Temporomandibular Joint Disorders among Patients with Juvenile Idiopathic Arthritis

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ABSTRACT:

BACKGROUND:

Juvenile idiopathic arthritis (JIA) is an immune mediated chronic disease. In its most severe clinical form, JIA may show localized and/or systemic and oral complications. This may result in variable growth and developmental anomalies. As a result, it is not uncommon for JIA patients to present with skeletal Class II and open bite malocclusions.

OBJECTIVE:

This study was conducted to assess temporomandibular joint (TMJ) among patients with JIA.

MATERIALS AND METHODS:

A cross sectional study was conducted among JIA patients attending Baghdad Teaching Hospital from November 2014 to April 2015. All patients underwent a clinical evaluation of their TMJ condition. TMJ disorder was assessed by using Helkimo's index (1974a), and distribution of TMJ disorders was assessed according to the age, gender, duration of illness and types of medication.

RESULTS:

The mean age of JIA patients was 17.59±9.63 years old and mean Illness duration of 8.45± 9.29 years. High percentage of patients (93.8%) presented with clinical dysfunction of TMJ (CDI). 22 patients with JIA (27.16%) presented with severe clinical dysfunction, 19 patients with JIA (23.46%) presented with moderate clinical dysfunction and 35 patients (43.21%) presented with mild clinical dysfunction of TMJ. No significant difference in mean value of CDI according to age and duration of illness. Females were affected by clinical dysfunctional index of TMJ more than males, but statistically non- significant. The highest mean value of CDI was among patients treated with prednisolone, while patients treated with combination of drugs were the least affected.

CONCLUSION:

This study confirms that patients with JIA have a high incidence of TMJ dysfunction. The systemic effect of disease may impact on development of TMJ and facial growth. Close supervision is required to JIA patients for orthodontic intervention need, regular dental care, and TMJ evaluation.

KEYWORDS: juvenile idiopathic arthritis, temporomandibular joint

INTRODUCTION:

Juvenile Idiopathic Arthritis (JIA) is chronic arthritis affect children under 16 years old. JIA causes persistent joint pain, stiffness, and swelling. Some children might have symptoms for only several months, while others might have symptoms as long as they live [(1)].Patients with JIA often have malocclusion because of the effects of the disease on the temporomandibular joint (TMJ) and facial growth [(2)]. These patients often have Class II molar and canine relationships, and many also have an anterior open bite because of the progressive loss of the posterior vertical dimension from progressive condylar resorption[(3)]. Reports of TMJ involvement in JIA range from 17% to 87% [(4)]. Micrognathia and retrognathia, which are less common because of their current management with methotrexate and biologicals, usually manifest in children with severe refractory disease or those who received pediatric rheumatology care late in the course of their disease [(5)]. As with other joints, in patients with JIA, the involvement of TMJ may presented as morning stiffness of the joint, along with trismus, reduced inter incisal opening, reduced ability to translate and possible clicking or crepitation [(6)].

There are no available Iraqi studies that investigate TMJ disorder among Iraqi patients with JIA so we decided to conduct this study to gain knowledge regarding TMJ disorder in these chronically ill patients.

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PATIENTS AND METHODS:

This cross sectional study performed among patients with JIA attending Baghdad Teaching Hospital during five month period between nineteenth of November 2014 to nineteenth April 2015, the sample of both genders, underwent clinical evaluation of TMJ disorder which was assessed by using Helkimo's index [7] which consists of the clinical dysfunction index (CDI) with evaluation of 5 clinical signs of dysfunction (jaw mobility, impaired TMJ function, jaw muscle pain, TMJ pain, and pain on mandibular movement). The exclusion criteria according to Ockeson in 2008 [8] and Quaker [9] in 2011 were: 1- History of recent head or neck injury/ surgical operation, muscle tenderness due to systemic diseases as fibromyalgia, neuralgia, oral neoplasm. 2- Cognitive impaired patients. 3- Severe dental pain also distribution of TMJ disorder was assessed according to the gender, age of the patients, duration of illness and types of medication.

