REPORT

Magnetic Resonance Imaging Findings of Unilateral Temporomandibular Joint Derangement and Condylar Morphological Changes in a 14-Year-Old Patient: A Case Report

Gerta Halilaj[1,3,*] **and Gentian Stroni**[2]

[1] Department of Diagnostics, University of Medicine, Tirana, Albania
[2] Department of Preclinical Sciences, University of Medicine, Tirana, Albania
[3] Department of Medical Laboratory Technology and Medical Imaging, Aldent University, Tirana, Albania

Abstract

Temporomandibular disorders may occur during adolescence, although the relationship between clinical symptoms and structural joint abnormalities remains incompletely understood. Magnetic resonance imaging (MRI) allows detailed assessment of articular disc position and morphology and of the disc–condyle relationship. This report describes unilateral discal and condylar abnormalities in a symptomatic adolescent. A 14-year-old female presented with a one-year history of right-sided preauricular pain, joint clicking, and restricted mouth opening. She also reported sleep bruxism and childhood jaw trauma. Bilateral temporomandibular joint (TMJ) MRI showed anterior displacement of the right articular disc without reduction, with irregular disc morphology; the disc remained anteriorly displaced in the open-mouth position. Flattening and irregularity of the right condylar articular surface were observed, together with increased thickness and signal intensity of the posterior disc attachment and minimal intra-articular fluid. The left TMJ showed preserved disc morphology, condylar contour, and a normal disc–condyle relationship in both mouth positions, with a minimal amount of intra-articular fluid. This case documents the coexistence of persistent unilateral TMJ symptoms with discal and condylar abnormalities during adolescence, and bilateral closed- and open-mouth MRI clarified the distribution and extent of intra-articular involvement. Although a single examination cannot establish the relationship between disc displacement and condylar changes, the findings support comprehensive clinical assessment and individualized follow-up in adolescents with persistent TMJ symptoms.

Keywords: adolescent, temporomandibular joint, magnetic resonance imaging, articular disc displacement.

Submitted: 24 October 2026
Revised: 03 November 2026
Accepted: 04 November 2026
Published: 11 November 2026

Vol. 1, **No.** 1, 2026.
10.62762/JODA.2026.471521

***Corresponding author:**
✉ Gerta Halilaj
gertahalilaj@yahoo.com

Citation
Halilaj, G., & Stroni, G. (2026). Magnetic Resonance Imaging Findings of Unilateral Temporomandibular Joint Derangement and Condylar Morphological Changes in a 14-Year-Old Patient: A Case Report. *Journal of Oral and Dental Approaches*, 1(1), 13–19.

© 2026 by the Authors. Published by Institute of Central Computation and Knowledge. This is an open access article under the CC BY license (https://creativecommons.org/licenses/by/4.0/).

1 Introduction

Temporomandibular disorders (TMDs) include a range of conditions affecting the temporomandibular joints (TMJs), masticatory muscles, and related structures [1]. Although TMDs are more widely studied in adults, pain, joint sounds, restricted mandibular movement, and episodes of jaw locking are also reported in children and adolescents. The reported frequency of these findings varies considerably across studies because of differences in age, study population, diagnostic definitions, and whether assessment is based on questionnaires, clinical examination, or imaging. In a large sample of adolescents aged 10–18 years, TMJ sounds were among the most frequent findings, and TMD symptoms and clinical signs became more common during pubertal development, particularly among females [2]. These observations suggest that TMD in adolescence represents a clinically relevant problem rather than an exclusively adult condition.

The identification of temporomandibular joint abnormalities during adolescence deserves particular attention because mandibular growth and condylar development may still be ongoing. Structural alterations involving the articular disc and mandibular condyle may coexist with pain, joint sounds, and functional limitations, although their clinical significance varies among individuals. Consequently, persistent TMJ symptoms in adolescents require careful clinical assessment to distinguish transient functional complaints from conditions that may warrant further investigation.

