

CHAPTER IV

RESULTS



4.1 To explore the usefulness of IOD plus NEED programme by making comprehensive comparison of the efficacies of NEED plus mandibular implant-supported overdentures (IOD), IOD only, conventional dentures (CD) plus NEED and conventional dentures (CD) in Thai elderly edentulous people in Prachatipat hospital, Pathumthani province, in the aspect of satisfaction, OHRQoL (Oral health related quality of life), nutritional improvement, and cost-effectiveness.

The study design of this research was a Randomized clinical trial. The NEED nutritional education was provided by staffs from BMA (Bangkok Metropolitan Administration) together with researcher, one public health nurse and dental assistances including one nutritionist. The effectiveness of the study was assessed by pretest, post 1 month, post 3 months and post 6 months during the period from September 2010 to March 2011. Failure of implant after the surgery was 5 out of 132 implants (2 Mandibular implants were inserted in one patient). Three implants were lost during surgery part and 2 implants were lost after prosthetic load. The researcher replaced new implants in all cases and all were successes, thus still included in study.

The study results were presented in 2 parts, as follow:

4.1.1 Part 1 Characteristics of the samples

4.1.2 Part 2 To explore the usefulness of IOD plus NEED programme by making comprehensive comparison of the efficacies of NEED plus mandibular implant-supported overdentures (IOD), IOD only, conventional dentures (CD) plus NEED and conventional dentures (CD).

4.1.1 Part 1 Characteristics of the samples

The sample characteristics are presented in Table (4). Out of the 33 participants in each group, 48.48% (n=16) of the “IODNEED” participants, 75.76% (n=25) of the

Table 4 General characteristics of the participants among the four groups

General characteristics	IOD NEED % (n= 33)	IOD % (n= 33)	CD NEED % (n= 33)	CD Control % (n= 33)	Test of group differences	
Gender						
Female	(48.48) 16	(75.76) 25	(57.58) 19	(63.64) 21	$\chi^2=5.464$, df=3, p=0.141*	
Male	(51.52) 17	(24.24) 8	(42.42) 14	(36.36) 12		
Age	Mean±SD	70.15±5.65	68.12±4.71	70.03±4.52	68.64±5.06	p= 0.261, df=3 (one way ANOVA)
	Mini: Maxi	65-83	65-80	65-81	65-81	
Age at Edentulous						
	Mean±SD	62.00±6.15	59.42±4.01	60.36±6.06	60.42±4.80	p= 0.270, df=3 (one way ANOVA)
	Mini: Maxi	50-80	50-73	48-73	40-72	
Current living status						
	Family	(87.88) 29	(84.85) 28	(87.88) 29	(93.94) 31	$\chi^2=1.429$, df=3, p=0.699*
	Others	(12.12) 4	(15.15) 5	(12.12) 4	(6.06) 2	
Religious						
	Buddhist	(100) 33	(100) 33	96.97) 32	(100) 33	$\chi^2=3.023$, df=3, p=0.388*
	Muslim			(3.03) 1		
Total monthly income						
	Mean±SD	5569±3210	3803±2183	4561±3030	4136±3329	p= 0.092, df=3 (one way ANOVA)
	Mini: Maxi	1500-12000	1500-10000	2000-13000	1500-20000	
BMI (Kg/m²)						
	Mean±SD	24.39±4.12	23.77±5.35	24.91±4.13	25.12±4.09	p= 0.611, df=3 (one way ANOVA)
	Mini:Maxi	16.41-33.20	14.27-38.54	15.63-35.55	16.40-38.06	
Smoking						
	No	(72.73) 24	(78.79) 26	(75.76) 25	(78.79) 26	$\chi^2=0.464$, df=3, p=0.927*
	Yes	(27.27) 9	(21.21) 7	(24.24) 8	(21.21) 7	
Systemic diseases						
	Have not	(39.39) 13	(39.39) 13	(42.42) 14	(48.48) 16	$\chi^2=3.285$, df=3, p=0.350*
	Have	(60.61) 20	(60.61) 20	(57.58) 19	(51.52) 17	

*Asymp. Sig. (2-sided)

“IOD”, 57.58% (n=19) of the “CDNEED” and 63.64 (n=21) of the “CD Control” participants were female. There were no statistical significant differences in gender among the four groups (p=0.141).

The average age of the four groups were nearly same; 70.15, 68.12, 70.03 and 68.64 in “IODNEED”, “IOD”, “CDNEED, and “CD Control” respectively. There were also no statistical significant differences in age among the four groups ($p=0.261$).

Moreover, the average age at edentulous happened among the four groups were nearly same; 62.00, 59.42, 60.36 and 60.42 in “IODNEED”, “IOD”, “CDNEED, and “CD Control” respectively. There were also no statistical significant differences among the four groups ($p=0.270$).

Moreover, of the 33 participants in each group, most of the participants; 87.88% ($n=29$) of the “IODNEED” participants, 84.85% ($n=28$) of the “IOD”, 87.88% ($n=29$) of the “CDNEED” and 93.94 ($n=31$) of the “CD Control” participants were living with their family and the remaining were staying with others such as with son, with daughter, with housemaid, with job owner, and alone. For the person staying alone, there were 1 person in “IODNEED” group, 2 persons in “IOD” group and 1 person in “CD control” group. There were no statistical significant differences in current living status among the four groups ($p=0.699$).

All of the participants in the four groups were Buddhist except only one was Muslim in “CDNEED” group.

The average income of the all the participants among the four groups were 5569 baths in “IODNEED” group, 3803 in “IOD” group, 4561 in “CDNEED”, and 4136 in “CD Control”. As a range for income; 1500-12000 baths in “IODNEED” group, 1500-10000 baths in “IOD” group, 2000-13000 baths in “CDNEED” group and 1500-20000 baths in “CD Control” group. There were no statistical significant differences in total monthly income among the four groups ($p=0.092$).

The mean and standard deviation of BMI (Kg/m²) among the four groups were nearly same; 22.39±4.12, 23.77±5.35, 24.91±4.13 and 25.12±4.09 in “IODNEED”, “IOD”, “CDNEED, and “CD Control” respectively. There were also no statistical significant differences among the four groups (p=0.611).

Regarding the smoking, most of the participants in all four groups were non-smoking; 72.73% (n=24) in “IODNEED” group, 78.79% (n=26) in “IOD”, 75.76% (n=25) IN “CDNEED” group, and 78.79% (n=26) in “CD Control”. There were no statistical significant differences in smoking habit among the groups (p=0.927).

As for the associated systemic diseases, most of the participants in all four groups had history of chronic systemic diseases, 60.61% (n=20) in “IODNEED” group, 60.61% (n=20) in “IOD”, 57.58% (n=19) in “CDNEED” group, and 51.52% (n=17) in “CD Control”, compared with 39.39% (n=13) in “IODNEED” group, 39.39% (n=13) in “IOD”, 42.42% (n=14) in “CDNEED” group, and 48.48% (n=16) in “CD Control” had no history of chronic diseases. There were also no statistical significant differences among the four groups (p=0.350).

In “IODNEED” group, among the 33 participants: 16 were female and their occupation were as follow; 12 housewife, 2 sale clerks, 1 retired, and 1 daily wages worker, remaining 17 were male and their occupation were as follow; 7 had no jobs, 4 sale clerks, 3 Taxi-drivers, 2 retired, and 1 daily wages worker.

In “IOD” group, among the 33 participants: 25 were female and their occupation were as follow; 19 housewife, 2 sale clerks, 2 retired, 1 labour, and 1 daily wages worker, remaining 8 were male and their occupation were as follow; 5 had no jobs, 1 retired, and 2 daily wages workers.

In “CDNEED” group, among the 33 participants: 19 were female and their occupation were as follow; 15 housewife, 1 sale clerk, 1 retired, 1 housemaid, and 1 daily wages worker, remaining 14 were male and their occupation were as follow: 10 had no jobs, 2 sale clerks, 1 retired, and 1 daily wages worker.

In “CD” group, among the 33 participants: 21 were female and their occupation were as follow; 17 housewife, 2 sale clerks, 1 retired, and 1 labour, remaining 12 were male and their occupation were as follow; 10 had no jobs and 2 sale clerks.

Number of participants enrolled in each step of the research project

Groups	Pretest	Post 1 month	Post 3 months	Post 6 months	Reason for losing
IODNEED	33	33	33	33	
IOD	33	33	33	33	
CDNEED	33	33	33	32*	Expired
CD	33	33	33	33	

* 72 year-old female, daily wages worker, no smoking, Buddhist, history of systemic hypertension, P0 BMI 25.9 Kg/m². cause of death by motor cycle accident.

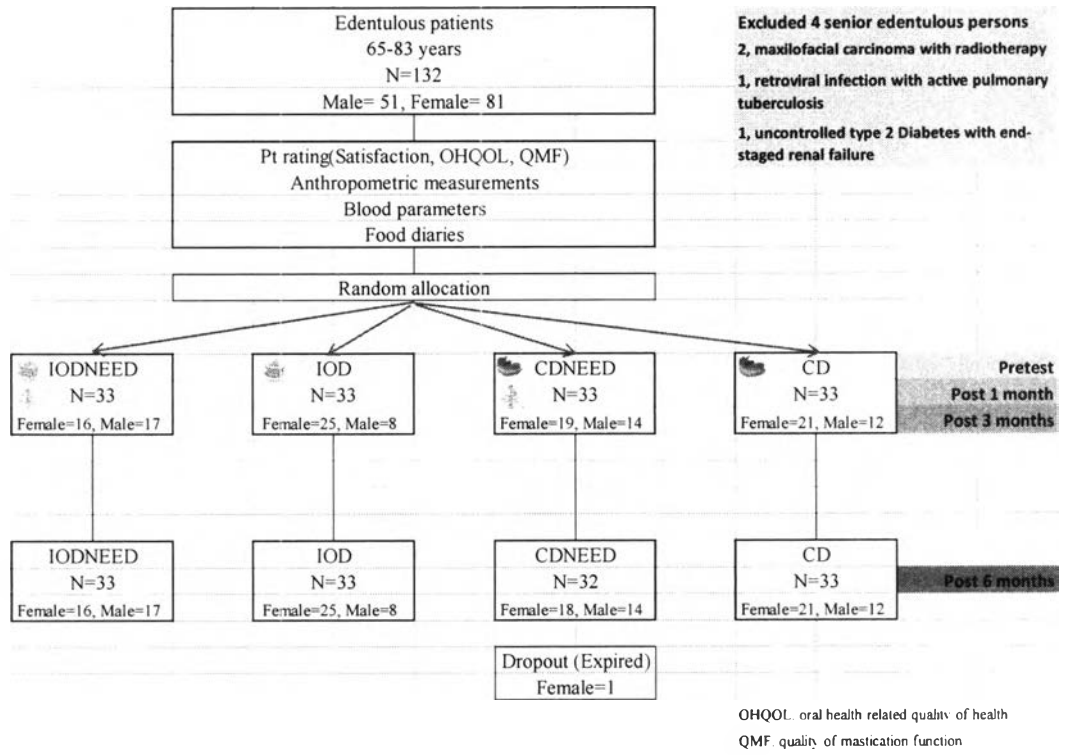


Figure 4 Participant flow and follow-up (CONSORT flow chart)

Table 5 Descriptive Statistics of (OHIP)

TIMING	IOD NEED Mean ± SD	IOD Mean ± SD	CD NEED Mean ± SD	CD Mean ± SD	N
Pretest	75.1818±19.1449	75.9394±18.0311	81.7576±14.2281	81.5455±15.3401	33/33/33/33
1 month	101.3030±12.1591	98.1515±12.1838	91.3939±13.9462	88.8182±11.1256	33/33/33/33
3 months	105.5455±8.9620	108.4848±8.1590	96.5000±14.0919	92.0303±10.7746	33/33/33/33
6 months	110.4242±5.6956	109.5152±7.4335	96.9688±13.9734	92.2424±10.8398	33/33/32/33

OHIP: Oral Health Impact Profile

As for description of mean and standard deviation of sum of scores of oral health impact profile (to measure oral health related quality of life) among the four groups:

Before the experiment: There were 75.1818±19.1449, 75.9394±18.0311, 81.7576 ± 14.2281, and 81.5455±15.3401 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the one month experiment: There were 101.3030±12.1591, 98.1515±12.1838, 91.3939±13.9462, and 88.8182±11.1256 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the three months experiment: There were 105.5455±8.9620 in the “IODNEED” group, followed by 108.4848±8.1590 in the “IOD” group, 96.5000±14.0919 in the “CDNEED” group and 92.0303±10.7746 in “CD control” group.

