

# Oral Manifestation Associated with Multiple Pituitary Hormone Deficiency and Ectopic Neurohypophysis

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*Multiple pituitary hormone deficiency (MPHD) is the diminished secretion of all the hormones produced in the anterior lobe of the pituitary gland. The oral manifestation of this condition includes delayed eruption and prolonged retention of primary teeth, delayed formation and eruption of permanent teeth, delay in development and growth of the jaws, tendency towards development of deep bite and enamel disturbances. This paper reports the case of an adolescent patient with MPHD. Clinical examination revealed partial ankylosis and prolonged retention of primary second molars, primary maxillary canines and deep bite. Dental treatment included extraction of all molars with prolonged retention preceded by the necessary medical care with clinical and radiographic follow-up afterwards. The patient was also referred to an orthodontist for orthodontic treatment. Patients' medical condition should always be investigated by clinicians when faced with cases of delayed tooth eruption and bone development.*

**Keywords:** children with special healthcare needs; growth and development; dental development.

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## INTRODUCTION

**M**ultiple pituitary hormone deficiency (MPHD) is the diminished secretion of all the hormones produced in the anterior lobe of the pituitary gland. This lobe is responsible for the secretion of six important hormones that play an important role in the metabolic control of the human body: growth, adrenocorticotropic, follicle stimulating and follicle luteinizing hormones, thyrotropin and prolactin. The posterior lobe of the gland controls the secretion of vasopressins and oxytocin. Almost all pituitary hormone secretion is controlled by the hypothalamo-hypophyseal system, which in turn receives signals from different parts of the nervous system.<sup>1</sup> The main functions of all the above-mentioned hormones are described in Table 1.

MPHD can be caused by a congenital anomaly, which is

usually related to the ectopic position of the posterior lobe or by some pathological disease, such as histiocytosis X and viral encephalitis.<sup>2</sup> The ectopic position of the posterior lobe can occur due to a defect in neural migration during embryogenesis<sup>3-5</sup> or due to some adverse neonatal effects.<sup>5</sup> In these cases, the posterior lobe, which should originally be located in the sella turcica, is located at different levels of the pituitary stalk or in the median eminence. This ectopic location can be determined by a magnetic resonance exam.<sup>6</sup> In this exam, in addition to the ectopic position of the posterior lobe, patients with MPHD frequently also present a thin or non-visible stalk and hypoplasia of the anterior lobe.<sup>7,8</sup>

The clinical features of MPHD in childhood include: short stature, hypoplasia of the genital organs, lack of secondary sexual characteristics, delay in bone maturation, hypersensitivity to cold and susceptibility to hypoglycemia. The intellectual development is normal.<sup>3</sup>

The oral manifestations are prolonged retention and partial ankylosis of the primary teeth, retarded formation and eruption of the permanent teeth,<sup>9-11</sup> delay in the development and growth of the face and cranium leading to malocclusion; tendency towards deep bite<sup>9</sup> and defects in enamel formation.<sup>12</sup>

As occurs with other endocrine disturbances, MPHD can cause important oral alterations and therefore, the dental professional could play an important role in diagnosis. This is particularly important when the patient presents alterations in dentition without remarkable changes in general development.<sup>13</sup> The type of physical deformation will depend on the child's stage of development during the occurrence of hormonal alteration. Nevertheless, although some dentofacial alterations occur as a result of certain

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**Table 1.** Main functions of the anterior and posterior pituitary hormones<sup>1</sup>:

HORMONES	FUNCTIONS
<b>Growth Hormone</b>	Promotes body growth, affects protein synthesis, cell multiplication and differentiation, improves fatty acid mobilization from adipose tissue to the blood and reduction of glucose use by the body.
<b>Adrenocorticotropic Hormone</b>	Controls cortex renal hormone secretion which affects protein, glucose and fat metabolism.
<b>Thyrotropin</b>	Controls the secretion of thyroid hormones. These hormones control the speed of the major chemical reactions of the body.
<b>Prolactin</b>	Promotes the development of mammary glands and milk production.
<b>Follicle stimulating hormone and luteinizing hormone</b>	Hormones that control ovarian and testis growth as well as hormone and reproduction activities.
<b>Vasopressins</b>	Controls water excretion in urine.
<b>Oxytocin</b>	Helps milk ejection from mammary glands to the nipples during suction, and possibly helps in the childbirth process at the end of pregnancy.

endocrine disturbances, that fact cannot be accepted as a pathognomonic sign, a medical evaluation is necessary in order to make a correct diagnosis.<sup>9</sup>

The objective of this paper is to report the clinical features of a 12 year-old patient with MPPHD as a result of an ectopic position of the posterior lobe.