Assessment of TMD in children and adolescents can be challenging because symptom reporting may be influenced by age and cognitive development. Moreover, self-reported symptoms cannot replace a standardized clinical examination. These considerations led to the development of age-adapted Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) protocols for children and adolescents, with separate instruments for symptom screening and physical assessment [3]. A further challenge is that clinical symptoms do not always correspond directly to intra-articular morphology. Magnetic resonance imaging (MRI) studies have demonstrated that intra-articular abnormalities may also be present in individuals without clinically evident temporomandibular symptoms, indicating that symptom status alone does not necessarily reflect the structural condition of the joint [4, 5]. This clinico-radiological discrepancy supports the complementary use of MRI when an intra-articular abnormality is suspected.

MRI is the preferred imaging method for evaluating the TMJ articular disc because it provides direct information about disc position, morphology, and its relationship with the condyle in closed- and open-mouth positions. It also allows assessment of the retrodiscal tissues, intra-articular fluid, bone marrow signal, and gross condylar morphology without ionizing radiation [6]. In adolescents, disc position has been associated with differences in lateromedial condylar dimensions, condylar inclination, and mandibular fossa depth [7]. Although these cross-sectional associations do not demonstrate that disc displacement causes osseous change, they support the combined assessment of the disc and osseous components in young patients whose mandibular development may not yet be complete.

This report describes a 14-year-old female with persistent unilateral TMJ symptoms and ipsilateral disc displacement, disc deformity, and condylar flattening and surface irregularity. The case illustrates the value of assessing disc position together with disc and condylar morphology, using bilateral closed- and open-mouth MRI to characterize the affected joint and compare it with the contralateral side.

2 Case Presentation

A 14-year-old female reported daily right-sided preauricular pain, clicking during mandibular opening, and difficulty opening her mouth because of pain.

Mouth opening was documented during the clinical examination as less than 35 mm, but the exact maximum interincisal distance was not recorded. The patient denied episodes of jaw locking and pain during mastication. No mandibular deviation during opening or closing was observed on clinical examination.

The patient reported sleep bruxism and usually slept for approximately 5–6 hours per night. She did not report chronic stress. Her medical history was negative for rheumatologic or systemic inflammatory disease. A history of jaw trauma at the age of five was reported; however, information regarding the mechanism, anatomical site, severity, and any associated fracture was unavailable.

Before MRI, the patient had undergone a clinical assessment and panoramic radiography. The panoramic radiograph was not available for review.