After the six months experiment: There were 110.4242±5.6956 in the “IODNEED” group, followed by 109.5152±7.4335 in the “IOD” group, 96.9688±13.9734 in the “CDNEED” group and 92.2424±10.8398 in “CD control” group. (Table 5)

Table 6 Descriptive Statistics of (QMF)

TIMING	IOD NEED Mean ± SD	IOD Mean ± SD	CD NEED Mean ± SD	CD Mean ± SD	N
Pretest	68.3333±20.1117	67.8182±17.2526	75.9697±16.7919	70.3030±15.4161	33/33/33/33
1 month	100.606±16.5245	96.9697±14.7574	83.0909±14.0809	80.6364±11.5402	33/33/33/33
3 months	112.4545±13.0098	114.9091±12.3374	87.2813±14.8720	83.0909±11.1869	33/33/33/33
6 months	116.7576±10.5713	117.0303±11.0439	88.6875±13.9964	89.7879±10.5260	33/33/32/33

QMF: Quality of Mastication Function

As for description of mean and standard deviation of sum of scores of quality of mastication function among the four groups;

Before the experiment: There were 68.3333±20.1117, 67.8182±17.2526, 75.9697±16.7919, and 70.3030±15.4161 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the one month experiment: There were 100.606±16.5245, 96.9697±14.7574, 83.0909±14.0809, and 80.6364±11.5402 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the three months experiment There were 112.4545±13.0098 in the “IODNEED” group, followed by 114.9091±12.3374 in the “IOD” group, 87.2813±14.8720 in the “CDNEED” group and 83.0909±11.1869 in “CD control” group.

After the six months experiment There were 116.7576±10.5713 in the “IODNEED” group, followed by 117.0303±11.0439 in the “IOD” group, 88.6875±13.9964 in the “CDNEED” group and 89.7879±10.5260 in “CD control” group. (Table 6)

Table 7 Descriptive Statistics of (VASMIX)

TIMING	IOD NEED	IOD	CD NEED	CD	N
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Pretest	561.788±125.3179	550.768±115.732	605.7576±85.1022	553.7879±79.2842	33/33/33/33
1 month	682.879±63.9339	651.061±64.563	635.0000±76.6995	604.0909±67.5631	33/33/33/33
3 months	686.9697±66.9149	668.3333±66.9149	660.3125±67.8463	603.3333±69.7167	33/33/33/33
6 months	688.9394±64.3933	668.1818±67.2660	658.2813±70.4320	602.4242±67.2591	33/33/32/33

VASMIX: Visual Analogue Satisfaction Score for Maxilla

As for description of mean and standard deviation of sum of scores of visual analogues satisfaction for maxilla among the four groups;

Before the experiment: There were 561.788±125.3179, 550.768±115.732, 605.7576±85.1022, and 553.7879±79.2842 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the one month experiment There were 682.879±63.9339, 651.061±64.563, 635.0000±76.6995, and 604.0909±67.5631 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the three months experiment There were 686.9697±66.9149 in the “IODNEED” group, followed by 668.3333±66.9149 in the “IOD” group, 660.3125±67.8463 in the “CDNEED” group and 603.3333±69.7167 in “CD control” group.

After the six months experiment There were 688.9394±64.3933 in the “IODNEED” group, followed by 668.1818±67.2660 in the “IOD” group, 658.2813±70.4320 in the “CDNEED” group and 602.4242±67.2591 in “CD control” group. (Table 7)

Table 8 Descriptive Statistics of (VASMD)

TIMING	IOD NEED	IOD	CD NEED	CD	N
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Pretest	488.333±117.0781	472.727±96.007	557.1212±100.078	509.6970±85.5948	33/33/33/33
1 month	684.546±58.1399	647.273±78.522	596.0606±91.8623	569.3939±74.6843	33/33/33/33
3 months	699.8485±66.7725	670.3030±82.7169	618.1250±91.0047	557.8788±70.1230	33/33/33/33
6 months	721.8182±48.9231	702.8788±51.1742	620.1563±84.9714	558.0303±68.4076	33/33/32/33

VASMD: Visual Analogue Satisfaction Score for Mandibular

As for description of mean and standard deviation of sum of scores of visual analogues satisfaction for mandibular among the four groups;

Before the experiment: There were 488.333±117.0781, 472.727±96.007, 557.1212±100.078, and 509.6970±85.5948 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the one month experiment There were 684.546±58.1399, 647.273±78.522, 596.0606±91.8623, and 569.3939±74.6843 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the three months experiment There were 699.8485±66.7725 in the “IODNEED” group, followed by 670.3030±82.7169 in the “IOD” group, 618.1250±91.0047 in the “CDNEED” group and 557.8788±70.1230 in “CD control” group.

After the six months experiment There were 721.8182±48.9231 in the “IODNEED” group, followed by 702.8788±51.1742 in the “IOD” group, 620.1563±84.9714 in the “CDNEED” group and 558.0303±68.4076 in “CD control” group. (Table 8)

Table 9 Descriptive Statistics of (MNA)

TIMING	IOD NEED Mean ± SD	IOD Mean ± SD	CD NEED Mean ± SD	CD Mean ± SD	N
Pretest	24.5606±3.5416	26.3182±2.9257	26.1970±2.3517	26.7727±2.5803	33/33/33/33
1 month	27.9848±1.9704	27.6818±2.5459	27.7879±1.9962	28.0000±2.6428	33/33/33/33
3 months	28.5000±1.7321	28.4545±2.1879	28.0938±1.9528	27.6061±2.7436	33/33/33/33
6 months	28.8485±1.3721	28.6212±1.8583	28.1719±1.7808	27.6970±2.5798	33/33/32/33

MNA: Mini Nutritional Assessment

As for description of mean and standard deviation of sum of scores of Mini nutritional assessment among the four groups;

Before the experiment: There were 24.5606±3.5416, 26.3182±2.9257, 26.1970±2.3517, and 26.7727±2.5803 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the one month experiment There were 27.9848±1.9704, 27.6818±2.5459, 27.7879±1.9962, and 28.0000±2.6428 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the three months experiment There were 28.5000±1.7321 in the “IODNEED” group, followed by 28.4545±2.1879 in the “IOD” group, 28.0938±1.9528 in the “CDNEED” group and 27.6061±2.7436 in “CD control” group.

After the six months experiment There were 28.8485±1.3721 in the “IODNEED” group, followed by 28.6212±1.8583 in the “IOD” group, 28.1719±1.7808 in the “CDNEED” group and 27.6970±2.5798 in “CD control” group. (Table 9)

Table 10 Descriptive Statistics of (BMI)

TIMING	IOD NEED Mean ± SD	IOD Mean ± SD	CD NEED Mean ± SD	CD Mean ± SD	N
Pretest	24.3864±4.1260	23.7688±5.3477	24.9100±4.1289	25.1242±4.0957	33/33/33/33
1 month	24.8667±4.2778	24.3876±5.2485	25.4470±3.7145	24.8755±3.8426	33/33/33/33
3 months	25.3242±4.2842	24.6685±5.2447	25.6809±3.7588	25.1645±3.7179	33/33/33/33
6 months	25.8073±4.0734	25.1464±4.8420	25.8650±3.3889	25.2448±3.6540	33/33/32/33

BMI: Body Mass Index

As for description of mean and standard deviation of sum of scores of body mass index among the four groups;

Before the experiment: There were 24.3864±4.1260, 23.7688±5.3477, 24.9100±4.1289, and 25.1242±4.0957 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the one month experiment There were 24.8667±4.2778, 24.3876±5.2485, 25.4470±3.7145, and 24.8755±3.8426 in “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group respectively.

After the three months experiment There were 25.3242±4.2842 in the “IODNEED” group, followed by 24.6685±5.2447 in the “IOD” group, 25.6809±3.7588 in the “CDNEED” group and 25.1645±3.7179 in “CD control” group.

After the six months experiment There were 25.8073±4.0734 in the “IODNEED” group, followed by 25.1464±4.8420 in the “IOD” group, 25.8650±3.3889 in the “CDNEED” group and 25.2448±3.6540 in “CD control” group. (Table 10)

4.1.2 To explore the usefulness of IOD plus NEED programme by making comprehensive comparison of the efficacies of NEED plus mandibular implant-supported overdentures (IOD), IOD only, conventional dentures (CD) plus NEED and conventional dentures (CD)

4.1.2.1 To compare before program patient satisfaction score, quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status among intervention group I (IOD plus NEED), intervention group II (IOD only), intervention group III (CD plus NEED) and control group (CD only).

Hypothesis: There are no different between before program patient satisfaction score, quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status among intervention group I (IOD plus NEED), intervention group II (IOD only), intervention group III (CD plus NEED) and control group (CD only).

Table 11 Pairwise comparisons among 4 groups for Pretest (OHIP)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	75.1818±19.1449	IOD	-0.7576	-11.8434	10.3283	1.000
		CD	-6.3636	-17.4495	4.7222	.759
		CDNEED	-6.5758	-17.6616	4.5101	.686
IOD	75.9394±18.0311	IODNEED	0.7576	-10.3283	11.8434	1.000
		CD	-5.6061	-16.6919	5.4798	1.000
		CDNEED	-5.8182	-16.9040	5.2677	.972
CDNEED	81.7576±14.2281	IOD	5.8182	-5.2677	16.9040	.972
		IODNEED	6.5758	-4.5101	17.6616	.686
		CD	0.2121	-10.8737	11.2980	1.000
CD	81.5455±15.3401	IOD	5.6061	-5.4798	16.6919	1.000
		IODNEED	6.3636	-4.7222	17.4495	.759
		CDNEED	-0.2121	-11.2980	10.8737	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

OHIP: Oral Health Impact Profile

Before the beginning of the intervention, sum of scores of pretest oral health impact profile (oral health related quality of life) among the four groups were not significant different. The “IODNEED” group, “IOD’ group, “CDNEED” group, and “CD control” group were 75.1818±19.1449, 75.9394±18.0311, 81.7576±14.2281, and 81.5455±15.3401, respectively with p-value >0.05. (Table 11)

Table 12 Pairwise comparisons among 4 groups for Pretest (QMF)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	68.3333 \pm 20.1117	IOD	0.5152	-11.0150	12.0453	1.000
		CD	-1.9697	-13.4999	9.5605	1.000
		CDNEED	-7.6364	-19.1665	3.8938	.470
IOD	67.8182 \pm 17.2526	IODNEED	-0.5152	-12.0453	11.0150	1.000
		CD	-2.4849	-14.0150	9.0453	1.000
		CDNEED	-8.1515	-19.6817	3.3787	.362
CDNEED	75.9697 \pm 16.7919	IOD	8.1515	-3.3787	19.6817	.362
		IODNEED	7.6364	-3.8938	19.1665	.470
		CD	5.6667	-5.8635	17.1968	1.000
CD	70.3030 \pm 15.4161	IOD	2.4849	-9.0453	14.0150	1.000
		IODNEED	1.9697	-9.5605	13.4999	1.000
		CDNEED	-5.6667	-17.1968	5.8635	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

QMF: Quality of Mastication Function

Before the beginning of the intervention, sum of scores of pretest quality of mastication function among the four groups were not significant different. The “IODNEED” group, “IOD’ group, “CDNEED” group, and “CD control” group were 68.3333 \pm 20.1117, 67.8182 \pm 17.2526, 75.9697 \pm 16.7919, and 70.3030 \pm 15.4161, respectively with p-value >0.05. (Table 12)

