Study of Temporomandibular Joint Range of Motion in Tobacco Chewers

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Abstract

Background: Temporomandibular joint (TMJ) is most regularly used joint in the human body. The TMJ connects the upper and lower jawbones which allow the jaw to open, move back and forth and sideways, it is also instrumental in several functional movements such as chewing, breathing, talking or yawning. There is pain followed by restricted mandibular movement and noises from the TMJ during jaw movement. Temporomandibular joint disorder (TMD) is a common condition that limits the natural function of the jaw; such as opening the mouth and chewing, and can cause pain TMJ disorders are conditions that affect the TMJ specifically. There is a decrease range of motion and, can cause varying amounts of discomfort. There are many possible causes of TMJ disorders like physical injury, arthritis, grinding or clenching the teeth during sleep, autoimmune diseases, dental surgery, infections, tobacco chewing etc.**Objective:-**To evaluate range of motion of TMJ joint in tobacco chewers and to explain them the importance of physiotherapy to combat with their problems.**Methodology:**After obtaining institution ethics committee clearance 50 participants were selected randomly from Acharya VinobaBhave Rural Hospital(AVBRH)and Dental Out Patient Department as per the inclusion and exclusion criteria. The informed consent was obtained. The TMJ ROM was measured with the help of ruler.**Result:** This study showed significant reduction in ROM of TMJ in tobacco chewers with respect to age. **Conclusion:** This study concluded that there was significant reduction in ROM in TMJ in tobacco chewers.

KEYWORDS: Temporomandibular joint, Range of Motion, Tobacco Chewers.

INTRODUCTION:-

Temporomandibular joint (TMJ) is most regularly used joint in the human body. The TMJ connects the upper and lower jawbones which allow the jaw to open, move back and forth and sideways, it is also instrumental in several functional movements such as chewing, breathing, talking or yawning. There is pain followed by restricted mandibular movement and noises from the TMJ during jaw movement. Study says that the symptoms most of the time becomes chronic. The temporomandibular joints (TMJ) are the two joints connecting the jawbone to the skull. It is a bilateral synovial articulation between the temporal bone of the skull above and the mandible below; it is from these bones that its name is derived. This joint is unique in that it is a bilateral joint that functions as one unit. Since the TMJ is connected to the mandible, the right and left joints must function together and therefore are not independent of each other.

Temporomandibular joint disorder (TMD) is a common condition that limits the natural function of the jaw, such as opening the mouth and chewing, and can cause pain

TMJ disorders are conditions that affect the TMJ specifically. There is a decrease range of motion and, can cause varying amounts of discomfort. There are many possible causes of TMJ disorders. Some known causes include:Grinding the teeth while asleep may lead to TMJ disorders.

Causes:

- Physical injury
- Arthritis
- Grinding or clenching the teeth during sleep
- Autoimmune diseases
- Dental surgery
- Infections
- Tobacco chewing
- Other causes may be genetic, hormonal, or environmental. For instance, violinists have been noted to experience TMJ disorders at a higher rate than the general population, since their work involves holding an instrument under the jaw. This can cause strain, which leads to TMJ disorders.
- It has been observed that women experience TMJ disorders at a higher rate than men, so researchers are currently looking into hormonal causes for TMJ.

Symptoms

There is a range of symptoms linked to TMJ, including:

- Pain: One of the most obvious symptoms of a TMJ disorder is pain that is felt when moving the jaw. However, other symptoms that may occur with a TMJ disorder include headaches or migraines, neck ache or backache, and earaches or pain around the ear that spreads to the cheeks.
- A common but often painless symptom is an unusual popping, clicking, or even grinding noise that can occur while eating, talking, or simply opening the mouth.

- Noises that occur when moving the jaw are not always a symptom of TMJ disorders. In fact, jaw noises are quite common. It is only when the sounds occur alongside pain or limited movement of the jaw that medical advice may be needed.
- Buzzing, ringing, or numbness in the ears can occur alongside earaches, and these symptoms can also be associated with TMJ disorders.
- Restricted movement OR Decrease range of motion (ROM)

Limited movement that prevents the mouth from being opened fully or the jaw from being moved in certain directions can cause severe discomfort in everyday life.

