Original Article

A Comparison of Oral Health Status, Traumatic Dental Injury and Tooth Wear between Autistic and Healthy Children

Noor Mohammed Hadi Layedh[1], Juman Mohammed Taqi Baqer[2], Rafeef Ahmed Mohamed[1] and Ali Hadi Fahad[3]

ABSTRACT

Objective: To assess and compare the oral health condition, caries experience, traumatic dental injuries, and tooth wear of autism spectrum disorder children with those of the healthy control group

Study Design: Comparative cross-sectional study

Place and Duration of Study: This study was conducted at the College of Dentistry, University of Kufa, Iraq, from 1st October 2025 to 28th February 2026.

Methodology: The study was conducted on children diagnosed with autism spectrum disorder and a healthy control group who participated in the study. Oral health examination was done using global oral health indicators. Oral hygiene and periodontal status were assessed using the Plaque index (PI), Gingival index (GI), and Calculus index (CI). Dental caries were assessed using the Decayed, Missing, and Filled Teeth (DMFT) and Decayed, Missing, and Filled Surfaces (DMFS) indexes. Data concerning traumatic dental injuries and tooth wear were collected.

Results: Oral health condition was found to be poor among the autism spectrum disorder group when compared with the healthy control group. The former had a significantly higher plaque, gingival, and calculus index when compared with the latter ($P < 0.05$). In addition, there was a significant difference in caries experience (DMFT and DMFS) between the two groups, with a higher Decayed, Missing, and Filled Teeth and Decayed, Missing, and Filled Surfaces being recorded in the autism spectrum disorder group. However, there was no significant difference in caries experience of permanent teeth (DMFT and DMFS) between the two groups; the overall mean Decayed, Missing, and Filled Teeth was significantly higher in the autism spectrum disorder group. Traumatic dental injuries and tooth wear were significantly higher in the autism spectrum disorder group. Males had a higher prevalence of traumatic dental injuries, whereas females with autism spectrum disorder had a higher prevalence of tooth wear

Conclusion: The oral health condition of children with autism spectrum disorder was found to be poor when compared with that of the healthy control group. The former had poor oral hygiene, higher gingival inflammation indices, poor caries experience of the primary teeth, and a higher prevalence of traumatic dental injuries and tooth wear.

Key Words: Autism spectrum disorder, Oral health, Dental caries, Plaque index, Gingival index, Tooth wear.

doi:http://doi.org/10.60110/medforum.37.10.14

Citation of article: Layedh NMH, Baqer JMT, Mohamed RA, Fahad AH. A Comparison of Oral Health Status, Traumatic Dental Injury and Tooth Wear between Autistic and Healthy Children. Med Forum 2026;37(10):73-78. doi:http://doi.org/10.60110/medforum.37.10.14.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

[1.] Lecturer / Assistant Lecturer[2] / Professor[3], Department of Pediatric, Orthodontic & Preventive Dentistry, College of Dentistry, University of Kufa, Iraq.

Correspondence: Noor Mohammed Hadi Layedh, Lecturer, Department of Pediatric, Orthodontic & Preventive Dentistry, College of Dentistry, University of Kufa, Iraq.
Contact No: 07811542803
Email: noorm.layedh@uokufa.edu.iq

Received: June, 2026
Reviewed: July-August, 2026
Accepted: September, 2026

Autism spectrum disorder (ASD) is a heterogeneous neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction, accompanied by restricted, repetitive patterns of behavior, interests, or activities.[1] It has been well known that ASD is a multifactorial psychiatric condition and a combination of three developmental, environmental and genetic factors is introduced as the etiology of this disorder.[2] Early signs of autism appear in infants as young as 6 months, the signs of this disorder are then stabilized by age 2-3 years, and then tend to continue through adulthood, boys are 3.7 times more likely to be autistic than girls.[3] The global prevalence of ASD has increased considerably over the

past two decades, with recent surveillance data estimating that approximately 1 in 36 children is diagnosed with ASD, highlighting its growing public health significance.[4]

Children with ASD often experience considerable challenges in maintaining adequate oral health because of impaired communication, behavioral difficulties, sensory hypersensitivity, limited manual dexterity, and poor cooperation during oral hygiene procedures and dental treatment.[5] In addition, food selectivity, frequent consumption of cariogenic diets, parafunctional oral habits, medication-induced xerostomia, and limited access to specialized dental services may further increase their susceptibility to oral diseases.[6]

