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CASE REPORT

Congenital hypothyrodism and its oral manifestations

Hipotiroidismo congénito y sus manifestaciones bucales

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ABSTRACT

Hypothyroidism is one of the most common thyroid disorders. Hypothyroidism can be congenital in cases when the thyroid gland does not develop normally. Female predominance is a characteristic of congenital hypothyroidism. Dental characteristics of hypothyroidism are thick lips, a large-sized tongue which, due to its position, can elicit anterior open bite as well as fanned-out anterior teeth. In these cases, delayed eruption of primary and permanent dentitions can be observed, and teeth, even though normal-sized, are crowded due to the small-sized jaws. This study presents clinical cases of female patients diagnosed with congenital hypothyroidism who sought treatment at the Dental Pediatrics Unit of the Autonomous University of the State of Mexico.

RESUMEN

El hipotiroidismo es el más común de los trastornos de la tiroides, puede ser congénito si la glándula tiroides no se desarrolla correctamente (hipotiroidismo congénito). La predominancia femenina es una característica. Entre las características odontológicas del hipotiroidismo se observan labios gruesos, lengua de gran tamaño, que debido a su posición suele producir mordida abierta anterior y dientes anteriores en abanico, destaca que la dentición temporal y permanente presentan un retardo eruptivo característico y, aunque los dientes son de tamaño normal, suelen estar apiñados por el tamaño pequeño de los maxilares. Se presentan dos casos clínicos de pacientes de sexo femenino que acuden a la clínica de Especialidad en Odontopediatría de la Universidad Autónoma del Estado de México con diagnóstico de hipotiroidismo congénito.

Key words: Hypothyroidism, myxedema, cretinism, delayed eruption, macroglossia, paedodontics.
Palabras clave: Hipotiroidismo, mixedema, cretinismo, erupción tardía, macroglosia, odontopediatría.

INTRODUCTION

The thyroid gland is located in the front section of the neck, underneath the larynx. It produces two hormones: triiodo-thryronine (T3) and thyroxine (T4), whose function is to control metabolism.[1-5]

Alterations of the thyroid function are the most common cause of endocrine disease. They affect patients of all ages and present great variety of clinical pictures. The spectrum varies from asymptomatic situations, multi-systemic failures, neoplasia and, in certain cases, even death.[2,6-8]

Hypothyroidism is the most common thyroid disorder. In these cases, a thyroid hormone insufficiency is present. It is more frequently found in women, increases with age and exhibits familial tendency.[1,3-5,8]

When hypothyroidism is present in childhood, it manifests itself as cretinism. When it affects adults (especially middle-aged women), it is known as myxedema.[9-11]

This condition can be classified into two categories: primary hypothyroidism, when the defect is intrathyroid, or secondary hypothyroidism, in which another condition can indirectly cause decrease in the hormone circulation (for example, a surgical event or a pathological alteration of the hypothalamus).[9-11]

Some signs of hypothyroidism are, among many others, the following: tiredness, mental depression, weakness, skin and hair dryness. Notwithstanding, many patients afflicted with hypothyroidism can present only one or two symptoms. Hypothyroidism can be congenital (CHT) in cases where the thyroid gland fails to develop correctly.[1-4,9,13,14]

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CHT is a birth defect which can represent a pediatric emergency. In cases when it is not timely treated, it can elicit serious consequences, among which irreversible mental retardation can be mentioned. CHT natural history has dramatically changed in recent years as a consequence of neonatal screening (NS) programs. These programs have the aim of detecting disease in all apparently healthy newborns (NB).[3-4,11,13,14]

NS programs have revealed the fact that worldwide CHT prevalence is two to three cases per 10,000 births (NB). Nevertheless, frequency variations related to population or geographic areas have been described.[3,4,14]

The main causes which trigger CHT are: a) incomplete or aberrant migration of the thyroid outline; b) defective thyroid growth or differentiation, which could result in thyroid agenesis, and c) defects in the biosynthesis of the thyroid hormones. The firstly and secondly mentioned cases exhibit predominance for female gender.[4,5,8] *Table I* contains a list of the most common CHT cases.

