DENTOFACIAL ASPECTS OF ACROMEGALY: CASE REPORT AND REVIEW OF THE LITERATURE

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Abstract
Acromegaly is an uncommon condition that results from excessive production of growth hormone. Most of the cases are due to pituitary adenomas. Craniofacial alterations are a hallmark of this condition and can affect various facial structures, including jaw enlargement, upper jaw widening, spacing between teeth and misalignment of the skeletal structure, broadening and thickening of the nose, prominence of the cheekbones, thickened lips, and pronounced facial lines. Additional intraoral symptoms include tongue enlargement (macroglossia), hypertrophy of the palatal tissues that can cause or exacerbating sleep apnea, and buccal tilting of the teeth caused by tongue enlargement. Given the high incidence of dental and jaw disorders associated with acromegaly, a thorough evaluation of oral and maxillofacial conditions by endocrinologists, dentists, and oral surgeons is essential. We present the case of a 44-year-old man who attended the Department of Oral Medicine, College of Dentistry, Ajman University, for dental examination and advice on multiple carious lesions and generalized periodontal breakdown. He reported that he was diagnosed with acromegaly about 5 years ago.
Keywords: Acromegaly; Dentofacial; Jaw; Oral

1. Introduction

Acromegaly, an endocrine disorder characterized by excessive growth hormone (GH) secretion leading to increased insulin-like growth factor 1 (IGF-1), is primarily due to pituitary adenomas [1,2]. Coined by Pierre Marie in 1886, the term "acromegaly" originates from the Greek words akron (extremities) and megas (large), describing its typical clinical presentation [3].

The approximate incidence of acromegaly is 3-11 new cases per million people annually, with a prevalence of approximately 60 per million. The diagnosis typically occurs between 40-60 years and affects both sexes equally. Epidemiological studies report a total prevalence ranging from 2.8 to 13.7 cases per 100,000 people, with annual incidence rates ranging from 0.2 to 1.1 cases per 100,000 people [4].

Acromegaly presents as a progressive dysmorphic syndrome, with symptoms often related to pituitary tumors (eg headaches, visual disturbances) or general signs such as sweating, carpal tunnel syndrome, joint pain, and impaired glucose tolerance. Younger patients tend to experience more aggressive disease progression due to rapidly growing adenomas. If left untreated, acromegaly is associated with systemic complications and increased mortality risk [3], affecting approximately 20% of cases of McCune-Albright syndrome [5].

Numerous case reports highlight the orofacial effects of acromegaly, particularly on aesthetics and function [6]. Orodental pathologies are prevalent, including tongue enlargement, tooth spacing, mandibular growth, and prognathism [7]. Increased growth hormone secretion in adults leads to somatic and metabolic changes, altering the configuration of craniofacial bones and resulting in periodontal, muscular, and articular disturbances [8].

Orofacial changes in acromegaly, such as everted and thickened lips, macroglossia, and gingival hyperplasia, progress slowly but significantly impact the quality of life of patients [9]. Functional consequences include obstructive sleep apnea syndrome, malocclusion, and oral maxillofacial pain. These changes develop progressively over time, often eluding early diagnosis by dentists and dental surgeons due to the low prevalence of the disease [10].

Reduced airway dimensions, particularly in the frontal bone and mandible, are common in acromegaly, and studies indicate a higher prevalence of bimaxillary prognathism compared to nonacromegalic malocclusion [11,12]. Acromegaly can cause skeletal malocclusions, which pose diagnostic and management challenges for dentists [13]. Dental examination may reveal initial signs, such as progressive open bite, which serve as early indicators of the disease [14,15].

Temporomandibular disorders (TMD) associated with acromegaly are often overlooked and require consideration in differential diagnosis [16]. Although paraesthesia, anesthesia, and pain are well documented, reports linking acromegaly with orofacial pain or dysaesthesia are scarce [17]. Parotidomegaly, a rare finding, can occur in acromegaly, with cases of unilateral non-neoplastic parotid gland enlargement reported [18].

The surgical management of patients with acromegaly is challenging, as stability depends on the stabilization of the disease. Bone changes and remodeling can limit treatment options, and some procedures are contraindicated [19]. Prosthodontic solutions, such as two-piece magnet-retained hollow lip bumper prostheses, aim to address dental problems and improve aesthetics [20].

