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ORIGINAL RESEARCH

Evaluation of Cephalometric Characteristics of Patients with Temporomandibular Joint Disorders: An observational study

Sneh Kalgotra[1], Mohammad Mushtaq[2], Abhishek Khajuria[3]

[1]Registrar, [2]Professor and Head, [3]Post Graduate Student, Post Graduate Department of Orthodontics &Dentofacial Orthopaedics,, Government Dental College & Hospital, Srinagar, India.

***ABSTRACT*:**
Background: The onset of temporomandibular joint disorders (TMDs) cannot be predicted. No method of prevention of these disorders has been demonstrated. Once it occurs, cure cannot be assured. Even though magnetic resonance imaging techniques are the gold standard for evaluating TMJ pathologies, it is still costly and not easily available to all spectrums of patients. Hence, under the light of above obtained data, we planned the present study to assess the cephalometric characteristics in TMD patients. **Materials & methods:** A total of 50 patients with symptomatic TMDs were included in the present study and were categorized under the study group. Another set of fifty subjects of comparable age and gender were also included in the present study. Lateral cephlametric radiography was done in all the subjects. Following parameters were analysed: SNA°, SNB°, ANB°, SN-MP°, AR-Go (MM), UI-SN° and LI-MP°. All the data was recorded in Microsoft excel sheet and were analysed by SPSS software. **Results:** Among the 50 subjects of the study group; 20 subjects were of unknown aetiology, while 12 subjects, 8 subjects, 6 subjects and 4 subjects belonged to the missing teeth group, dental procedure group, orthodontic treatment group and Occlusal discrepancy group respectively. Significant results were obtained while comparing the SNA°, UI-SN° and LI-MP° cephalometric parameters in between the study group and control group respectively. **Conclusion:** In subjects with TMDs, there had been reduction in the forward development of maxilla, along with reduction in the inclination of upper and lower incisors; highlighting their effect on development of TMDs.
Key words: Cephalometric, Disorders, Temporomandibular Joint

Corresponding Author: Dr. Sneh Kalgotra, Registrar, Post Graduate Department of Orthodontics and Dentofacial Orthopaedics, Government Dental College & Hospital, Srinagar, Jammu & Kashmir, India

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INTRODUCTION

The Temporomandibular articulation is composed of bilateral, diarthrodial, Temporomandibular joints (TMJs). Each joint is formed by a mandibular condyle and its corresponding temporal cavity (glenoid fossa and articular eminence).[1,] [2]While up to 25% of the population may experience symptoms of TMD, only a small percentage of afflicted individuals seek treatment. For instance, studies in the 1980s detected TMD symptoms in 16% to 59% of the population, although only 3% to 7% of the adult population actually sought care for pain and dysfunction associated with TMD.[3, 4]

The onset of temporomandibular joint disorders (TMDs) cannot be predicted. No method of prevention of these disorders has been demonstrated. Once it occurs, cure cannot be assured. One of the consistent finding is that among those who seek treatment for temporomandibular disorders, by far the greatest majority are females, outnumbering males by at least four to one. It is not clear why this is so since it is suspected that temporomandibular disorders affect both males and females in almost equal numbers in the general population. [5- 7]

Even though magnetic resonance imaging techniques are the gold standard for evaluating TMJ pathologies, it is still costly and not easily available to all spectrums of patients.[7] Hence, under the light of above obtained data, we planned the present study to assess the cephalometric characteristics in TMD patients.

MATERIALS & METHODS

The present study was planned with the aim of assessing thecephalometric characteristics in TMD patients. A total of 50 patients with symptomatic TMDs were included in the present study and were categorized under the study group. Another set of fifty subjects of comparable age and gender were also included in the present study. All the cases referred for lateral cephalometric radiography were included in the present study. Inclusion criteria for including subjects in the study groups were as follows:

- Subjects reporting with complaint of pain, tenderness, or clicking/ crepitus in the pre-tragal region
- Subjects with negative history of any other systemic illness,
- Patients with negative history of ankylosis

Detailed clinical and medical history of all the subjects was obtained. Lateral cephlametric radiography was done in all the subjects. All the images were analysed. Following parameters were analysed: SNA°, SNB°, ANB°, SN-MP°, AR-Go (MM), UI-SN° and LI-MP°; based on criteria described previously in the literature.[8]All the data was recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