Table 13 Pairwise comparisons among 4 groups for Pretest (VASMIX)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	561.788 \pm 125.3179	IOD	11.0303	-79.1363	57.0757	1.000
		CD	8.0000	-71.1363	65.0757	1.000
		CDNEED	-43.9697	-123.1060	13.1060	.194
IOD	550.768 \pm 115.732	IODNEED	-11.0303	-57.0757	79.1363	1.000
		CD	-3.0303	-60.1060	76.1060	1.000
		CDNEED	-55.0000	-112.0757	24.1363	.516
CDNEED	605.7576 \pm 85.1022	IOD	55.0000	-13.1060	123.1060	.194
		IODNEED	43.9697	-24.1363	112.0757	.516
		CD	51.9697	-16.1363	120.0757	.257
CD	553.7879 \pm 79.2842	IOD	3.0303	-65.0757	71.1363	1.000
		IODNEED	-8.0000	-76.1060	60.1060	1.000
		CDNEED	-51.9697	-120.0757	16.1363	.257

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

VASMIX: Visual Analogue Satisfaction Score for Maxilla

Before the beginning of the intervention, sum of scores of pretest visual analogue satisfaction score for maxilla among the four groups were not significant different. The “IODNEED” group, “IOD’ group, “CDNEED” group, and “CD control” group were 561.788 \pm 125.3179, 550.768 \pm 115.732, 605.7576 \pm 85.1022, and 553.7879 \pm 79.2842, respectively with p-value >0.05. (Table 13)

Table 14 Pairwise comparisons among 4 groups for Pretest (VASMD)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	488.333±117.0781	IOD	15.6061	-50.5877	81.7998	1.000
		CD	-21.3636	-87.5574	44.8301	1.000
		CDNEED	-68.7879	-134.9816	-2.5941	.037
IOD	472.727±96.007	IODNEED	-15.6061	-81.7998	50.5877	1.000
		CD	-36.9697	-103.1634	29.2240	.822
		CDNEED	-84.3939	-150.5877	-18.2002	.005
CDNEED	557.1212±100.078	IOD	84.3939	18.2002	150.5877	.005
		IODNEED	68.7879	2.5941	134.9816	.037
		CD	47.4242	-18.7695	113.6180	.343
CD	509.6970±85.5948	IOD	36.9697	-29.2240	103.1634	.822
		IODNEED	21.3636	-44.8301	87.5574	1.000
		CDNEED	-47.4242	-113.6180	18.7695	.343

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

VASMD: Visual Analogue Satisfaction Score for Mandibular

Before the beginning of the intervention, sum of scores of pretest visual analogue satisfaction score for mandibular among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 488.333±117.0781, 472.727±96.007, 557.1212±100.078, and 509.6970±85.5948, respectively.

There were significantly higher score in “CDNEED” group than “IODNEED” group and “CD control” group. (p=0.037, p=0.005) On the other hand, there were no significant different among “IODNEED” group, “IOD” group, “CD control” group and “CDNEED” group and “CD control” group with p-value >0.05. (Table 14)

Table 15 Pairwise comparisons among 4 groups for Pretest (MNA)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	24.5606±3.5416	IOD	-1.7576	-3.6748	.1596	.092
		CD	-2.2619	-4.2099	-.3141	.014
		CDNEED	-1.6364	-3.5536	.2809	.143
IOD	26.3182±2.9257	IODNEED	1.7576	-.1596	3.6748	.092
		CD	-0.5044	-2.4523	1.4435	1.000
		CDNEED	0.1212	-1.7960	2.0384	1.000
CDNEED	26.1970±2.3517	IOD	-0.1212	-2.0384	1.7960	1.000
		IODNEED	1.6364	-.2809	3.5536	.143
		CD	-0.6256	-2.5735	1.3223	1.000
CD	26.7727±2.5803	IOD	0.5044	-1.4435	2.4523	1.000
		IODNEED	2.2619	.3141	4.2099	.014
		CDNEED	0.6256	-1.3223	2.5735	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

MNA: Mini Nutritional Assessment

Before the beginning of the intervention, sum of scores of pretest mini nutritional assessment among the four groups were not significant different except “CD control” group had significant higher score than “IODNEED” group with p-value 0.014. The “IODNEED” group, “IOD’ group, “CDNEED” group, and “CD control” group were 24.5606±3.5416, 26.3182±2.9257, 26.1970±2.3517, and 26.7727±2.5803, respectively. (Table 15)

Table 16 Pairwise comparisons among 4 groups for Pretest (BMI)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	24.3864 \pm 4.1260	IOD	0.6176	-2.3226	3.5578	1.000
		CD	-0.7379	-3.6781	2.2023	1.000
		CDNEED	-0.5236	-3.4638	2.4165	1.000
IOD	23.7688 \pm 5.3477	IODNEED	-0.6176	-3.5578	2.3226	1.000
		CD	-1.3555	-4.2956	1.5847	1.000
		CDNEED	-1.1412	-4.0814	1.7990	1.000
CDNEED	24.9100 \pm 4.1289	IOD	1.1412	-1.7990	4.0814	1.000
		IODNEED	0.5236	-2.4165	3.4638	1.000
		CD	-0.2142	-3.1544	2.7259	1.000
CD	25.1242 \pm 4.0957	IOD	1.3555	-1.5847	4.2956	1.000
		IODNEED	0.7379	-2.2023	3.6781	1.000
		CDNEED	0.2142	-2.7259	3.1544	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

BMI: Body Mass Index

Before the beginning of the intervention, sum of scores of pretest body mass index among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 24.3864 \pm 4.1260, 23.7688 \pm 5.3477, 24.9100 \pm 4.1289, and 25.1242 \pm 4.0957, respectively with p-value >0.05.

(Table 16)

Table 17 Pairwise comparisons among 4 groups for Pretest (BFAT %)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	27.0394 \pm 6.3728	IOD	-1.7788	-5.8038	2.2462	1.000
		CD	-0.8697	-4.8947	3.1553	1.000
		CDNEED	-0.5242	-4.5492	3.5008	1.000
IOD	28.8182 \pm 5.7726	IODNEED	1.7788	-2.2462	5.8038	1.000
		CD	0.9091	-3.1159	4.9341	1.000
		CDNEED	1.2546	-2.7705	5.2795	1.000
CDNEED	27.5636 \pm 6.0801	IOD	-1.2546	-5.2795	2.7705	1.000
		IODNEED	0.5242	-3.5008	4.5492	1.000
		CD	-0.3455	-4.3705	3.6795	1.000
CD	27.9091 \pm 6.1627	IOD	-0.9091	-4.9341	3.1159	1.000
		IODNEED	0.8697	-3.1553	4.8947	1.000
		CDNEED	0.3455	-3.6795	4.3705	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

BFAT: Body Fat Percentage

Before the beginning of the intervention, sum of scores of pretest body fat percentage among the four groups were not significant different. The “IODNEED” group, “IOD’ group, “CDNEED” group, and “CD control” group were 27.0394 \pm 6.3728, 28.8182 \pm 5.7726, 27.5636 \pm 6.0801, and 27.9091 \pm 6.1627, respectively with p-value >0.05. (Table 17)

Table 18 Pairwise comparisons among 4 groups for Pretest (LBM)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	45.0636 \pm 7.9842	IOD	2.9091	-3.0485	8.8667	1.000
		CD	-0.4606	-6.4182	5.4970	1.000
		CDNEED	-0.0485	-6.0061	5.9091	1.000
IOD	42.1545 \pm 9.9550	IODNEED	-2.9091	-8.8667	3.0485	1.000
		CD	-3.3697	-9.3273	2.5879	.792
		CDNEED	-2.9576	-8.9152	3.0000	1.000
CDNEED	45.1121 \pm 7.4442	IOD	2.9576	-3.0000	8.9152	1.000
		IODNEED	0.0485	-5.9091	6.0061	1.000
		CD	-0.4121	-6.3697	5.5455	1.000
CD	45.5242 \pm 10.3883	IOD	3.3697	-2.5879	9.3273	.792
		IODNEED	0.4606	-5.4970	6.4182	1.000
		CDNEED	0.4121	-5.5455	6.3697	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

LBM: Lean Body Mass

Before the beginning of the intervention, sum of scores of pretest lean body mass among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 45.0636 \pm 7.9842, 42.1545 \pm 9.9550, 45.1121 \pm 7.4442, and 45.5242 \pm 10.3883, respectively with p-value >0.05. (Table 18)

Table 19 Pairwise comparisons among 4 groups for Pretest Serum albumin (g/L)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	4.4727±.6686	IOD	0.5576	.1428	.9724	.003
		CD	0.7121	.3471	1.0772	<.001
		CDNEED	0.6212	.2238	1.0187	<.001
IOD	3.9152±.5696	IODNEED	-0.5576	-.9724	-.1428	.003
		CD	0.1546	-.1692	.4782	.725
		CDNEED	0.0636	-.2971	.4243	.997
CDNEED	3.8515±.5094	IOD	0.9970	-.4243	.2971	.997
		IODNEED	-0.6212	-1.0187	-.2238	<.001
		CD	0.9560	-.2088	.3906	.956
CD	3.7606±.3766	IOD	-0.1546	-.4782	.1692	.725
		IODNEED	-0.7121	-1.0772	-.3471	<.001
		CDNEED	-0.0909	-.3906	.2088	.956

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Dunnett T3

Before the beginning of the intervention, sum of scores of pretest Serum albumin (g/L) among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 4.4727±.6686, 3.9152±.5696, 3.8515±.5094, and 3.7606±.3766, respectively.

There were significantly higher score in “IODNEED” group than “IOD” group, “CDNEED” group and “CD control” group, with p-value .003, <.001 and <.001, respectively. On the other hand, there were no significant different among “IOD” group, “CDNEED” group and “CD control” group with p-value >0.05. (Table 19)

Table 20 Pairwise comparisons among 4 groups for Pretest Plasma cobalamin (B12) (pmol/L)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	539.030±201.664	IOD	18.303	-115.1378	151.7439	1.000
		CD	25.7879	-107.6529	159.2287	1.000
		CDNEED	25.9091	-107.5317	159.3499	1.000
IOD	520.727±198.997	IODNEED	-18.303	-151.7439	115.1378	1.000
		CD	7.4849	-125.9560	140.9257	1.000
		CDNEED	7.6061	-125.8348	141.0469	1.000
CDNEED	513.121±192.758	IOD	-7.6061	-141.0469	125.8348	1.000
		IODNEED	-25.9091	-159.3499	107.5317	1.000
		CD	-0.1212	-133.5620	133.3196	1.000
CD	513.242±214.9800	IOD	-7.4849	-140.9257	125.9560	1.000
		IODNEED	-25.7879	-159.2287	107.6529	1.000
		CDNEED	0.1212	-133.3196	133.5620	1.000

Based on observed means

! : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Before the beginning of the intervention, sum of scores of pretest plasma cobalamin (B12) (pmol/L) among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 539.030±201.664, 520.727±198.997, 513.121±192.758, and 513.242±214.9800, respectively, with p-value >0.05. (Table 20)

Table 21 Pairwise comparisons among 4 groups for Pretest Serum and erythrocyte folate (nmol/L)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	8.3200 \pm 6.0527	IOD	-0.5306	-4.5088	3.4476	1.000
		CD	2.6103	-1.3679	6.5885	.486
		CDNEED	1.7776	-2.2006	5.7558	1.000
IOD	8.8506 \pm 7.0947	IODNEED	0.5306	-3.4476	4.5088	1.000
		CD	3.1409	-.8373	7.1191	.218
		CDNEED	2.3082	-1.6700	6.2864	.735
CDNEED	6.5424 \pm 5.6535	IOD	-2.3082	-6.2864	1.6700	.735
		IODNEED	-1.7776	-5.7558	2.2006	1.000
		CD	0.8327	-3.1454	4.8109	1.000
CD	5.7097 \pm 5.1485	IOD	-3.1409	-7.1191	.8373	.218
		IODNEED	-2.6103	-6.5885	1.3679	.486
		CDNEED	-0.8327	-4.8109	3.1454	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Before the beginning of the intervention, sum of scores of pretest Serum and erythrocyte folate (nmol/L) among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 8.3200 \pm 6.0527, 8.8506 \pm 7.0947, 6.5424 \pm 5.6535, and 5.7097 \pm 5.1485, respectively with p-value >0.05. (Table 21)