In India, tobacco consumption is responsible for half of all the cancers in men and a quarter of all cancers in women, Forms of tobacco chewing include pan (piper betel leaf filled with sliced areca nut, lime, catechu, and other spices chewed with or without tobacco), pan-masala or gutkha (a chewable tobacco containing areca nut), and mishri (a powdered tobacco rubbed on the gums as toothpaste).

Thirty per cent of the population 15 years or older—47% men and 14% of women—either smoked or chewed tobacco, which translates to almost 195 million people—154 million men and 41million women in India. However, the prevalence may be underestimated by almost 11% and 1.5% for chewing tobacco among men and women, respectively, and by 5% and 0.5% for smoking among men and women, respectively, because of use of household informants.

The overall prevalence of tobacco use was significantly higher in the rural (23.7%) compared to semi-urban (20.9%) and urban (19.4%) areas (P value <0.001) Tobacco smoking prevalence was 14.3%, 13.9% and 12.4% in rural, semi-urban and urban areas respectively. The corresponding values for smokeless tobacco use were 9.5%, 7.0% and 7.0% respectively. Logistic regression analysis showed that the odds of using tobacco (with smoke or smokeless forms) were significantly higher among males, older individuals, alcoholics, in rural areas and slum localities.

Tobacco consumption was significantly higher in poor, less educated, scheduled castes and scheduled tribe populations. The prevalence of tobacco consumption increased up to the age of 50 years and then levelled or declined. The prevalence of smoking and chewing also varied widely between different states and had a strong association with individual's sociocultural characteristics.

There is hypothesis that it is expected that the people with TMJ pain will have reduced range of motion of their jaw for all motion direction while chewing.

Need for study/rationale:-

1. Need for the study is to assess the problems faced by tobacco chewers because of tobacco chewing habit.
2. To explain them the importance of physiotherapy to combat with their problems.

OBJECTIVE:-

1. To evaluate range of motion of TMJ joint in tobacco chewers.

2. To explain them the importance of physiotherapy to combat with their problems.

MATERIAL AND METHODOLOGY:

Methodology:- After obtaining institution ethics committee clearance 50 participants were selected randomly from Acharya VinobaBhave Rural Hospital(AVBRH)and Dental Out Patient Department as per the inclusion and exclusion criteria. The informed consent was obtained. The TMJ ROM was measured with the help of ruler.

Study design:- Observational study

Sampling technique:-simple random sampling technique

Study setting: Acharya VinobaBhave Rural Hospital,Sawangi (Meghe),wardha

Sample size:-50

Study duration:-1 year

Inclusion criteria:

1. Person having tobacco chewing habit.
2. Both genders included.
3. Age above 18 years.

Exclusion criteria:

1. Age below 18 years.
2. Any history of surgery Of TMJ

Material required:-Ruler

Statistical Analysis:

Statistical analysis was done by using descriptive and inferential statistics using one way ANOVA and student's unpaired t test and software used in the analysis was SPSS 22.0 version and $p<0.05$ is considered as level of significance.

RESULT:-

This study showed significant reduction in ROM of TMJ with respect to age. Gender wise only depression movement significantly reduced.

Table 1 showed Comparison of age in years with Depression**.** Mean value of active ROM of depression for the patient with 21-30 yrs of age is 25.37 +_4.61,31-40yrs of age is 19.78 +_4.91,41-50yrs of age is 25.28 +_2.21,51-60yrs of age is 18.40 +_3.31,>60yrs is 16.62 +_5.50.

By using one way ANOVA statistically most significant variation was formed in mean value of active ROM of depression among various ages of patient(f-value 8.00,p-value 0.003).

Mean value of passive ROM of depression for the patient with 21-30 yrs of age is 25.71 +_4.66,31-40yrs of age is 20.21 +_5.07,41-50yrs of age is26.00 +_2.64,51-60yrs of age is 19.20 +_2.68,>60yrs is 17.00 +_4.18.