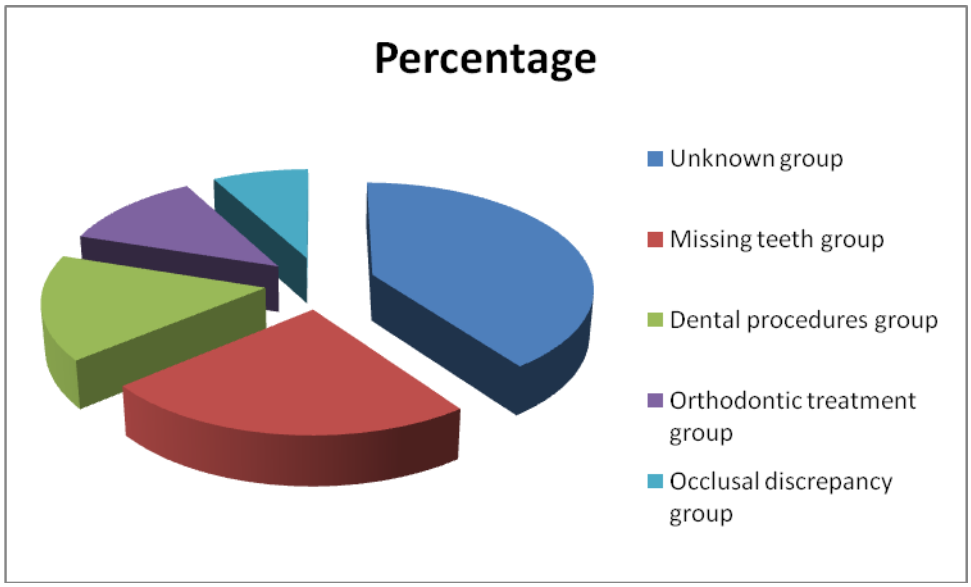
RESULTS

Among the 50 subjects of the study group; 20 subjects were of unknown aetiology, while 12 subjects, 8 subjects, 6 subjects and 4 subjects belonged to the missing teeth group, dental procedure group, orthodontic treatment group and Occlusal discrepancy group respectively. Mean age of the subjects of the study group and the control group was 19.8 years and 20.2 years respectively. There were 19 males and 31 females in the study group, while there were 20 males and 30 females in the control group respectively.Significant results were obtained while comparing the SNA°, UI-SN° and LI-MP° cephalometric parameters in between the study group and control group respectively.

Table 1: Distribution of subjects according to aetiology

Aetiology	Number of patients	Percentage
Unknown group	20	40
Missing teeth group	12	24
Dental procedures group	8	16
Orthodontic treatment group	6	12
Occlusal discrepancy group	4	8