We present the case of a 44-year-old man who attended the Department of Oral Medicine, College of Dentistry, Ajman University, for dental examination and advice on multiple carious lesions and generalized periodontal breakdown. He reported that he was diagnosed with acromegaly about 5 years ago.

2. Case Report

A 44-year-old Asian man came to the Department of Oral Medicine, College of Dentistry, Ajman University, seeking a dental evaluation for multiple carious lesions and widespread periodontal deterioration. He disclosed a diagnosis of acromegaly five years earlier, currently managed by an

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endocrinologist. While his acromegaly is stable, he struggles with uncontrolled diabetes treated with oral hypoglycemics. No significant dental or family history was reported.

On examination, the patient appeared well built, middle-aged, oriented and free from discomfort. His facial features exhibited coarseness, frontal prominence, and pronounced enlargement of the nose **[Figure 1],** hands, and feet **[Figure 2].** Mandibular prognathism and an everted enlarged lower lip were observed affecting lip closure. Sensory and motor neural functions appeared intact. Intraorally, macroglossia and tooth spacing with noticeable diastema were observed, along with plaque deposits, accumulation of calculus, generalized periodontitis, and multiple carious lesions. Cephalometric analysis revealed frontal prominence, mandibular prognathism, sella turcica hyperplasia, increased mandibular angle, and widened maxillary sinus. An orthopantomogram (OPG) demonstrated multiple carious lesions and periapical pathology but a normal-sized dentition **[Figures 3 & 4].**

The treatment plan consisted of basic oral prophylaxis and dental fillings. Orthodontic tracing was initiated to document his current dental condition.

Figure 1: Orofacial features of acromegaly in a 44-year-old male: Frontal possessing – Enlarged nose, and macroglossia