Table 22 Pairwise comparisons among 4 groups for Pretest Serum Fe (mmol/L)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	104.0000±26.8608	IOD	19.3939	.0480	38.7399	.049
		CD	14.5455	-4.8005	33.8914	.276
		CDNEED	10.2121	-9.1338	29.5581	.958
IOD	84.6061±27.4453	IODNEED	-19.3939	-38.7399	-.0480	.049
		CD	-4.8485	-24.1944	14.4975	1.000
		CDNEED	-9.1818	-28.5278	10.1641	1.000
CDNEED	93.7879±36.6306	IOD	9.1818	-10.1641	28.5278	1.000
		IODNEED	-10.2121	-29.5581	9.1338	.958
		CD	4.3333	-15.0126	23.6793	1.000
CD	89.4545±24.9588	IOD	4.8485	-14.4975	24.1944	1.000
		IODNEED	-14.5455	-33.8914	4.8005	.276
		CDNEED	-4.3333	-23.6793	15.0126	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Before the beginning of the intervention, sum of scores of pretest Serum Fe (mmol/L) among the four groups were not significant different except “IODNEED” group had significant higher score than “IOD” group with p-value 0.049. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 104.0000±26.8608, 84.6061±27.4453, 93.7879±36.6306, and 89.4545±24.9588, respectively. (Table 22)

Table 23 Pairwise comparisons among 4 groups for Pretest RBC ($\times 10^{12}$)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	4.7933 \pm .7205	IOD	0.5333	.1288	.9379	.004
		CD	0.4594	.0415	.8773	.024
		CDNEED	0.3994	-.0151	.8139	.064
IOD	4.2600 \pm .4559	IODNEED	-0.5333	-.9379	-.1288	.004
		CD	-0.0739	-.3969	.2490	.989
		CDNEED	-0.1339	-.4521	.1843	.825
CDNEED	4.3939 \pm .4967	IOD	0.1339	-.1843	.4521	.825
		IODNEED	-0.3994	-.8139	.0151	.064
		CD	0.06	-.2760	.3960	.997
CD	4.339 \pm .5101	IOD	0.0739	-.2490	.3969	.989
		IODNEED	-0.4594	-.8773	-.0415	.024
		CDNEED	-0.06	-.3960	.2760	.997

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Dunnett T3

Before the beginning of the intervention, sum of scores of pretest red blood cells RBC ($\times 10^{12}$) among the four groups were not significant different except “IODNEED” group had significant higher score than “IOD” group and “CD control” group, with p-value 0.004 and 0.24, respectively. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 4.7933 \pm .7205, 4.2600 \pm .4559, 4.3939 \pm .4967, and 4.339 \pm .5101, respectively. (Table 23)

Table 24 Pairwise comparisons among 4 groups for Pretest Hb (g/L)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	12.6273 \pm 1.7816	IOD	0.6636	-.6273	1.9546	1.000
		CD	0.403	-.8879	1.6940	1.000
		CDNEED	0.1394	-1.1515	1.4303	1.000
IOD	11.9636 \pm 1.0439	IODNEED	-0.6636	-1.9546	.6273	1.000
		CD	-0.2606	-1.5515	1.0303	1.000
		CDNEED	-0.5242	-1.8152	.7667	1.000
CDNEED	12.4879 \pm 3.0139	IOD	0.5242	-.7667	1.8152	1.000
		IODNEED	-0.1394	-1.4303	1.1515	1.000
		CD	0.2636	-1.0273	1.5546	1.000
CD	12.2242 \pm 1.4042	IOD	0.2606	-1.0303	1.5515	1.000
		IODNEED	-0.403	-1.6940	.8879	1.000
		CDNEED	-0.2636	-1.5546	1.0273	1.000

Based on observed means

! : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Before the beginning of the intervention, sum of scores of pretest haemoglobin Hb (g/L) among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 12.6273 \pm 1.7816, 11.9636 \pm 1.0439, 12.4879 \pm 3.0139, and 12.2242 \pm 1.4042, respectively with p-value >0.05. (Table 24)

Table 25 Pairwise comparisons among 4 groups for Pretest Total lymphocyte ($\times 10^9$)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	43.0303 \pm 15.5433	IOD	11.7727	3.2633	20.2821	.002
		CD	8.4546	.3103	16.5988	.038
		CDNEED	4.5606	-4.4362	13.5575	.670
IOD	31.2576 \pm 8.8654	IODNEED	-11.7727	-20.2821	-3.2633	.002
		CD	-3.3182	-8.6462	2.0098	.445
		CDNEED	-7.2121	-13.8611	-.5631	.027
CDNEED	38.4697 \pm 10.9294	IOD	7.2121	.5631	13.8611	.027
		IODNEED	-4.5606	-13.5575	4.4362	.670
		CD	3.8939	-2.2536	10.0415	.422
CD	34.5758 \pm 6.9621	IOD	3.3182	-2.0098	8.6462	.445
		IODNEED	-8.4546	-16.5988	-.3103	.038
		CDNEED	-3.8939	-10.0415	2.2536	.422

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Dunnett T3

Before the beginning of the intervention, sum of scores of pretest Total lymphocyte ($\times 10^9$) among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 43.0303 \pm 15.5433, 31.2576 \pm 8.8654, 38.4697 \pm 10.9294, and 34.5758 \pm 6.9621, respectively.

There were significantly higher score in “IODNEED” group than “IOD” group and “CD control” group. ($p=0.002$, $p=0.038$) And also significant higher score in “CDNEED” group than “IOD” group ($p=0.027$). On the other hand, there were no significant different between “IODNEED” group and “CDNEED” group, “IOD” group and “CD control” group, “CDNEED” group and “CD control” group, with $p\text{-value} > 0.05$. (Table 25)

4.1.2.2 To compare before and after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status within intervention group I (IOD plus NEED).

Hypothesis: The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status will be better than before program in intervention group I (IOD plus NEED).

Table 26 Comparison of scores between pretest and P-6 months in IODNEED grp (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
OHIP	Pretest	75.1818 \pm 19.1449	33	-41.2769	-29.2080	-11.896	32	<.001
	Post 6 mo	110.4242 \pm 5.6956	33					
QMF	Pretest	68.3333 \pm 20.1117	33	-55.9878	-40.8607	-13.041	32	<.001
	Post 6 mo	116.7576 \pm 10.5713	33					
VASMX	Pretest	561.788 \pm 125.3179	33	-166.5227	-87.7803	-6.578	32	<.001
	Post 6 mo	688.9394 \pm 64.3933	33					
VASMD	Pretest	488.333 \pm 117.0781	33	-277.4954	-189.4743	-10.806	32	<.001
	Post 6 mo	721.8182 \pm 48.9231	33					
MNA	Pretest	24.5606 \pm 3.5416	33	-5.4985	-3.0773	-7.215	32	<.001
	Post 6 mo	28.8485 \pm 1.3721	33					
BMI	Pretest	24.3864 \pm 4.1260	33	-1.8614	-0.9804	-6.570	32	<.001
	Post 6 mo	25.8073 \pm 4.0734	33					

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

OHIP: Oral Health Impact Profile, QMF: Quality of Mastication Function

VASMX: Visual Analogue Satisfaction Score for Maxilla

VASMD: Visual Analogue Satisfaction Score for Mandibular, BMI: Body Mass Index

MNA: Mini Nutritional Assessment, IOD: mandibular two-implant supported overdentures

NEED: Nutritional Empowerment in Edentulous people with Dentures

P-6 months: Post 6 months

Comparison of the mean scores categorized by oral health impact profile. quality of mastication, satisfaction for maxilla, satisfaction for mandibular, mini nutritional

assessment and body mass index within the “IODNEED” group, before and after 6 months intervention, found:

After the 6 months intervention, mean score for oral health impact profile was higher than pretest, 110.4242 ± 5.6956 and 75.1818 ± 19.1449 , respectively, with statistical significance (p-value < 0.001).

After the 6 months intervention, there had a higher mean score for quality of mastication than pretest, at 116.7576 ± 10.5713 and 68.3333 ± 20.1117 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for satisfaction for maxilla and satisfaction for mandibular were higher than pretest, 688.9394 ± 64.3933 and 561.788 ± 125.3179 , 721.8182 ± 48.9231 and 488.333 ± 117.0781 , respectively, with statistical significance (p-value < 0.001).

After the 6 months intervention, there had a higher mean score for mini nutritional assessment than pretest, at 28.8485 ± 1.3721 and 24.5606 ± 3.5416 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for body mass index was higher than pretest, 25.8073 ± 4.0734 and 24.3864 ± 4.1260 , respectively, with statistical significance (p-value < 0.001). (Table 26)

Table 27 Comparison of scores between pretest and P-6 months in IODNEED grp (Paired T-test)

		Mean ±SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
Biceps	Pretest	6.70±2.35	33	-.927	1.169	.236	32	.815
	Post 6 mo	6.58±2.61	33					
Triceps	Pretest	9.03±4.26	33	-.739	1.285	.549	32	.587
	Post 6 mo	8.76±3.80	33					
Subscap	Pretest	12.39±4.57	33	-2.101	1.011	-.714	32	.480
	Post 6 mo	12.94±4.87	33					
Abdom	Pretest	15.15±4.82	33	-2.827	1.857	-.422	32	.676
	Post 6 mo	15.64±5.69	33					
WC	Pretest	87.42±11.58	33	-1.242	3.364	.938	32	.355
	Post 6 mo	86.36±11.03	33					
HC	Pretest	96.52±10.19	33	7.925	13.226	8.127	32	<.001
	Post 6 mo	85.94±10.66	33					

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

Biceps: Bicep Skin Fold Thickness, Triceps: Triceps Skin Fold Thickness

Subscap: Sub-scapular Skin Fold Thickness, Abdom: Abdominal Skin Fold Thickness

WC: Waist Circumference, HC: Hip Circumference

IOD: mandibular two-implant supported overdentures

NEED: Nutritional Empowerment in Edentulous people with Dentures

P-6 months: Post 6 months

Comparison of the mean scores categorized by skin fold thickness of Biceps, Triceps, Sub-scapular, abdominal, and waist circumference, hip circumference within the “IODNEED” group, before and after 6 months intervention, found:

After the 6 months intervention, there had a more or less similar mean score for skin fold thickness of Biceps, Triceps, sub-scapular, abdominal, and waist circumference, within the “IODNEED” group, compared with pretest, which were also not statistically significance (p-value > 0.05).

After the 6 months intervention, there had a lower mean score for hip circumference than pretest, at 85.94 ± 10.662 and 96.52 ± 10.189 , respectively, which was statistically significance ($p\text{-value} < 0.001$). (Table 27)

Table 28 Comparison of scores between pretest and p-6 months in IODNEED group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
BFAT%	Pretest	27.0394 \pm 6.3728	33	-2.4754	3.9966	.479	32	.635
	Post 6 mo	26.2788 \pm 6.7579	33					
LBM	Pretest	45.0636 \pm 7.9842	33	-6.9952	1.6618	-1.255	32	.219
	Post 6 mo	47.7303 \pm 8.9333	33					
Salbu	Pretest	4.4727 \pm .6686	33	-0.1699	-0.0604	-4.286	32	<.001
	Post 6 mo	4.5879 \pm .6097	33					
PB ₁₂	Pretest	539.030 \pm 201.664	33	-126.5038	-56.1629	-5.290	32	<.001
	Post 6 mo	630.645 \pm 187.0484	33					
Folate	Pretest	8.3200 \pm 6.0527	33	-4.4961	-1.9554	-5.172	32	<.001
	Post 6 mo	11.5458 \pm 5.6611	33					
Fe	Pretest	104.0000 \pm 26.8608	33	-16.5947	-1.8901	-2.561	32	.015
	Post 6 mo	113.2424 \pm 27.7861	33					
RBC	Pretest	4.7933 \pm .7205	33	-0.2635	-0.0917	-4.211	32	<.001
	Post 6 mo	4.9709 \pm .7637	33					
Hb	Pretest	12.6273 \pm 1.7816	33	-0.9135	-0.3896	-5.066	32	<.001
	Post 6 mo	13.2788 \pm 1.7757	33					
Lympho	Pretest	43.0303 \pm 15.5433	33	-2.6001	3.1456	.193	32	.848
	Post 6 mo	42.7576 \pm 13.7932	33					

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

BFAT%: Body Fat Percentage, LBM: Lean Body Mass, Salbu: Serum albumin (g/L)

Pb12: Plasma cobalamin (B12) (pmol/L), Folate: Serum and erythrocyte folate (nmol/L)

Fe: Serum Fe (mmol/L), RBC: RBC ($\times 10^{12}$), Hb: Hgb (g/L)

Lympho: Total lymphocyte ($\times 10^9$)

IOD: mandibular two-implant supported overdentures

NEED: Nutritional Empowerment in Edentulous people with Dentures

P-6 months: Post 6 months

Comparison of the mean scores categorized by body fat percentage, lean body mass, blood parameters such as Serum albumin, Plasma cobalamin (B12), Serum and erythrocyte folate, Serum iron (Fe), red blood cells count (RBC), hemoglobin (Hb), and Total lymphocyte within the “IODNEED” group, before and after 6 months intervention, found:

After the 6 months intervention, there had a lower mean score for body fat percentage than pretest, at 26.2788 ± 6.7579 and 27.0394 ± 6.3728 , respectively, which was not statistically significance (p-value =0.635).