Graph 1: Distribution of subjects according to aetiology



Graph 2: Mean age of the subjects of the study group and the control group

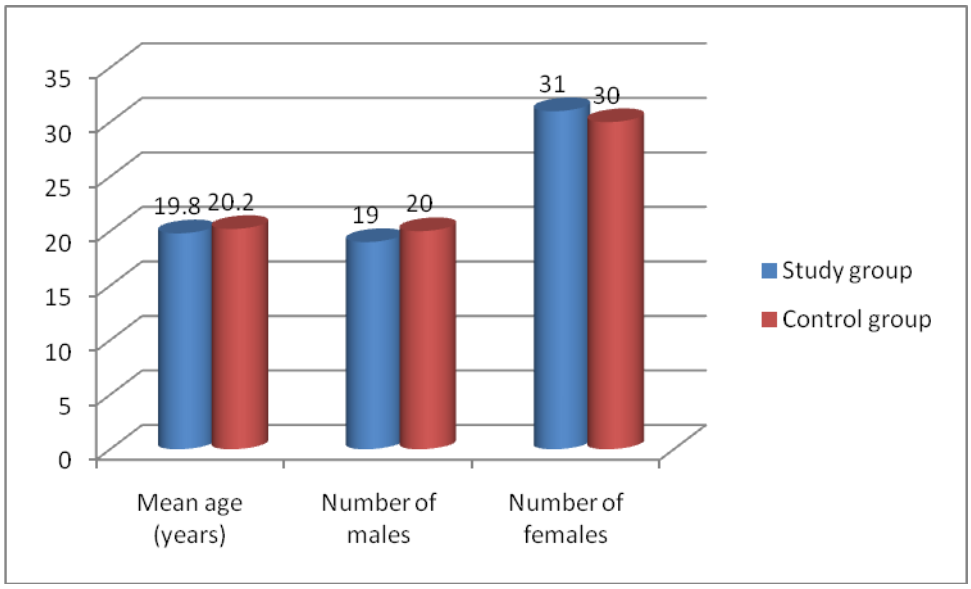
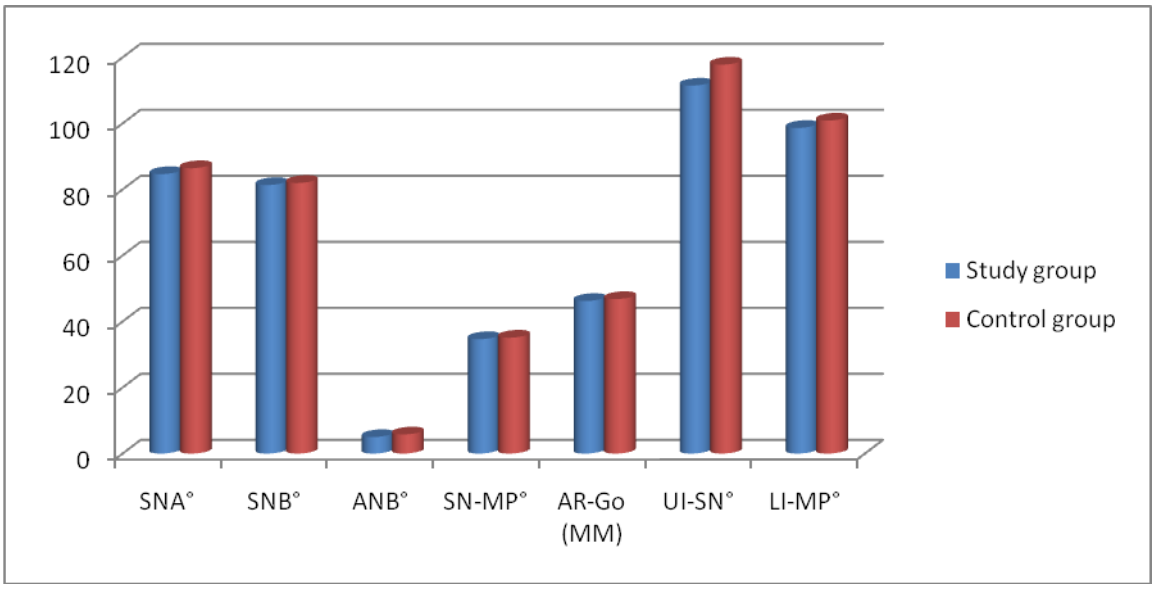


Table 2: Comparison of parameters between the study group and the control group

Mean lateral cephalometric parameter	Study group	Control group	p- value
SNA°	84.66	86.45	0.02*
SNB°	81.35	81.98	0.25
ANB°	5.02	5.82	0.09
SN-MP°	34.67	35.12	0.08
AR-Go (MM)	46.22	46.81	0.32
UI-SN°	111.45	117.81	0.00*
LI-MP°	98.64	100.87	0.00*

*: Significant

Graph 3: Lateral cephalometric parameters of the study group and the control group



