Case Report

Orthognathic Surgery in Multiple Endocrine Neoplasia Type 2B Complicated by Intraosseous Neural Hyperplasia: A Case Report

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ABSTRACT

Multiple Endocrine Neoplasia Type 2B (MEN2B) is a rare RET-associated syndrome characterized by mucosal neuromas, craniofacial anomalies, and life-threatening endocrine tumors. Reports of orthognathic surgery in the MEN2B population are extremely limited, despite the functional and aesthetic burden of skeletal deformities. This case highlights intraosseous neural hyperplasia of the jaws in MEN2B, a rare finding with direct implications for surgical planning and outcomes. A 20-year-old Iranian woman with genetically confirmed MEN2B, previously treated with thyroidectomy, presented for correction of severe craniofacial deformities. Clinical findings included double lips, mucosal neuromas, and hypertrophic eyelids. Cephalometric analysis revealed vertical maxillary excess, maxillary prognathism, and a Class II skeletal pattern. Following multidisciplinary evaluation, she underwent Le Fort I osteotomy, bilateral sagittal split osteotomy, and genioplasty. Intraoperatively, unusually dense cortical bone, cortical cracking, and intraosseous neural hyperplasia complicated fixation, requiring modified techniques. Orthognathic surgery in MEN2B patients may be complicated by dense, brittle cortical bone, intraosseous neural hyperplasia, and abundant submucosal soft tissue, which can affect osteotomy and fixation. Multidisciplinary preoperative evaluation, careful surgical planning, and flexible intraoperative techniques are essential to optimize outcomes in this rare population.

KEYWORDS
Multiple endocrine neoplasia type 2b; Orthognathic Surgery; Osteotomy, Le Fort

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INTRODUCTION

Multiple Endocrine Neoplasia Type 2B (MEN2B) is a rare autosomal dominant syndrome due to activating mutations in the RET proto-oncogene [1]. It is characterized by early onset medullary thyroid carcinoma (MTC), pheochromocytomas, mucosal neuromas, and distinct craniofacial features, including mandibular prognathism, high-arched palate, and thickened lips [2]. MEN2B has an estimated incidence of 1.4–2.6 per million live births, and the majority of cases are due to sporadic de novo mutations [3]. Although rare, the syndrome has clinical importance because of the aggressive behavior of MTC and

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the life-threatening complications associated with malignancy [4].

Orthognathic surgery is a well-established approach for correcting craniofacial deformities and functional impairments, but reports of surgical outcomes in MEN2B patients are rare [5]. Combined craniofacial anomalies, neural hyperplasia, and systemic complications, including pheochromocytomas associated with MEN2B, present important considerations when planning and performing surgical procedures in these patients [6]. The interplay among skeletal, dental, and soft-tissue anomalies makes meeting functional and aesthetic treatment objectives challenging in these patients [7].

This case report highlights the surgical management of a MEN2B patient with severe craniofacial deformities and documents intraosseous neural hyperplasia in the jawbones, a rare finding with direct implications for osteotomy and fixation.

CASE PRESENTATION

Ethics approval and informed consent were obtained in accordance with institutional guidelines.

A 20-year-old Iranian woman was evaluated for orthognathic surgery, including bilateral sagittal split osteotomy (BSSO), Le Fort I osteotomy, and genioplasty, following completion of presurgical orthodontic preparation. The patient had been diagnosed with MEN2B during early childhood. She subsequently underwent thyroidectomy, with histopathology showing no evidence of MTC, and later tested positive for the RET gene mutation. Clinical examination revealed thick, bulbous double lips, nodular lesions on the tongue and buccal mucosa, and hypertrophic eyelids (Figure 1). Gynecologic history was notable for secondary amenorrhea, with the last menstrual period occurring approximately one year prior. Cephalometric analysis demonstrated vertical maxillary excess (gummy smile), maxillary prognathism, and a Class II skeletal pattern (Figure 2).

Preoperative Assessment and Surgical Procedure

A comprehensive preoperative evaluation included full dental and orthodontic records, panoramic radiography, and a lateral and posteroanterior (PA) cephalogram. Her medical history was notable for thyroid and parathyroid disorders and secondary amenorrhea. Endocrinology and anesthesia consultations were obtained, and relevant laboratory studies, including thyroid function, serum calcium, and parathyroid hormone, were reviewed.