The oral health condition of children with ASD, significantly higher levels of dental plaque, gingival inflammation, untreated dental caries, and poor oral hygiene compared with healthy children.[7] Conversely, other studies have found no significant differences in caries prevalence between children with ASD and their typically developing peers, suggesting that oral health outcomes may be influenced by socioeconomic factors, caregiver education, dietary habits, access to dental care, and methodological differences among studies.[8]

Traumatic dental injuries (TDIs) constitute another important oral health problem among children with ASD. Motor coordination deficits, hyperactivity, impulsive behavior, self-injurious habits, and reduced awareness of environmental hazards may increase the likelihood of dental trauma in this population.[9] The communication difficulties may delay recognition of traumatic injuries and prevent timely dental intervention, thereby increasing the risk of long-term functional and esthetic complications.[10]

Tooth wear is increasingly recognized as an important oral condition among children with ASD. Bruxism, repetitive chewing behaviors, object biting, gastroesophageal reflux, dietary acids, and medication-related xerostomia may accelerate the progressive loss of dental hard tissues.[11] However, the prevalence and severity of tooth wear in children with ASD is poorly understood and remains inconsistent in the literature.[12]

The oral condition of children with ASD in Europe, North America, and some Asian countries, there is a lack of information on oral health status in Iraq.[13] A variation in health care resources, socioeconomic conditions, oral health status, health behaviors, diet, and access to oral health services may affect oral health status and should be considered for the study population in Iraq. Therefore, the present study aimed to compare the oral health condition, traumatic dental injury, and tooth wear of children with autism spectrum disorder and healthy children in Najaf City, Iraq.

METHODOLOGY

This comparative cross-sectional study was conducted at the College of Dentistry, University of Kufa, Iraq, from October 2025 to February 2026. It included 159 children with ASD (105 males, 54 females) and 300 controls (215 males, 85 females). Children with ASD were recruited from autism rehabilitation centers and special needs schools; controls were randomly selected from local government primary schools. Administrative permissions and parental or guardian consent were obtained, and procedures followed the Declaration of Helsinki.[14]

Eligibility specified children aged 6–12 years. ASD diagnoses were established by pediatric neurologists or psychiatrists using the Diagnostic and Statistical Manual of Mental Disorders.[15] Controls had no neurodevelopmental disorders. Exclusion criteria included neurological or systemic conditions affecting oral health, craniofacial anomalies, inability to complete examination, and absent parental consent.

A calibrated pediatric dentist performed examinations using standard dental instruments and portable illumination. Caries was assessed using WHO criteria for primary and permanent dentition.[16] Plaque, gingival, and calculus indices assessed oral hygiene and gingival health. TDIs were classified using McDonald and Avery criteria[17] and tooth wear using the Bardsley index.[18] Data were analyzed using SPSS version 27, with Mann-Whitney U tests for nonnormally distributed continuous variables and chi-square tests for categorical variables. Statistical significance was set at $p<0.05$.

RESULTS

The largest age group was 7–9 years in both populations (Table 1). Plaque scores were higher in children with ASD aged 4–6 and 7–9 years (both $p < 0.001$), but the difference was nonsignificant at 10–12 years ($p = 0.156$). Gingival and calculus indices were significantly higher across all age groups (Table 2).

TDIs affected 33/159 children with ASD (20.8%) and 34/300 controls (11.3%; p=0.007). The difference was significant among males (21.9% versus 12.1%; p=0.022), but not females (18.5% versus 9.4%; $p = 0.119$; Table 3). Tooth wear affected 67/159 children with ASD (42.1%) and 33/300 controls (11.0%), with significant differences overall and within both sexes (all $p < 0.001$; Table 4).

Primary-dentition caries experience was higher in the ASD group, with median dmfs scores of 11 versus 9 (p=0.003) and dmft scores of 5 versus 4 ($p<0.001$); differences were significant within both sexes. Permanent-dentition DMFS did not differ significantly overall (p=0.054), whereas DMFT was significantly higher overall (p=0.040), despite identical medians of 2 and nonsignificant sex-specific comparisons (Tables 5-6).

