

## CHAPTER 4: RESULTS

### 4.1. EMG test before conservative treatment

#### 4.1.1. EMG test for experimental group before conservative treatment

The postural and maximum clenching EMG activities before and after insertion of the splint for the masseter and anterior temporal muscles of the experimental group, before conservative treatment, were shown in the Table 4.1.1(a) and Table 4.1.1(b) respectively. They were also shown in boxplots (Figure 4.1.1(a) and Figure 4.1.1(b)).

**Table 4.1.1(a)** Postural EMG activity of experimental group before conservative treatment

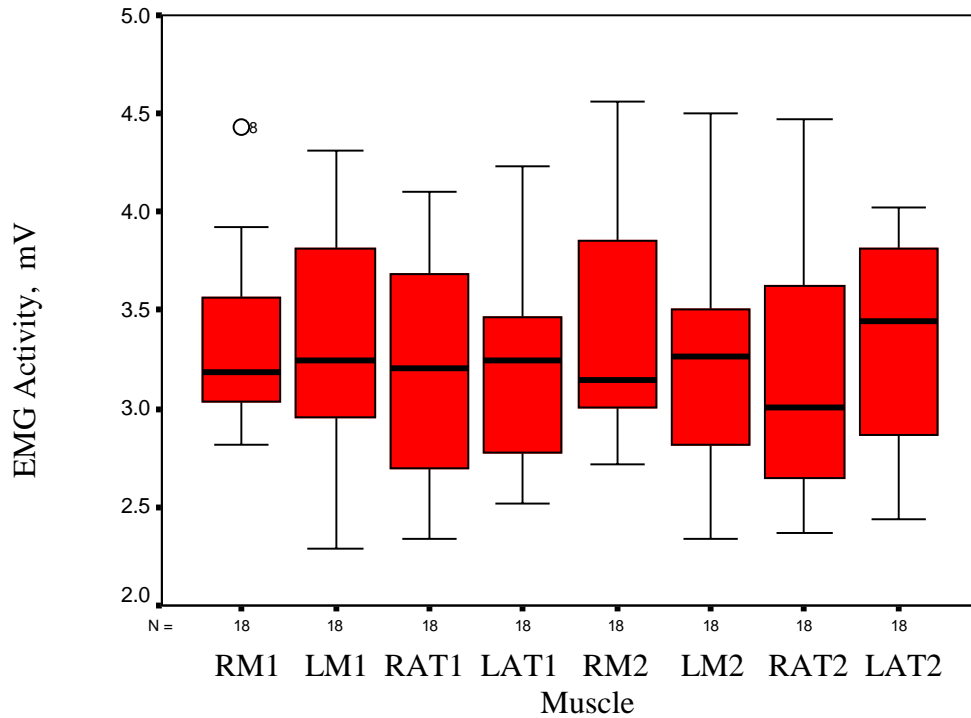
Subject No.	Postural EMG Activity, $\mu\text{V}$							
	Without Splint				With Splint			
	Masseter		Anterior Temporal		Masseter		Anterior Temporal	
	Right	Left	Right	Left	Right	Left	Right	Left
1	3.73	4.03	3.82	3.26	4.34	4.50	4.47	3.73
2	3.09	2.92	4.05	3.44	3.01	2.81	3.62	3.67
3	3.03	2.41	2.60	2.60	3.12	2.65	2.59	2.98
4	2.90	3.33	2.83	2.84	2.93	3.22	3.00	3.01
5	2.85	2.86	2.76	2.94	2.72	2.60	2.64	2.66
6	3.27	3.37	3.59	3.27	2.88	3.27	2.97	3.49
7	3.05	3.22	2.70	2.73	3.02	2.95	2.69	3.01
8	4.43	4.31	3.75	3.58	4.56	3.97	3.84	3.85
9	3.34	3.26	3.07	3.46	3.73	3.51	3.02	3.92
10	3.93	3.00	3.09	3.23	3.85	3.31	3.45	3.51
11	3.03	3.13	2.41	2.77	3.04	3.27	2.46	2.68
12	3.06	2.96	2.58	2.73	3.01	2.49	2.48	2.78
13	3.04	3.83	3.68	4.23	3.30	3.21	4.13	4.02
14	3.34	3.92	3.40	3.49	3.93	3.33	2.80	2.87
15	2.81	2.29	2.34	2.52	2.77	2.34	2.37	2.44
16	3.29	3.09	3.33	3.18	3.52	3.41	3.75	3.82
17	3.66	3.82	4.11	3.88	3.17	3.79	3.45	3.41
18	3.57	3.80	3.33	3.47	4.22	4.14	3.39	3.92
Mean	3.30	3.31	3.19	3.20	3.40	3.27	3.17	3.32
SD	0.42	0.55	0.56	0.46	0.57	0.58	0.62	0.52

Subject with number 1 to 13 were those with resolved pain after six weeks of conservative treatment; subject with number 14-18 were those with unresolved pain.

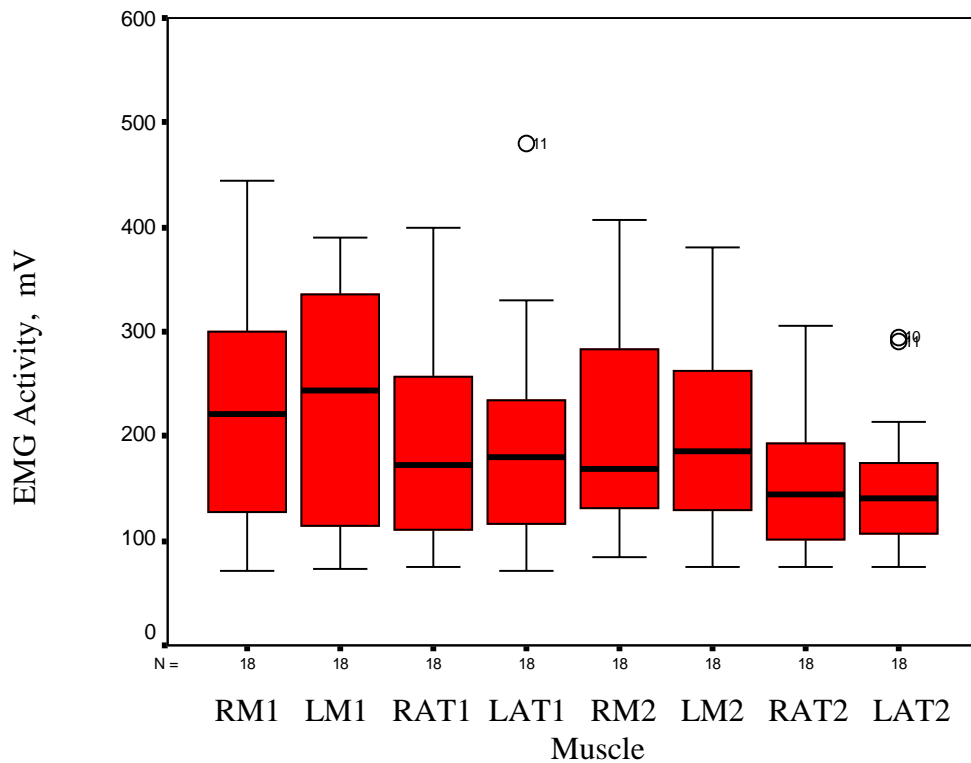
**Table 4.1.1(b)** Maximum clenching EMG activity of experimental group before conservative treatment