After the 6 months intervention, there had a higher mean score for lean body mass than pretest, at 47.7303 ± 8.9333 and 45.0636 ± 7.9842 , respectively, which was not statistically significance (p-value =0.219).

After the 6 months intervention, there had a higher mean score for serum albumin, plasma B₁₂, serum and erythrocyte folate, serum iron (Fe), red blood cells count (RBC), and hemoglobin (Hb) than pretest, which were statistically significance (p-value <0.05).

After the 6 months intervention, there had a lower mean score for total lymphocyte than pretest, at 42.7576 ± 13.7932 and 43.0303 ± 15.5433 , respectively, which was not statistically significance (p-value =0.848). (Table 28)

4.1.2.3 To compare before and after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status within intervention group II (IOD only).

Hypothesis: The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status will be better than before program in intervention group II (IOD only).

Table 29 Comparison of scores between pretest and post 6 months in IOD group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
OHIP	Pretest	75.9394 \pm 18.0311	33	-39.7052	-27.4463	-11.158	32	<.001
	Post 6 mo	109.5152 \pm 7.4335	33					
QMF	Pretest	67.8182 \pm 17.2526	33	-56.0302	-42.3940	-14.702	32	<.001
	Post 6 mo	117.0303 \pm 11.0439	33					
VASM _X	Pretest	550.768 \pm 115.732	33	-157.7926	-77.0559	-5.925	32	<.001
	Post 6 mo	668.1818 \pm 67.2660	33					
VASM _D	Pretest	472.727 \pm 96.007	33	-264.1635	-196.1396	-13.783	32	<.001
	Post 6 mo	702.8788 \pm 51.1742	33					
MNA	Pretest	26.3182 \pm 2.9257	33	-3.4004	-1.2057	-4.275	32	<.001
	Post 6 mo	28.6212 \pm 1.8583	33					
BMI	Pretest	23.7688 \pm 5.3477	33	-1.8436	-0.9115	-6.021	32	<.001
	Post 6 mo	25.1464 \pm 4.8420	33					

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

OHIP: Oral Health Impact Profile, QMF: Quality of Mastication Function

VASM_X: Visual Analogue Satisfaction Score for Maxilla

VASM_D: Visual Analogue Satisfaction Score for Mandibular

MNA: Mini Nutritional Assessment, BMI: Body Mass Index

IOD: mandibular two-implant supported overdentures

Comparison of the mean scores categorized by oral health impact profile, quality of mastication, satisfaction for maxilla, satisfaction for mandibular, mini nutritional assessment and body mass index within the “IOD” group, before and after 6 months intervention, found:

After the 6 months intervention, mean score for oral health impact profile was higher than pretest, 109.5152 ± 7.4335 and 75.9394 ± 18.0311 , respectively, with statistical significance (p-value < 0.001).

After the 6 months intervention, there had a higher mean score for quality of mastication than pretest, at 117.0303 ± 11.0439 and 67.8182 ± 17.2526 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for satisfaction for maxilla and satisfaction for mandibular were higher than pretest, 668.1818 ± 67.2660 and 550.768 ± 115.732 , 702.8788 ± 51.1742 and 472.727 ± 96.007 , respectively, with statistical significance (p-value < 0.001).

After the 6 months intervention, there had a higher mean score for mini nutritional assessment than pretest, at 28.6212 ± 1.8583 and 26.3182 ± 2.9257 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for body mass index was higher than pretest, 25.1464 ± 4.8420 and 23.7688 ± 5.3477 , respectively, with statistical significance (p-value < 0.001). (Table 29)

Table 30 Comparison of scores between pretest and post 6 months in IOD group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
Biceps	Pretest	6.76 \pm 2.93	33	-1.458	.185	-1.578	32	.124
	Post 6 mo	7.39 \pm 3.48	33					
Triceps	Pretest	9.21 \pm 4.53	33	-2.023	1.114	-.590	32	.559
	Post 6 mo	9.67 \pm 5.14	33					
Subscap	Pretest	11.64 \pm 4.24	33	-2.469	-.379	-2.776	32	.009
	Post 6 mo	13.06 \pm 4.82	33					
Abdom	Pretest	15.58 \pm 5.90	33	-3.306	-.512	-2.784	32	.009
	Post 6 mo	17.48 \pm 6.56	33					
WC	Pretest	86.58 \pm 13.96	33	-1.181	1.545	.272	32	.788
	Post 6 mo	86.39 \pm 12.72	33					
HC	Pretest	94.82 \pm 13.54	33	5.292	9.799	6.821	32	<.001
	Post 6 mo	87.27 \pm 12.80	33					

^a 95% Confidence Interval of the Difference^b Sig (2-tailed)

Biceps: Biceps Skin Fold Thickness, Triceps: Triceps Skin Fold Thickness

Subscap: Sub-scapular Skin Fold Thickness, Abdom: Abdominal Skin Fold Thickness

WC: Waist Circumference

HC: Hip Circumference

IOD: mandibular two-implant supported overdentures

Comparison of the mean scores categorized by skin fold thickness of Biceps, Triceps, sub-scapular, abdominal, and waist circumference, hip circumference within the “IOD” group, before and after 6 months intervention, found:

After the 6 months intervention, there had a higher mean score for skin fold thickness of Biceps, Triceps, and waist circumference, within the “IOD” group, compared with pretest, but which were not statistically significance (p-value > 0.05).

After the 6 months intervention, there had a lower mean score for hip circumference than pretest, at 87.27 ± 12.804 and 94.82 ± 13.536 , respectively, which was statistically significance ($p\text{-value} < 0.001$).

After the 6 months intervention, mean score for skin fold thickness of sub-scapular, and abdominal, were higher than pretest, 13.06 ± 4.815 and 11.64 ± 4.241 , 17.48 ± 6.563 and 15.58 ± 5.906 , respectively, with statistical significance ($p\text{-value} < 0.05$).
(Table 30)

Table 31 Comparison of scores between pretest and post 6 months in IOD group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
BFAT%	Pretest	28.8182 \pm 5.7726	33	-4.3183	0.9546	-1.299	32	.203
	Post 6 mo	30.5000 \pm 5.8186	33					
LBM	Pretest	42.1545 \pm 9.9550	33	-5.8378	4.1105	-.354	32	.726
	Post 6 mo	43.0182 \pm 8.4094	33					
Salbu	Pretest	3.9152 \pm .5696	33	-0.0963	0.0478	-.686	32	.498
	Post 6 mo	3.9394 \pm .5646	33					
PB ₁₂	Pretest	520.727 \pm 198.9969	33	-30.2383	22.5413	-.297	32	.768
	Post 6 mo	524.576 \pm 192.1817	33					
Folate	Pretest	8.8506 \pm 7.0947	33	-0.9624	1.4054	.381	32	.706
	Post 6 mo	8.6291 \pm 6.2348	33					
Fe	Pretest	84.6061 \pm 27.4453	33	-2.3267	3.7207	.470	32	.642
	Post 6 mo	83.9091 \pm 27.1585	33					
RBC	Pretest	4.2600 \pm .4559	33	-0.1416	0.0107	-1.750	32	.090
	Post 6 mo	4.3255 \pm .4739	33					
Hb	Pretest	11.9636 \pm 1.0439	33	-0.3010	-0.0384	-2.632	32	.013
	Post 6 mo	12.1333 \pm 1.0723	33					
Lympho	Pretest	31.2576 \pm 8.8654	33	-2.7680	0.9801	-.972	32	.339
	Post 6 mo	32.1515 \pm 6.9625	33					

^a 95% Confidence Interval of the Difference^b Sig (2-tailed)

BFAT%: Body Fat Percentage, LBM: Lean Body Mass, Salbu: Serum albumin (g/L)

Pb₁₂: Plasma cobalamin (B₁₂) (pmol/L), Folate: Serum and erythrocyte folate (nmol/L)Fe: Serum Fe (mmol/L), RBC: RBC ($\times 10^{12}$), Hb: Hgb (g/L)Lympho: Total lymphocyte ($\times 10^9$)

IOD: mandibular two-implant supported overdentures

Comparison of the mean scores categorized by body fat percentage, lean body mass, blood parameters such as Serum albumin, Plasma cobalamin (B₁₂), Serum and erythrocyte folate, Serum iron (Fe), red blood cells count (RBC), hemoglobin (Hb), and Total lymphocyte within the “IOD” group, before and after 6 months intervention. found:

After the 6 months intervention, there had a higher mean score for body fat percentage than pretest, at 30.5000 ± 5.8186 and 28.8182 ± 5.7726 , respectively, which was not statistically significance (p-value =0.203).

After the 6 months intervention, there had a higher mean score for lean body mass than pretest, at 43.0182 ± 8.4094 and 42.1545 ± 9.9550 , respectively, which was also not statistically significance (p-value =0.726).

After the 6 months intervention, there had a more or less similar mean score for Serum albumin, Plasma cobalamin (B12), Serum and erythrocyte folate, Serum iron (Fe), red blood cells count (RBC), and total lymphocyte within the “IOD” group, compared with pretest, which were not statistically significance (p-value > 0.05).

After the 6 months intervention, there had a higher mean score for heamoglobin (Hb) than pretest, at 12.1333 ± 1.0723 and 11.9636 ± 1.0439 , respectively, which were statistically significance (p-value= 0.013). (Table 31)

4.1.2.4. To compare before and after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status within intervention group III (CD plus NEED).

Hypothesis: The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status will be better than before program in intervention group III (CD plus NEED).

Table 32 Comparison of scores between pretest and p-6 months in CDNEED grp (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
OHIP	Pretest	81.7576 \pm 14.2281	33	-21.7439	-9.7561	-5.359	31	<.001
	Post 6 mo	96.9688 \pm 13.9734	32					
QMF	Pretest	75.9697 \pm 16.7919	33	-18.5363	-7.9012	-5.070	31	<.001
	Post 6 mo	88.6875 \pm 13.9964	32					
VASMX	Pretest	605.7576 \pm 85.1022	33	-78.9461	-31.0539	-4.684	31	<.001
	Post 6 mo	658.2813 \pm 70.4320	32					
VASMD	Pretest	557.1212 \pm 100.078	33	-99.3093	-31.0032	-3.891	31	<.001
	Post 6 mo	620.1563 \pm 84.9714	32					
MNA	Pretest	26.1970 \pm 2.3517	33	-2.8715	-0.9723	-4.128	31	<.001
	Post 6 mo	28.1719 \pm 1.7808	32					
BMI	Pretest	24.9100 \pm 4.1289	33	-1.8138	-0.1075	-2.296	31	.029
	Post 6 mo	25.8650 \pm 3.3889	32					

^a 95% Confidence Interval of the Difference^b Sig (2-tailed)

OHIP: Oral Health Impact Profile, QMF: Quality of Mastication Function

VASMX: Visual Analogue Satisfaction Score for Maxilla

VASMD: Visual Analogue Satisfaction Score for Mandibular

MNA: Mini Nutritional Assessment, BMI: Body Mass Index, CD: Conventional Dentures

NEED: Nutritional Empowerment in Edentulous people with Dentures

P-6 months: Post 6 months

Comparison of the mean scores categorized by oral health impact profile, quality of mastication, satisfaction for maxilla, satisfaction for mandibular, mini nutritional assessment and body mass index within the “CDNEED” group, before and after 6 months intervention, found:

After the 6 months intervention, mean score for oral health impact profile was higher than pretest, 96.9688 \pm 13.9734 and 81.7576 \pm 14.2281, respectively, with statistical significance (p-value <0.001).