Table No. 1: Distribution of the study population according to age group and sex

Age (years)	Study Group			Control Group		
	Male	Female	Total	Male	Female	Total
4-6	41	14	55	61	19	80
7-9	49	24	73	96	43	139
10-12	15	16	31	58	23	81
Total	105	54	159	215	85	300

Table No. 2: Comparison of plaque index, gingival index and calculus index scores between children with autism spectrum disorder and healthy controls according to age group

Plaque Index Scores				
Age group (years)	**Study Group**	**Control Group**	**Statistical Sig.**	
	Median of PII	**Median of PII**	**Mann-Whitney**	**P value**
4-6	1.60	0.55	811.000	0.001**<
7-9	1.60	1	2124.000	0.001**<
10-12	1.60	0.80	1040.000	0.156
Gingival Index Scores				
Age group (years)	**Study Group**	**Control Group**	**Statistical Sig.**	
	Median of GI	**Median of GI**	**Mann-Whitney**	**P value**
4-6	1.60	0.80	866.500	0.001**<
7-9	1.70	0.30	1639.000	0.001**<
10-12	1.50	0.90	808.000	0.003**
Calculus index scores				
Age group (years)	**Study Group**	**Control Group**	**Statistical Sig.**	
	Median of CI	**Median of CI**	**Mann-Whitney**	**P value**
4-6	1.60	-	659.000	0.001**<
7-9	1.60	-	1193.500	0.001**<
10-12	1.50	0.60	552.500	0.001**<

Table No. 3: Distribution of traumatic dental injuries among children with autism spectrum disorder and healthy controls according to sex

Gender	**Study Group**			**Control Group**			**Statistical Sig.**	
	Total	**With Trauma**		**Total**	**With Trauma**		**X^2**	**P value**
		No.	**%**		**No.**	**%**		
Male	105	23	21.9	215	26	12.1	5.237	0.022*
Female	54	10	18.5	85	8	9.4	2.429	0.119
Total	159	33	20.8	300	34	11.3	7.399	0.007*

Table No. 4: Distribution of tooth wear among children with autism spectrum disorder and healthy controls according to sex

Gender	**Study Group**			**Control Group**			**Statistical Sig.**	
	Total	**With Tooth Wear**		**Total**	**With Tooth Wear**		**X^2**	**P value**
		No.	**%**		**No.**	**%**		
Male	105	37	35.2	215	26	12.1	23.901	0.001**<
Female	54	30	55.6	85	7	8.2	37.855	0.001**<
Total	159	67	42.1	300	33	11.0	59.133	0.001**<

Table No. 5: Comparison of caries experience DMFS of primary and permanent teeth between children with autism spectrum disorder and healthy controls according to sex

Gender	**Study Group**			**Control Group**			**Statistical Sig.**	
	Total	**DMFS**		**Total**	**DMFS**		**X^2**	**P value**
		Median	**Mean Rank**		**Median**	**Mean Rank**		
Primary Teeth								
Male	105	10	175.41	215	9	153.22	9721.500	0.043*
Female	54	11.5	79.76	85	9	63.80	1768.000	0.023*
Total	159	11	255.25	300	9	216.62	19835.000	0.003**
Permanent Teeth								
Male	105	2	167.09	215	2	157.28	10596.000	0.362
Female	54	4.5	77.67	85	3	65.13	1881.000	0.071
Total	159	2	246.11	300	2	221.46	21289.000	0.054

Table No. 6: Comparison of caries experience DMFT of primary and permanent teeth between children with autism spectrum disorder and healthy controls according to sex

Gender	Study Group			Control Group			Statistical Sig.	
	Total	DMFT		Total	DMFT		Mann-Whitney	P value
		Median	Mean Rank		Median	Mean Rank		
Primary Teeth								
Male	105	5	194.61	215	4	143.84	7705.500	0.001**<
Female	54	5	84.63	85	4	60.71	1505.000	0.001**
Total	159	5	278.59	300	4	204.25	16124.000	0.001**<
Permanent Teeth								
Male	105	2	167.82	215	2	156.93	10519.000	0.309
Female	54	3	77.92	85	2	64.97	1867.500	0.061
Total	159	2	247.10	300	2	220.94	21131	0.040*

DISCUSSION

In the present study, children with ASD tend to have poorer oral health status than their healthy peers, as evidenced by higher plaque, gingival inflammation levels, number of calculus, experience of caries in primary dentition, and prevalence of traumatic dental injury and tooth wear. This indicates that children with ASD are a vulnerable population that requires developing tailored preventive measures against dental diseases. Children with ASD had significantly higher plaque indices than typically developing children, which was consistent with a previous body of research reporting on compromised oral hygiene in children with ASD.[19,20] The higher plaque indices are explained by numerous factors associated with ASD, including decreased fine motor skills, impaired tactile senses, challenging behaviors, noncompliance with toothbrushing procedures, and parental involvement in oral hygiene. Resistance to tooth brushing because of tactile sensitivity and altered sensory processing further contributes to persistent plaque accumulation.