RESULTS:

In this study, 93.8% of the study sample presented with clinical dysfunction of TMJ. Mean value of clinical dysfunctional index of TMJ increased with age but no significant difference found as shown in Table (1). Females were affected by clinical dysfunctional index of TMJ more than males, but statistically non-significant as shown in Table (2), also no significant difference in mean value of CDI of TMJ according to illness duration as shown in Table (3). Statically significant difference was recorded in CDI among patients under prednisolone with a higher mean value of CDI than patients under combination of drugs as shown in Table (4).

Table 1: Distribution (Mean and Standard deviation) of Clinical Dysfunction in Helkimo' Index System by Age among Patients with Juvenile Idiopathic Arthritis.

Age group (year)	No.	Mean	±SD	SE	ANOVA	
					F-value	Sig.
2.5-10	26	5.62	.79	1.14	0.85	0.43≠
11-20	39	6.21	.59	0.90		
21+	16	8.13	.98	2.00		
Total	81	6.40	.17	0.69		

#=Not significant at P>0.05

Table 2: Distribution of Clinical Dysfunction in Helkimo' Index System by Gender among Patients with Juvenile Idiopathic Arthritis.

Variable	Gender	No.	Mean	±SD	SE	T-test	Sig.
CDI	Males	37	5.08	5.35	0.88	1.78	0.08≠
	Females	44	7.50	6.65	1.00		

CDI= Clinical dysfunction index, df=81, #=not significant at P>0.05

Table 3: Clinical Dysfunctional Index of Temporomandibular Joint (Mean and Standard deviation) among Patients with Juvenile Idiopathic Arthritis by Duration of Illness.

Variable	Duration of illness	No.	Mean	±SD	SE	ANOVA	
						F-value	Sig.
CDI	<=10	59	5.86	5.71	0.74	1.99	0.14#
	11-20	12	6.00	4.05	1.17		
	21+	10	10.00	9.58	3.03		
	Total	81	6.40	6.17	0.69		

CDI= Clinical dysfunction index, #=Not significant at P>0.05.

Table 4: Clinical Dysfunction of Temporomandibular Joint (Mean and Standard Deviation) among patients with Juvenile Idiopathic Arthritis by the Types of Drugs.

Drug type	No.	Mean	±SD	SE	F-value	P-value
Prednisolone	18	10.78	8.14	1.92	7.45	0.001
DMARDs	14	6.71	4.95	1.32		
Combination drugs (DMARDs + prednisolone)	49	4.69	4.82	0.69		

DMARDs=Disease modifying anti-rheumatic drugs, **=Highly significant at P<0.01.

DISCUSSION:

This is the first Iraqi study of TMJ disorders among JIA. In the present study, the prevalence of symptoms of TMJ dysfunction was (93.8%) among JIA patients which was lower than that reported by Savioli et al. in 2004 [(10)], who found that 94% of the patients with JIA presented with clinical signs of TMJ dysfunction. These dysfunction could be attributed to pathogenesis of JIA which characterize by prolong chronic inflammation of the synovial membranes, accompanied by recruitment of mononuclear cell and phagocyte into the synovial fluid [(11)].

Mean value of clinical dysfunctional index of TMJ increased with increased age but no significant difference found. This finding could be attributed to significant level of disability, often related to continuing active disease over prolong time that adults with JIA are suffering from. Carlsson and De Boever in 1994 [(12)] found that signs and symptoms of TMJ disorder have been found to be less frequent in children than in adults in general. Regarding gender distribution female had higher mean value than male but statistically non-significant. In healthy normal population TMJ disorders are more commonly seen in females [(13)]. Mean value of CDI showed the highest value with long duration of disease (third group) while the lowest value in the beginning of disease (first group), but there is no statistical significant difference. This finding also reported by others who concluded that in many patients of JIA increase duration of illness associated with more period of disease activity and TMJ affected by disease activity more than duration of illness. Cedströmer et al in 2014 [(14)] found that that active disease appears to increase the risk of alterations to the TMJs despite medication. The longer disease duration had been associated with the presence of TMJ damage [(15).] Stabrun et al in 1989[(16)] found that combination of disease duration and disease activity was associated with TMJ abnormality. Mean value of CDI show highest among patients treated with prednisolone. This finding could be attributed to that prednisolone use for long duration cause significant bone loss and a doubling in the risk of fracture [(17, 18)].