Female predominance is a particularly interesting characteristic of primary CHT epidemiology. Nevertheless, to this date it remains unknown whether women are more susceptible to CHT or whether CHT-afflicted female fetuses possess greater uterine survival when compared to male phoetuses.[3-5,14]

Dental characteristics of child hypothyroidism are the following: vertical facial growth, decrease of length and skull base angle, thick lips, large-sized tongue (macroglossia), which, due to its position, frequently elicits anterior open bite and fanned-out anterior teeth. Macroglossia can be congenital or acquired. Congenital macroglossia can be caused by over-development of the individual musculature, and becomes evident during the subject's growth. Primary and permanent dentition present characteristic eruption retardation, and although teeth reach normal size, they are frequently crowded due to the small size of the jaws. Oral respiration and secondary irritative hyperplasia can be present. Structural dental alterations can equally be present, mainly in the root (open apexes permanence and short-root appearance), as well as large pulp chambers caused by slow dentin formation. Enamel hypoplasia can be found among development anomalies. Endocrine alterations are of great dental and medical importance; therefore, it is paramount to ascertain which is the best dental treatment to observe with these patients.[6,9,10,15-18]

The objective of the present article was to report two clinical cases of female patients who attended the paedodontics specialty clinic at the State of Mexico University, having been diagnosed with CHT.

CLINICAL CASES

Case 1. 7-year-old female patient, attended the clinic seeking dental treatment. Pertinent information was provided by the patient's mother. Non-pathological personal history details were as follows: the patient was the product of a third pregnancy, third delivery. Dystocic delivery due to preeclampsia. Upon arrival to the clinic, the patient weighed 18 kg and measured 1.03 meters.

Pathological history details were the following: congenital hypothyroidism determined at birth with the help of neonatal screening. The patient was at the time under medical treatment with levothyroxine (75 mg per day) and levocarnitine (1 spoonful every 12 hours). The rest of apparatus and interrogated systems were denied.

Mesiofacial clinical examination revealed orthognatic, symmetric profile. Oral cavity examination revealed primary dentition, macroglossia, non-determined terminal planes due to absence of teeth 75 and 85, bilateral class I canine relationship, upper and lower Baume II arch type, 50% vertical overbite, 3 mm horizontal overbite *(Figure 1)*.

X-ray studies revealed teeth 46 and 36 about to erupt into the mouth. The patient's age notwithstanding, teeth 51, 52, 61 and 62 exhibited full root formation. Teeth buds 11, 12, 21 and 22 exhibited one-third root formation when, according to eruption chronology, they should be already present in the mouth. Teeth 74 and 84 exhibited short roots *(Figure 2)*.

The patient did not complete dental treatment due to the fact that she resided out-of-state, in the state of Oaxaca; nevertheless, it was decided to include the report because the case presented eruption delay and short roots in teeth 74 and 84, which are all dental characteristics of congenital hypothyroidism.

Case 2. Two-year and five-months-old patient, who attended the clinic seeking treatment for dental caries. Indirect interrogation was conducted with the mother.

Non-pathological history was as follows: first pregnancy, first delivery, eutocic (vaginal) delivery of a normal evolution pregnancy. Upon arrival to the clinic, the patient weighed 15 kg and measured 89 centimeters.

Pathological history was as follows: congenital hypothyroidism determined at birth with the help of neonatal screening. At that time, the patient was under medical treatment of levothyroxine (25 μg per day). The rest of apparatus and interrogated systems were denied.