By using one way ANOVA statistically most significant variation was formed in mean value of passive ROM of depression among various ages of patient(f-value 7.75,p-value 0.001).

Table 2 showed Comparison of age in years with Protrusion.Mean value o Mean value of active ROM of protrusion for the patient with 21-30 yrs of age is3.75 +_1.12,31-40yrs of age is 3.07 +_0.64,41-50yrs of age is 3.00 +_1.15,51-60yrs of age is 2.80 +_0.83,>60yrs is 2.00 +_1.60.

By using one way ANOVA statistically most significant variation was formed in mean value of active ROM of depression among various ages of patient(f-value 4.41,p-value 0.004).

Mean value of passive ROM of protrusion for the patient with 21-30 yrs of age is 3.96 +_1.13,31-40yrs of age is 3.22 +_0.67,41-50yrs of age is 3.42 +_1.27,51-60yrs of age is 3.10 +_0.89,>60yrs is 2.06 +_1.08.

By using one way ANOVA statistically most significant variation was formed in mean value of passive ROM of protrusion among various ages of patient(f-value 4.80,p-value 0.003).

Table 3 showed Comparison of age in years with Right Lateral Excursion.Mean value of active ROM of right lateral excursion for the patient with 21-30 yrs of age is 5.12 +_1.45,31-40yrs of age is 4.50 +_1.01,41-50yrs of age is 4.42 +_1.13,51-60yrs of age is3.40 +_2.30,>60yrs is 3.12 +_2.03.

By using one way ANOVA statistically most significant variation was formed in mean value of active ROM of right lateral excursion among various ages of patient(f-value 2.89,p-value 0.033).

Mean value of passive ROM of right lateral excursion for the patient with 21-30 yrs of age is 5.18 +_1.47,31-40yrs of age is 4.71 +_1.25,41-50yrs of age is 4.71 +_0.75,51-60yrs of age is 3.40 +_2.30,>60yrs is 3.25 +_2.12.

By using one way ANOVA statistically most significant variation was formed in mean value of passive ROM of right lateral excursion among various ages of patient(f-value 2.79,p-value 0.037).

Table 4 showed Comparison of age in years with Left Lateral Excursion. Mean value of active ROM of left lateral excursion for the patient with 21-30 yrs of age is 4.12 +_1.70,31-40yrs of age is 3.53 +_1.18,41-50yrs of age is 3.28 +_1.11,51-60yrs of age is 2.60 +_1.67,>60yrs is 1.87 +_1.35.

By using one way ANOVA statistically most significant variation was formed in mean value of active ROM of left lateral excursion among various ages of patient(f-value 3.64,p-value 0.012).

Mean value of passive ROM of left lateral excursion for the patient with 21-30 yrs of age is 4.28 +_1.61,31-40yrs of age is 3.84 +_1.06,41-50yrs of age is 3.71 +_0.75,51-60yrs of age is 2.80+_1.92,>60yrs is 1.87 +_1.35.

By using one way ANOVA statistically most significant variation was formed in mean value of passive ROM of left lateral excursion among various ages of patient(f-value 4.67,p-value 0.003).

Table 5 showed Comparison of gender with depression. Mean value of active ROM of depression in males was 22.37+_5.63 and in females was 22.92 +_5.64.

By using student's unpaired t test statistically significant difference was found in mean value of active ROM of depression among males and females (t-value 2.12 p-value 0.048).

Mean value of passive ROM of depression in males was 22.92 +_5.64 and in females was 19.15 +_4.08.

By using student's unpaired t test statistically significant difference was found in mean value of active ROM of depression among males and females (t-value 2.40 p-value 0.027).

Table 6 showed comparison of gender with Protrusion. Mean value of active ROM of protrusion in males was 2.98 +_1.20 and in females was 3.45 +_0.49.

By using student's unpaired t test statistically no significant difference was found in mean value of active ROM of protrusion among males and females (t-value1.18 p-value 0.24).

Mean value of passive ROM of protrusion in males was 3.21 +_1.25 and in females was 3.62 +_0.61.