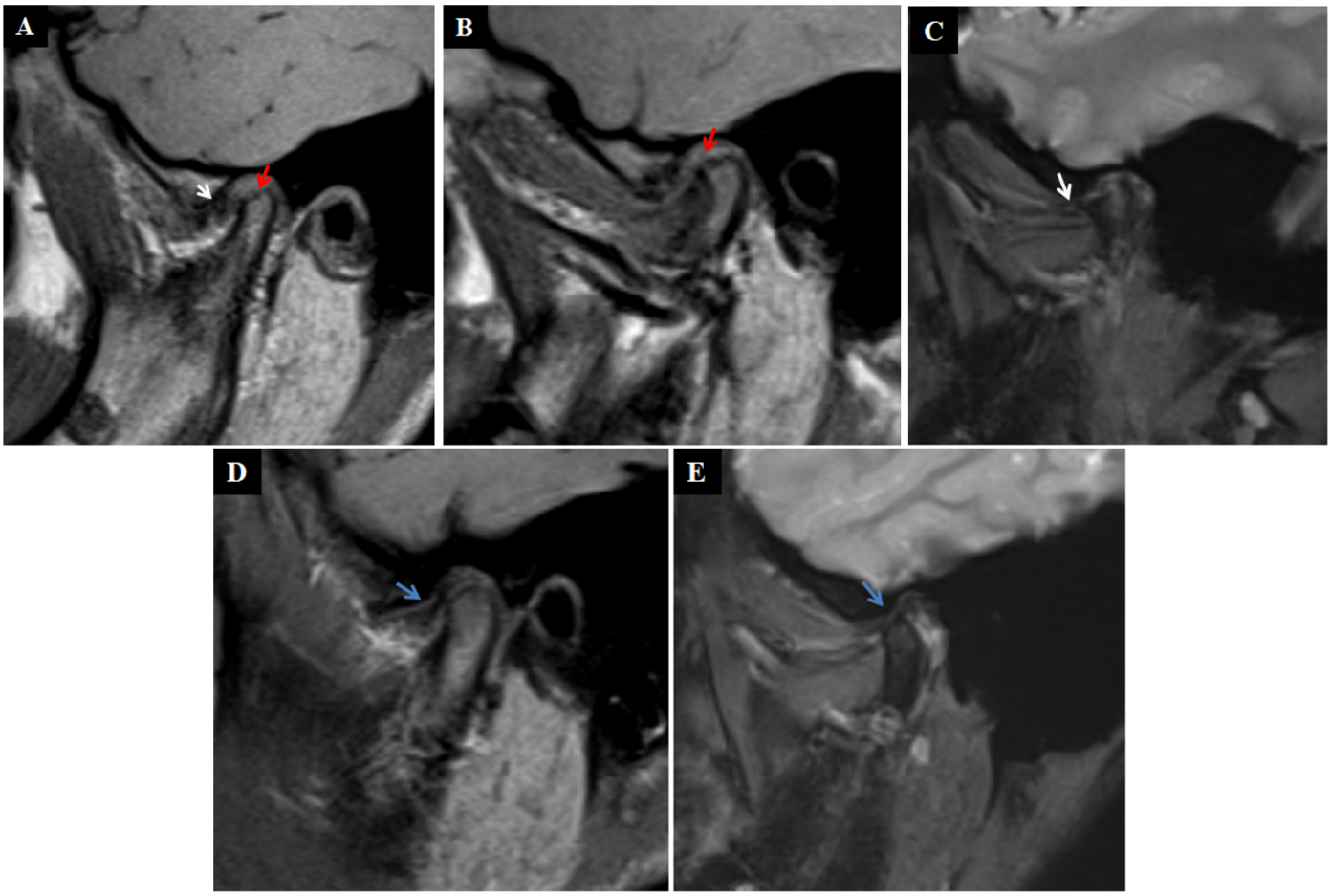


Figure 1. Sagittal MR images of the right and left temporomandibular joints. (A, B) Closed-mouth T1-weighted images of the right TMJ showing flattening and irregularity of the condylar articular surface (red arrows). In (A), the articular disc is anteriorly displaced and shows an irregular, globular morphology (white arrow). (C) Open-mouth T2-weighted image of the right TMJ showing persistent anterior displacement of the articular disc relative to the mandibular condyle (white arrow), consistent with disc displacement without reduction. (D) Closed-mouth T1-weighted image of the left TMJ showing an articular disc with preserved morphology and position (blue arrow). (E) Open-mouth T2-weighted image of the left TMJ showing the disc normally placed between the mandibular condyle and articular eminence (blue arrow), with preserved disc morphology and a normal disc–condyle relationship.

A standardized DC/TMD examination had not been performed; consequently, the patient-reported symptom history was not used to establish a formal DC/TMD diagnosis.

Bilateral MRI of the temporomandibular joints was performed using a 1.5 T MAGNETOM Essenza system (Siemens Healthineers, Erlangen, Germany). The imaging protocol included sagittal T1- and T2-weighted sequences acquired in closed- and open-mouth positions, together with a coronal short tau inversion recovery (STIR) sequence. Images were obtained with a slice thickness of 2 mm. A 10 mL syringe was used to maintain the open-mouth position during image acquisition. Both temporomandibular joints were evaluated to assess articular disc position and morphology, the disc–condyle relationship in the closed- and open-mouth positions, condylar morphology, and associated intra-articular findings.

On the right side, MRI demonstrated anterior displacement of the articular disc in the closed-mouth position, accompanied by an irregular and globular disc morphology (Figure 1A). Flattening and irregularity of the mandibular condylar articular surface were also observed (Figure 1B). In the open-mouth position, the disc remained anteriorly displaced relative to the mandibular condyle, consistent with anterior disc displacement without reduction (Figure 1C). The posterior band of the disc and the bilaminar zone showed increased thickness and signal intensity, along with a minimal amount of intra-articular fluid. These findings indicated discal and condylar abnormalities in the symptomatic right TMJ.

Because previous imaging examinations were unavailable, the onset and progression of the condylar changes could not be established. The findings were therefore considered in the context of the patient's clinical presentation without assuming a direct causal relationship between disc displacement and condylar morphological changes.