Subject No.	Maximum Clenching EMG Activity, $\mu$ V							
	Without Splint				With Splint			
	Masseter		Anterior Temporal		Masseter		Anterior Temporal	
	Right	Left	Right	Left	Right	Left	Right	Left
1	252.63	273.24	236.97	180.70	283.64	305.81	238.05	196.11
2	155.29	114.40	124.19	92.64	119.57	77.96	74.55	76.31
3	172.89	143.23	111.39	116.50	179.05	179.80	163.81	163.70
4	269.52	335.25	257.48	234.60	161.59	189.11	171.28	122.85
5	269.28	239.81	193.61	177.89	152.94	149.28	108.80	98.16
6	286.25	291.84	359.38	245.63	219.68	187.20	237.29	173.49
7	127.25	247.73	127.19	229.43	166.97	133.83	161.48	144.11
8	71.96	74.03	75.71	71.55	92.53	93.61	101.93	111.76
9	89.69	82.55	76.63	106.92	104.71	109.33	101.68	98.96
10	299.94	340.68	271.42	287.98	324.81	380.16	193.63	294.91
11	376.45	325.88	362.35	479.87	279.46	262.40	250.47	290.51
12	190.37	209.94	111.49	124.73	130.81	201.75	82.81	106.72
13	127.05	143.42	183.95	182.18	169.20	183.54	127.87	137.60
14	443.45	338.68	161.47	184.93	348.93	268.91	119.22	147.25
15	116.80	111.98	88.78	91.08	84.41	74.95	108.62	74.74
16	399.49	390.81	399.69	330.80	311.53	246.77	305.56	213.05
17	114.82	102.51	74.93	136.15	138.05	129.68	80.49	114.20
18	428.47	348.10	206.68	175.29	407.40	327.64	193.82	163.00
Mean	232.87	228.56	190.18	191.60	204.18	194.54	156.74	151.53
SD	121.02	107.17	104.86	100.98	97.57	88.51	67.73	64.01

Subject with number 1 to 13 were those with resolved pain after six weeks of conservative treatment; subject with number 14-18 were those with unresolved pain.



**Figure 4.1.1(a)** Boxplot for postural EMG activity of experimental group before conservative treatment. RM, right masseter; LM, left masseter; RAT, right anterior temporal; LAT, left anterior temporal; 1, without splint; 2, with splint (e.g. RM1, right masseter without splint etc.).



**Figure 4.1.1(b)** Boxplot for maximum clenching EMG activity of experimental group before conservative treatment. RM, right masseter; LM, left masseter; RAT, right anterior temporal; LAT, left anterior temporal; 1, without splint; 2, with splint (e.g. RM1, right masseter without splint etc.).

#### **4.1.1.1. Paired t-Test for EMG activity of experimental group (n=18)**

##### **4.1.1.1.1. Postural**

Before conservative treatment, there was no significant difference ( $P>0.05$ ) in the postural EMG activity before and after insertion of splint for the masseter muscle, as well as the anterior temporal muscle (Table 4.1.1.1.1).

##### **4.1.1.1.2. Maximum clenching**

However, during maximum clenching, EMG activity of the masseter was decreased after insertion of splint, and the difference was significant ( $P<0.05$ ). The maximum clenching activity of the anterior temporal muscle was also decreased after insertion of splint, and the difference was significant ( $P<0.02$ ) (Table 4.1.1.1.2).

**Table 4.1.1.1.1** Paired t-Test for postural EMG activity of experimental group before conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean,	3.30	3.40	3.31	3.27	3.19	3.17	3.20	3.32
Variance	0.18	0.33	0.30	0.34	0.32	0.38	0.21	0.27
Observations	18	18	18	18	18	18	18	18
Difference of mean (%)	0.09 (2.85)		-0.04 (-1.33)		-0.02 (-0.51)		0.12 (3.71)	
t Statistic	-1.26		0.56		0.19		-1.46	
P(T<=t) two-tail	0.225		0.584		0.854		0.163	
t Critical two-tail	2.11		2.11		2.11		2.11	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.1.1.1.2** Paired t-Test for maximum clenching EMG activity of experimental group before conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	232.87	204.18	228.56	194.54	190.18	156.74	191.60	151.53
Variance	14645	9520	11485	7833	10995	4587	10196	4097
Observations	18	18	18	18	18	18	18	18
Difference of mean (%)	-28.69 (-12.32)		-34.02 (-14.88)		-33.44 (-17.58)		-40.08 (-20.92)	
t Statistic	2.17		2.20		2.59		2.83	
P(T<=t) two-tail	0.044		0.042		0.019		0.011	
t Critical two-tail	2.11		2.11		2.11		2.11	
Significance of difference	Yes (P<0.05)		Yes (P<0.05)		Yes (P<0.02)		Yes (P<0.02)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

#### 4.1.2. EMG test for control group

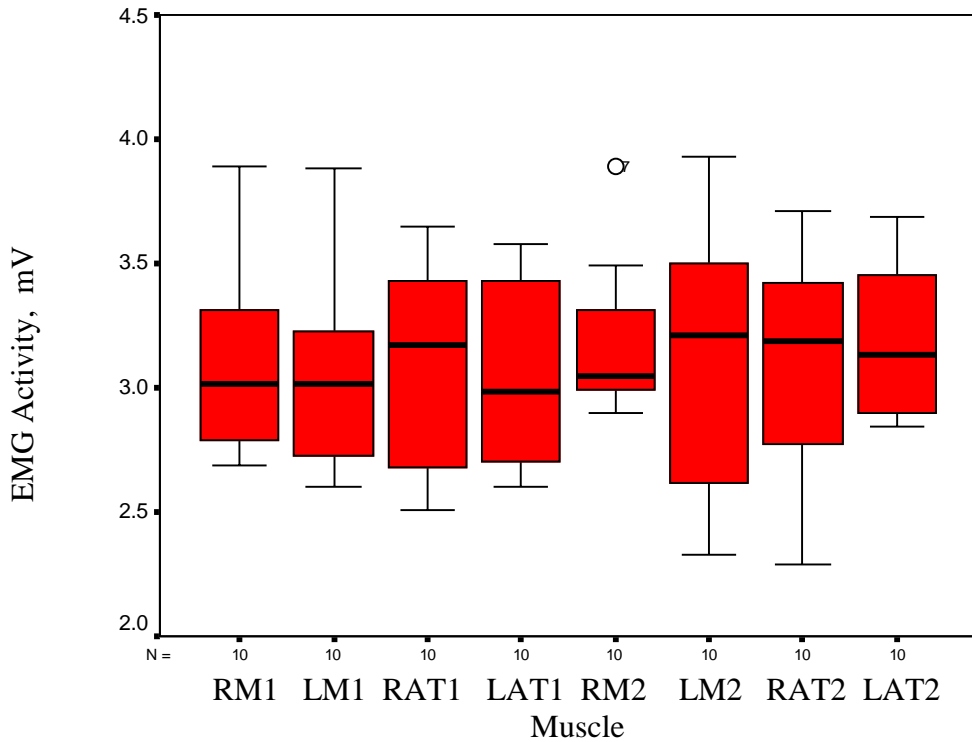
The postural and maximum clenching EMG activities before and after insertion of the splint for the masseter and anterior temporal muscles of the control group were shown in the Table 4.1.2(a) and Table 4.1.2(b) respectively. They were also shown in boxplots. (Figure 4.1.2(a) and Figure 4.1.2(b)).