By using student's unpaired t test statistically no significant difference was found in mean value of passive ROM of protrusion among males and females (t-value0.99 p-value 0.32).

Table 7 showed comparison of gender with Right Lateral ExcursionMean value of active ROM of right lateral excursion in males was 4.32 +_1.78 and in females was 4.50 +_0.70.

By using student's unpaired t test statistically no significant difference was found in mean value of active ROM of right lateral excursion among males and females (t-value 0.30 p-value 0.76).

Mean value of passive ROM of right lateral excursion in males was 4.47 +_1.83 and in females was 4.60 +_0.65.

By using student's unpaired t test statistically no significant difference was found in mean value of passive ROM of right lateral excursion among males and females (t-value 2.12 p-value 0.048).

Table 8 showed comparison of gender with Left Lateral ExcursionMean value of active ROM of left lateral excursion in males was 3.17 +_1.72 and in females was 3.95 +_0.59.

By using student's unpaired t test statistically no significant difference was found in mean value of active ROM of left lateral excursion among males and females (t-value 1.39 p-value 0.17).

Mean value of passive ROM of left lateral excursion in males was 3.42 +_1.70 and in females was 4.30+_0.60.

By using student's unpaired t test statistically no significant difference was found in mean value of passive ROM of left lateral excursion among males and females (t-value 0.21 p-value 0.83).

DISCUSSION:-

Andrea Jensen et.al studied that Patients initially suspected of TMD requires a thorough history of the presenting complaint including a recent experience of TMJ pain and /or sudden mandibular restriction. The clinical exam must include TMJ palpation and palpation of the masticatory muscles to duplicate the chief complaint of pain. Joint sounds and mandibular range of motion are secondary signs since they can be asymptomatic. It is vital to examine other systems including adjacent musculoskeletal systems, neurologic, vascular and otolaryngoglic systems to rule out other causes of pain.[19]

Betsy Mitchel DCet.al suggested that temporomandibular disorders are a collection of syndromes associated with pain and dysfunction caused by problems with the temporomandibular joint and its associated musculature**.** Disorders of the temporomandibular joint complex are the most common cause of orofacial pain.

Weingarten tn et.al stated that current use was associated with unfavorable demographic background variables and more pain interference in subjects with TMD presenting to a specialized orofacial pain clinic. These effects were more pronounced in cases where myofascial pain was not present.

M.B.Rao et.al stated that the chewing habits (betel leaf,tobacco,betel nut) which are prevalent in India appeared to have no effect on the incidence of PDS.

Robert et.al concluded that the evaluation of the mandibular patterns is recommended as a diagnostic criterion for all classifications of temporomandibular disorders.

TK Mondal1, et.al stated that Tobacco consumption is widespread in India. In the present study 31.9% of total adult population was using tobacco products.

Mohhmadkhaja Khalid Nawaz et.al stated that chewing areca nut on habitual basis is known to be deleterious to health.

Anand M Dixit et.alstated that Prevalence of Tobacco habit is quite high. Awareness regarding impact on health is very poor.

CONCLUSION:-

This study concluded that there was significant reduction in ROM in TMJ in tobacco chewers.

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Table and Graphical Presentation:-

Table 1: Comparison of age in years with Depression

Age in yrs	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
21-30 yrs	16	25.37	4.61	25.71	4.66
31-40 yrs	14	19.78	4.91	20.21	5.07
41-50 yrs	7	25.28	2.21	26.00	2.64
51-60 yrs	5	18.40	3.13	19.20	2.68
>60 yrs	8	16.62	4.86	17.00	4.81
Total	50	21.70	5.50	22.17	5.54
F-value		8.00		7.75	
p-value		0.003,S		0.0001,S	