On the left side, the mandibular condyle, articular eminence, and glenoid fossa showed normal morphology. In the closed-mouth position, the articular disc had a normal shape, signal intensity, and position (Figure 1D). Disc morphology remained preserved, with a normal disc–condyle relationship in the open-mouth position (Figure 1E). A minimal amount of intra-articular fluid was also present.

Based on the clinical history and MRI findings, the case was characterized by right-sided internal derangement with anterior disc displacement without reduction, disc deformity, and associated condylar flattening and surface irregularity. Clinical follow-up was recommended to monitor pain intensity and frequency, mandibular range of motion, TMJ and masticatory muscle tenderness, joint sounds, occlusion, and facial symmetry. Particular attention to mandibular development was advised given the patient's age and the associated condylar morphological changes. No subsequent treatment or follow-up data were available. The clinical timeline is summarized in Table 1.

Table 1. Clinical timeline of the patient's temporomandibular joint symptoms and diagnostic assessment.

Time	Clinical event
Age 5 years	History of jaw trauma; anatomical location and severity were not documented.
Approximately one year before MRI	Onset of right-sided preauricular pain, TMJ clicking, and restricted mouth opening.
Before MRI examination	Persistent right-sided preauricular pain and reported restriction of mouth opening.
Age 14 years	Clinical assessment and panoramic radiography.
Age 14 years	Bilateral TMJ MRI demonstrating right-sided anterior disc displacement without reduction, abnormal disc morphology, and condylar surface irregularity.
After MRI	Clinical follow-up was recommended; subsequent treatment and follow-up data were unavailable.

3 Discussion

This case describes a 14-year-old female with persistent right-sided TMJ pain, clicking, and restricted mouth opening, accompanied by anterior disc displacement without reduction, disc deformity, and ipsilateral condylar flattening and surface irregularity. The preserved disc morphology and condylar contour of the left TMJ provided a useful anatomical comparison. The clinical relevance of this case lies in the coexistence of persistent symptoms, functional limitation, and structural findings in the affected right TMJ.

However, the relationship between symptoms and TMJ morphology is not always consistent. Disc displacement and other intra-articular findings may occur in asymptomatic individuals [4, 5], while associations between clinical findings and MRI-detected disc displacement have been reported in symptomatic populations [8]. The correspondence observed in this patient should therefore be interpreted as an association, without attributing every symptom directly to the structural findings.

The joint abnormality extended beyond disc displacement alone. The right articular disc had lost its normal biconcave configuration and showed an irregular, globular morphology, together with changes in the bilaminar zone and posterior band. These findings were accompanied by flattening and irregularity of the condylar articular surface. Previous imaging studies have reported associations between disc status and several aspects of TMJ morphology. Three-dimensional analysis has shown differences in condylar volume, condylar surface area, and superior and medial joint spaces according to disc status [9], and comparable associations with condylar and fossa morphology have been described in adolescents [7]. Such data argue for evaluating the disc and condyle together, rather than treating disc displacement as an isolated positional finding.

The coexistence of disc displacement and condylar morphological changes raises questions regarding the relationship between disc position and condylar morphology. However, the direction and nature of this relationship cannot be established from the present

case. The condylar changes may have developed before, after, or independently of the observed disc displacement. Furthermore, condylar flattening in an adolescent may reflect adaptive remodeling and should not, on its own, be interpreted as evidence of degenerative joint disease. Age-related variation should also be considered, as condylar shape and dimensions change during normal development [10]. In the absence of previous imaging, standardized longitudinal measurements, and clinical follow-up, the findings should be interpreted as concurrent structural abnormalities rather than evidence of a defined pathological sequence.

The patient's age adds clinical importance to the condylar findings. In a longitudinal MRI study of patients with unilateral anterior disc displacement, affected condyles showed no statistically significant reduction in height in the 11–14- and 15–17-year age groups, whereas unaffected condyles showed significant growth. The difference in condylar height between sides increased during follow-up, which the authors interpreted as suggesting a potential inhibitory effect on condylar growth in adolescents [11]. In this context, clinical follow-up was recommended to monitor mandibular function, occlusion, and facial symmetry during subsequent growth. However, the present findings do not establish that condylar growth was altered or that the observed abnormalities would progress over time.