Clinical examination revealed orthognatic, symmetrical brachyfacial profile. Oral cavity

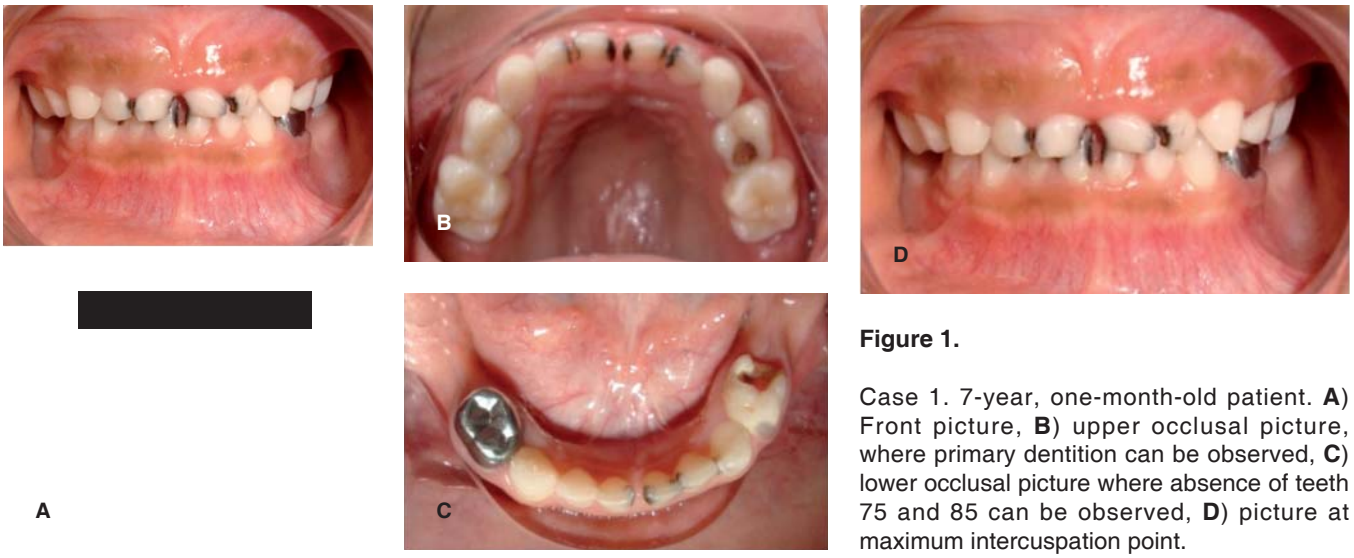

Figure 1.

Case 1. 7-year, one-month-old patient. **A**) Front picture, **B**) upper occlusal picture, where primary dentition can be observed, **C**) lower occlusal picture where absence of teeth 75 and 85 can be observed, **D**) picture at maximum intercuspation point.

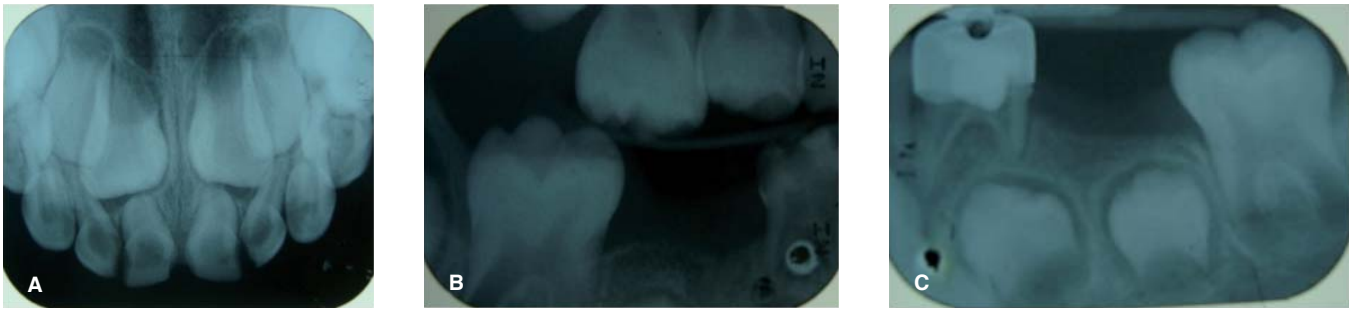

Figure 2. Case 1 X-rays. **A**) Upper occlusal X-ray, **B**) right bite wing X-ray, **C**) lower left periapical X-ray.

examination revealed primary dentition, macroglossia and geographical tongue, bilateral mesial step (echelon), bilateral class I canine relationship. Upper and lower Baume II arch type. 10% vertical overbite. 1 mm horizontal overbite *(Figure 3)* Radiographic studies did not reveal alterations in the performed projections *(Figure 4)*.