Graph 1: Comparison of age in years with Depression

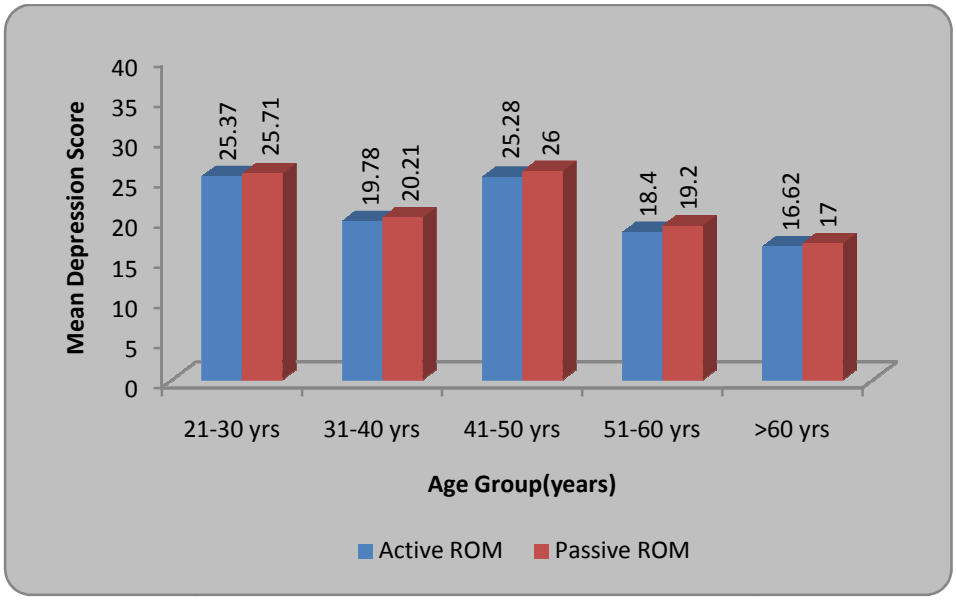

Table 2: Comparison of age in years with Protrusion

Age in yrs	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
21-30 yrs	16	3.75	1.12	3.96	1.13
31-40 yrs	14	3.07	0.64	3.22	0.67
41-50 yrs	7	3.00	1.15	3.42	1.27
51-60 yrs	5	2.80	0.83	3.10	0.89
>60 yrs	8	2.00	1.06	2.06	1.08
Total	50	3.08	1.10	3.29	1.16
F-value		4.41		4.80	
p-value		0.004,S		0.003,S	

Graph 2: Comparison of age in years with Protrusion

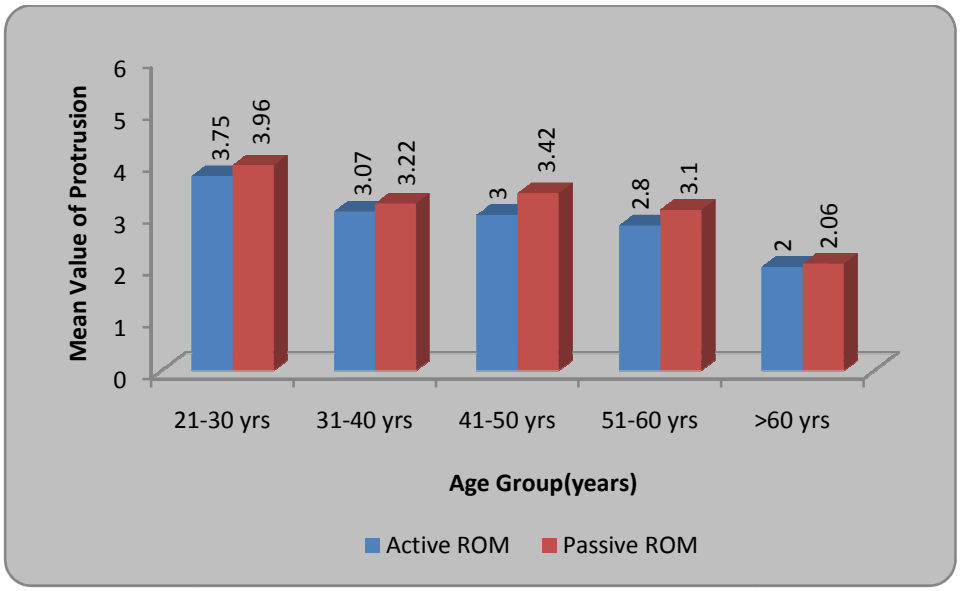

Table 3: Comparison of age in years with Right Lateral Excursion

Age in yrs	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
21-30 yrs	16	5.12	1.45	5.18	1.47
31-40 yrs	14	4.50	1.01	4.71	1.25
41-50 yrs	7	4.42	1.13	4.71	0.75
51-60 yrs	5	3.40	2.30	3.40	2.30
>60 yrs	8	3.12	2.03	3.25	2.12
Total	50	4.36	1.62	4.50	1.66
F-value		2.89		2.79	
p-value		0.033,S		0.037,S	