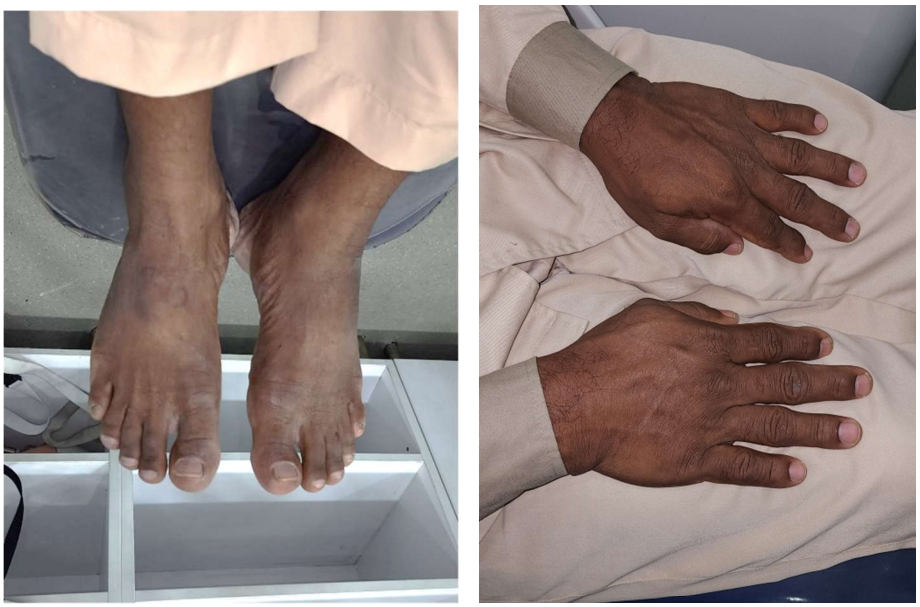

Figure 2: Enlagement the extrimities

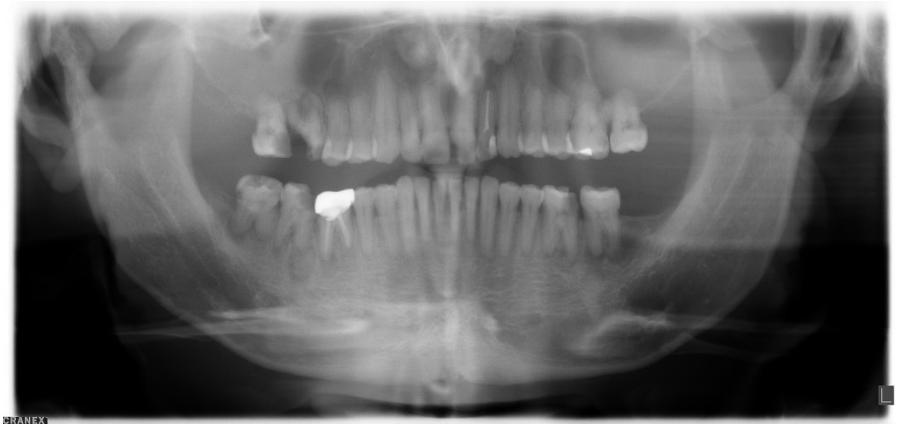

Figure 3: An OPG demonstrate flatning of the angle of the mandible, teeth spacing, multiple carious teeth, and periapical lesions.

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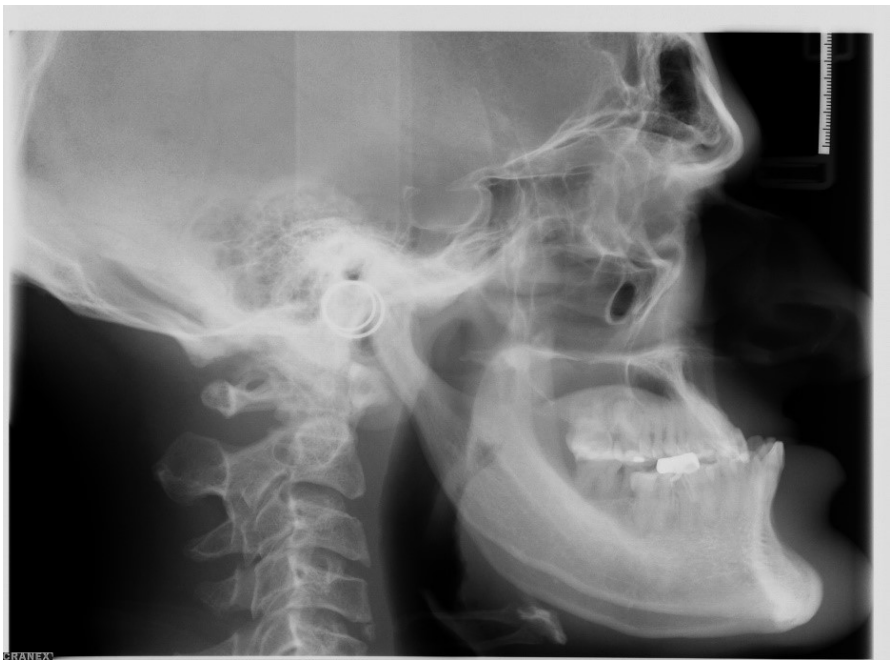

Figure 4: Cephalogram showing mandibular prognathism, enlarged sella turicica, pneumotized maxillary sinus, and enlarged nose

3. Discussion

The orofacial manifestations of acromegaly often present as early indicators of the disease and are frequently observed at the time of diagnosis. Despite this significant prevalence of oral manifestations in acromegaly, dentists have traditionally not been central in the identification and diagnosis of the condition [21]. Due to the insidious nature of the disease, dental professionals can often be the first healthcare providers consulted by these patients, potentially playing a crucial role in early detection [2]. Dentists are crucial in diagnosing acromegaly due to observable intraoral and extraoral symptoms.

Preo and co-workers [22] investigated the ability of 426 participants, including 220 dentists and 206 orthodontists, to recognize the orofacial manifestations of acromegaly through a telematic questionnaire featuring photos and lateral teleradiography of patients with acromegaly. Dentists commonly identified mandibular prognathism and lip protrusion, while orthodontists also observed soft tissue alterations. Orthodontists, who are accustomed to using photos to document facial characteristics, showed a greater awareness of these impairments compared to dentists. During dental evaluations, most participants, especially orthodontists, routinely examined the size, diastemas, and signs of sleep impairment. Orthodontists were also more adept at identifying enlargement of the sella turcica by teleradiography. This study underscored the strategic role of dentists in the recognition of acromegaly and emphasized the importance of increasing awareness among dental professionals to improve early diagnosis and improve patient outcomes.