**Case Report**

The informed consent to document this case was obtained from the patient’s parents. A 12-year-old Caucasian girl began dental treatment when she was 7 years and 10 months old. She was treated at the post-graduate pediatric dentistry clinic of the Foundation for Scientific and Technological Development in Dentistry (“Fundação para o Desenvolvimento Científico e Tecnológico da Odontologia – Fundecto”), an institution related to the School of Dentistry, University of São Paulo, São Paulo, Brazil. The patient’s medical history revealed that she had been followed-up medically by the Endocrine Division of Hospital das Clínicas de São Paulo (HC, São Paulo SP) since she was 7 years and 6 months old, when MPPHD was diagnosed, as a result of an ectopic posterior lobe. Since then, the patient has been undergoing treatment including the following daily medication intake: Prednisone® (5mg, ½ pill per day) to supply the lack of adrenocorticotropic hormones; Puran T4,® thyroxine (50 mg, 1 pill per day) to supply the lack of thyroid hormones; Premarin,® estrogens (0.6 mg, ¼ pill per day) to

supply the lack of gonatropins; and a subcutaneous application of 40 ml of the growth hormone, once a day, 6 times a week. Her dental history showed that almost all her primary teeth presented prolonged retention, and the eruption of several permanent teeth was delayed.

At the clinical exam, it was observed that all the permanent incisors and first molars were present in the oral cavity. The permanent mandibular canines were absent; there was prolonged retention of the primary maxillary canines; and the primary maxillary and mandibular second molars presented infraocclusion and prolonged retention (Figures 1A and 1B). The radiographic exam showed that prolonged retention had led to the roots of the primary teeth suffering the normal resorption process, with the exception of the mesial root of the primary mandibular second molar on the right side (Figures 2C and 2D). Regarding occlusion, the patient presented deep bite (Figure 1E).

In order to plan the patient’s treatment, our group contacted the endocrinologist responsible for her medical treatment to ask for guidance in the event of surgical procedures. According to medical instructions, 50 mg of Hydrocortisone (intramuscular) would have to be administered 2 hours before surgery. In addition, to help with orthodontic treatment, her physician also sent the patient’s hand and wrist radiographic exam taken when she was 10 years and 11 months. According to this exam, her bone age was compatible with that of a child aged 7 years and 10 months



**Figure 1.** Clinical figures showing retention of primary teeth and failure of eruption of permanent teeth.

(Greulich-Pyle criteria).

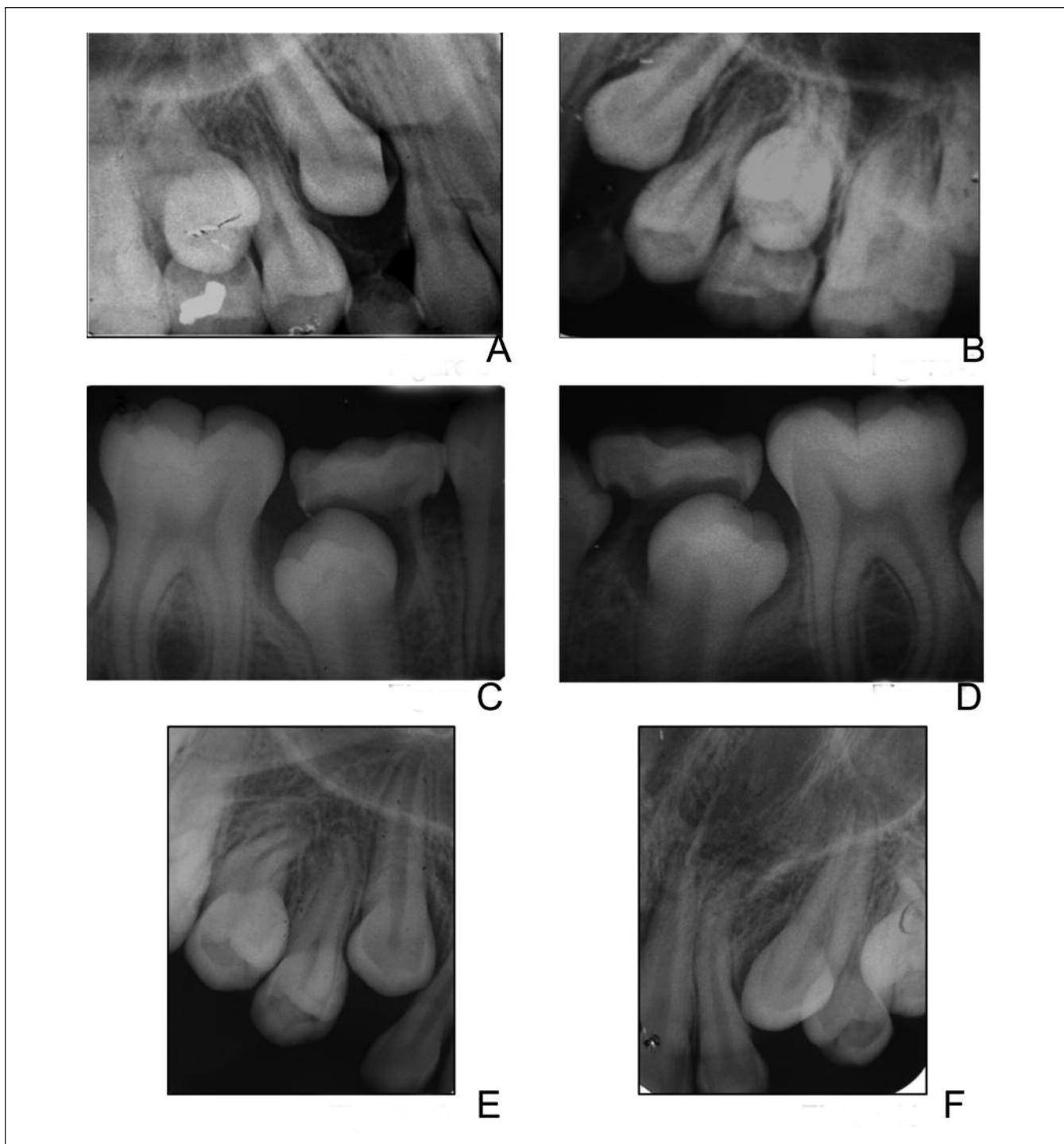
The patient's treatment started with preventive measures, such as guidance on oral hygiene and diet, prophylaxis and topical fluoride application. After this, surgeries were performed to remove the teeth with prolonged retention in two different sessions. In the first session, the primary maxillary and mandibular right second molars were removed, and in the second, the primary maxillary and mandibular left second molars. In both sessions, hydrocortisone was administered before the surgical procedures, in accordance to medical guidance. The primary maxillary canines showed mobility, therefore, it was decided to allow natural exfoliation to occur. Follow-up sessions were scheduled to observe eruption of permanent teeth and for preventive methods (oral hygiene, dietary guidance). The patient was also referred to an orthodontist.