Graph 3: Comparison of age in years with Right Lateral Excursion

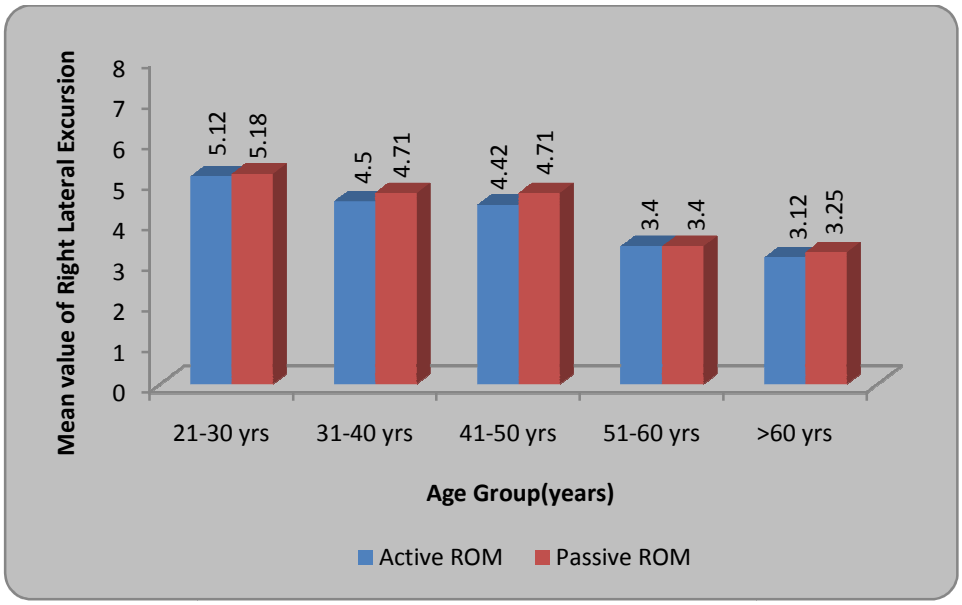

Table 4: Comparison of age in years with Left Lateral Excursion

Age in yrs	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
21-30 yrs	16	4.12	1.70	4.28	1.61
31-40 yrs	14	3.53	1.18	3.84	1.06
41-50 yrs	7	3.28	1.11	3.71	0.75
51-60 yrs	5	2.60	1.67	2.80	1.92
>60 yrs	8	1.87	1.35	1.87	1.35
Total	50	3.33	1.58	3.54	1.56
F-value		3.64		4.67	
p-value		0.012,S		0.003,S	