**Table 4.1.2(a)** Postural EMG activity of control group

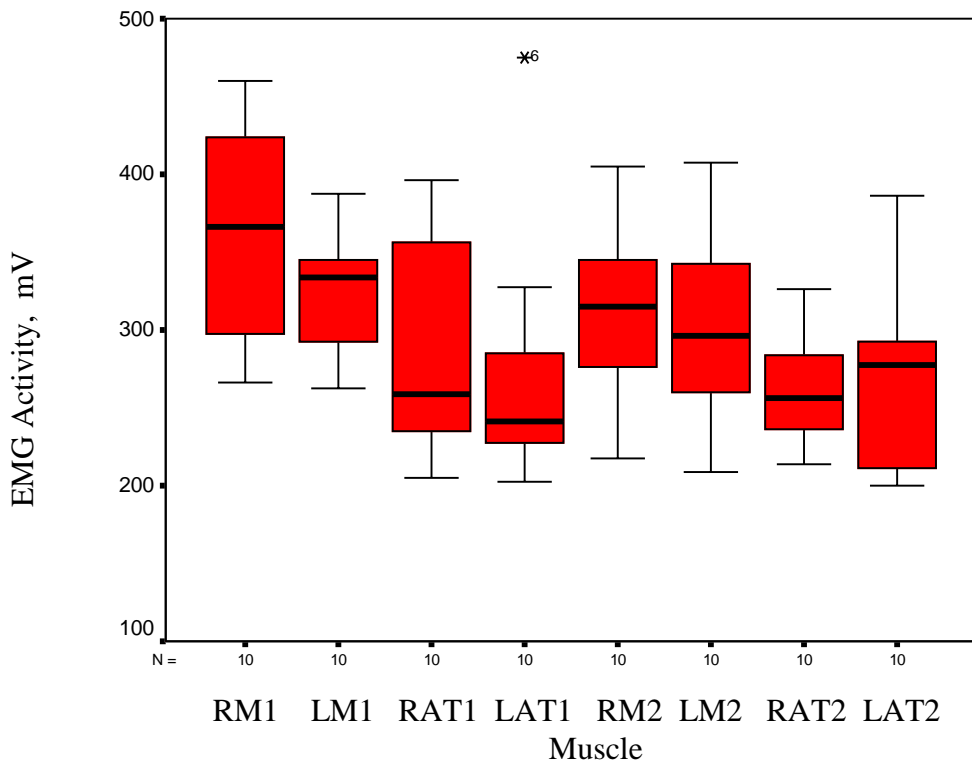
Subject No.	Postural EMG Activity, $\mu\text{V}$							
	Without Splint				With Splint			
	Masseter		Anterior Temporal		Masseter		Anterior Temporal	
	Right	Left	Right	Left	Right	Left	Right	Left
1	3.02	3.19	2.68	2.70	2.99	3.93	3.58	3.69
2	3.00	3.23	2.57	3.43	3.09	2.62	2.99	2.95
3	3.24	2.84	2.80	2.91	2.90	3.19	2.62	2.98
4	3.89	3.10	3.56	3.15	3.49	3.23	3.71	3.45
5	3.01	2.93	3.05	2.74	3.01	3.28	3.42	3.47
6	2.79	3.88	3.65	3.43	2.98	3.76	3.41	3.38
7	2.69	2.73	3.30	3.58	3.89	3.50	2.77	2.84
8	3.39	3.30	3.35	2.60	3.21	2.33	3.36	3.29
9	3.31	2.60	2.51	2.66	3.31	2.34	3.02	2.86
10	2.72	2.62	3.43	3.06	3.01	2.79	2.29	2.90
Mean	3.11	3.04	3.09	3.03	3.19	3.10	3.12	3.18
SD	0.37	0.39	0.42	0.36	0.30	0.56	0.46	0.31

**Table 4.1.2(b)** Maximum clenching EMG activity of control group

Subject No.	Maximum Clenching EMG Activity, $\mu\text{V}$							
	Without Splint				With Splint			
	Masseter		Anterior Temporal		Masseter		Anterior Temporal	
	Right	Left	Right	Left	Right	Left	Right	Left
1	266.83	331.90	234.60	227.13	280.81	302.75	235.67	210.92
2	283.39	288.93	254.91	232.25	217.48	244.30	234.92	291.96
3	395.50	386.91	355.79	243.18	308.41	376.36	302.51	287.61
4	296.94	337.27	395.70	327.49	321.56	259.78	247.97	338.01
5	372.69	322.62	268.71	285.10	276.67	266.23	262.13	199.76
6	439.01	335.30	358.73	475.07	345.44	324.36	249.82	242.04
7	424.19	344.62	204.62	274.66	403.32	407.90	273.29	280.60
8	297.06	292.01	220.62	218.67	405.24	342.14	214.34	273.98
9	361.05	262.28	242.51	239.30	328.51	209.10	283.26	385.74
10	459.73	347.52	262.49	201.90	251.13	289.06	325.86	200.73
Mean	359.64	324.93	279.87	272.48	313.86	302.20	262.97	271.14
SD	70.09	35.52	65.88	80.10	60.88	61.50	33.88	60.49



**Figure 4.1.2(a)** Boxplot for postural EMG activity of control group. RM, right masseter; LM, left masseter; RAT, right anterior temporal; LAT, left anterior temporal; 1, without splint; 2, with splint; (e.g. RM1, right masseter without splint etc.).



**Figure 4.1.2(b)** Boxplot for maximum clenching EMG activity of control group. RM, right masseter; LM, left masseter; RAT, right anterior temporal; LAT, left anterior temporal; 1, without splint; 2, with splint; (e.g. RM1, right masseter without splint etc.).

#### **4.1.2.1. Paired t-Test for EMG activity of control group (n=10)**

##### **4.1.2.1.1. Postural**

In the postural position of control group, there was no significant difference ( $P>0.05$ ) in the EMG activity before and after insertion of splint for the masseter muscle, as well as the anterior temporal muscle (Table 4.1.2.1.1).

##### **4.1.2.1.2. Maximum clenching**

There was also no significant difference ( $P>0.05$ ) in the maximum clenching activity before and after insertion of splint for the masseter muscle, as well as the anterior temporal muscle (Table 4.1.2.1.2).



**Table 4.1.2.1.1** Paired t-Test for postural EMG activity of control group

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	3.11	3.19	3.04	3.10	3.09	3.12	3.03	3.18
Variance	0.13	0.09	0.15	0.31	0.18	0.21	0.13	0.10
Observations	10	10	10	10	10	10	10	10
Difference of mean (%)	0.08 (2.66)		0.06 (1.82)		0.03 (0.89)		0.16 (5.16)	
t Statistic	-0.58		-0.31		-0.15		-0.91	
P(T<=t) two-tail	0.576		0.760		0.884		0.389	
t Critical two-tail	2.26		2.26		2.26		2.26	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.1.2.1.2** Paired t-Test for maximum clenching EMG activity of control group

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	359.64	313.86	324.93	302.20	279.87	262.97	272.48	271.14
Variance	4913.1	3706.1	1262.0	3782.7	4340.7	1148.0	6416.2	3659.3
Observations	10	10	10	10	10	10	10	10
Difference of mean (%)	-45.78 (-12.73)		-22.74 (-7.00)		-16.89 (-6.04)		-1.34 (-0.49)	
t Statistic	1.68		1.53		0.76		0.04	
P(T<=t) two-tail	0.126		0.160		0.467		0.967	
t Critical two-tail	2.26		2.26		2.26		2.26	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

#### 4.2. EMG test for experimental group after six weeks of conservative treatment

The postural and maximum clenching EMG activities before and after insertion of the splint for the masseter and anterior temporal muscles of the experimental group, after six weeks of conservative treatment, were shown in the Table 4.2(a) and Table 4.2(b) respectively. They were also shown in boxplots (Figure 4.2(a) and Figure 4.2(b)).