During the follow up, it was observed that the complete eruption of the maxillary and mandibular premolars occurred only eighteen months after surgeries (Figures 2A, 2B, 2C and 2D). However, at that time, the maxillary canines had not yet erupted (Figures 2E and 2F).

## DISCUSSION

The present paper reported the clinical features and the necessary recommendations for the dental treatment of a 12 year-old patient with MPHD. Prior to the dental treatment, the endocrinologist responsible for the case was consulted with regard to the preventive measures that would be required in cases of surgical procedures. This is an important step that should not be overlooked when planning the dental treatment of patients with systemic disorders. In this case, in addition to other hormone deficiencies, the patient had a deficiency of the adrenocorticotropic hormone, which controls the secretion of the supra adrenal gland. In view of this fact, as suggested by her physician, she required an extra dose of cortisone before surgical procedures. Cortisone prevents acute supra renal crises such as vomiting, abdominal pain, hypotension and vascular collapse. If the therapy is not quickly implemented, the patient could die.<sup>2</sup>

The radiographic exam of the hand and wrist is commonly requested, particularly by the orthodontic professional at the beginning of treatment. This exam is a powerful tool in the diagnosis of delayed bone development, frequently present in patients with isolated deficiency of the



**Figure 2.** Radiographic image before extractions showing the occurrence of prolonged retention of several primary teeth and failure of eruption of several other teeth.

growth hormone, hypothyroidism and MPHD.<sup>15,16</sup> Together with the medical recommendations, the doctor responsible for the patient's treatment also sent her hand and wrist radiographic exam, performed when she was 10 years old. At that time, her bone age was retarded by approximately 30%, similar to the delay in bone age found by Edler<sup>15</sup> (28%), in MPHD patients.

Regarding dental development, the patient presented

partial ankylosis, prolonged and symmetrical retention of the primary second molars and delayed eruption of the second pre-molars and canines. The symmetry of teeth with prolonged retention has already been reported as a characteristic of hormonal disturbances.<sup>11</sup> Considering that the permanent maxillary canines generally erupt between 9 and 10.5 years of age; mandibular second pre-molars between the ages of 10 and 11 years, and in the maxilla between the

ages of 11 and 12 years; at the age of 12 years this patient still presented the primary maxillary canines and primary second molars. In this case, she had a small delay in her dental age, similar to the period of 1 to 3 years found in the study of Kosowicz and Rzymisky<sup>11</sup> for children with pituitary disorders in the first decade of life. Probably because her medical therapy had started early, the dental age delay was less remarkable than the delay in her bone age.

The occlusion analysis detected a deep bite (vertical overlap), one of the characteristics reported by Salzmann and Wein<sup>9</sup> in patients with this condition, which occurs because they have deficient vertical facial growth. This emphasizes the need for orthodontic, and especially orthopedic treatment in almost all patients with this deficiency.

Post-treatment follow-up is important for all patients, especially patients with endocrine disturbances. In these cases, in addition to the preventive measures for oral health maintenance, special attention should be given to observe correct permanent tooth eruption, and correct development and growth of the jaws.

## CONCLUSION

Dental professionals should perform an overall evaluation of their patients, starting with a detailed medical history, especially when faced with delays in dental and bone development and suspected endocrine disturbances. They must be familiar with the correct chronological eruption of the permanent teeth and also have sufficient knowledge to make the differential diagnosis to eliminate other possible causes for the delay in tooth eruption, such as trauma. Finally, dental professionals could play an important role in the diagnosis of some endocrinal disturbances, particularly when there are no other general signs present.

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