

# Comparative Analysis For The Presence And Intensity Of TMD Symptoms In Skeletal Class I Malocclusion, Skeletal Class II Horizontal Malocclusion & Skeletal Class II Vertical Malocclusion Using Helkimo And Craniomandibular Index. A Study Protocol

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***Abstract: Background: Healthy dentition is a pre requisite for good esthetic, phonetics and self-esteem of an individual. In India 40-80% of population have one or the other class of malocclusion with varying severity. There are various methods used of evaluation of TMJ dysfunction like tomogram, MRI, but Helkimo is a pioneer in developing indices by which severity can be clinical evaluated Temporomandibular disorder is a multifactorial disease. Awareness regarding this is an important aspect in today's scenario. In Orthodontic practice awareness regarding TMD is utmost important. A parallel group trial study is to analyze & compare presence and intensity of TMD symptoms in skeletal class I, class II (vertical & horizontal) using Helkimo and Craniomandibular index. This study will help us in day to day Orthodontic practice.***

***Objective: Evaluation of presence & intensity of TMD symptoms in skeletal class I, class II (vertical & horizontal) cases using Helkimo index & Craniomandibular index.***

***Evaluation of presence & intensity of TMD symptoms in skeletal class I, class II (vertical & horizontal) cases using Craniomandibular index***

***Material and methods: Total 90 patients (Class I, Class II (vertical & horizontal)), in age range of 14-25 years, will be selected.***

***For every patient, Helkimo and craniomandibular index will be taken. Scores will be recorded and will be compared. The results compared will give us which skeletal pattern is prone for TMD.***

**Results:** *All the results that will be obtained in each group will be compared and give an expected result which skeletal pattern is more prone to temporomandibular disorders.*

**Conclusion:** *This study will help us to know which skeletal pattern is more prone to TMD as well as help in early screening of TMD disorders.*

**Keywords:** *TMD Symptoms, Malocclusion, Helkimo And Craniomandibular Index*

### **Introduction:**

Healthy dentition is a pre requisite for good esthetic, phonetics and self-esteem of an individual [1]. In India 40-80% of population have one or the other class of malocclusion with varying severity. Also an estimated 50-60% of population suffer from mild to moderate TMJ disorders especially in the range of 20-30 years. Most often the mild to moderate severity of TMJ disorder due to deep impact in the Otorhinology of the case may go 'unnoticed' as they are often mistaken for earaches or ear related problems[2].

There are various methods used of evaluation of TMJ dysfunction like tomogram, MRI, but Helkimo is a pioneer in developing indices by which severity can be clinically evaluated [3]

It is a need to assess TMJ dysfunction before beginning of orthodontic treatment so that necessary precautions can be taken while ongoing orthodontic treatment. Also between the stages of orthodontic treatment. TMJ evaluation will also be helpful in monitoring any signs of TMJ dysfunction and TMD disorders so it can be identified and therapeutic measures can be taken. Hence the parallel group study is planned in department of orthodontics and dentofacial orthopedics. To analyze & compare presence and intensity of TMD symptoms in skeletal class I, Class II (vertical & horizontal) using Helkimo and Craniomandibular index.

### **Objectives –**

1. Evaluation of presence & intensity of TMD symptoms in skeletal class I, class II (vertical & horizontal) cases using Helkimo index.
2. Evaluation of presence & intensity of TMD symptoms in skeletal class I, class II (vertical & horizontal) cases using Craniomandibular index.
3. To compare the presence & intensity of TMD symptoms in skeletal class II horizontal & class I cases.
4. To compare the presence & intensity of TMD symptoms in skeletal class II vertical & class I cases.
5. To compare the presence & intensity of TMD in skeletal class II horizontal & class II vertical cases.
6. To compare the presence & intensity of TMD symptoms in male and female.

Aim of the (parallel group) trial study is to assess & compare presence and intensity of TMD symptoms in skeletal class I, class II (vertical & horizontal) using Helkimo and Craniomandibular index.

### Study design:

An observational study will be conducted in the Department Of Orthodontics and Dentofacial Orthopaedics, Sharad Pawar Dental College, Sawangi (Meghe), (W).

Total 90 patients class I, Class II (vertical and horizontal), in age group of 14-25 years, will be selected.

Equal no of cases will be selected.

- a) Group I- 30 skeletal class I Malocclusion.
- b) Group II-30 skeletal class II Vertical Malocclusion.
- c) Group III-30 skeletal class II Horizontal Malocclusion.