**Table 4.2(a)** Postural EMG activity of experimental group after six weeks of conservative treatment

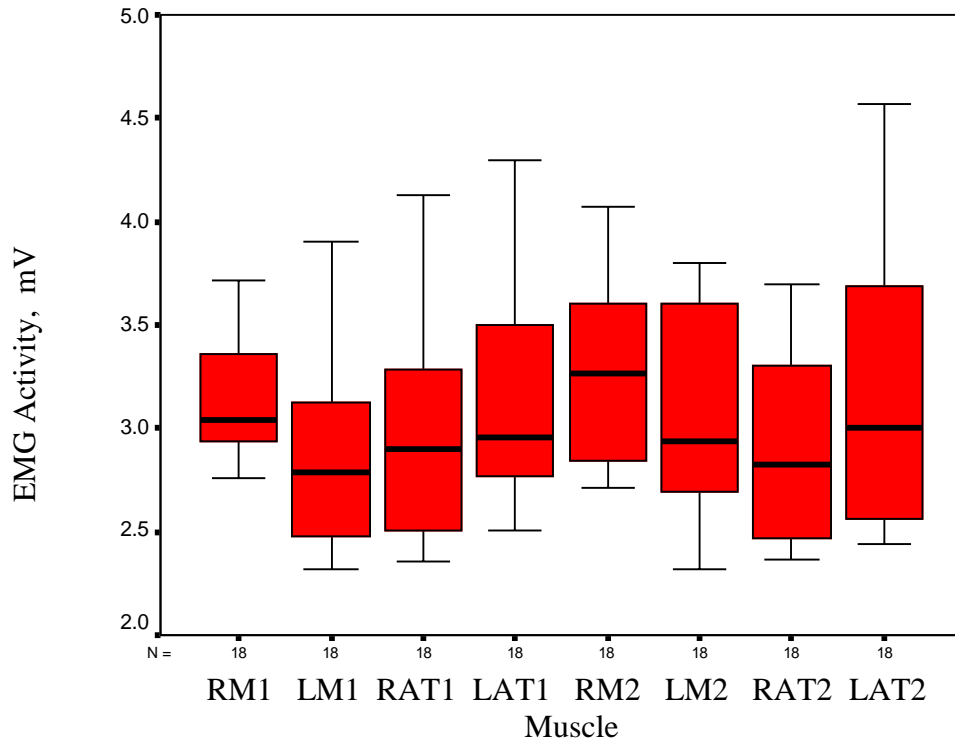
Subject No.	Postural EMG Activity, $\mu\text{V}$							
	Without Splint				With Splint			
	Masseter		Anterior Temporal		Masseter		Anterior Temporal	
	Right	Left	Right	Left	Right	Left	Right	Left
1	3.53	3.44	3.28	3.50	3.79	3.80	3.66	3.75
2	3.36	2.47	3.44	3.19	3.61	3.00	2.86	2.75
3	2.95	3.12	3.01	2.96	2.77	3.60	2.68	2.89
4	3.20	2.67	2.41	2.79	3.15	2.84	2.40	2.92
5	3.65	2.91	2.54	2.67	4.07	2.80	2.46	3.69
6	2.81	2.32	2.51	2.51	2.80	2.32	2.47	2.44
7	2.79	3.67	2.61	3.67	2.71	3.17	2.40	3.25
8	2.95	3.90	2.72	2.77	3.56	3.78	3.31	3.09
9	2.97	2.48	3.13	3.54	3.00	2.44	3.35	3.44
10	3.54	3.78	4.13	3.92	3.59	3.79	3.70	4.14
11	3.71	2.36	2.35	2.54	3.89	2.79	2.68	2.47
12	2.76	2.81	3.44	2.82	2.74	2.88	2.89	3.79
13	2.94	2.64	2.98	3.15	3.49	3.13	2.80	2.64
14	3.17	2.92	3.30	2.95	2.98	3.49	3.01	2.53
15	3.05	2.57	2.49	2.80	2.85	2.33	2.36	2.52
16	2.79	2.39	2.41	2.61	2.93	2.45	2.63	2.56
17	3.03	2.76	3.08	3.47	3.39	2.69	3.49	3.30
18	3.13	3.05	2.82	4.29	3.86	3.71	2.92	4.56
Mean	3.13	2.90	2.92	3.12	3.29	3.06	2.89	3.15
SD	0.31	0.50	0.48	0.51	0.46	0.53	0.44	0.63

Subject with number 1 to 13 were those with resolved pain after six weeks of conservative treatment; subject with number 14-18 were those with unresolved pain.

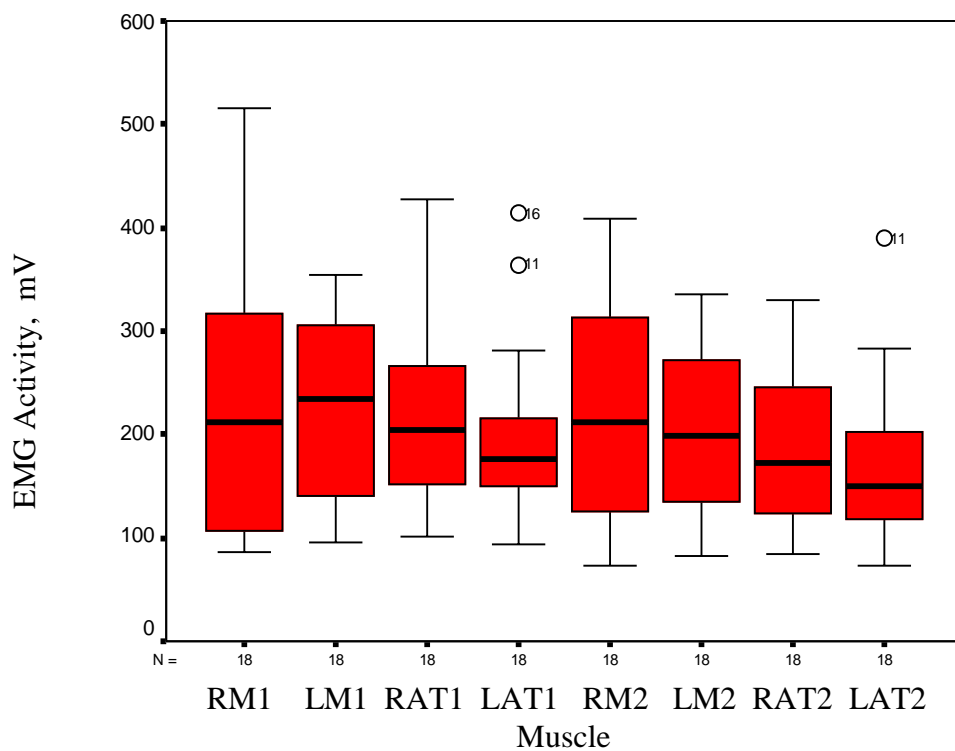
**Table 4.2(b)** Maximum clenching EMG activity of experimental group after six weeks of conservative treatment

Subject No.	Maximum Clenching EMG Activity, $\mu\text{V}$							
	Without Splint				With Splint			
	Masseter		Anterior Temporal		Masseter		Anterior Temporal	
	Right	Left	Right	Left	Right	Left	Right	Left
1	300.47	304.59	281.48	246.99	314.21	326.16	252.34	244.49
2	102.96	95.90	127.29	94.52	126.39	82.99	106.92	98.16
3	183.33	189.85	231.33	200.22	266.89	272.74	276.05	283.43
4	156.75	245.88	152.82	95.17	93.95	174.88	84.39	85.73
5	408.43	221.43	266.96	178.89	301.08	197.23	210.22	167.21
6	268.57	346.91	285.83	216.23	241.48	244.66	216.50	168.58
7	157.98	276.37	201.21	281.76	183.52	191.83	195.39	142.41
8	89.57	140.14	119.56	149.28	93.96	134.85	124.63	152.64
9	106.24	133.72	152.20	163.91	115.37	124.79	151.93	128.33
10	238.81	206.52	208.82	165.54	261.74	254.61	147.33	143.45
11	317.76	305.66	340.53	364.46	338.27	335.74	329.15	389.63
12	303.92	257.96	153.20	174.29	160.72	159.89	124.85	118.40
13	148.41	140.97	170.46	163.75	177.00	199.79	139.88	157.78
14	376.16	321.02	223.27	200.65	409.32	309.85	245.82	202.75
15	86.77	109.94	107.91	110.02	73.70	88.35	94.79	73.06
16	515.40	353.83	426.86	414.06	333.58	248.81	286.12	276.75
17	100.80	95.28	101.15	140.97	126.67	124.67	99.17	92.69
18	332.02	354.81	226.24	190.36	313.84	319.56	194.33	146.18
Mean	233.02	227.82	209.84	197.28	218.43	210.63	182.21	170.65
SD	126.58	92.45	86.72	85.12	102.80	82.38	73.86	81.76

Subject with number 1 to 13 were those with resolved pain after six weeks of conservative treatment; subject with number 14-18 were those with unresolved pain.



**Figure 4.2(a)** Boxplot for postural EMG activity of experimental group after six weeks of conservative treatment. RM, right masseter; LM, left masseter; RAT, right anterior temporal; LAT, left anterior temporal; 1, without splint; 2, with splint; (e.g. RM1, right masseter without splint etc.).



**Figure 4.2(b)** Boxplot for maximum clenching EMG activity of experimental group after six weeks of conservative treatment. RM, right masseter; LM, left masseter; RAT, right anterior temporal; LAT, left anterior temporal; 1, without splint; 2, with splint; (e.g. RM1, right masseter without splint etc.).