Oral rehabilitation of the patient was conducted in four days. At the first visit, pit and fissure sealing was performed in teeth 54, 55, 64 and 65. At the second visit, preventive resin was placed on tooth 74 and pit and fissure sealant on tooth 75, as well as resin in teeth 71 and 72. At the third visit, preventive resin was placed on tooth 84, pit and fissure sealant on tooth 85, and resin on tooth 81. At the fourth visit, resin was applied to teeth 52 and 62, and nickel-chromium crowns on teeth 51 and 61. At a fifth visit, fluoride was applied and preventive measures were reinforced.

DISCUSSION

Many hereditary disorders exhibit oral manifestations such as alterations in the tooth morphology or chemical composition, which can be detected in oral X-rays. The dentist, thus, can be the first to detect developmental and metabolic alterations in the patient, which are significant for the patient's general welfare, as well as that of his family.[12]

Whereas genetic and metabolic disorders are generally diagnosed by geneticists and endocrinologists, oral symptoms must be considered by dental professionals. Simple dental treatments can considerably improve the patient's welfare.[18]

In cases when congenital hypothyroidism remains untreated, there is risk of severe mental retardation, as well as growth delays.[9,15]

Knowledge or CHT oral manifestations can help us to identify patients thus afflicted, and then devise

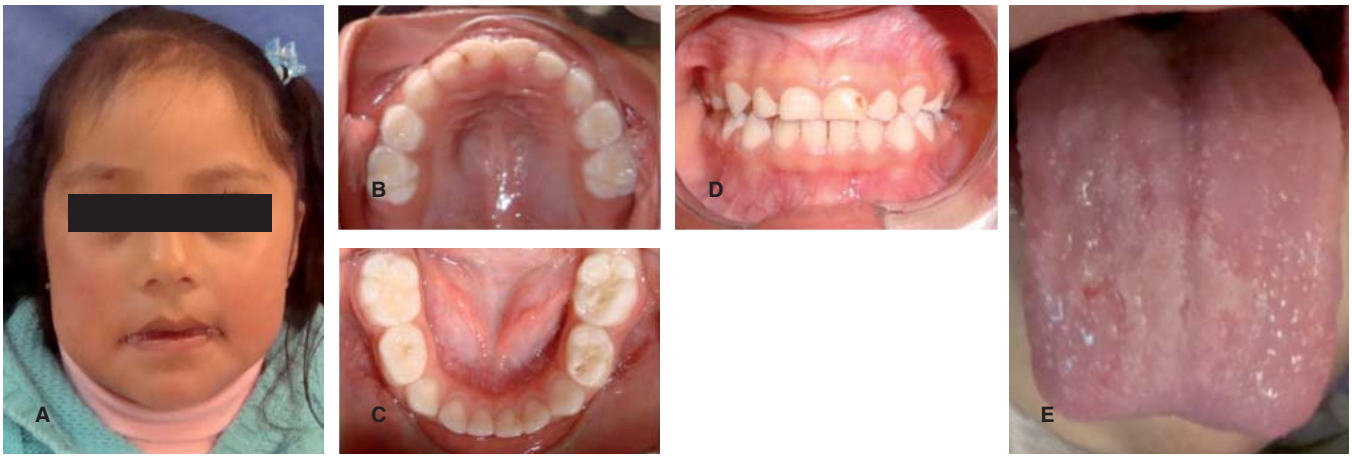

Figure 3. Case 2 patient. **A**) 2-year, 5-month-old patient, front picture, **B**) upper occusal picture where full primary dentition can be observed, **C**) lower occlusal picture with primary dentition, **D**) picture taken at maximum intercuspation point, **E**) macroglossia and geographic tongue.