Jaw trauma at the age of five was another notable element of the patient's history. Injuries involving the mandibular condyle during childhood can have long-term consequences for TMJ function, occlusion, and facial development, particularly when a condylar fracture is not recognized at the time of injury [12]. In this patient, the available history did not specify the location or severity of the trauma, and there was no documentation of a fracture. The previous injury should therefore be considered as a possible contributing factor rather than a confirmed explanation for the unilateral discal and condylar abnormalities. Sleep bruxism was also documented. Although an association between sleep bruxism and TMD symptoms has been reported in children [13], its role in the structural MRI findings of this patient cannot be determined.

In this case, MRI of both TMJs in closed- and open-mouth positions allowed assessment of disc position and morphology and comparison between the affected and contralateral joints. MRI helped clarify the diagnosis but could not establish the cause of the abnormalities or predict their progression. Its use should be guided by the clinical findings and whether the results are expected to inform patient management.

Several limitations should be acknowledged when interpreting the present case. First, a standardized DC/TMD examination was not performed, and the exact maximum interincisal opening was not recorded, limiting the precision of the clinical characterization. Second, the available history did not provide sufficient information regarding the anatomical location or severity of the childhood jaw trauma, preventing an assessment of its potential contribution to the current joint abnormalities. Third, the absence of previous imaging examinations made it impossible to establish the onset or progression of the observed discal and condylar changes. The cross-sectional nature of the MRI examination also prevented determination of a causal relationship between disc displacement and condylar morphological alterations. An additional limitation relates to the assessment of osseous changes. Although MRI demonstrated condylar flattening and surface irregularity, conventional MRI provides less detailed characterization of cortical bone than computed tomography (CT) or cone-beam computed tomography (CBCT) [6]. CBCT enables three-dimensional assessment of osseous TMJ abnormalities [14]. Therefore, the condylar findings in this case should be interpreted within the limitations of the imaging protocol used.

Finally, treatment and clinical follow-up data were unavailable, precluding evaluation of symptom evolution, therapeutic response, and subsequent changes in joint morphology or mandibular function. Despite these limitations, the combination of clinical findings and bilateral MRI provides a detailed characterization of unilateral discal and condylar involvement in a symptomatic adolescent.

4 Conclusion

In this 14-year-old female, persistent right-sided TMJ symptoms were accompanied by anterior disc displacement without reduction, disc deformity, and ipsilateral condylar flattening and surface irregularity. The agreement between the clinical presentation and the MRI findings underlines the need to evaluate both the soft-tissue and osseous components of the TMJ in symptomatic adolescents. Imaging both joints in the closed- and open-mouth positions showed how far the intra-articular changes extended on the affected side and allowed direct comparison

with the structurally preserved contralateral joint. However, a single cross-sectional examination does not permit conclusions regarding the cause, progression, or long-term clinical consequences of the observed abnormalities. Adolescents with persistent TMJ symptoms therefore benefit from a thorough clinical work-up and follow-up planned for the individual patient.

Data Availability Statement

Data will be made available on request.

Funding

This work was supported without any funding.

Conflicts of Interest

The authors declare no conflicts of interest.

AI Use Statement

The authors declare that no generative AI was used in the preparation of this manuscript.

Ethical Approval and Consent to Participate

Ethical approval for the publication of this case report was obtained from the Ethics Committee of Aldent University (Protocol No. 13/8, 4 May 2026). Written informed consent was obtained from the patient's parent for publication of this case report.

References

[1] Li, D. T. S., & Leung, Y. Y. (2021). Temporomandibular disorders: Current concepts and controversies in diagnosis and management. *Diagnostics, 11*(3), 459. [CrossRef]

[2] Rauch, A., Schierz, O., Körner, A., Kiess, W., & Hirsch, C. (2020). Prevalence of anamnestic symptoms and clinical signs of temporomandibular disorders in adolescents—Results of the epidemiologic LIFE Child Study. *Journal of Oral Rehabilitation, 47*(4), 425-431. [CrossRef]