#### **4.2.1. Paired t-Test for EMG activity of experimental group after six weeks of conservative treatment**

##### **4.2.1.1. Postural**

After six weeks of conservative treatment includes splint therapy, there was a significant increase ( $P < 0.03$ ) in the postural activity after insertion of splint for the right masseter muscle, but not the left ( $P > 0.05$ ). There was no significant difference ( $P > 0.05$ ) in the postural activity before and after insertion of splint for the anterior temporal muscle (Table 4.2.1.1).

##### **4.2.1.2. Maximum clenching**

After six weeks of conservative treatment, there was a significant decrease in the clenching activity after insertion of splint for right anterior temporal ( $P < 0.02$ ) and also left anterior temporal muscle ( $P < 0.05$ ). There was no significant difference ( $P > 0.05$ ) in the clenching activity before and after insertion of splint for the masseter muscle (Table 4.2.1.2).

**Table 4.2.1.1** Paired t-Test for postural EMG activity of experimental group after six weeks of conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	3.13	3.29	2.90	3.06	2.92	2.89	3.12	3.15
Variance	0.10	0.21	0.25	0.28	0.23	0.19	0.26	0.40
Observations	18	18	18	18	18	18	18	18
Difference of mean (%)	0.16 (5.09)		0.15 (5.23)		-0.03 (-1.09)		0.03 (1.00)	
t Statistic	-2.37		-2.00		0.40		-0.30	
P(T<=t) two-tail	0.030		0.062		0.696		0.765	
t Critical two-tail	2.11		2.11		2.11		2.11	
Significance of difference	Yes (P<0.03)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.2.1.2** Paired t-Test for maximum clenching EMG activity of experimental group after six weeks of conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	233.02	218.43	227.82	210.63	209.84	182.21	197.28	170.65
Variance	16021	10567	8547	6786	7520	5456	7245	6685
Observations	18	18	18	18	18	18	18	18
Difference of mean (%)	-14.59 (-6.26)		-17.19 (-7.54)		-27.63 (-13.17)		-26.63 (-13.50)	
t Statistic	0.91		1.28		2.82		2.17	
P(T<=t) two-tail	0.375		0.219		0.012		0.045	
t Critical two-tail	2.11		2.11		2.11		2.11	
Significance of difference	No (P>0.05)		No (P>0.05)		Yes (P<0.02)		Yes (P<0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

## **4.2.2. Paired t-Test for EMG activity of TMD patients with resolved and unresolved pain after six weeks of conservative treatment**

### **4.2.2.1. Paired t-Test for EMG activity of TMD patients with resolved pain (n=13)**

#### **4.2.2.1.1. Postural**

After six weeks of conservative treatment, TMD patients with resolved pain generally showed no significant difference ( $P>0.05$ ) in the postural EMG activity of the anterior temporal and masseter muscles before and after insertion of the splint, except there was a significant increase in the postural activity for the right masseter muscle ( $P<0.05$ ) (Table 4.2.2.1.1).

#### **4.2.2.1.2. Maximum clenching**

After six weeks of conservative treatment, TMD patients with resolved pain generally showed no significant difference ( $P>0.05$ ) in the maximum clenching activity of the anterior temporal and masseter muscles before and after insertion of the splint, except there was a significant decrease in the maximum clenching activity of the right anterior temporal muscle ( $P<0.02$ ) (Table 4.2.2.1.2).

**Table 4.2.2.1.1** Paired t-Test for postural EMG activity of TMD patients with resolved pain after six weeks of conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	3.17	3.32	2.97	3.10	2.97	2.90	3.08	3.17
Variance	0.12	0.23	0.31	0.25	0.27	0.21	0.21	0.30
Observations	13	13	13	13	13	13	13	13
Difference of mean (%)	0.16 (4.91)		0.14 (4.55)		-0.07 (-2.32)		0.09 (3.04)	
t Statistic	-2.23		-1.59		0.68		-0.71	
P(T<=t) two-tail	0.046		0.138		0.509		0.494	
t Critical two-tail	2.18		2.18		2.18		2.18	
Significance of difference	Yes (P<0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.2.2.1.2** Paired t-Test for maximum clenching EMG of TMD patients with resolved pain after six weeks of conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	214.09	205.74	220.45	207.70	207.05	181.51	191.92	175.40
Variance	9901	7448	6037	5812	4832	5268	5413	7072
Observations	13	13	13	13	13	13	13	13
Difference of mean (%)	-8.36 (-3.90)		-12.75 (-5.78)		-25.55 (-12.34)		-16.52 (-8.61)	
t Statistic	0.49		0.75		2.78		1.17	
P(T<=t) two-tail	0.635		0.467		0.017		0.263	
t Critical two-tail	2.18		2.18		2.18		2.18	
Significance of difference	No (P>0.05)		No (P>0.05)		Yes (P<0.02)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).



#### **4.2.2.2. Paired t-Test for EMG activity of TMD patients with unresolved pain (n=5)**

##### **4.2.2.2.1. Postural**

After six weeks of conservative treatment among TMD patients with unresolved pain, there was no significant difference ( $P>0.05$ ) in the postural activity before and after insertion of splint for both the masseter and anterior temporal muscles (Table 4.2.2.2.1).

##### **4.2.2.2.2. Maximum clenching**

Among TMD patients with unresolved pain, there was also no significant difference ( $P>0.05$ ) in the maximum clenching activity before and after insertion of splint for both the masseter and anterior temporal muscles (Table 4.2.2.2.2).

**Table 4.2.2.2.1** Paired t-Test for postural EMG activity of TMD patients with unresolved pain after six weeks of conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	3.03	3.20	2.74	2.93	2.82	2.88	3.23	3.09
Variance	0.02	0.18	0.07	0.39	0.14	0.18	0.46	0.78
Observations	5	5	5	5	5	5	5	5
Difference of mean (%)	0.17 (5.57)		0.20 (7.13)		0.06 (2.28)		-0.13 (-4.07)	
t Statistic	-0.96		-1.10		-0.51		1.11	
P(T<=t) two-tail	0.392		0.331		0.634		0.329	
t Critical two-tail	2.78		2.78		2.78		2.78	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.2.2.2.2** Paired t-Test for maximum clenching EMG activity of TMD patients with unresolved pain after six weeks of conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	282.23	251.42	246.98	218.25	217.09	184.04	211.21	158.29
Variance	34198	20682	17580	11305	17372	7378	14217	6931
Observations	5	5	5	5	5	5	5	5
Difference of mean (%)	-30.81 (-10.92)		-28.73 (-11.63)		-33.04 (-15.22)		-52.93 (-25.06)	
t Statistic	0.79		1.31		1.17		2.31	
P(T<=t) two-tail	0.475		0.260		0.308		0.082	
t Critical two-tail	2.78		2.78		2.78		2.78	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

### **4.2.3. Paired t-Test for EMG activity of TMD patients with resolved and unresolved pain before conservative treatment**

#### **4.2.3.1. Paired t-Test for EMG activity of TMD patients with resolved pain (n=13) before conservative treatment**

##### **4.2.3.1.1. Postural**

Before the conservative treatment, TMD patients with resolved pain generally showed no significant difference ( $P>0.05$ ) in the postural EMG activity of the anterior temporal and masseter muscles before and after insertion of the splint, except there was a significant increase in the postural activity for the left anterior temporal muscle ( $P<0.03$ ) (Table 4.2.3.1.1).

##### **4.2.3.1.2. Maximum clenching**

Before the conservative treatment, TMD patients with resolved pain generally showed no significant difference ( $P>0.05$ ) in the maximum clenching activity of the anterior temporal and masseter muscles before and after insertion of the splint, except there was a significant decrease in the maximum clenching activity of the right anterior temporal muscle ( $P<0.05$ ) (Table 4.2.3.1.2).