Graph 4: Comparison of age in years with Left Lateral Excursion

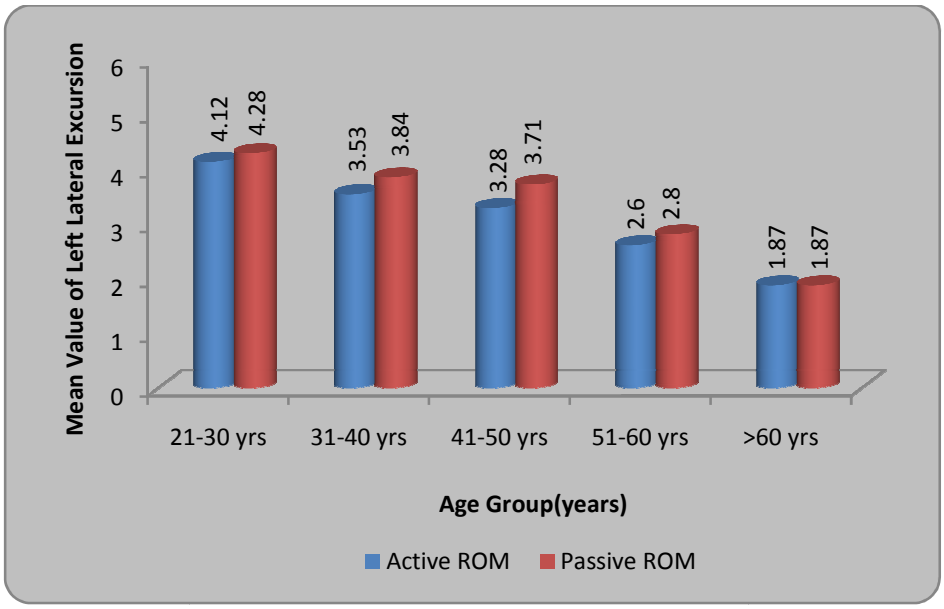

Table 5: Comparison of gender with depression

Gender	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
Male	40	22.37	5.63	22.92	5.64
Female	10	19.00	4.16	19.15	4.08
t-value		2.12		2.40	
p-value		0.048,S		0.027,S	

Graph 5: Comparison of gender with depression

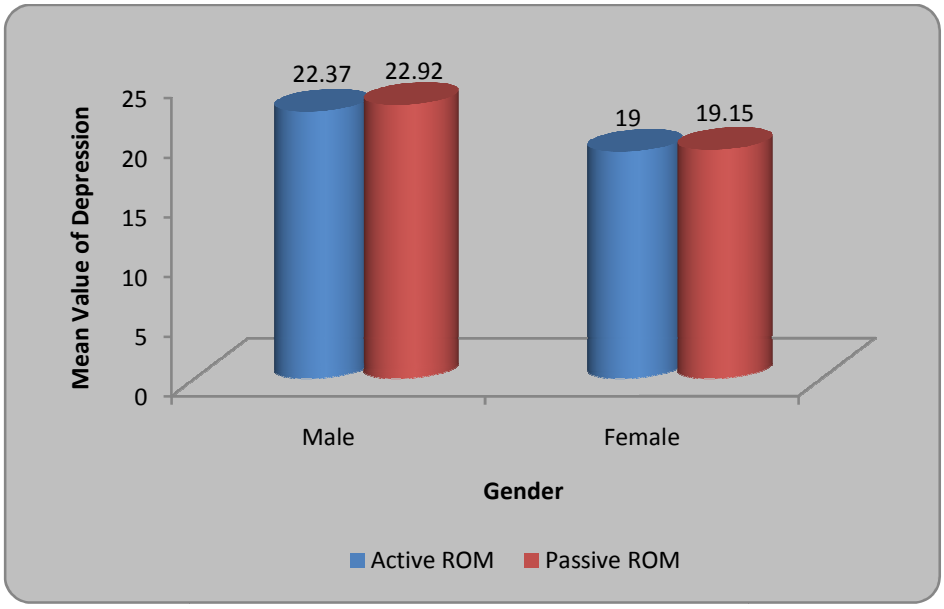

Table 6: Comparison of gender with Protrusion

Gender	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
Male	40	2.98	1.20	3.21	1.25
Female	10	3.45	0.49	3.62	0.61
t-value		1.18		0.99	
p-value		0.24,NS		0.32,NS	