Informed and written consent will be obtained from the selected patients.

For every patient, Helkimo and craniomandibular index will be taken.

Firstly anamnesis index, according to different symptoms (subjective symptom)

1	Do you have a sound (clicking or crepitation) in the area of TMJ?	Yes	No
2	Do you have jaw rigidity during awakening or slow movement of mandible?	Yes	No
3	Do you feel fatigue in the jaw area?	Yes	No
4	Do you have difficulty while opening mouth?	Yes	No
5	Do you have locked mandible during opening the mouth?	Yes	No
6	Do you have pain in the TMJ in the area of masticatory muscles?	Yes	No
7	Do you have pain during movement of mandible?	Yes	No
8	Do you have luxation of mandible?	Yes	No

TMJ: Temporomandibular joint

#### Clinical dysfunction index

Mandibular opening
>40 mm
30-39 mm
>30 mm
Mandibular deviation during lowering
<2 mm
2-5 mm
>5 mm
TMJ dysfunction
No impairment
Palpable clicking
Evident clicking
TMJ pain
No pain
Palpable pain
Palpebral reflex
Muscle pain
No pain
Palpable pain
Palpebral reflex

TMJ: Temporomandibular joint

To obtain the CMI, each positive item will be scored as 1 point, whereas each negative item will be scored 0 points. Seven main aspects shall be evaluated as follows.

Pos (1)	Neg (0)	Feature	
—	—	<b>Mandibular movement (MM)</b> (normal values in parens)	
		Maximum opening (incisor to incisor)	
		— mm (40-60)	
—	—	Passive stretch opening	
		— mm (42-62)	
—	—	Restriction on opening	
—	—	Pain on opening	
—	—	Jerky opening or closing	
—	—	"S" deviation on opening or closing ( $\leq 2$ mm)	
—	—	Lateral deviation at full opening ( $\leq 2$ mm)	
—	—	Protrusion — Pain	
—	—	Protrusion — Limitation — mm ( $\geq 7$ mm)	
—	—	Right laterotrusion — Pain	
—	—	Right laterotrusion — Limitation — mm ( $> 7$ mm)	
—	—	Left laterotrusion — Pain	
—	—	Left laterotrusion — Limitation — mm ( $\geq 7$ mm)	
—	—	Clinically can lock open (subluxate)	
—	—	Clinically can lock or is locked closed with condylar translation (right or left)	
—	—	Rigidity of jaw on manipulation MM Total —	
		TMJ noise (TN) (Check no more than two on each side)	
	(Right)	Reciprocal click -----	(Left)
		(reciprocal elim. w/mandibular repositioning)	
—	—	Reproducible opening click -----	—
—	—	Reproducible laterotrusive click only -----	—
—	—	Reproducible closing click -----	—
—	—	Nonreproducible opening click -----	—
—	—	Crepitus — Fine -----	—
—	—	Crepitus — Coarse -----	—
—	—	Popping -----	—
		(audible without stethoscope)	TN total —

Muscle	Pos. Neg.		> < =	Left		
	(1)	(0)		Pos. (1)	Neg. (0)	
Extraoral jaw						
	—	—	Anterior temporal	---	—	—
	—	—	Deep temporal	---	—	—
	—	—	Middle temporal	---	—	—
	—	—	Deep masseter	---	—	—
	—	—	Anterior masseter	---	—	—
	—	—	Inferior masseter	---	—	—
	—	—	Posterior digastric	---	—	—
	—	—	Medial pterygoid	---	—	—
	—	—	Vertex	---	—	—
						EP Total ---
Intraoral jaw						
	—	—	Lateral pterygoid	---	—	—
	—	—	Medial pterygoid	---	—	—
	—	—	Temporalis insertion	---	—	—
						IP Total ---
Neck						
	—	—	Superior sternocleidomastoid	---	—	—
	—	—	Middle sternocleidomastoid	---	—	—
	—	—	Inferior sternocleidomastoid	---	—	—
	—	—	Insertion trapezius	---	—	—
	—	—	Upper trapezius	---	—	—
	—	—	Splenius capitis	---	—	—
						NP Total ---
TMJ						
	—	—	Lateral capsule	---	—	—
	—	—	Posterior capsule	---	—	—
	—	—	Superior capsule	---	—	—
						TP Total ---

Inclusion Criteria:

1. Patients with all permanent dentition
2. No history of orthodontics treatment previously.(skeletal class I, class II vertical & class II horizontal).