**Table 4.2.3.1.1** Paired t-Test for postural EMG activity of TMD patients with resolved pain before conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	3.29	3.35	3.28	3.21	3.15	3.18	3.16	3.33
Variance	0.22	0.34	0.27	0.31	0.31	0.44	0.21	0.24
Observations	13	13	13	13	13	13	13	13
Difference of mean (%)	0.06 (1.75)		-0.07 (-2.07)		0.03 (1.09)		0.17 (5.41)	
t Statistic	-0.83		0.75		-0.36		-2.58	
P(T<=t) two-tail	0.425		0.470		0.723		0.024	
t Critical two-tail	2.18		2.18		2.18		2.18	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		Yes (P<0.03)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.2.3.1.2** Paired t-Test for maximum clenching EMG activity of TMD patients with resolved pain before conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	206.81	183.46	217.08	188.75	191.68	154.90	194.66	155.02
Variance	8530	5314	9276	7354	9861	3740	11696	4856
Observations	13	13	13	13	13	13	13	13
Difference of mean (%)	-23.36 (-11.29)		-28.32 (-13.05)		-36.78 (-19.19)		-39.65 (-20.37)	
t Statistic	1.42		1.51		2.24		2.14	
P(T<=t) two-tail	0.182		0.158		0.045		0.054	
t Critical two-tail	2.18		2.18		2.18		2.18	
Significance of difference	No (P>0.05)		No (P>0.05)		Yes (P<0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

#### **4.2.3.2. Paired t-Test for EMG activity of TMD patients with unresolved pain (n=5)**

##### **4.2.3.2.1. Postural**

Before conservative treatment, among TMD patients with unresolved pain there was no significant difference ( $P>0.05$ ) in the postural activity before and after insertion of splint for both the masseter and anterior temporal muscles (Table 4.2.3.2.1).

##### **4.2.3.2.2. Maximum clenching**

Among TMD patients with unresolved pain, there was also no significant difference ( $P>0.05$ ) in the maximum clenching activity before and after insertion of splint for both the masseter and anterior temporal muscles (Table 4.2.3.2.2).

**Table 4.2.3.2.1** Paired t-Test for postural EMG activity of TMD patients with unresolved pain before conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	3.33	3.52	3.38	3.40	3.30	3.15	3.31	3.29
Variance	0.11	0.33	0.48	0.46	0.40	0.31	0.26	0.39
Observations	5	5	5	5	5	5	5	5
Difference of mean (%)	0.19 (5.69)		0.02 (0.54)		-0.15 (-4.49)		-0.02 (-0.50)	
t Statistic	-0.90		-0.11		0.71		0.07	
P(T<=t) two-tail	0.421		0.920		0.517		0.950	
t Critical two-tail	2.78		2.78		2.78		2.78	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

**Table 4.2.3.2.2** Paired t-Test for maximum clenching EMG activity of TMD patients with unresolved pain before conservative treatment

Statistic	Masseter				Anterior Temporal			
	Right		Left		Right		Left	
	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint	without Splint	with Splint
Mean	300.61	258.06	258.42	209.59	186.31	161.54	183.65	142.45
Variance	28708	19494	19442	10837	17121	8236	8138	2703
Observations	5	5	5	5	5	5	5	5
Difference of mean (%)	-42.54 (-14.15)		-48.83 (-18.89)		-24.77 (-13.29)		-41.20 (-22.43)	
t Statistic	1.94		1.71		1.23		2.10	
P(T<=t) two-tail	0.125		0.162		0.288		0.104	
t Critical two-tail	2.78		2.78		2.78		2.78	
Significance of difference	No (P>0.05)		No (P>0.05)		No (P>0.05)		No (P>0.05)	

- 1) P(T<=t) two-tail gives the probability that a value of the t-Statistic would be observed that is larger in absolute value than t.
- 2) t Critical two-tail gives the cutoff value so that the probability of an observed t-Statistic larger in absolute value than "t Critical two-tail" is Alpha (0.05).

### **4.3. TMD sign and symptoms distribution**

#### **4.3.1. Signs and symptoms before conservative treatment (Table 4.3.1)**

##### **4.3.1.1. Muscle pain**

In the experimental group, 14 (77.8%) subjects complained of masticatory muscle pain. Among them, 5 (27.8%) had pain on the right side only, 4 (22.2%) left side only and 5 (27.8%) both. Overall, 9 (50.0%) subjects had pain on the right side and 10 (55.6%) on the left.

##### **4.3.1.2. Joint pain**

Ten (55.6%) subjects out of the experimental group complained of TMJ pain. Three (16.7%) had pain on the right side only, 5 (27.8%) on the left side only and 2 (11.1%) on the both sides. Overall, 5 (27.8%) had pain on the right and 7 (38.9%) on the left.

##### **4.3.1.3. Muscle and joint pain**

In the experimental group, 6 (33.3%) subjects presented with muscle and joint pain at the same time, whereas 8 (44.4%) had muscle pain only and another 4 (22.2%) had joint pain only.

##### **4.3.1.4. Joint click**

Thirteen (72.2%) subjects presented with TMJ click during movement of which 5 (27.8%) had single side clicking and 8 had (44.4%) both sides clicking.

#### **4.3.1.5. Limitation of mouth-opening**

Nine (50.0%) subjects had limitation of mouth-opening. Generally, 6 (33.3%) of them were due to muscle pain and joint pain or obstruction, while the other 3 (16.7%) was due to either joint pain or obstruction only.

#### **4.3.1.6. Limitation of lateral mandible movement**

Ten (55.6%) subjects exhibited limitation of lateral mandible movement.

#### **4.3.1.7. Mandible deviation during mouth-opening**

Fourteen (77.8%) subjects exhibited mandibular deviation during mouth opening of which 6 (33.3%) of them were lasting deviations while the remaining 8 (44.4%) were transient deviations.

### **4.3.2. Signs and symptoms after six weeks of conservative treatment (Table 4.3.2)**

#### **4.3.2.1. Muscle pain (n= 14)**

After six weeks of conservative treatment, out of the 14 (100%) subjects who had complained of having masticatory muscle pain, 11 (78.6%) regained their routine oral function without pain while 3 (21.4%) still having pain on function. Out of the 11 subjects who regained their routine oral function without pain, 7 (50.0%) subjects had minor pain upon attempting maximum mouth-opening.

#### **4.3.2.2. Joint pain (n= 10)**

After conservative treatment, out of the 10 (100%) subjects who had complained of having TMJ pain, 7 (70%) regained their routine oral function without pain while 3 (30.0%) still having pain on function.



#### **4.3.2.3. Muscle and joint pain (n= 18)**

After conservative treatment, 13 (72.2%) had resumed their routine oral function without muscle and/or joint pain, while 5 (27.8%) still having pain on function.

#### **4.3.2.4. Joint click (n= 13)**

After conservative treatment, out of the 13 (100%) subjects who presented with TMJ click during movement, only one (8%) subsided while the remaining 12 subjects (92%) continued to have TMJ click.

#### **4.3.2.5. Limitation of mouth-opening (n= 9)**

After conservative treatment, out of the 9 (100%) subjects who had limitation of mouth-opening, 4 (44.4%) subsided while the remaining 5 (55.6%) still had limitation of mouth-opening.

#### **4.3.2.6. Limitation of lateral mandible movement (n= 10)**

After conservative treatment, out of the 10 (100%) subjects who exhibited limitation of lateral mandible movement, only one (10.0%) subsided while the remaining 9 (90.0%) continued to have limitation of lateral mandible movement.

#### **4.3.2.7. Mandible deviation during mouth-opening (n= 14)**

After the conservative treatment, out of the fourteen subjects who exhibited mandible deviation during mouth-opening, none of them resolved.

**Table 4.3.1** Signs and symptoms of TMD patients before conservative treatment

Subject No.	Muscle pain		Joint pain		Click		Limited opening		Limited excursion		Deviated opening	
	Right	Left	Right	Left	Right	Left	d/t M	d/t J	< Right	Left >	< Right	Left >
1		+			+	+						+
2	+		+		+		+	+	+			+
3	+					+				+	++	
4				+							+	
5				+		+					+	
6		+		+				+	+			++
7	+	+			+	+			+			+
8		+			+	+			+	+		
9	+		+		+		+	+		+	++	
10		+							+	+	+	
11	+	+			+	+						+
12	+	+	+	+	+	+	+	+	+	+		
13	+	+	+	+			+	+	+	+		++
14				+		+		+				+
15			+		+	+						++
16	+				+	+	+	+			++	
17	+							+	+	+		
18	+	+		+	+	+	+	+				
Subtotal (%)	9 (50.0)	10 (55.6)	5 (27.8)	7 (38.9)	10 (55.6)	11 (61.1)	6 (33.3)	9 (50.0)	7 (38.9)	7 (38.9)	6 (33.3)	8 (44.4)
Total (%)	14 (77.8)		10 (55.6)		13 (72.2)		9 (50.0)		10 (55.6)		14 (77.8)	
Grand Total (%)	18 (100)											

1) \*, Symptoms resolved after six weeks of conservative treatment

2) Deviation: +, transient deviation; ++, lasting deviation; others: +, present of respective signs and symptoms.