[3] Rongo, R., Ekberg, E., Nilsson, I. M., Al-Khotani, A., Alstergren, P., Conti, P. C. R., ... & Michelotti, A. (2021). Diagnostic criteria for temporomandibular disorders (DC/TMD) for children and adolescents: An international Delphi study—Part 1-Development of Axis I. *Journal of Oral Rehabilitation, 48*(7), 836-845. [CrossRef]

[4] Tominaga, K., Konoo, T., Morimoto, Y., Tanaka, T., Habu, M., & Fukuda, J. (2007). Changes in temporomandibular disc position during growth in young Japanese. *Dentomaxillofacial Radiology, 36*(7), 397-401. [CrossRef]

[5] Li, C., & Zhang, Q. (2023). Comparison of imaging findings of 714 symptomatic and asymptomatic temporomandibular joints: a retrospective study. *BMC Oral Health, 23*(1), 79. [CrossRef]

[6] Mallya, S. M., Ahmad, M., Cohen, J. R., Kaspo, G., & Ramesh, A. (2022). Recommendations for imaging of the temporomandibular joint. Position statement from the American Academy of Oral and Maxillofacial Radiology and the American Academy of Orofacial Pain. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology, 134*(5), 639-648. [CrossRef]

[7] De Stefano, A. A., Guercio-Mónaco, E., Hernández-Andara, A., Horodynski, M., & Galluccio, G. (2025). Association Between Temporomandibular Disk Position and Condylar and Fossa Morphology in Adolescents: A Cross-Sectional Study. *FACE, 6*(3), 456-465. [CrossRef]

[8] Kumar, R., Pallagatti, S., Sheikh, S., Mittal, A., Gupta, D., & Gupta, S. (2015). Correlation between clinical findings of temporomandibular disorders and MRI characteristics of disc displacement. *The Open Dentistry Journal, 9*, 273-281. [CrossRef]

[9] Li, C. X., Liu, X., Gong, Z. C., Jumatai, S., & Ling, B. (2022). Morphologic analysis of condyle among different disc status in the temporomandibular joints by three-dimensional reconstructive imaging: a preliminary study. *BMC Oral Health, 22*(1), 395. [CrossRef]

[10] Junhasavasdikul, T., Abadeh, A., Tolend, M., & Doria, A. S. (2018). Developing a reference MRI database for temporomandibular joints in healthy children and adolescents. *Pediatric Radiology, 48*(8), 1113–1122. [CrossRef]

[11] Wu, S., Zhang, D., Xia, S., Shen, P., & Yang, C. (2025). Effect of temporomandibular joint anterior disc displacement on condylar height in different age groups. *BMC Oral Health, 25*(1), 1100. [CrossRef]

[12] Bottini, G. B., Roccia, F., & Sobrero, F. (2024). Management of pediatric mandibular condyle fractures: A literature review. *Journal of Clinical Medicine, 13*(22), 6921. [CrossRef]

[13] Topaloglu-Ak, A., Kurtulmus, H., Basa, S., & Sabuncuoglu, O. (2022). Can sleeping habits be associated with sleep bruxism, temporomandibular disorders and dental caries among children? *Dental and medical problems, 59*(4), 517-522. [CrossRef]

[14] Meto, A., & Halilaj, G. (2025). The integration of cone beam computed tomography, artificial intelligence, augmented reality, and virtual reality in dental diagnostics, surgical planning, and education: A narrative review. *Applied Sciences, 15*(11), 6308. [CrossRef]



Gerta Halilaj is a PhD candidate and lecturer in medical imaging at Aldent University and the University of Medicine, Tirana, Albania. She holds a Master of Science in Medical Imaging and coordinates the Imaging and Radiotherapy Study Program at Aldent University. Her research interests include temporomandibular joint MRI and dental imaging. She has authored and co-authored scientific publications and is the author of a university textbook on computed tomography. (Email: gertahalilaj@yahoo.com)



Gentian Stroni is an Associate Professor and Head of the Department of Preclinical Sciences at the University of Medicine, Tirana, Albania. He holds a medical degree and a doctorate in Medicine, with specialist training in infectious diseases. He has taught at the university since 2004 and has extensive clinical experience at Mother Teresa University Hospital Centre. His research interests include HIV/AIDS, foodborne infections, and gastrointestinal infectious diseases. (Email: gentian.stroni@umed.edu.al)