Graph 6: Comparison of gender with Protrusion

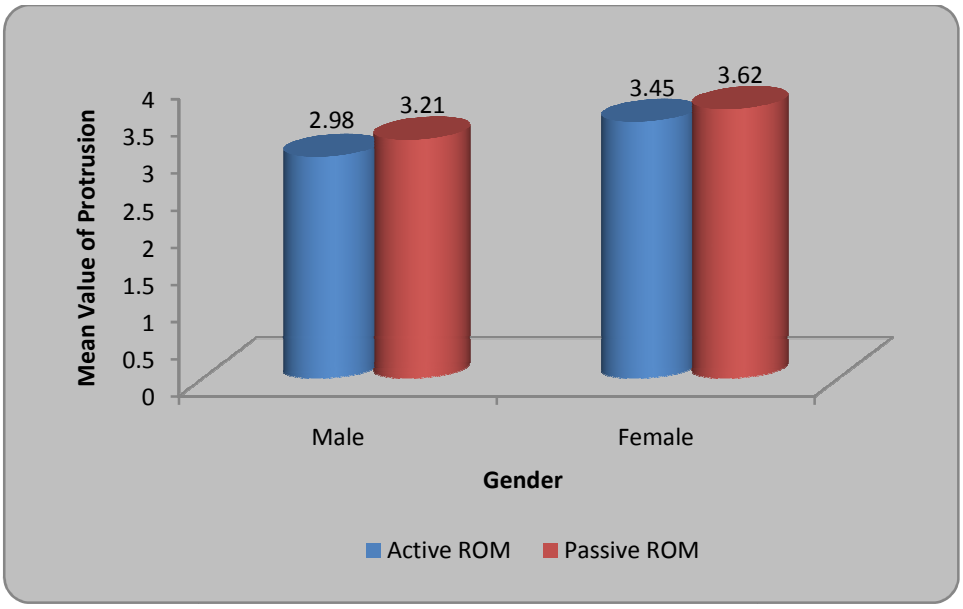

Table 7: Comparison of gender with Right Lateral Excursion

Gender	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
Male	40	4.32	1.78	4.47	1.83
Female	10	4.50	0.70	4.60	0.65
t-value		0.30		0.21	
p-value		0.76,NS		0.83,NS	

Graph 7: Comparison of gender with Right Lateral Excursion

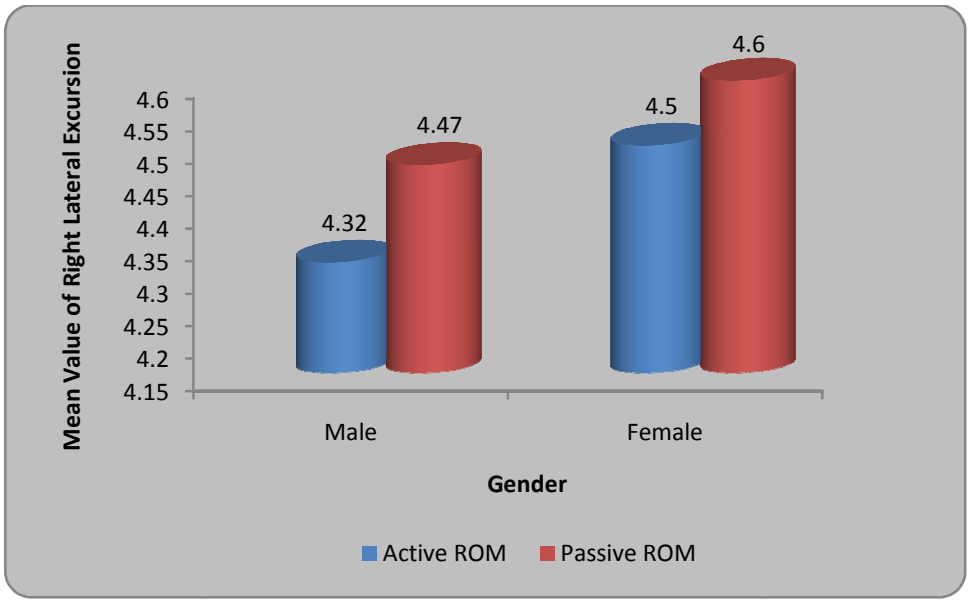

Table 8: Comparison of gender with Left Lateral Excursion

Gender	N	Active ROM		Passive ROM	
		Mean	SD	Mean	SD
Male	40	3.17	1.72	3.42	1.70
Female	10	3.95	0.59	4.03	0.60
t-value		1.39		0.21	
p-value		0.17,NS		0.83,NS	

Graph 8: Comparison of gender with Left Lateral Excursion