General anesthesia with nasotracheal intubation was administered to allow unobstructed intraoral

Figure 1: Preoperative photographs

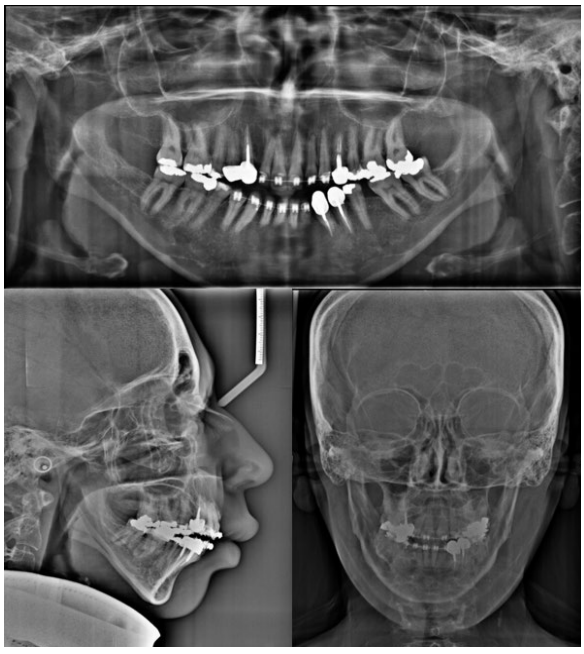

Figure 2: Preoperative radiographies

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access. Standard ASA monitoring was employed, with vigilance for electrolyte disturbances, particularly calcium. The patient was positioned supine with slight head extension, and intraoral and extraoral preparation followed institutional sterile technique. The surgical sequence included Le Fort I osteotomy, bilateral sagittal split osteotomy (BSSO), and genioplasty.

LeFort I Osteotomy

A maxillary labial vestibular incision was made, and mucoperiosteal flaps were elevated to expose the anterior maxilla, lateral nasal walls, and pterygomaxillary junction. Bilateral horizontal osteotomies were completed, followed by controlled pterygomaxillary disjunction and down-fracture. The maxilla was mobilized and repositioned according to preoperative planning, with provisional stabilization using titanium miniplates and screws. Thick cortical bone with minimal cancellous bone required increased force and careful handling to avoid bad splits.

Bilateral Sagittal Split Osteotomy

An intraoral buccal incision and subperiosteal dissection exposed the mandibular body and ramus. Sagittal osteotomies were performed according to the surgical plan. Due to the fragility and dense cortical nature of the bone in the posterior mandible, and to mitigate the risk of a bad split, the conventional lateral osteotomy line was intentionally terminated early at the mandibular angle region. This approach differs from the traditional technique, which typically extends the lateral cut far anteriorly, often reaching the area between the mandibular first and second molars. This modification was implemented to ensure a more controlled split pattern and reduce the potential for segment fracturing during the final splitting phase. The use of positional screws was specifically intended to avoid generating excessive pressure or irritation on the Inferior Alveolar Nerve (IAN), thereby minimizing the risk of postoperative neurosensory deficits.

Genioplasty

A horizontal symphyseal osteotomy was performed for chin advancement. Cortical cracking and screw thread stripping occurred on one side due to brittle bone. Fixation was modified intraoperatively using a contoured platform plate to bridge the compromised region, while standard fixation was applied contralaterally. Overtightening of screws was avoided to prevent further cortical failure.

Throughout surgery, abundant submucosal adipose tissue in the labial, buccal, and lingual mucosa complicated exposure and hemostasis. Meticulous bipolar cautery, topical hemostatic agents, copious irrigation, and frequent suction were used. Layered soft tissue handling and secure mucosal closure were emphasized.

Anesthesia management focused on airway safety, hemodynamic stability, and calcium homeostasis, with perioperative monitoring and correction of electrolytes. The procedure lasted approximately 4 h, longer than the institutional average of 2.5 h, due to dense cortical bone, difficult osteotomies, and repeated fixation adjustments. No airway complications or bad splits occurred.