After the 6 months intervention, there had a higher mean score for quality of mastication than pretest, at 88.6875 ± 13.9964 and 75.9697 ± 16.7919 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for satisfaction for maxilla and satisfaction for mandibular were higher than pretest, 658.2813 ± 70.4320 and 605.7576 ± 85.1022 , 620.1563 ± 84.9714 and 557.1212 ± 100.078 , respectively, with statistical significance (p-value < 0.001).

After the 6 months intervention, there had a higher mean score for mini nutritional assessment than pretest, at 28.1719 ± 1.7808 and 26.1970 ± 2.3517 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for body mass index was higher than pretest, 25.8650 ± 3.3889 and 24.9100 ± 4.1289 , respectively, with statistical significance (p-value = 0.029). (Table 32)

Table 33 Comparison of scores between pretest and p-6 months in CDNEED grp (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b																																																																		
				Lower	Upper																																																																					
Biceps	Pretest	6.19 \pm 3.21	33	-1.810	.497	-1.161	31	.255																																																																		
	Post 6 mo	6.84 \pm 2.36	32						Triceps	Pretest	8.28 \pm 3.84	33	-1.466	.653	-.782	31	.440	Post 6 mo	8.69 \pm 4.29	32			Subscap	Pretest	12.09 \pm 4.52	33	-1.750	.437	-1.224	31	.230	Post 6 mo	12.75 \pm 5.20	32			Abdom	Pretest	16.59 \pm 5.62	33	.078	2.985	2.148	31	.040	Post 6 mo	15.06 \pm 5.79	32			WC	Pretest	88.06 \pm 12.44	33	-2.769	.456	-1.462	31	.154	Post 6 mo	89.22 \pm 12.90	32			HC	Pretest	96.97 \pm 11.09	33	5.635	10.928	6.382	31	<.001	Post 6 mo
Triceps	Pretest	8.28 \pm 3.84	33	-1.466	.653	-.782	31	.440																																																																		
	Post 6 mo	8.69 \pm 4.29	32						Subscap	Pretest	12.09 \pm 4.52	33	-1.750	.437	-1.224	31	.230	Post 6 mo	12.75 \pm 5.20	32			Abdom	Pretest	16.59 \pm 5.62	33	.078	2.985	2.148	31	.040	Post 6 mo	15.06 \pm 5.79	32			WC	Pretest	88.06 \pm 12.44	33	-2.769	.456	-1.462	31	.154	Post 6 mo	89.22 \pm 12.90	32			HC	Pretest	96.97 \pm 11.09	33	5.635	10.928	6.382	31	<.001	Post 6 mo	88.69 \pm 11.90	32												
Subscap	Pretest	12.09 \pm 4.52	33	-1.750	.437	-1.224	31	.230																																																																		
	Post 6 mo	12.75 \pm 5.20	32						Abdom	Pretest	16.59 \pm 5.62	33	.078	2.985	2.148	31	.040	Post 6 mo	15.06 \pm 5.79	32			WC	Pretest	88.06 \pm 12.44	33	-2.769	.456	-1.462	31	.154	Post 6 mo	89.22 \pm 12.90	32			HC	Pretest	96.97 \pm 11.09	33	5.635	10.928	6.382	31	<.001	Post 6 mo	88.69 \pm 11.90	32																										
Abdom	Pretest	16.59 \pm 5.62	33	.078	2.985	2.148	31	.040																																																																		
	Post 6 mo	15.06 \pm 5.79	32						WC	Pretest	88.06 \pm 12.44	33	-2.769	.456	-1.462	31	.154	Post 6 mo	89.22 \pm 12.90	32			HC	Pretest	96.97 \pm 11.09	33	5.635	10.928	6.382	31	<.001	Post 6 mo	88.69 \pm 11.90	32																																								
WC	Pretest	88.06 \pm 12.44	33	-2.769	.456	-1.462	31	.154																																																																		
	Post 6 mo	89.22 \pm 12.90	32						HC	Pretest	96.97 \pm 11.09	33	5.635	10.928	6.382	31	<.001	Post 6 mo	88.69 \pm 11.90	32																																																						
HC	Pretest	96.97 \pm 11.09	33	5.635	10.928	6.382	31	<.001																																																																		
	Post 6 mo	88.69 \pm 11.90	32																																																																							

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

Biceps: Biceps Skin Fold Thickness, Triceps: Triceps Skin Fold Thickness

Subscap: Sub-scapular Skin Fold Thickness, Abdom: Abdominal Skin Fold Thickness

WC: Waist Circumference

HC: Hip Circumference, CD: Conventional Dentures

NEED: Nutritional Empowerment in Edentulous people with Dentures

P-6 months: Post 6 months

Comparison of the mean scores categorized by skin fold thickness of Biceps, Triceps, sub-scapular, abdominal, and waist circumference, hip circumference within the "CDNEED" group, before and after 6 months intervention, found:

After the 6 months intervention, there had a higher mean score for skin fold thickness of Biceps, Triceps, sub-scapular, and waist circumference, within the "CDNEED" group, compared with pretest, but which were not statistically significance (p-value > 0.05).

After the 6 months intervention, there had a lower mean score for skin fold thickness of sub-scapular, and hip circumference than pretest, at 15.06 ± 5.786 and 16.59 ± 5.616 , 88.69 ± 11.899 and 96.97 ± 11.090 , respectively, which were statistically significance at $p\text{-value}=0.40$, $p\text{-value}< 0.001$. (Table 33)

Table 34 Comparison of scores between pretest and p-6 months in CDNEED grp (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
BFAT%	Pretest	27.5636 \pm 6.0801	33	-0.8318	1.4505	.553	31	.584
	Post 6 mo	27.2906 \pm 6.5261	32					
LBM	Pretest	45.1121 \pm 7.4442	33	-2.8317	-0.3871	-2.685	31	.012
	Post 6 mo	46.5219 \pm 8.1269	32					
Salbu	Pretest	3.8515 \pm .5094	33	-0.1634	-0.0116	-2.350	31	.025
	Post 6 mo	3.9063 \pm .5352	32					
PB ₁₂	Pretest	513.121 \pm 192.758	33	-19.0017	18.8142	-.010	31	.992
	Post 6 mo	522.406 \pm 190.1514	32					
Folate	Pretest	6.5424 \pm 5.6535	33	-0.8986	-0.0745	-2.408	31	.022
	Post 6 mo	7.1041 \pm 5.5670	32					
Fe	Pretest	89.8750 \pm 29.3859	33	-6.5282	1.3407	-1.345	31	.189
	Post 6 mo	92.4688 \pm 30.4641	32					
RBC	Pretest	4.3939 \pm .4967	33	-0.1492	-0.0276	-2.967	31	.006
	Post 6 mo	4.4594 \pm .5096	32					
Hb	Pretest	12.4879 \pm 3.0139	33	-0.5092	0.6155	.193	31	.848
	Post 6 mo	12.4063 \pm 3.6156	32					
Lympho	Pretest	38.4697 \pm 10.9294	33	-2.3413	3.1225	.292	31	.773
	Post 6 mo	37.6875 \pm 9.5544	32					

^a 95% Confidence Interval of the Difference^b Sig (2-tailed)

BFAT%: Body Fat Percentage, LBM: Lean Body Mass, Salbu: Serum albumin (g/L)

Pb₁₂: Plasma cobalamin (B12) (pmol/L), Folate: Serum and erythrocyte folate (nmol/L)Fe: Serum Fe (mmol/L), RBC: RBC ($\times 10^{12}$), Hb: Hgb (g/L)Lympho: Total lymphocyte ($\times 10^9$)

CD: Conventional Dentures

P-6 months: Post 6 months

NEED: Nutritional Empowerment in Edentulous people with Dentures

Comparison of the mean scores categorized by body fat percentage, lean body mass, blood parameters such as Serum albumin, Plasma cobalamin (B12), Serum and erythrocyte folate, Serum iron (Fe), red blood cells count (RBC), hemoglobin (Hb), and Total lymphocyte within the “CDNEED” group, before and after 6 months intervention, found:

After the 6 months intervention, there had a lower mean score for body fat percentage than pretest, at 27.2906 ± 6.5261 and 27.5636 ± 6.0801 , respectively, but which was not statistically significance ($p\text{-value} = 0.584$).

After the 6 months intervention, there had a higher mean score for lean body mass than pretest, at 46.5219 ± 8.1269 and 45.1121 ± 7.4442 , respectively, which was statistically significance ($p\text{-value} = 0.012$).

After the 6 months intervention, there had a higher mean score for Serum albumin, Serum and erythrocyte folate, and red blood cells count (RBC) than pretest, which were statistically significance ($p\text{-value} < 0.05$).

After the 6 months intervention, there had a more or less similar mean score for plasma cobalamin (B12), serum iron (Fe), heamoglobin (Hb), and total lymphocyte within the "CDNEED" group, compared with pretest, which were not statistically significance ($p\text{-value} > 0.05$). (Table 34)

4.1.2.5 To compare before and after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status within control group (CD only).

Hypothesis: The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status will be the same as before program in control group (CD only).

Table 35 Comparison of scores between pretest and post 6 months in CD group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
OHIP	Pretest	81.5455 \pm 15.3401	33	-15.7229	-5.6710	-4.335	32	<.001
	Post 6 mo	92.2424 \pm 10.8398	33					
QMF	Pretest	70.3030 \pm 15.4161	33	-25.7788	-13.1909	-6.306	32	<.001
	Post 6 mo	89.7879 \pm 10.5260	33					
VASM _X	Pretest	553.7879 \pm 79.2842	33	-73.1478	-24.1250	-4.042	32	<.001
	Post 6 mo	602.4242 \pm 67.2591	33					
VASM _D	Pretest	509.6970 \pm 85.5948	33	-75.0880	-21.5787	-3.680	32	.001
	Post 6 mo	558.0303 \pm 68.4076	33					
MNA	Pretest	26.7727 \pm 2.5803	33	-2.0535	0.2050	-1.667	32	.105
	Post 6 mo	27.6970 \pm 2.5798	33					
BMI	Pretest	25.1242 \pm 4.0957	33	-0.8291	0.5879	-.347	32	.731
	Post 6 mo	25.2448 \pm 3.6540	33					

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

OHIP: Oral Health Impact Profile, QMF: Quality of Mastication Function

VASM_X: Visual Analogue Satisfaction Score for Maxilla

VASM_D: Visual Analogue Satisfaction Score for Mandibular

MNA: Mini Nutritional Assessment, BMI: Body Mass Index

CD: Conventional Dentures

Comparison of the mean scores categorized by oral health impact profile, quality of mastication, satisfaction for maxilla, satisfaction for mandibular, mini nutritional assessment and body mass index within the “CD” group, before and after 6 months intervention, found:

After the 6 months intervention, mean score for oral health impact profile was higher than pretest, 92.2424 \pm 10.8398 and 81.5455 \pm 15.3401, respectively, with statistical significance (p-value <0.001).

After the 6 months intervention, there had a higher mean score for quality of mastication than pretest, at 89.7879 ± 10.5260 and 70.3030 ± 15.4161 , respectively, which was also statistically significance (p-value < 0.001).

After the 6 months intervention, mean score for satisfaction for maxilla and satisfaction for mandibular were higher than pretest, 602.4242 ± 67.2591 and 553.7879 ± 79.2842 , 558.0303 ± 68.4076 and 509.6970 ± 85.5948 , respectively, with statistical significance (p-value < 0.001 and p-value = 0.001).

On the other hand, after the 6 months intervention, there had a slight higher mean score for mini nutritional assessment than pretest, at 27.6970 ± 2.5798 and 26.7727 ± 2.5803 , respectively, but which was not statistically significance (p-value = 0.105).

