



# Orofacial Manifestations of Hyperparathyroidism: A Dental Perspective

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Hyperparathyroidism (HPT) is a significant condition marked by the overproduction of parathyroid hormones, affecting both systemic health and orofacial regions. Predominantly, secondary HPT associated with chronic kidney disease (CKD) is critical because of its link to widespread conditions such as diabetes and hypertension. This short article highlights the vital role of dental professionals in identifying HPT through panoramic radiography, which can reveal critical orofacial signs such as brown tumors, altered dental development, and specific bone changes. With the CKD prevalence expected to increase alongside an aging population, the importance of early detection of HPT and its manifestations in dental settings cannot be overstated. Dental practitioners play a crucial role in the early detection of HPT, emphasizing the importance of being knowledgeable about its orofacial manifestations.

**Keywords:** Chronic kidney disease-mineral and bone disorder; Dental; Hyperparathyroidism; Panoramic radiography; Renal

## INTRODUCTION

Hyperparathyroidism (HPT) results from excessive parathyroid hormone production by the parathyroid glands, causing systemic and orofacial problems that medical and dental professionals must understand [1]. This brief communication will concentrate on the orofacial manifestations of HPT and the significance of recognizing these signs in panoramic radiography.

This report was approved by the Institutional Review Board of Dankook University Dental Hospital (DKUDH IRB 2024-04-006), and the committee waived the need for written informed consent.

## OROFACIAL MANIFESTATIONS OF HPT

HPT is one of the most important metabolic bone diseases affecting dentofacial structures [1,2]. HPT is categorized into three types [3]: primary HPT (parathyroid adenomas, hyperplasia, or carcinoma), secondary HPT in response to either lower serum calcium levels or high serum phosphate levels (e.g., low vitamin D and chronic kidney disease [CKD]), and tertiary HPT resulting from parathyroid hyperplasia related to prolonged secondary HPT. Secondary HPT related to CKD is the most common, with a 75% prevalence among CKD patients, because of the high prevalence of diabetes and hypertension with increased life expectancy [4].

Systemically, patients with secondary HPT may exhibit hypercalcemia, bone demineralization (osteopenia and osteoporosis), renal problems (kidney stones), neuromuscular



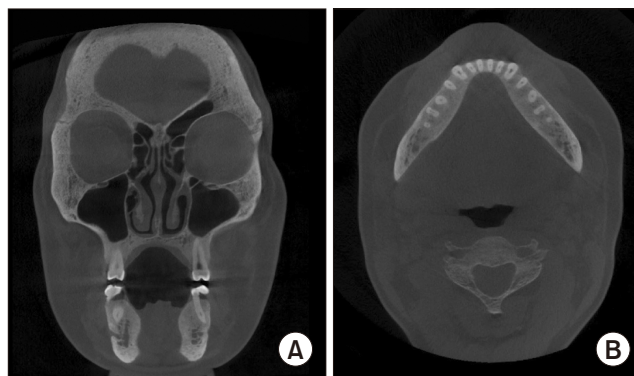
**Fig. 1.** Signs of secondary hyperparathyroidism on a dental panoramic radiograph. An altered bone pattern exhibits a “ground-glass” appearance and diminished trabeculation. Loss of the lamina dura around the teeth, indistinct delineation of the inferior alveolar nerve canal, and bilateral condylar resorption of both temporomandibular joints can be seen.

symptoms (muscle weakness and fatigue), and gastrointestinal symptoms (e.g., constipation, peptic ulcers, and pancreatitis). In particular, all the skeletal manifestations in patients with CKD are called renal osteodystrophy (RO) [3,5].

The dental perspective offers a unique vantage point for the early detection of secondary HPT based on specific orofacial signs [1,2,5-7]:

- 1) Brown tumors: These rare lesions are the result of osteoclastic activity and fibroblastic proliferation and present as painless jaw swelling and radiolucency on the radiograph.
- 2) Altered dental development: Delayed eruption of the teeth, hypoplastic enamel and/or dentin, cementum loss, and loss of the lamina dura may occur (Fig. 1).
- 3) Radiographic findings: Panoramic radiographs may show demineralization of the jaw bone, subperiosteal resorption along the jawline, or presence of cystic changes (Fig. 1).
- 4) Craniofacial bone changes: These include the loss of the cortical bone and the presence of a mixed, ground-glass lesion in severe cases (Fig. 2).

In addition to incidental radiologic findings, patients presented with a spectrum of symptoms, ranging from systemic symptoms, facial asymmetry, and swelling to orofacial pain, including neuropathy, toothache, and temporomandibular disorders, which are characterized by crepitus and pain during mastication and mouth opening [2].



**Fig. 2.** Coronal (A) and axial (B) views of computed tomography reflecting renal osteodystrophy in secondary hyperparathyroidism. An irregular “ground-glass appearance” is noted throughout the skull, encompassing both the maxilla and mandible, as well as a loss of the lamina dura.

## DISCUSSION

CKD is a prevalent condition that affects approximately 10% of the population [3]. The increase in life expectancy and consequent rise in the older population could potentially lead to a higher prevalence of this condition.

Therefore, dental professionals must recognize CKD-related orofacial complications. Specifically, when evaluating patients for dental implant placement, dentists should be vigilant regarding a range of metabolic bone disorders such as osteoporosis, osteomalacia, and Paget’s disease, along with RO [8].

The success of managing RO depends on early diagnosis, and dental panoramic radiographs are crucial in its early detection. Competency to assess signs, symptoms, and risk factors associated with HPT and other metabolic bone diseases is requisite for dental practitioners.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

## DATA AVAILABILITY STATEMENT

The datasets used during the current study are available from the corresponding author on reasonable request.

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