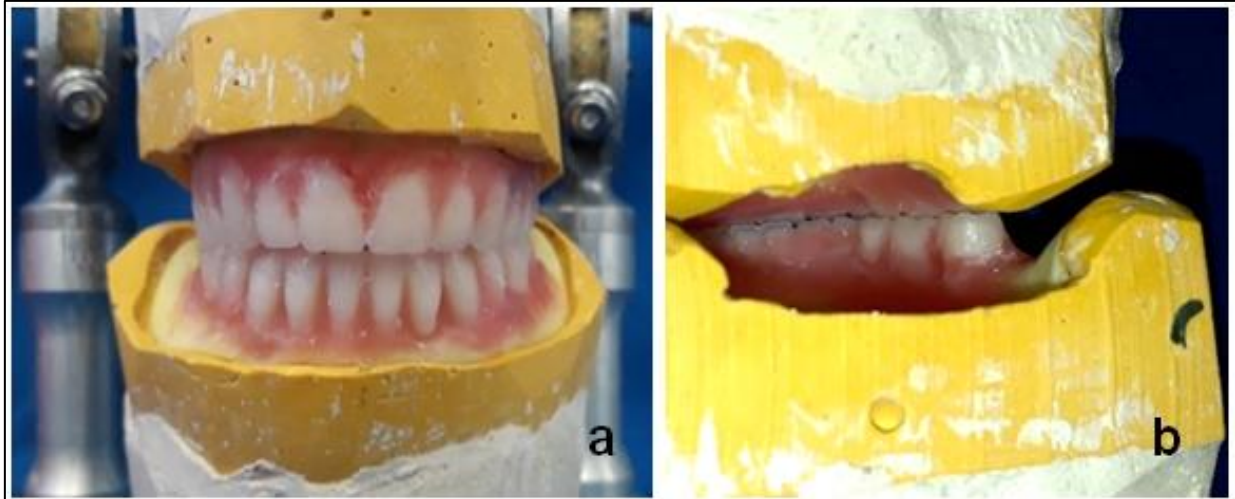


Figure 4: Teeth setting. a: frontal view, b: posterior view



Figure 5: Post-treatment views. a: Intraoral frontal view of the definitive prostheses' occlusion, b: Restoration of facial appearance and smile

DISCUSSION

One of the characteristic features of DS is the variability of the manifestations among individuals with DS. Since the additional third 21st chromosome is present in every cell, it is understandable that every system in the body may be impacted to some extent. However, it is important to note that not all people with DS experience the same difficulties or associated conditions [9].

Patient with DS may present mental and physical disorders that have implications on oral health and treatment management. In fact, various clinical manifestations related to oral conditions and medical issues with oral implications make the DS individuals require assistance and help from dental health care professionals. They are considered as special patients, requiring a special approach mainly with prosthetic rehabilitation for complete edentulism [2, 3, 5].

They are affected by anxiety, phobia, complete lack of cooperation and low motivation to carry on with their treatment. With mild to moderate mental retardation, their intellectual disability may have an effect on their behavior during therapeutic procedures [3, 7, 10]. Insufficient cooperation consisted of the recurring missed appointments and frequent loss, improper use or damage to their previous appliances. Moreover, unexpected specific events may arise during the treatment course [4]. Thus, compromised cooperation may increase the complexity of the prosthetic treatment, as a multi-appointment therapy, requiring patient's cooperation and his involvement in the decision-making and therapeutic process [5]. To make prosthetic treatment efficient, the treatment plan must be kept simple and realistic to achieve a prompt and therapeutically satisfactory treatment outcome [4]. The dentist is asked to identify patient's intellectual and functional abilities and provide him an environment with fewer distractions. It's preferable to conduct treatment

using standard behavioral management techniques to seek good cooperation by paying compliments and positive reinforcement with both verbal and nonverbal communication, to process slowly and to give extra time to explain each stage of the prosthetic procedure in simple and concrete terms appropriate to his level of understanding, to repeat instructions to compensate for the memory problem, to show him the instruments to use (tell-show-do) and to keep the appointment as short as possible [7, 11].

Muscle hypotonia in DS affects motor skills. Moreover, rhythm disorders disturb motor commands and contractility [5]. Consequent loss of dexterity may have repercussions on the denture set and removal, and oral and prosthetic hygiene. Muscular disorders can exacerbate the difficulty of precise movements, and contribute to frequent falling out and fractures of the dentures. So, an outside help needed to be present (family, carers) [12].

Concerning oral characteristics, patients with DS may present alterations in jaw bone growth. Microstomia, maxillary hypoplasia due to the lack of development of the midface and to the oral breathing, short and narrow palate, maxillary retrognathism, protruded mandible with decreased effective jaw length, small chin, and class III malocclusion according to Angle's classification are frequently observed. The sagittal skeletal misalignment and disturbance in the transverse measurements giving an inversion of the intermaxillary relationship can influence the choice and sitting of prosthetic teeth in complete denture [1, 7, 8].

In addition, a high frequency of macroglossia has been reported in people with DS. The tongue, strongly affected by hypotonia, is, absolutely or relatively, too large for the reduced volume allowed by the shape of the jawbone and the craniofacial dimensions. Thus, a marked lingual protrusion, with low positioned tongue interfering between the opposite arches are usually noted (open mouth posture), giving the typical aspect of protruding tongue and lip incompetence [1, 7, 13].

Altered composition of saliva, macroglossia and protrusive lingual position may compromise the stability of mandibular denture [8]. It is therefore essential that the prosthetic teeth and surfaces fit into a "neutral zone" between the bucco-labial and the lingual pressures. Piezography can be used, through muscular pressure, to record edentulous available prosthetic space for a suitable teeth arrangement in relation to oral function. Because of macroglossia, mandibular prosthesis must have anterior-posterior and mesio-distal concavities in the sublingual region called "lingual cradle" [14].

In addition to difficulties in verbal expression and problems associated with language and speech, DS patients suffer from difficulties in perceiving pain that sounds much later or absent. Superficial sensitivity is impaired, leading to a poor perception of touch, grittiness and sharpness that can exacerbate prosthetic integration difficulties and compromise treatment success [8, 10]. Thus, prostheses and performed procedures must be atraumatic. Periodic clinical check-ups must be regular.

Cognitive impairment and motor functions delay, the most common clinical manifestations in DS, affect the capacity to carry out good prosthetic and oral care. In fact, at clinical examination, active oral candidiasis was more common in children/young adults with DS. Moreover, the tongue of DS individuals is characterized by a dry surface due to mixed or oral breathing and often deeply fissured and trapping food. Consequently, halitosis, deficient oral hygiene and infections may occur [1, 2, 8]. To avoid the accumulation of plaque and/or the onset of fungal infections, it is required to educate parents and caregivers to conduct the prosthetic, oral and lingual hygiene. For this objective, the use of tongue scrapers and/or brush cleaners can assist in maintaining satisfactory levels of hygiene. Certain individuals may require more support than others [7, 15].

CONCLUSION

In contrast to healthy individuals, those with DS exhibit distinct craniofacial and oral characteristics. Consequently, acquiring a deeper understanding of these specific traits will provide clinicians with relevant information essential for effectively managing the treatment of these individuals.

When teeth loss occurs, there are three main players in the well-being of edentulous patients with DS: the individual, the parents and the professional staff involved. These pillars work together to ensure oral health and prosthetic treatment success.

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