3) d/t M, due to muscle pain; d/t J, due to joint pain or obstruction; < Right, to the right; Left >, to the left.

**Table 4.3.2** Signs and symptoms of TMD patients after six weeks of conservative treatment

Subject No.	Muscle pain		Joint pain		Click		Limited opening		Limited excursion		Deviated opening	
	Right	Left	Right	Left	Right	Left	d/t M	d/t J	< Right	Left >	< Right	Left >
1					+	+						+
2												+
3						+				+	++	
4											+	
5						+					+	
6								+	+			++
7	#	#			+	+			+			+
8		#			+	+			+	+		
9	#				+					+	++	
10		#							+	+	+	
11	#	#			+	+						+
12	#				+	+			+	+		
13	#	#							+	+		++
14				+		+		+				+
15			+		+	+						++
16	+				+	+	+	+			++	
17	+							+	+	+		
18		+		+	+	+	+	+				
Subtotal (%)	2 (11.1)	1 (5.6)	1 (5.6)	2 (11.1)	9 (50.0)	11 (61.1)	2 (11.1)	5 (27.8)	7 (38.9)	7 (38.9)	6 (33.3)	8 (44.4)
Total (%)	3 (16.7)		3 (16.7)		12 (66.7)		5 (27.8)		9 (50.0)		14 (77.8)	
Grand Total (%)	5 (27.8)											

- 1) #, no pain at routine oral functional movement but slight pain at maximum opening
- 2) Deviation: +, transient deviation; ++, lasting deviation; others: +, present of respective signs and symptoms.
- 3) d/t M, due to muscle pain; d/t J, due to joint pain or obstruction; < Right, to the right; Left >, to the left.

### 4.3.3. Effectiveness of conservative treatments

Thirteen (72.2%) subjects reported resumption of their routine oral functions without pain whereas the other 5 (27.8%) did not. For this respect, the effectiveness of conservative treatments in relieving the symptoms of temporomandibular disorders was 72.2% (Table 4.3.3). Among subjects with resolved pain, 5 were diagnosed with myofascial pain, 4 with arthralgia with disc displacement and 5 with both disorders.

#### 4.3.3.1. Patient's comments on the usefulness of splint

Only 4 (22.2%) patients had commented that the soft splint was useful in relieving the symptoms. There were also 4 (22.2%) patients who commented that the splint made them feel worse, while 10 (55.6%) others remained neutral (Table 4.3.3).

**Table 4.3.3** Effectiveness of conservative treatment and patient's comments on splint therapy

Subject No.	Effectiveness of conservative treatment		Patient's comment on splint therapy		
	effective	Ineffective	Positive	Negative	Neutral
1	+				+
2	+				+
3	+				+
4	+				+
5	+		+		
6	+		+		
7	+		+		
8	+			+	
9	+				+
10	+		+		
11	+				+
12	+				+
13	+				+
14		+		+	
15		+		+	
16		+		+	
17		+			+
18		+			+
No. (%)	13 (72.2)	5 (27.8)	4 (22.2)	4 (22.2)	10 (55.6)

- 1) Effectiveness of conservative treatment with the duration of six weeks:
  - a) Effective: +, patient resumed their routine oral functions without pain.
  - b) Ineffective: +, patient still had pain during their routine oral functions.
- 2) Patient's comments on splint therapy:
  - a) Positive: +, splint had improved their symptoms.
  - b) Negative: +, splint had worsened their symptoms.
  - c) Neutral: +, splint had neither improved nor worsened their symptoms.

#### **4.4.1. Demographic distribution**

##### **4.4.1.1. Sex**

Eighteen subjects were recruited for this study. There were 14 (77.8%) females and 4 (22.2%) males (Table 4.4.1(a)) (Figure 4.4.1(a)).

##### **4.4.1.2. Race**

The experimental group comprised 9 (50.0%) Malays, 5 (27.8%) Chinese and 4 (22.2%) Indians (Table 4.4.1(a)) (Figure 4.4.1(b)).

##### **4.4.1.3. Age**

The overall mean age was 28.9 years ( $SD_{\pm} 10.9$ ) and the age range was 14 to 55 years (Table 4.4.1(b)).

Within the male group, the mean age was 33.3 years ( $SD_{\pm} 17.6$ ) with an age range of 15-55 years, while in the female group the mean age was 27.6 years ( $SD_{\pm} 8.8$ ) with an age range of 14-42 years (Table 4.4.1(b)) (Figure 4.4.1(a)).

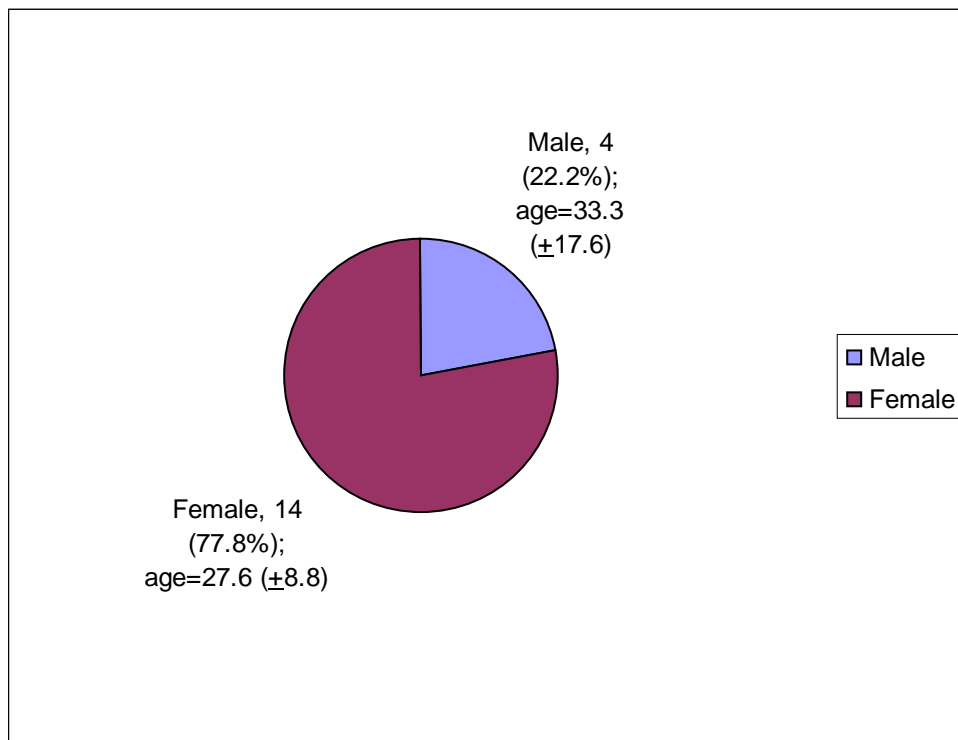
Analysis according to race revealed that the mean age for the Malays was 25.2 years ( $SD_{\pm} 8.3$ ) with an age range of 14-39 years; Chinese 28.6 years ( $SD_{\pm} 7.6$ ), age range 22-41 years; and Indians 37.5 years ( $SD_{\pm} 16.7$ ), age range 15-55 years (Table 4.4.1(b)) (Figure 4.4.1(b)).

