



Multidisciplinary Management of Post-Traumatic Unilateral Condylar Hypoplasia with Endodontic and Endocrown Rehabilitation of Mandibular First Molar: A Case Report

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Abstract:

Background: Acquired condylar hypoplasia after childhood trauma can lead to facial asymmetry, mandibular deviation, and reduced mouth opening. Restoring a severely damaged molar in such a constrained environment presents unique challenges.

Case presentation: A 25-year-old male reported with pain in the lower right first molar (tooth 46), limited mouth opening (~20 mm), and facial asymmetry. OPG and CBCT confirmed right condylar hypoplasia secondary to trauma 10 years earlier. Tooth 46 had irreversible pulpitis and significant coronal destruction. Root canal treatment followed by an adhesive lithium disilicate endocrown was performed.

Conclusion: Through careful diagnosis and adhesive restorative techniques, full rehabilitation was achieved in a challenging clinical scenario. Endocrown proved to be a conservative, effective option in cases with limited access and structural loss.

Keywords: Condylar hypoplasia; CBCT; endodontics; endocrown; facial asymmetry; trauma sequelae

I. INTRODUCTION

Condylar hypoplasia, particularly when acquired during growth phases, can lead to mandibular deviation, facial asymmetry, and functional limitations in jaw movement [1]. Among etiological factors, childhood trauma has been well documented [2].

In cases of extensive coronal loss in endodontically treated molars, restoration with full cuspal coverage is crucial to prevent structural failure. Endocrowns have gained popularity as a conservative alternative to traditional post-core crowns [3–5]. These restorations utilize the pulp chamber for macroretention, eliminating the need for intraradicular post placement and preserving radicular dentin [6]. Among available materials, lithium disilicate-based ceramics have shown excellent mechanical strength, esthetic outcomes, and clinical longevity [8–10].

II. CASE REPORT

2.1 Patient Information

A 25-year-old male presented with pain in the lower right back tooth (tooth 46). The patient reported a history of trauma to the lower face at age 15. No systemic diseases were reported.

2.2 Clinical Examination

Extraoral examination revealed facial asymmetry, rightward mandibular deviation, and reduced mouth opening (~20 mm). Intraorally, tooth 46 showed gross coronal destruction and tenderness on percussion. **Figure ;1**

2.3 Radiographic Examination

Orthopantomogram (OPG) revealed a hypoplastic right condyle and shortened mandibular ramus. Cone-beam computed tomography (CBCT) confirmed unilateral condylar hypoplasia and mandibular asymmetry. Intraoral periapical radiograph of tooth 46 showed a deep carious lesion with periapical radiolucency. **Figure ;1**

2.4 Diagnosis

- **Tooth 46:** Symptomatic irreversible pulpitis with apical periodontitis
- **Temporomandibular joint (TMJ):** Acquired unilateral condylar hypoplasia secondary to childhood trauma

2.5 Treatment Plan

- Non-surgical root canal treatment (RCT) for tooth 46
- Endocrown fabrication using lithium disilicate
- Physiotherapy for TMJ function

III. ENDODONTIC MANAGEMENT

Rubber dam isolation was done, and access opening performed. Cleaning and shaping were completed with rotary NiTi instruments and 2.5% sodium hypochlorite irrigation. Calcium hydroxide was used as an intracanal medicament. After 1 week, canals were obturated using warm vertical compaction technique. **Figure, 2,3.**

IV. ENDOCROWN REHABILITATION

The remaining tooth structure was modified to create a flat pulp chamber floor and butt-joint margins. A digital intraoral scan was obtained, and a lithium disilicate endocrown was designed and milled. The restoration was cemented with dual-cure resin cement following standard adhesive protocol. **Figure, 4,5.**

V. FOLLOW-UP AND OUTCOME

At 1-month follow-up, the patient reported no symptoms. Occlusion was stable, and radiographs showed dense obturation and satisfactory marginal adaptation of the endocrown. Functional improvement was observed, though facial asymmetry remained.

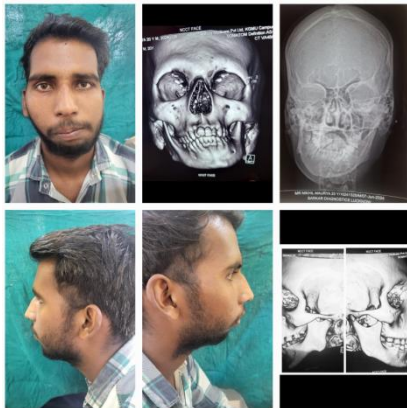


Figure 1:

- (a) Frontal extraoral photograph showing facial asymmetry and mandibular deviation.
- (b) 3D reconstructed NCCT image displaying maxillofacial skeletal structure with hypoplastic right condyle.
- (c) Posterior-anterior (PA) cephalogram indicating deviation of the mandible and condylar asymmetry.
- (d) Left lateral extraoral profile showing relatively normal contour.
- (e) Right lateral extraoral profile showing posterior positioning of the mandible.
- (f) Axial and coronal CT images revealing unilateral condylar hypoplasia and associated skeletal deformity.