Consistent with the increased plaque scores, children with ASD exhibited significantly poorer gingival health than healthy controls. Gingival inflammation is primarily plaque-induced and reflects inadequate oral hygiene practices. Similar findings have been consistently reported in recent systematic reviews and meta-analyses demonstrating a higher prevalence of gingivitis and periodontal disease among children with ASD than neurotypical peers.[21,22] Besides plaque accumulation, dietary preferences, sensory hypersensitivity, limited cooperation, and caregiver-related factors may further contribute to poor periodontal health.[23]

The calculus index was also significantly higher among children with ASD, suggesting prolonged plaque retention and inadequate long-term plaque control. Similar findings have been reported in Iraq and neighboring countries.[24] No significant differences in calculus accumulation, indicating that socioeconomic status, caregiver education, oral health awareness, and access to preventive dental services may substantially influence calculus formation.[25]

Regarding dental caries, children with ASD exhibited significantly higher DMFT scores than healthy controls, indicating a greater burden of disease in the primary dentition. In contrast, no significant differences were found in DMFS, which were only moderately, but significantly, higher in the ASD group. These results suggest that the caries experience gap is more prominent during the early mixed dentition and before the permanent dentition erupts. Increased caries experience in children and adolescents with ASD is consistent with Zhou et al.[26] Several factors contribute to caries development among people with ASD such as poor plaque control, selective eating with frequent intake of soft carbohydrate-dense food, extended eating periods, less frequent dental visits, and decreased ability to cooperate during dental procedures, and reduced utilization of preventive dental services. Drugs that can be prescribed for behavioral or neurological disorders can decrease salivary flow, resulting in decreased protection of the teeth from caries-developing bacteria.[23]

Children with ASD were more likely to have traumatic dental injuries compared to healthy counterparts confirmed by the study. This result aligns with previous studies heightened the risk of dental trauma among children with ASD.[27] The contributing factors for the development of traumatic injuries may include challenges in fine and gross motor skills, hyperactivity, and stereotyped behaviors, self-injurious activities, increased risk of falling, and occurrence of epileptic seizures, and reduced awareness of the surroundings. In addition, boys with ASD were more likely to be affected by TDI compared to girls, which may be explained by the fact that children with ASD are more likely to participate in physically demanding activities, and boys are more active than girls, therefore, are more likely to be exposed to accidental injuries.[25]

Tooth wear was also found to be significantly higher among children with ASD. The reason for this is that ASD was previously associated with parafunctional oral

habits such as bruxism, clenching, masticatory movements, and biting objects. Bruxism seems to be a common manifestation in children with ASD that is often related to anxiety, sleep disorders, behavioral problems, and the use of specific drugs. Parafunctional activity such as bruxism damages enamel and dentin, contributing to extensive tooth wear.[28]

CONCLUSION

Children with autism spectrum disorder exhibited a significantly greater caries experience in the primary dentition than healthy controls. Oral hygiene status and gingival health were significantly poorer among children with ASD, as reflected by higher plaque accumulation and gingival inflammation. The prevalence of traumatic dental injuries was significantly higher in the ASD group than in the control group, with male participants showing a higher frequency of traumatic dental injuries than females in both groups. Tooth wear was also significantly more prevalent among children with ASD than healthy controls; within the ASD group, female participants exhibited a significantly higher prevalence of tooth wear than males.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Noor Mohammed Hadi Layedh, Juman Mohammed Taqi Baqer
Drafting or Revising Critically:	Rafeef Ahmed Mohamed, Ali Hadi Fahad
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.451 Dated 10.05.2025