**Table 4.4.1(a)** Sex and race distribution of TMD patients

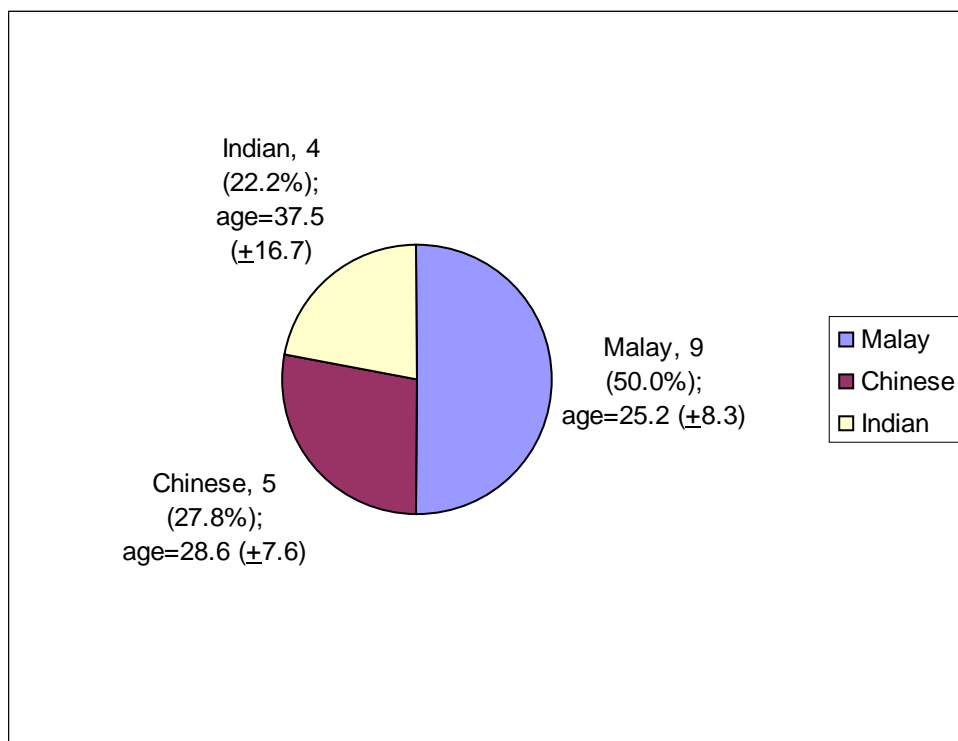
Subject No.	Sex		Race		
	Male	Female	Malay	Chinese	Indian
1		Female		Chinese	
2		Female	Malay		
3	Male		Malay		
4		Female	Malay		
5		Female			Indian
6		Female	Malay		
7		Female	Malay		
8		Female		Chinese	
9		Female		Chinese	
10		Female			Indian
11	Male				Indian
12		Female		Chinese	
13		Female			Indian
14	Male		Malay		
15		Female	Malay		
16		Female		Chinese	
17		Female	Malay		
18	Male		Malay		
Group Total (%)	4 (22.2)	14 (77.8)	9 (50.0)	5 (27.8)	4 (22.2)
Grand total (%)	18 (100)		18 (100)		

**Table 4.4.1(b)** Age distribution of TMD patients

Subject No.	Age (year)				
	Sex		Race		
	Male	Female	Malay	Chinese	Indian
1		22		22	
2		24	24		
3	39		39		
4		24	24		
5		15			15
6		27	27		
7		24	24		
8		41		41	
9		29		29	
10		38			38
11	55				55
12		28		28	
13		42			42
14	24		24		
15		14	14		
16		23		23	
17		36	36		
18	15		15		
Mean (SD)	33.3 ( $\pm$ 17.6)	27.6 ( $\pm$ 8.8)	25.2 ( $\pm$ 8.3)	28.6 ( $\pm$ 7.6)	37.5 ( $\pm$ 16.7)
Mean for all (SD)	28.9 ( $\pm$ 10.9)		28.9 ( $\pm$ 10.9)		



**Figure 4.4.1(a)** Sex distribution of TMD patients, number of patients (percentage); mean of age in year (SD).



**Figure 4.4.1(b)** Race distribution of TMD patients, number of patients (percentage); mean of age in year (SD).

#### **4.4.2. Dentition characteristic (Table 4.4.2)**

##### **4.4.2.1. Incisor relationship**

In this sample, 6 (33.3%) subjects each had Class I incisor and Class II division 1 incisor relationship, 5 (27.8%) Class III, and 1 (5.6%) Class II division 2.

##### **4.4.2.2. Anterior Guidance**

Eleven (61.1%) subjects had group function on posterior teeth, while 2 (11.1%) had group function on anterior teeth and 5 (27.8%) had canine guidance.

##### **4.4.2.3. Deep overbite**

Four (22.2%) subjects had deep overbite.

##### **4.4.2.4. Deviated occlusal plane**

Three (16.7%) subjects had deviated occlusal plane.

##### **4.4.2.5. Crowding**

Three (16.7%) subjects had moderate to severe crowding.

##### **4.4.2.6. Interference on lateral excursion**

Thirteen (72.2%) subjects had non-working side interference on lateral excursion.



**Table 4.4.2** Dentition characteristic of TMD patients

Subject No.	Incisor classification				Anterior guidance			Deep overbite	Deviated occlusion	Crowding	Interference
1			II/2			group-ant		+		+	+
2	I						group-post				
3				III			group-post				
4	I				canine						+
5		II/1			canine						+
6				III			group-post		+		+
7	I						group-post				+
8				III			group-post				
9				III			group-post			+	+
10		II/1					group-post	+			+
11		II/1			canine				+		+
12				III		group-ant		+			+
13		II/1					group-post	+	+		+
14	I				canine						+
15		II/1					group-post			+	
16	I						group-post		+		+
17		II/1			canine						+
18	I						group-post				
Subtotal (%)	6 (33.3)	6 (33.3)	1 (5.6)	5 (27.8)	5 (27.8)	2 (11.1)	11 (61.1)	4 (22.2)	4 (22.2)	3(16.7)	13(72.2)

- 1) Group-ant, group function on the anterior teeth; group-post, group function on the posterior teeth; +, present of the respective characteristic.
- 2) Subject with number 1 to 13 were those with resolved pain after six weeks of conservative treatment; subject with number 14-18 were those with unresolved pain

### **4.4.3. Functional overloading (Table 4.4.3)**

#### **4.4.3.1. Parafunctional habits**

Although having parafunctional habit was not an inclusion criterion, all of the 18 patients were found to have some sort of parafunctional habits. All of them had either clenching or/and grinding habits. There were 11 (61.1%) of them have clenching habit and grinding 14 (77.8%) of them. Eleven (61.1%) patient had reported of habits of resting the jaw on the hand, while 8 (44.4%) had the parafunctional habits of object biting.

#### **4.4.3.2. Adverse usage**

There were 12 (66.7%) patients had reported of adverse usage of the masticatory system, which all these 12 patients had preference in taking hard diet. Four (22.2%) patients had poor sleeping posture that they usually slept on stomach. Three (16.7%) patients frequently yawn widely. One patient had task-related adverse usage that she often played tuba.

**Table 4.4.3** Parafunctional habit and adverse usage of the masticatory system of the TMD patients

Subject No.	Parafunctional habit				Adverse usage				
	Clenching	Grinding	Object biting	Jaw leaning	Hard diet	Gum chewing	Sleeping on stomach	Task related	Yawning
1	+		+	+	+	+			
2	+	+		+	+				
3		+		+	+	+			+
4	+		+	+					
5	+	+		+	+	+		+	+
6	+	+		+	+				+
7		+							
8		+	+	+	+				
9	+	+					+		
10		+		+	+				
11	+	+	+		+				
12	+	+		+	+				
13	+		+	+					
14	+		+	+	+	+	+		
15		+	+	+	+		+		
16		+	+		+		+		
17	+	+							
18		+							
Total (%)	11 (61.1)	14 (77.8)	8 (44.4)	12 (66.7)	12 (66.7)	4 (22.2)	4 (22.2)	1 (5.6)	3 (16.7)
Grand Total (%)	18 (100)				13 (72.2)				

1) +, present of the respective type of functional overloading.

2) Subject with number 1 to 13 were those with resolved pain after six weeks of conservative treatment; subject with number 14-18 were those with unresolved pain.