Exclusion Criteria:

1. Patients clinically diagnosed with TMD or any TMJ disorder.

2. Patients with gross pathology of ear.
3. Patient with any systemic disease or any muscular dystrophies.
4. Class III Malocclusion cases.
5. Patients that have undergone previous orthodontic treatment.

### Statistical Analysis

Statistics can be done - “Descriptive & inferential statistics” “chi square test” student “unpaired t-test, students t test & two way ANOVA” will be used .

Software using analysis will be SPSS22:0 version & graph pad “prism 6.0 version” &  $p < 0.05$  will be considered as level of significance.

### **Expected Outcome:**

Outcome that will be obtained in each group will be compared and give an expected result which skeletal pattern is more prone to temporomandibular disorders.

### **Discussion:**

The association between “orthodontic treatment and temporomandibular joint (TMJ) disorders” is among the important topic in orthodontics and there is conflicting viewpoints regarding the topic whether “orthodontic treatment can either resolve, initiate, or have little or no effect on TMJ pain and dysfunction”[4]. This study will help in diagnosing TMD before, after & ongoing Orthodontic treatment. Temporomandibular disorders are increasing day by day and its diagnosis is utmost important in today’s scenario. This study will help to in diagnosis of TMD before starting of any Orthodontic treatment and help us to treat the disorder efficiently. Gupta et al reported about stress distribution in the temporomandibular joint after mandibular protraction[5]. Naqvi and Fating reported about a non-invasive approach towards the management of a long-standing TMJ disorders[6]. Few related studies were reported by Zigo et al , Shah et al[8] and Shrivastava et al[9].

### **Conclusion:**

This study will help us to know which skeletal pattern is more prone to TMD as well as help in early screening of TMD disorders.

### **References:**

- [1] Dunning JM. Principles of dental public health. Harvard University Press; 1986.
- [2] Türp JC, Schindler H. The dental occlusion as a suspected cause for TMDs: epidemiological and etiological considerations. Journal of oral rehabilitation. 2012 Jul;39(7):502-12.
- [3] Lima DR, Brunetti RF, Oliveira W. Study of the prevalence of craniomandibular dysfunction using Helkimo's index and having as variables sex, age and whether the subjects had or had not been treated orthodontically. Pós Grad Rev Fac Odontol São José Dos Campos. 1999;2:127–33.
- [4] Rendell JK, Norton LA, Gay T. Orthodontic treatment and temporomandibular joint disorders. American Journal of Orthodontics and Dentofacial Orthopedics. 1992 Jan 1;101(1):84-7.

- [5] Gupta, Anurag, Pushpa V. Hazarey, Om P. Kharbanda, Virender S. Kohli, and Amit Gunjal. "Stress Distribution in the Temporomandibular Joint after Mandibular Protraction: A 3-Dimensional Finite Element Study. Part 2." *AMERICAN JOURNAL OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS* 135, no. 6 (June 2009): 749–56. <https://doi.org/10.1016/j.ajodo.2007.12.026>.
- [6] Naqvi, W.M., and T.B. Fating. "Temporomandibular Joint Dysfunction: A Non-Invasive Approach towards the Management of a Long-Standing Condition." *International Journal of Pharmaceutical Research* 12 (2020): 1131–34. <https://doi.org/10.31838/ijpr/2020.SP1.131>.
- [7] Zigo, F., Lakticová, K. V., & M, M. V. ,The occurrence of Bacterial agents causing MASTITIS IN DAIRY SHEEP AND THEIR RESISTANCE TO ANTIBIOTICS. *Journal of Medical Research and Health Sciences*, 3(7) (2020). <https://doi.org/10.15520/jmrhs.v3i7.215>
- [8] Shah, Shishir B., Shandilya Ramanojam, Pushkar K. Gadre, and Kiran S. Gadre. "Synovial Chondromatosis of Temporomandibular Joint: Journey Through 25 Decades and a Case Report." *JOURNAL OF ORAL AND MAXILLOFACIAL SURGERY* 69, no. 11 (November 2011): 2795–2814. <https://doi.org/10.1016/j.joms.2010.12.029>.
- [9] Shrivastava, Abhinav, Pushpa V. Hazarey, Om P. Kharbanda, and Anurag Gupta. "Stress Distribution in the Temporomandibular Joint after Mandibular Protraction: A Three-Dimensional Finite Element Study." *ANGLE ORTHODONTIST* 85, no. 2 (March 2015): 196–205. <https://doi.org/10.2319/091913-690.1>.