REFERENCES

1. World Health Organization. Autism. Geneva: World Health Organization; 2025; 48.
2. Suhaib F, Saeed A, Gul H, Kaleem M. Oral assessment of children with autism spectrum disorder in Rawalpindi, Pakistan. Autism 2019; 23:81-86.
3. Chandrashekhar S, Bommangoudar JS. Management of Autistic Patients in Dental Office: A Clinical Update. Int J Clin Pediatr Dent 2018; 11:219-27.
4. Shaw KA, Williams S, Patrick ME, Valencia-Prado M, et al. Prevalence and early identification of autism spectrum disorder among children aged 4 and 8 years - Autism and Developmental Disabilities Monitoring Network, 16 Sites, United States, 2022. MMWR SurveillSumm 2025;74(2): 1-22.
5. Lam PPY, Du R, Peng Y, McGrath CPJ, Yiu CKY. Oral health status of children and adolescents with autism spectrum disorder: A systematic review of case-control studies and meta-analysis. Autism 2020;24(5):1047-66.
6. Alrashidi M, Alhumaid J, Almulhim B, et al. Oral health statuses of children and young adults with autism spectrum disorder: an umbrella review. J Clin Med 2024;13(1):59.
7. Lam R. Epidemiology and outcomes of traumatic dental injuries: A review of the literature. Aust Dent J 2016;61(Suppl 1):4-20.
8. Andersson L, Andreasen JO, Day P, Heithersay G, et al. International Association of Dental Traumatology Guidelines for the Management of Traumatic Dental Injuries: avulsion of permanent teeth. Dent Traumatol 2020;36(4):331-42.
9. Schlueter N, Luka B. Erosive tooth wear - a review on global prevalence and on its prevalence in risk groups. Br Dent J 2018;224(5):364-70.
10. Bartlett D, O'Toole S. Tooth Wear. Monographs in Oral Science. Basel: Karger, 2020;1:77-82.
11. Schlueter N, Amaechi BT, Bartlett D, Buzalaf MAR, et al. Terminology of Erosive Tooth Wear: Consensus Report of a Workshop Organized by the ORCA and the Cariology Research Group of the IADR. Caries Res 2020;54(1):2-6.
12. Schlueter N, Luka B. Erosive tooth wear - a review on global prevalence and on its prevalence in risk groups. Br Dent J 2018;224(5):364-70.
13. Al-Batayneh OB, Owais AI, Khader YS. Oral health status and dental treatment needs among children with autism spectrum disorder: A case-control study. Special Care Dent 2024;19:45-65.
14. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. JAMA 2013;310(20):2191-4.
15. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington (VA): American Psychiatric Association; 2013; 65.
16. World Health Organization. oral health survey basic methods 5th ed. Geneva: World Health Organization; 2013.
17. McDonald RE, Avery DR. Dentistry for the child And Adolescent. 8th ed. Elsevier, Mosby, 2024;35.
18. Bardsley PF. The evolution of tooth wear indices. Clin Oral Investig 2008;12(Suppl 1):S15-9.
19. da Silva SN, Gimenez T, Souza RC, Mello-Moura ACV. Oral health conditions in children and adolescents with autism spectrum disorder: updated evidence from observational studies. BMC Oral Health 2023;23:742.

20. Loo CY, Graham RM, Hughes CV. Oral health challenges in children with autism spectrum disorder: a contemporary review. Int J Paediatr Dent 2024;34(2):125-36.
21. de Oliveira BHC, Costa FO, et al. Oral health status of individuals with autism spectrum disorder: A systematic review and meta-analysis. Clin Oral Investigations 2024;28:140.
22. Rodrigues M, Oliveira A, Figueiredo R. Periodontal health among children with autism spectrum disorder: systematic review. BMC Oral Health 2024;24:118.
23. Alrashidi M, Alshammari A, et al. Oral health status of children and young adults with autism spectrum disorder: An umbrella review. J Clin Med 2024; 13: 59.
24. Jaber MA. Dental caries experience, oral health status and treatment needs of dental patients with autism. J Appl Oral Sci 2011;19(3):212-7.
25. Lam PPY, Du R, Peng Y, McGrath CPJ, et al. Oral health status of children and adolescents with autism spectrum disorder: A systematic review and meta-analysis. Autism 2020;24(5):1047-66.
26. Zhou Y, Li X, Wang H. Oral health inequalities among children with autism spectrum disorder: evidence from recent epidemiological studies. Front Oral Health 2024;5:1372294.
27. Day PF, Flores MT, O'Connell AC, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: Fractures and luxations. Dent Traumatol 2020;36(4):314-30.
28. Schlueter N, Luka B. Erosive tooth wear - A review on global prevalence and its prevalence in risk groups. Br Dent J 2018;224(5):364-70.