And also, mean score for body mass index was slightly higher than pretest. 25.2448 ± 3.6540 and 25.1242 ± 4.0957 , respectively, with no statistical significance (p-value = 0.731). (Table 35)

Table 36 Comparison of scores between pretest and post 6 months in CD group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
Biceps	Pretest	6.52 \pm 2.54	33	-1.197	.107	-1.704	32	.098
	Post 6 mo	7.06 \pm 2.70	33					
Triceps	Pretest	8.48 \pm 3.73	33	-1.990	.051	-1.936	32	.062
	Post 6 mo	9.45 \pm 4.62	33					
Subscap	Pretest	11.70 \pm 4.37	33	-1.719	-.039	-2.131	32	.041
	Post 6 mo	12.58 \pm 4.49	33					
Abdom	Pretest	16.24 \pm 4.92	33	-1.398	.125	-1.702	32	.098
	Post 6 mo	16.88 \pm 4.54	33					
WC	Pretest	88.06 \pm 10.12	33	-2.332	.454	-1.374	32	.179
	Post 6 mo	89.00 \pm 9.65	33					
HC	Pretest	96.24 \pm 9.21	33	4.585	9.051	6.220	32	<.001
	Post 6 mo	89.42 \pm 9.61	33					

^a 95% Confidence Interval of the Difference^b Sig (2-tailed)

Biceps: Bicep Skin Fold Thickness, Triceps: Triceps Skin Fold Thickness

Subscap: Sub-scapular Skin Fold Thickness, Abdom: Abdominal Skin Fold Thickness

WC: Waist Circumference

HC: Hip Circumference

CD: Conventional Dentures

Comparison of the mean scores categorized by skin fold thickness of Biceps, Triceps, sub-scapular, abdominal, and waist circumference, hip circumference within the “CD” group, before and after 6 months intervention, found:

After the 6 months intervention, there had a higher mean score for skin fold thickness of Biceps, Triceps, abdominal, and waist circumference, within the “CD” group. compared with pretest, but which were not statistically significance (p-value> 0.05). Moreover, there had a higher mean score for abdominal skin fold thickness than pretest, 16.88 \pm 4.540 and 16.24 \pm 4.918, respectively, which was not significance (p-value=0.098).

On the other hand, there had a lower mean score for hip circumference than pretest, 89.42 ± 9.608 and 96.24 ± 9.213 , respectively, which was statistically significance (p-value <0.001). (Table 36)

Table 37 Comparison of scores between pretest and post 6 months in CD group (Paired T-test)

		Mean \pm SD	n	95%CI ^a		t	df	p-value ^b
				Lower	Upper			
BFAT%	Pretest	27.9091 \pm 6.1627	33	-1.7563	0.6291	-.963	32	.343
	Post 6 mo	28.4727 \pm 6.0396	33					
LBM	Pretest	45.5242 \pm 10.3883	33	-1.0243	1.3152	.253	32	.802
	Post 6 mo	45.3788 \pm 9.4478	33					
Salbu	Pretest	3.7606 \pm .3766	33	-0.0091	0.0334	1.161	32	.254
	Post 6 mo	3.7485 \pm .3801	33					
PB ₁₂	Pretest	513.242 \pm 214.9800	33	-19.4072	90.8617	1.320	32	.196
	Post 6 mo	477.515 \pm 149.2373	33					
Folate	Pretest	5.7097 \pm 5.1485	33	-1.0237	1.0328	.009	32	.993
	Post 6 mo	5.7052 \pm 4.6293	33					
Fe	Pretest	89.4545 \pm 24.9588	33	-1.3739	2.4042	.555	32	.582
	Post 6 mo	88.9394 \pm 26.0564	33					
RBC	Pretest	4.339 \pm .5101	33	-0.0365	0.0159	-.801	32	.429
	Post 6 mo	4.3442 \pm .4855	33					
Hb	Pretest	12.2242 \pm 1.4042	33	-0.4063	-0.0240	-2.292	32	.029
	Post 6 mo	12.4394 \pm 1.4948	33					
Lympho	Pretest	34.5758 \pm 6.9621	33	-0.8735	2.2857	.910	32	.369
	Post 6 mo	33.8697 \pm 8.2850	33					

^a 95% Confidence Interval of the Difference

^b Sig (2-tailed)

BFAT%: Body Fat Percentage, LBM: Lean Body Mass, Salbu: Serum albumin (g/L)

Pb₁₂: Plasma cobalamin (B₁₂) (pmol/L), Folate: Serum and erythrocyte folate (nmol/L)

Fe: Serum Fe (mmol/L), RBC: RBC ($\times 10^{12}$), Hb: Hgb (g/L)

Lympho: Total lymphocyte ($\times 10^9$)

CD: Conventional Dentures

Comparison of the mean scores categorized by body fat percentage, lean body mass, blood parameters such as Serum albumin, Plasma cobalamin (B12), Serum and erythrocyte folate, Serum iron (Fe), red blood cells count (RBC), hemoglobin (Hb), and Total lymphocyte within the “CD” group, before and after 6 months intervention, found:

After the 6 months intervention, there had even a higher mean score for body fat percentage than pretest, at 28.4727 ± 6.0396 and 27.9091 ± 6.1627 , respectively, which was not statistically significance ($p\text{-value} = 0.343$).

After the 6 months intervention, there had a slight higher mean score for lean body mass than pretest, at 45.3788 ± 9.4478 and 45.5242 ± 10.3883 , respectively, which was not statistically significance ($p\text{-value} = 0.802$).

After the 6 months intervention, there had a more or less similar mean score for serum albumin, plasma cobalamin (B12), serum and erythrocyte folate, serum iron (Fe), red blood cells count (RBC), and total lymphocyte within the “CD” group, compared with pretest, which were not statistically significance ($p\text{-value} > 0.05$).

After the 6 months intervention, there had a slight higher mean score for hemoglobin (Hb) than pretest, at 12.4394 ± 1.4948 and 12.2242 ± 1.4042 , respectively, which was statistically significance ($p\text{-value} = 0.029$). (Table 37)

4.1.2.6.1 To compare after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status among intervention group I (IOD plus NEED), intervention group II (IOD only), intervention group III (CD plus NEED) and control group (CD only).

Hypothesis: The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status in intervention group I (IOD plus NEED) will be better than intervention group II (IOD only), intervention group III (CD plus NEED) and control group (CD only).

The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status in intervention group II (IOD only) will be better than intervention group III (CD plus NEED) and control group (CD only).

The after program patient quality of masticatory function, daily diet intake, OHRQoL (OHIP) and nutrition status in intervention group III (CD plus NEED) will be better than control group (CD only).

Table 38 Pairwise comparisons among 4 groups for Post 6 months (OHIP)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	110.4242±5.6956	IOD	0.9091	-5.6681	7.4863	1.000
		CD	18.1818	11.6046	24.7591	< .001
		CDNEED	13.4555	6.8271	20.0839	< .001
IOD	109.5152±7.4335	IODNEED	-0.9091	-7.4863	5.6681	1.000
		CD	17.2727	10.6955	23.8500	< .001
		CDNEED	12.5464	5.9180	19.1748	< .001
CDNEED	96.9688±13.9734	IOD	-12.5464	-19.1748	-5.9180	< .001
		IODNEED	-13.4555	-20.0839	-6.8271	< .001
		CD	4.7263	-1.9021	11.3548	.349
CD	92.2424±10.8398	IOD	-17.2727	-23.8500	-10.6955	< .001
		IODNEED	-18.1818	-24.7591	-11.6046	< .001
		CDNEED	-4.7263	-11.3548	1.9021	.349

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

OHIP: Oral Health Impact Profile

After six months of the intervention, mean scores of Oral Health Impact Profile among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 110.4242±5.6956, 109.5152±7.4335, 96.9688±13.9734, and 92.2424±10.8398, respectively.

There were significantly higher mean score in “IODNEED” group than “CDNEED” group and “CD control” group, with p-value <.001 and <.001, respectively. On the other hand, there were higher mean score in “IODNEED” group than “IOD” group, which was not statistically significance (p-value> 0.05).

There were significantly higher mean score in “IOD” group than “CDNEED” group and “CD control” group, with p-value <.001 and <.001, respectively. On the other hand, there were higher mean score in “CDNEED” group than “CD” group, which was not statistically significance (p-value> 0.05). (Table 38)

Table 39 Pairwise comparisons among 4 groups for Post 6 months (QMF)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	116.7576 \pm 10.5713	IOD	-0.2727	-7.9285	7.3831	1.000
		CD	26.9697	19.3139	34.6255	< .001
		CDNEED	28.0701	20.3547	35.7855	< .001
IOD	117.0303 \pm 11.0439	IODNEED	0.2727	-7.3831	7.9285	1.000
		CD	27.2424	19.5866	34.8982	< .001
		CDNEED	28.3428	20.6274	36.0582	< .001
CDNEED	88.6875 \pm 13.9964	IOD	-28.3428	-36.0582	-20.6274	< .001
		IODNEED	-28.0701	-35.7855	-20.3547	< .001
		CD	-1.1004	-8.8158	6.6150	1.000
CD	89.7879 \pm 10.5260	IOD	-27.2424	-34.8982	-19.5866	< .001
		IODNEED	-26.9697	-34.6255	-19.3139	< .001
		CDNEED	1.1004	-6.6150	8.8158	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

QMF: Quality of Mastication Function

After six months of the intervention, mean scores of quality of mastication function among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 116.7576 \pm 10.5713, 117.0303 \pm 11.0439, 88.6875 \pm 13.9964, and 89.7879 \pm 10.5260, respectively.

There were significantly higher mean score in “IODNEED” group than “CDNEED” group and “CD control” group, with p-value <.001 and <.001, respectively. On the other hand, there were similar score between “IODNEED” group and “IOD” group, which was not statistically significance (p-value> 0.05).

There were significantly higher mean score in “IOD” group than “CDNEED” group and “CD control” group, with p-value <.001 and <.001, respectively. On the other hand, there were similar mean score between “CDNEED” group and “CD” group, which was also not statistically significance (p-value> 0.05). (Table 39)

Table 40 Pairwise comparisons among 4 groups for Post 6 months (VASMX)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	688.9394±64.3933	IOD	20.7576	-23.6792	65.1944	1.000
		CD	86.5152	42.0784	130.9519	< .001
		CDNEED	30.6581	-14.1245	75.4407	.413
IOD	668.1818±67.2660	IODNEED	-20.7576	-65.1944	23.6792	1.000
		CD	65.7576	21.3208	110.1944	.001
		CDNEED	9.9006	-34.8820	54.6832	1.000
CDNEED	658.2813±70.4320	IOD	-9.9006	-54.6832	34.8820	1.000
		IODNEED	-30.6581	-75.4407	14.1245	.413
		CD	55.857	11.0744	100.6396	.007
CD	602.4242±67.2591	IOD	-65.7576	-110.194	-21.3208	.001
		IODNEED	-86.5152	-130.952	-42.0784	< .001
		CDNEED	-55.857	-100.640	-11.0744	.007

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

VASMX: Visual Analogue Satisfaction Score for Maxilla

After six months of the intervention, mean satisfaction scores for maxilla among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 688.9394±64.3933, 668.1818±67.2660, 658.2813±70.4320, and 602.4242±67.2591, respectively.

There were significantly higher mean score in “IODNEED” group than “CD” group, “IOD” group than “CD” group, and “CDNEED” group than “CD control” group, with p-value <.001, .001 and .007, respectively. On the other hand, there were even higher mean scores in “IODNEED” than “IOD” group and “CDNEED” group, which were not statistically significance (p-value> 0.05). (Table 40)

Table 41 Pairwise comparisons among 4 groups for Post 6 months (VASMD)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	721.8182 \pm 48.923	IOD	18.939	-23.845	61.723	1.000
		CD	163.788	121.004	206.572	< .001
		CDNEED	101.662	58.545	144.779	< .001
IOD	702.8788 \pm 51.174	IODNEED	-18.939	-61.723	23.845	1.000
		CD	144.849	102.064	187.632	< .001
		CDNEED	82.723	39.606	125.839	< .001
CDNEED	620.1563 \pm 84.971	IOD	-82.723	-125.839	-39.606	< .001
		IODNEED	-101.662	-144.779	-58.545	< .001
		CD	62.126	19.009	105.243	.001
CD	558.0303 \pm 68.407	IOD	-144.849	-187.632	-102.064	< .001
		IODNEED	-163.788	-206.572	-121.004	< .001
		CDNEED	-62.126	-105.243	-19.009	.001

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

VASMD: Visual Analogue Satisfaction Score for Mandibular

After six months of the intervention, mean satisfaction scores for mandibular among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 721.8182 \pm 48.923, 702.8788 \pm 51.174, 620.1563 \pm 84.971, and 558.0303 \pm 68.407, respectively.