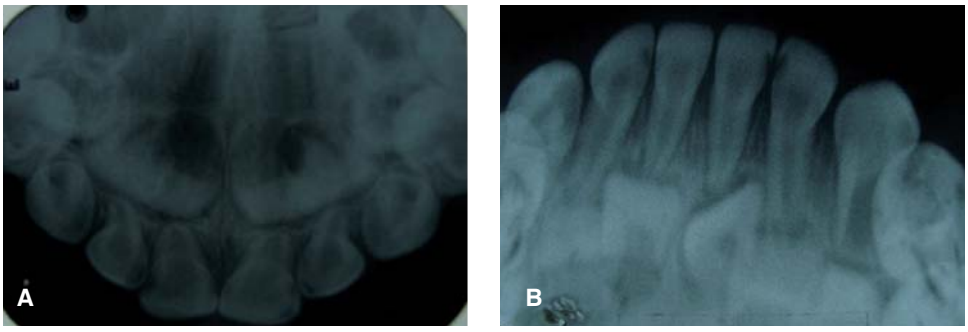

Figure 4.

Case 2 X-rays. **A**) Upper occlusal X-ray, **B**) lower occlusal X-ray.

a comprehensive treatment plan to facilitate patient care.[6,9]

With the help of history and clinical examination, the dentist can detect evidence associated to this condition. Untreated patients exhibiting severe signs of hypothyroidism can be at risk when dental treatment is considered. Therefore, the main objective for the dentist is to detect these patients and refer them for medical regimen before undertaking any dental treatment.[18]

Knowledge of drugs and dosages administered to the patient is paramount in order to ascertain aggregated conditions which could possibly be present (urological, renal or cardiac congenital anomalies, mental retardation, growth delays, deafness or hypometabolism signs) and thus avoid complications in the dental office such as hypothyroid coma which consists of hypothermia, bradycardia, hypotension or convulsions. For the aforementioned reasons, the patients' mothers were interrogated on medical treatment administered to their offspring.[19] In cases when newborns are diagnosed and treated for hypothyroidism during their first six weeks of life, patients generally develop normal intelligence. In more developed countries, there are presently systems for early detection in newborns to identify hypothyroidism cases.[18,20]

Once the hypothyroidism patient is under suitable medical care, there are no further expected problems in the dental treatment, exception made for treatment of malocclusion and tongue enlargement, in case these anomalies were present.[11]

Clinical characteristics more often reported in scientific literature are retardation in physical and mental development, thickened lips and macroglossia.[6,9,10,15-18] Lack of longitudinal growth can be observed at very early stages. Early diagnosis benefits the child's growth and mental capacity.[19] With respect to physical development, it can be noted that patient 1 exhibited lower size and weight than

Table I. Etiology of congenital hypothyroidism.

Permanent primary hypothyroidism.
Thyroid dysgenesis (ectopia, hypoplasia, maternal exposition to radioactive iodine).
Inherited defects in the synthesis, secretion and use of thyroid hormone.
Transient primary hypothyroidism.
Maternal exposition to anti-thyroid drugs or excessive iodine.
Iodine deficiency (endemic cretinism).
Idiopathic.
Secondary hypothyroidism (hypothalamic-pituitary).
HRT deficiency.
Idiopathic hypopituitarism.
Familial hypopituitarism.
Malformation syndromes with pituitary dysgenesis.

Table II. Clinical characteristics and oral manifestations of hypothyroidism patients.