DISCUSSION

Temporomandibular joint disorder (TMD) is described as "a collective term embracing a number of clinical problems that involve the masticator musculature, the temporomandibular joint (TMJ) associated structures, or both". The etiology of TMJ disorders is poorly understood, but it is generally accepted that it is multifactorial, involving a large number of direct and indirect etiological factors, occlusion being frequently cited as one of the major etiological factors causing TMD.[5- 7] in the present study, among the 50 subjects of the study group; 20 subjects were of unknown aetiology, while 12 subjects, 8 subjects, 6 subjects and 4 subjects belonged to the missing teeth group, dental procedure group, orthodontic treatment group and Occlusal discrepancy group respectively. Ko EW et al collected data from forty-five patients with intraarticular TMJ ankylosis from the files at the Chang Gung Craniofacial Center. There were 21 male and 24 female patients, aged 3 to 47 years. Thirty-seven patients were unilaterally affected and eight had bilateral involvement. Patients were grouped according to gender and age. Both the medical history and onset of the disease were investigated in all patients. The pretreatment lateral cephalograms were used for analysis. The variables were compared with the Chinese norms with corresponding sex and age groups. The etiology included 48.9% facial trauma history, 17.8% traumatic delivery or birth injury, 15.6% middle ear or dental infection, 2.2% chronic arthritis and 15.6% unknown causes. The onset of mouth opening limitation was under 16 years of age. The average total mandibular length was less than the norm by 30 mm. Each patient presented with a mandible that had backward rotation with chin recession. Accentuated antegonial notch and inferiorly located condyle were observed on the affected side. The maxilla was shorter and the ANB was larger than the norm by 10 degrees but the overbite and overjet were within normal ranges. The facial growth was severely disturbed in terms of dimension, morphology and direction of growth in patients with TMJ ankylosis.[9]

Hwang CJ et al determined the relationship between craniofacial skeletal structures and TMJ disorders by using lateral cephalogram measurements to examine the characteristics of the facial profile of patients with TMJ disorders. Of 111 patients over 18 years of age from the Department of Orthodontics, Dental Hospital, Yonsei University, those showing symptoms of TMJ disorders

were chosen as the experimental group (56 patients), and patients without TMJ disorders were chosen as the control group (55 patients). A lateral cephalogram of each subject was taken and traced to confirm the significance of the craniofacial measurements between the experimental group and the control group of Class I (mean ANB angle, 2.89 degrees), Class II (mean ANB angle, 6.32 degrees), Class III (mean ANB angle, -2.02 degrees) patients, who were grouped according to ANB-angle difference. Each experimental subject with a TMJ disorder had a hyperdivergent facial profile, more lingual tilting of the maxillary incisors, and a steeper inclined occlusal plane. There was a significant correlation between the structure of the lower face and the temporomandibular disorder.[10]

In the present study, mean age of the subjects of the study group and the control group was 19.8 years and 20.2 years respectively. There were 19 males and 31 females in the study group, while there were 20 males and 30 females in the control group respectively. Significant results were obtained while comparing the SNA°, UI-SN° and LI-MP° cephalometric parameters in between the study group and control group respectively .Almăşan OC et al established the changes in posteroanterior cephalometric variables in subjects with temporomandibular joint disorders (TMDs). Posteroanterior cephalograms of 61 subjects (age range 16–36.6 years, standard deviation 4.88 years) were used to determine cephalometric differences. Subjects were classified according to the Research Diagnostic Criteria for Temporomandibular Joint Disorders into three groups: unilateral TMD, bilateral TMD and no TMD. 14 linear and angular measurements were assessed on the posteroanterior cephalogram. For assessing facial asymmetry, the asymmetry index for bilateral measurements was calculated between the right and the left side.47 subjects were females (77%) and 14 were males (23%). 19 subjects had unilateral TMDs and 16 subjects had bilateral TMDs. The asymmetry index of the distance from the horizontal plane to the antegonion was higher in subjects with unilateral TMD than in patients with bilateral or no TMD ($p < 0.05$). Also, the asymmetry index of the distances from the vertical plane to the condyle ($p = 0.05$), gonion (Go) ($p = 0.0004$), antegonion ($p = 0.002$) and chin (Ch) ($p = 0.02$) was higher in subjects with unilateral TMDs. The asymmetry index of the O point–Go–Go′ and O point–Ch–Ch′ angles differed significantly in subjects with unilateral TMDs ($p < 0.05$). Unilateral TMDs are associated with changes in posteroanterior cephalometric measurements.[11]

CONCLUSION

Under the light of above obtained results, the authors conclude that in subjects with TMDs, there had been reduction in the forward development of maxilla, along with reduction in the inclination of upper and lower incisors; highlighting their effect on development of TMDs. However; further studies are recommended.

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