CONCLUSION:

This study confirms that patients with JIA have a high incidence of TMJ dysfunction. The systemic effect of disease may impact on development of TMJ and facial growth. Close supervision is required to JIA patients for orthodontic intervention need and TMJ evaluation.

REFERENCES:

1. Ravelli A, Martini A. Juvenile idiopathic arthritis. Lancet 2007;369:767–78.
2. Synodinos P, Polyzois I. Oral health and orthodontic considerations in children with juvenile idiopathic arthritis: review of the literature and report of a case. J Ir Dent Assoc. 2008;54:29-36.
3. Carvalho RT1, Braga FS, Brito F, et al. Temporomandibular joint alterations, and their orofacial complication in patients with juvenile idiopathic arthritis. Rev Bras Reumatol. 2012;52:907-1.
4. Twilt M, Schulten AJ, Nicolaas P, et al. Facioskeletal changes in children with juvenile idiopathic arthritis. Ann Rheum Dis 2006;65:823-25.
5. Bhatt K, Karjodkar F, Sansare K, and Patil D. Juvenile idiopathic arthritis. Contemp Clin Dent.2014;5: 89–91.
6. Foster HE, Eltringham MS, Kay LJ, et al. Delay in access to appropriate care for children presenting with musculoskeletal symptoms and ultimately diagnosed with juvenile idiopathic arthritis. Arthritis Rheum 2007;57:921–27.
7. Helkimo M. Studies on function and dysfunction of the masticatory system. III. Analyses of the anamnestic and clinical recordings of dysfunction with the aid of indices. Swed Dent J1974;67:1–17.
8. Ockeson JP. Management of temporomandibular disorders and occlusion. 6th ed. St Louis (MO): The CV Mosby Company; 2008.
9. Quaker S. A. Consequences Of tooth loss on oral function and need for replacement of missingteeth among patients attending Muhimbili Dental Clinic. M.Sc. thesis, Muhimbili University of Health and Allied Sciences, 2011.

10. Savioli C, Silva CA, Ching LH, et al. Dental and facial characteristics of patients with juvenile idiopathic arthritis Rev. Hosp. Clin J 2004;59.

11. Schaller JG. Juvenile rheumatoid arthritis. Pediatr Rev 1980; 2:163-74 cited by Hahn YS, Kim GJ. Pathogenesis and clinical manifestations of juvenile rheumatoid arthritis. Korean J Pediatr 2010; 53:921-930.

12. Carlsson GE, De Boever JA: Epidemiology. In: Zarb GA, Carlsson GE, Sessle BJ, Mohl ND**.** Temporomandibular joint and masticatory muscle disorders. 2nd Edition.Copenhagen: Munksgaard. Wiley-Blackwell; 1994:159-70.

13. Wright E F. Manual of temporomandibular disorders (2nd Ed.). Ames, IA: Wiley-Blackwell. 2010.

14. Cedströmer AL, Ahlqwist M, Andlin-Sobocki A, et al. Temporomandibular condylar alterations in juvenile idiopathic arthritis most common in longitudinally severe disease despite medical treatment. Pediatric Rheumatology 2014;12:43.

15. Twilt M, Mobers SM, Arends LR, et al. Temporomandibular involvement in juvenile idiopathic arthritis. J Rheumatol. 2004;31:1418-22.

16. Stabrun AE. Impaired mandibular growth and micrognathic development in children with juvenile rheumatoid arthritis. A longitudinal study of lateral cephalographs. Eur J Orthod. 1991;13:423-34.

17. Jehle PM, Jehle DR. Use of corticosteroids in nephrology-risk and prevention of osteoporosis induction. Nephrol Dial Transplant. 2000;15:565–68.

18. Dubois EF, Röder E, Dekhuijzen PN, et al. Dual energy X-ray absorptiometry outcomes in male COPD patients after treatment with different glucocorticoid regimens. Chest. 2002;121:1456–63.