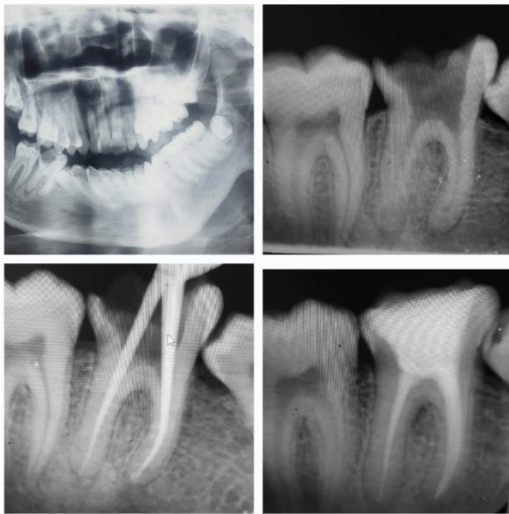


Figure 2:

- (a) Preoperative panoramic radiograph showing reduced ramus-condyle unit on the right side and periapical pathology associated with tooth 46.
- (b) Intraoral periapical (IOPA) radiograph showing periapical radiolucency in relation to mandibular right first molar (tooth 46).
- (c) Master cone placement confirming canal obturation length.
- (d) Postoperative radiograph showing completed root canal treatment with adequate obturation.

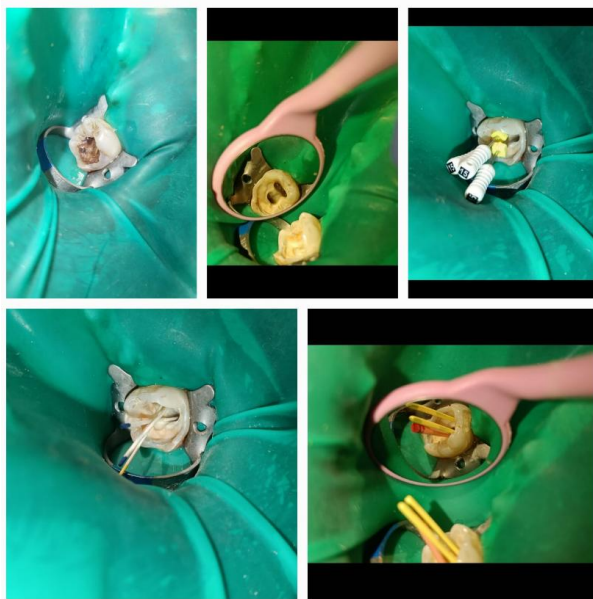


Figure 3:

- (a) Preoperative view of tooth 46 under rubber dam isolation showing deep caries and loss of tooth structure.
- (b) Endodontic access opening under rubber dam isolation revealing canal orifices.
- (c) Working length determination using paper points and electronic apex locator.
- (d) Biomechanical preparation using rotary files under aseptic isolation.
- (e) Master cone trial with gutta-percha points confirming canal preparation before obturation.



Figure

4:

- (a) Cast model showing prepared tooth 46 with endocrown cavity design.
- (b) Digital intraoral scan demonstrating occlusion and arch alignment.
- (c) Final fabricated zirconia endocrown adapted on the cast and occlusal view showing anatomical morphology of the endocrown.
- (d) Maxillary and mandibular casts in occlusion confirming articulation and occlusal contact.



Figure

5:

- (a) Intraoral view of post-endodontic tooth showing complete obturation.
- (b) Post-endodontic build-up of the tooth.
- (c) Tooth preparation for endocrown restoration.
- (d) Final cemented endocrown in occlusion with adjacent dentition, showing anatomical contour and functional integrity.

VI. DISCUSSION

Trauma during growth can impair development of the condylar cartilage, resulting in asymmetry and occlusal instability [1,2]. Early diagnosis using 3D imaging like CBCT is crucial [1]. In compromised endodontically treated molars, endocrowns eliminate the need for post space preparation, especially beneficial in cases with restricted mouth opening [3,5]. Lithium disilicate offers superior compressive strength (~360–400 MPa), minimal wear, and excellent bond strength with resin cements [6,8]. Clinical studies report endocrown survival rates between 73% and 99% over extended periods [9,10], making them a reliable choice in complex restorative cases.

VII. CONCLUSION

This case report demonstrates a multidisciplinary approach integrating endodontic therapy and restorative rehabilitation in a patient with unilateral condylar hypoplasia. The use of endocrowns proved advantageous in situations with limited mouth opening, offering a conservative, esthetic, and structurally durable solution without the need for post placement. Lithium disilicate ceramics, owing to their favorable biomechanical and adhesive properties, further contributed to the long-term success of the restoration. While the facial asymmetry due to the underlying skeletal discrepancy persisted, the patient regained masticatory function, esthetics, and comfort. This case highlights the value of individualized treatment planning and interdisciplinary collaboration in managing complex cases involving both skeletal deformity and dental structural compromise.

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