Clinical characteristics	Oral manifestations
Anemia	Salivary gland enlargement
Cardiomegalia	Macroglossia
Heat intolerance	Glossitis
Constipation	Delayed dental eruption
Cretinism (children)	Compromised periodontal health-bone resorption
Dry hair	Dysgeusia
High levels of aspartate, transaminase, alanine, deshydrogenase and lactate	Upper maxillary protrusion
	Anterior open bite
High creatinine levels	Enamel hypoplasia in both dentitions (less frequent in permanent dentition)
Goiter	
Hyperlipidemia	Hypertelorism
Hypertelorism	Thick lips
Hypotension	Oral breathing
Inverted T waves in electrocardiogram	Open apexes permanence
Lethargy	Short root appearance
Low amplitude in QRS waves in electrocardiogram	Large pulp chambers (due to slow dentin formation)
Myxedema	
Paresthesia	
Reduction of cardiac and respiratory frequency	
Convulsions	
Tachycardia	
Weight increase	

recommended percentiles by institutions such as WHO (World Health Organization) and CDC (Center for Disease Control and Prevention)[21,22] *(Figure 5)*. In both cases, an enlarged tongue was found when compared to other pediatric patients. *Table II* describes clinical characteristic and oral manifestations of this condition.

The importance of knowledge of eruption delays lies in the fact of being able to restore and preserve primary teeth, since these are to remain longer before the eruption of permanent teeth. Delayed eruption becomes a more severe problem as the child grows.[11,20,23] For the aforementioned reasons, treatment of patient number 1 targeted the rehabilitation of upper incisors in spite of the patient's age.

Structural alterations in the teeth can be equally found.[9,15] In case 1, short roots were found, as well as large pulp chambers. These facts will become important data in order to modify prosthetic and pulp treatment.

Whenever it can be decided to undertake orthodontic treatment for a patient with hypothyroidism,

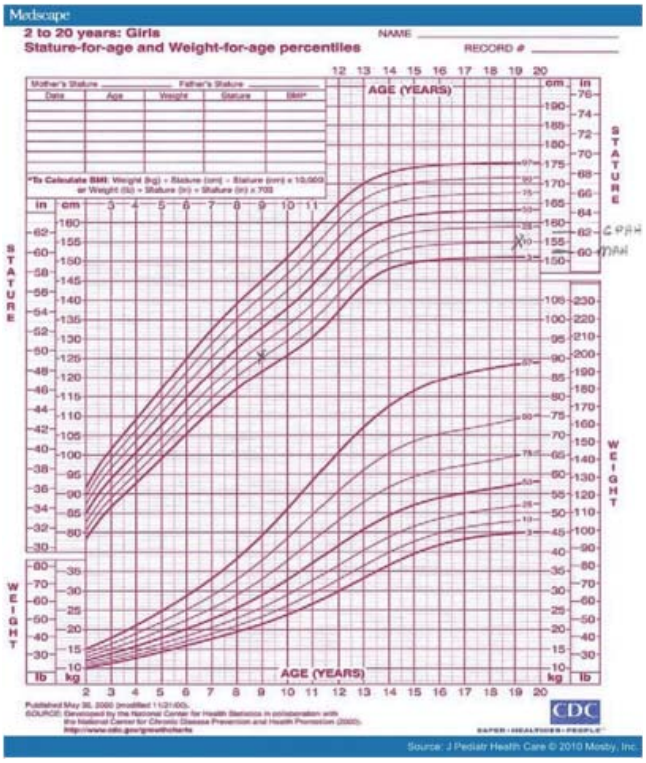

Figure 5. Percentiles' table.

the treatment must be conducted bearing in mind the fact that the thyroid hormone delays, in great measure, the speed of growth in the patient.[8,20]

CONCLUSIONS

Alterations of thyroid function are the most common cause for endocrine disease; therefore, it is paramount for the pediatric dentist to recognize physical and oral variations present.

In patients afflicted with this condition, treatment of primary teeth is of paramount importance, and it must aim at preserving them to the utmost, since a delay in permanent teeth eruption can be expected. Morphological variations of these teeth must equally be taken into consideration.

In order to achieve success, patient treatment must be of a multidisciplinary and interdisciplinary nature.

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