Postoperative Care

Incisions were closed in layers with resorbable sutures. Postoperative management included a soft diet, prophylactic antibiotics, corticosteroids for edema control, and ongoing monitoring of serum calcium and electrolytes. Imaging confirmed stable segmental positioning and fixation integrity (Figures 3 and 4).

Figure 3: Postoperative photographs

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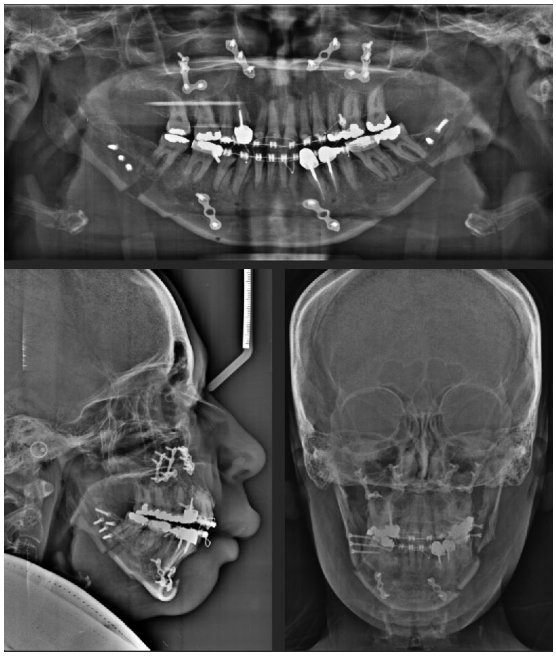

Figure 4: Postoperative radiographies

DISCUSSION

We report a case of a 20-year-old Iranian woman with MEN2B undergoing orthognathic surgery, including Le Fort I osteotomy, bilateral sagittal split osteotomy (BSSO), and genioplasty. Intraoperatively, extensive intraosseous neural hyperplasia was observed, a rare finding that poses unique challenges for surgical planning and fixation, highlighting its relevance for optimizing operative outcomes in similar patients.

MEN2B is a rare autosomal dominant syndrome caused by germline mutations in the RET proto-oncogene, most frequently the M918T variant [8]. The classic phenotype includes early-onset, aggressive MTC, mucosal neuromas involving the tongue, lips, and buccal mucosa, marfanoid habitus, and craniofacial dysmorphism such as a long face, maxillary prognathism, and thickened eyelids [2]. MEN2B represents about 5% of all MEN2 cases, with an estimated prevalence of 1–2 per 100,000 individuals [9]. Early genetic diagnosis allows prophylactic thyroidectomy to prevent MTC, while ongoing surveillance is essential to detect pheochromocytoma and guide safe perioperative management [10]. In this patient, identification of the M918T RET mutation not only confirmed her diagnosis but also informed preoperative planning for orthognathic surgery, emphasizing the importance of anticipating both endocrine and craniofacial challenges.

Reports of intraosseous neural hyperplasia in the jaws of patients with MEN2B are exceptionally rare [2]. The oral and maxillofacial literature more commonly describes mucosal neuromas, lingual nodules, or buccolingual neural lesions as early diagnostic features of MEN2B, whereas histologically confirmed intraosseous neural proliferation has seldom been documented [2, 3, 11]. The seminal report by Usami et al. [2] remains the most detailed account, describing multiple neural hyperplasias within the maxillary bone identified during orthognathic surgery, with immunohistochemical confirmation of Schwann cell proliferation. The intraosseous neural hyperplasia may represent a distinctive manifestation of MEN2B in addition to its more typical mucosal findings [2].

Other literature has primarily emphasized systemic and soft tissue manifestations. Bouchard et al. [12] highlighted the anesthetic risk of an undiagnosed pheochromocytoma during orthognathic surgery, underscoring the importance of endocrine evaluation rather than craniofacial pathology. Similarly, Jahantab et al. [13] and other case reports have described MEN2B presentations dominated by MTC, pheochromocytoma, and mucosal neuromas, without attention to intraosseous jaw involvement [13, 14]. Larger clinical series have documented consistent orofacial skeletal patterns in MEN2B, including dolichocephaly, apertognathia, and dental diastemas, and noted that some patients underwent orthognathic correction [5]. However, histologic evidence of intraosseous neural hyperplasia was either absent or incidental, and bone quality during surgery was not described in detail.