Craniofacial alterations are a hallmark of acromegaly, affecting various facial tissues and structures. Increased glycosaminoglycan deposition and increased collagen production lead to thickening of the skin [23]. Typical facial features in patients with acromegaly include a broadened and thickened nose, prominent cheekbones, thick lips, and marked facial lines. Mandibular protrusion and jaw thickening are the result of excessive growth hormone, leading to periosteal bone deposition [24-27]. Other intraoral manifestations include tooth spacing, malocclusion, macroglossia, and hypertrophy of the palatal tissues, which can exacerbate sleep apnea [25-29].
Dental radiography may reveal large pulp chambers and hypercementosis at the roots of the posterior teeth [25-29]. Studies suggest different morphological changes in male and female patients, such as downward mandibular advancement and crossbite in males and ascending ramus extension and bimaxillary alveolar protrusion in females [30]. Orodental pathologies are common in acromegaly, with significant improvement after treatment, although patients are often not referred to specialists despite the need [31].

Acromegaly is associated with systemic complications, including cardiovascular problems such as hypertension and cardiac hypertrophy, metabolic abnormalities, and musculoskeletal and endocrine disorders [25,31]. Early intervention by endocrinologists is crucial to prevent further complications.
Treatment of acromegaly should ideally involve a multidisciplinary team, preferably within specialized centers for rare pituitary diseases [32]. Dentists and orthodontists should be vigilant about cranial and dental abnormalities in patients with acromegaly.

Treatment options include surgery, radiation therapy, and medical therapy, with surgical intervention often necessary for tumor removal or correction of disfigurement (28, 33). Orthodontic consultations and prosthodontic work may be necessary, and dental treatment may be complicated by comorbidities such as blindness, diabetes, or hypertension [4].

The prosthetic treatment of patients with acromegaly presents challenges, particularly in terms of the development of severe class III jaw relationships due to growth in the condyles and rami [34,35]. Obstructive sleep apnea, frequently seen in acromegaly, is associated with thickening of the upper airway walls, including the soft palate [36].
Acromegaly is a rare condition, and many dentists may not encounter it frequently in their practice. Ongoing education and training programs can provide dentists with updated information on the clinical manifestations and oral signs of acromegaly, ensuring they can recognize these indicators during routine examinations. Training programs can include case studies, interactive workshops, and clinical simulations focused on recognizing the subtle signs of acromegaly, such as facial changes, malocclusion, and soft tissue alterations. Training should also cover the appropriate use of diagnostic tools such as radiography and photography to aid in the detection of acromegaly-related oral manifestations. Dentists need to be proficient in interpreting radiographic findings and correlating them with clinical presentations. Collaboration between dental and medical specialties

is essential for comprehensive patient care. Initiatives promoting interdisciplinary communication and teamwork, such as joint seminars or case conferences, can facilitate better understanding and cooperation between dental and medical professionals. Clear referral pathways need to be established to ensure seamless transfer of patients between dental and medical specialties. Dentists should feel empowered to refer patients suspected of having acromegaly to endocrinologists for further evaluation and management. Conversely, endocrinologists should recognize the role of dentists in early detection and promptly refer patients for dental assessment when necessary. Implementing integrated care models that involve multidisciplinary teams working together in specialized centers can streamline the management of rare conditions like acromegaly. By emphasizing ongoing education and training for dentists and addressing barriers to collaboration between dental and medical specialties, healthcare systems can enhance early detection of acromegaly and improve patient outcomes through timely intervention and holistic patient care.

4. Conclusions

Acromegaly, resulting from excessive growth hormone secretion primarily due to pituitary adenomas, presents with characteristic clinical features. Early detection is essential, and dental professionals play a crucial role in identifying oral manifestations, and potentially preventing life-threatening events. Effective communication and collaboration between endocrinologists and dentists are vital to diagnosis, treatment planning, and patient management.

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