In comparison, the present case is distinguished by both its extent of orthognathic intervention and its intraoperative skeletal findings. Our patient required a combination of Le Fort I osteotomy, bilateral sagittal split osteotomy, and genioplasty, representing a rare instance of triple orthognathic procedures in MEN2B. Intraoperatively, the patient's maxillomandibular skeleton demonstrated unusually dense and brittle cortical bone with minimal cancellous component, leading to cortical cracking and screw thread stripping during fixation, necessitating modified hardware placement. These features prolonged surgical time and directly influenced operative management.

Future prospective series should incorporate

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quantitative densitometry, endocrine and bone-metabolism testing, and standardized specimen collection to clarify mechanisms and inform operative strategy. Meanwhile, surgeons should anticipate atypical bone and soft-tissue characteristics in MEN2B, plan for extended operative time, and adopt flexible fixation techniques in multidisciplinary settings.

CONCLUSION

Orthognathic surgery in MEN2B may be complicated by unexpected soft-tissue and bone findings as well as by increased anaesthetic risk due to endocrine disease. Careful multidisciplinary preoperative workup, anticipation of prolonged operative time, and flexible intraoperative fixation strategies are recommended.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Çakır M. What is New in Multiple Endocrine Neoplasia Type 2? *Endocrinol Res Pract* 2025;**29**(1).
2. Usami Y, Takenobu T, Kurihara R, et al. Neural hyperplasia in maxillary bone of multiple endocrine neoplasia type 2B patient. *Oral Surg Oral Med Oral Pathol Oral Radiol Endodontol* 2011;**112**(6):783-90.
3. Castinetti F, Moley J, Mulligan L, Waguespack SG. A comprehensive review on MEN2B. *Endocrine-Related Cancer* 2018;**25**(2):T29-T39.
4. Waguespack SG, Rich TA, Perrier ND, Jimenez C, Cote GJ. Management of medullary thyroid carcinoma and MEN2 syndromes in childhood. *Nature Revi Endocrinol* 2011;**7**(10):596-607.
5. MacIntosh RB, Shivapuja P-K, Krzemien MB, Lee M. Multiple endocrine neoplasia type 2B: maxillofacial significance in 5 cases. *J Oral Maxillofac Surg* 2014;**72**(12):2498. e1-. e17.
6. Stratakis CA. Hereditary syndromes predisposing to endocrine tumors and their skin manifestations. *Rev Endocr Metab Disord* 2016;**17**(3):381-8.
7. Thakker RV, Newey PJ, Walls GV, et al. Clinical practice guidelines for multiple endocrine neoplasia type 1 (MEN1). *J Clin Endocrinol Metab* 2012;**97**(9):2990-3011.
8. Heydarzadeh S, Hedayati M. RET proto-oncogene mutations: impact on diagnosis, treatment and prognosis of MTC. Thyroid Cancer-The Road From Genes to Successful Treatment: IntechOpen; 2023.
9. Amodru V, Taieb D, Guerin C, et al. MEN2-related pheochromocytoma: current state of knowledge, specific characteristics in MEN2B, and perspectives. *Endocrine* 2020;**69**(3):496-503.
10. Moline J, Eng C. Multiple endocrine neoplasia type 2: an overview. *Genet Med* 2011;**13**(9):755-64.
11. Lee MJ, Chung KH, Park JS, Chung H, Jang HC, Kim JW. Multiple endocrine neoplasia type 2B: early diagnosis by multiple mucosal neuroma and its DNA analysis. *Ann Dermatol* 2010;**22**(4):452-5.
12. Bouchard C, Chiniara G, Valcourt A-C. Intraoperative hypertensive crisis secondary to an undiagnosed pheochromocytoma during orthognathic surgery: a case report. *J Oral Maxillofac Surg* 2014;**72**(4):672-5.
13. Jahantab MB, Rastegar B, Aria A. A case report of multiple endocrine neoplasia type 2B. *Ann Med Surg* 2024;**86**(5):3016-9.
14. Majidi M, Haghpanah V, Hedayati M, Khashayar P, Mohajeri-Tehrani MR, Larijani B. A family presenting with multiple endocrine neoplasia type 2B: A case report. *J Med Case Rep* 2011;**5**(1):587.

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