There were significantly higher mean score in “IODNEED” group than “CDNEED” group and “CD control” group, with p-value <.001 and <.001, respectively. On the other hand, there was higher mean score in “IODNEED” group than “IOD” group, which was not statistically significance (p-value> 0.05).

There were significantly higher mean score in “IOD” group than “CDNEED” group and “CD control” group, with p-value <.001 and <.001, respectively. On the other hand, there was higher mean score in “CDNEED” group than “CD” group, which was also not statistically significance (p-value> 0.05). (Table 41)

Table 42 Pairwise comparisons among 4 groups for Post 6 months (MNA)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	28.8485 \pm 1.3721	IOD	0.3939	-1.0748	1.8626	1.000
		CD	0.3788	-1.0899	1.8475	1.000
		CDNEED	-0.0961	-1.5763	1.3840	1.000
IOD	28.6212 \pm 1.8583	IODNEED	-0.3939	-1.8626	1.0748	1.000
		CD	-0.0152	-1.4839	1.4536	1.000
		CDNEED	-0.4901	-1.9702	.9901	1.000
CDNEED	28.1719 \pm 1.7808	IOD	0.4901	-.9901	1.9702	1.000
		IODNEED	0.0961	-1.3840	1.5763	1.000
		CD	0.4749	-1.0052	1.9550	1.000
CD	27.6970 \pm 2.5798	IOD	0.0152	-1.4536	1.4839	1.000
		IODNEED	-0.3788	-1.8475	1.0899	1.000
		CDNEED	-0.4749	-1.9550	1.0052	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

MNA: Mini Nutritional Assessment

Regarding mean scores of mini nutritional assessment, after six months of the intervention, among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 28.8485 \pm 1.3721, 28.6212 \pm 1.8583, 28.1719 \pm 1.7808, and 27.6970 \pm 2.5798, respectively with p-value >0.05. (Table 42)

Even though, there were higher mean score in “IODNEED” group than “IOD” group and “CDNEED” group than “CD control” group, which were not statistically significance (p-value > 0.05). (Table 42)

Table 43 Pairwise comparisons among 4 groups for Post 6 months (BMI)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	25.8073 \pm 4.0734	IOD	0.6609	-1.9994	3.3212	1.000
		CD	0.5624	-2.0979	3.2227	1.000
		CDNEED	-0.0577	-2.7387	2.6233	1.000
IOD	25.1464 \pm 4.8420	IODNEED	-0.6609	-3.3212	1.9994	1.000
		CD	-0.0984	-2.7588	2.5618	1.000
		CDNEED	-0.7186	-3.3996	1.9624	1.000
CDNEED	25.8650 \pm 3.3889	IOD	0.7186	-1.9624	3.3996	1.000
		IODNEED	0.0577	-2.6233	2.7387	1.000
		CD	0.6202	-2.0609	3.3012	1.000
CD	25.2448 \pm 3.6540	IOD	0.0985	-2.5618	2.7588	1.000
		IODNEED	-0.5624	-3.2227	2.0979	1.000
		CDNEED	-0.6202	-3.3012	2.0609	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

BMI: Body Mass Index

Regarding mean scores of body mass index, after six months of the intervention, among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 25.8073 \pm 4.0734, 25.1464 \pm 4.8420, 25.8650 \pm 3.3889, and 25.2448 \pm 3.6540, respectively with p-value >0.05. (Table 43)

Even though, there were higher mean score in “IODNEED” group than “IOD” group and “CDNEED” group than “CD control” group, which were not statistically significance (p-value > 0.05). (Table 43)

Table 44 Pairwise comparisons among 4 groups for Post 6 months (BFAT %)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	26.2788±6.7579	IOD	-4.2212	-8.3747	-.0677	.044
		CD	-2.1939	-6.3474	1.9595	.956
		CDNEED	-1.0118	-5.1976	3.1740	1.000
IOD	30.5000±5.8186	IODNEED	4.2212	.0677	8.3747	.044
		CD	2.0273	-2.1262	6.1807	1.000
		CDNEED	3.2094	-.9764	7.3952	.252
CDNEED	27.2906±6.5261	IOD	-3.2094	-7.3952	.9764	.252
		IODNEED	1.0118	-3.1740	5.1976	1.000
		CD	-1.1821	-5.3679	3.0037	1.000
CD	28.4727±6.0396	IOD	-2.0273	-6.1807	2.1262	1.000
		IODNEED	2.1939	-1.9595	6.3474	.956
		CDNEED	1.1821	-3.0037	5.3679	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonfèroni

BFAT: Body Fat Percentage

After six months of the intervention, mean for body fat percentage among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 26.2788±6.7579, 30.5000±5.8186, 27.2906±6.5261, and 28.4727±6.0396, respectively.

The “IODNEED” group had a significant higher mean score than “IOD” group at p-value .044. On the other hand, the remaining groups were not significant difference. (Table 44)

Table 45 Pairwise comparisons among 4 groups for Post 6 months (LBM)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	47.7303±8.9333	IOD	4.7121	-1.0604	10.4847	.183
		CD	2.3515	-3.4210	8.1241	1.000
		CDNEED	1.2084	-4.6091	7.0259	1.000
IOD	43.0182±8.4094	IODNEED	-4.7121	-10.4847	1.0604	.183
		CD	-2.3606	-8.1332	3.4120	1.000
		CDNEED	-3.5037	-9.3212	2.3138	.654
CDNEED	46.5219±8.1269	IOD	3.5037	-2.3138	9.3212	.654
		IODNEED	-1.2084	-7.0259	4.6091	1.000
		CD	1.1431	-4.6744	6.9606	1.000
CD	45.3788±9.4478	IOD	2.3606	-3.4120	8.1332	1.000
		IODNEED	-2.3515	-8.1241	3.4210	1.000
		CDNEED	-1.1431	-6.9606	4.6744	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

LBM: Lean Body Mass

Regarding mean scores of lean body mass, after six months of the intervention, among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 47.7303±8.9333, 43.0182±8.4094, 46.5219±8.1269, and 45.3788±9.4478, respectively with p-value >0.05.

(Table 45)

Table 46 Pairwise comparisons among 4 groups for Post 6 months Serum albumin (g/L)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	4.5879 \pm .6097	IOD	0.6485	.2563	1.0406	<.001
		CD	0.8394	.4984	1.1804	<.001
		CDNEED	0.6816	.2959	1.0673	<.001
IOD	3.9394 \pm .5646	IODNEED	-0.6485	-1.0406	-.2563	<.001
		CD	0.1909	-.1316	.5134	.501
		CDNEED	0.3314	-.3368	.4031	1.000
CDNEED	3.9063 \pm .5352	IOD	-0.3314	-.4031	.3368	1.000
		IODNEED	-0.6816	-1.0673	-.2959	<.001
		CD	0.1558	-.1566	.4721	.678
CD	3.7485 \pm .3801	IOD	-0.1909	-.5134	.1316	.501
		IODNEED	-0.8394	-1.1804	-.4984	<.001
		CDNEED	-0.1578	-.4721	.1566	.678

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Dunnett T3

Regarding mean scores of serum albumin, after six months of the intervention, among the four groups, “IODNEED” group, “IOD’ group, “CDNEED” group, and “CD control” group were 4.5879 \pm .6097, 3.9394 \pm .5646, 3.9063 \pm .5352, and 3.7485 \pm .3801, respectively.

There were significantly higher mean score in “IODNEED” group than “IOD’ group, “CDNEED” group, and “CD control” group, with p-value <.001, <.001 and <.001, respectively. On the other hand, there were no significant different among “IOD’ group, “CDNEED” group and “CD control” group with p-value >0.05. (Table 46)

Table 47 Pairwise comparisons among 4 grps for Post 6 mnths Plasma cobalamin (B12) (pmol/L)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	630.645 \pm 187.0484	IOD	105.7879	-13.272	224.848	.112
		CD	152.8485	33.788	271.908	.005
		CDNEED	107.9574	-12.029	227.944	.104
IOD	524.576 \pm 192.1817	IODNEED	-105.7879	-224.848	13.272	.112
		CD	47.0606	-71.999	166.121	1.000
		CDNEED	2.1695	-117.817	122.156	1.000
CDNEED	522.406 \pm 190.1514	IOD	-2.1695	-122.156	117.817	1.000
		IODNEED	-107.9574	-227.944	12.029	.104
		CD	44.8911	-75.095	164.878	1.000
CD	477.515 \pm 149.2373	IOD	-47.0606	-166.121	71.999	1.000
		IODNEED	-152.8485	-271.908	-33.788	.005
		CDNEED	-44.8911	-164.878	75.095	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Regarding mean scores of plasma B₁₂, after six months of the intervention, among the four groups, “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 630.645 \pm 187.0484, 524.576 \pm 192.1817, 522.406 \pm 190.1514, and 477.515 \pm 149.2373, respectively.

There were significantly higher score in “IODNEED” group than “CD control” group only, with p-value .005. On the other hand, there were no significant different among remaining groups with p-value >0.05. (Table 47)

Table 48 Pairwise comparisons among 4 groups for Post 6 Serum and erythrocyte folate (nmol/L.)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	11.5458 \pm 5.6611	IOD	2.9167	-.7472	6.5806	.209
		CD	5.8406	2.1767	9.5045	<.001
		CDNEED	4.4417	.7493	8.1341	.010
IOD	8.6291 \pm 6.2348	IODNEED	-2.9167	-6.5806	.7472	.209
		CD	2.9239	-.7400	6.5878	.206
		CDNEED	1.5250	-2.1674	5.2174	1.000
CDNEED	7.1041 \pm 5.5670	IOD	-1.5250	-5.2174	2.1674	1.000
		IODNEED	-4.4417	-8.1341	-.7493	.010
		CD	1.3989	-2.2935	5.0913	1.000
CD	5.7052 \pm 4.6293	IOD	-2.9239	-6.5878	.7400	.206
		IODNEED	-5.5406	-9.5045	-2.1767	<.001
		CDNEED	-1.3989	-5.0913	2.2935	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

After six months of the intervention, mean scores of serum and erythrocyte folate among the four groups; “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 11.5458 \pm 5.6611, 8.6291 \pm 6.2348, 7.1041 \pm 5.5670, and 5.7052 \pm 4.6293, respectively.

There were significantly higher score in “IODNEED” group than “CDNEED” group and “CD control” group. (p=0.010, p <.001)

On the other hand, there were no significant different between “IODNEED” group and “IOD” group, “IOD” group and “CD control” group, “CDNEED” group and “CD control” group, with p-value >0.05. (Table 48)

Table 49 Pairwise comparisons among 4 groups for Post 6 months Serum Fe (mmol/L)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	113.2424 \pm 27.7861	IOD	29.3333	10.9292	47.7374	<.001
		CD	24.303	5.8989	42.7071	<.001
		CDNEED	20.7737	2.2264	39.3210	.019
IOD	83.9091 \pm 27.1585	IODNEED	-29.3333	-47.7374	-10.9292	<.001
		CD	-5.0303	-23.4344	13.3738	1.000
		CDNEED	-8.5597	-27.1070	9.9876	1.000
CDNEED	92.4688 \pm 30.4641	IOD	8.5597	-9.9876	27.1070	1.000
		IODNEED	-20.7737	-39.3210	-2.2264	.019
		CD	3.5294	-15.0180	22.0767	1.000
CD	88.9394 \pm 26.0564	IOD	5.0303	-13.3738	23.4344	1.000
		IODNEED	-27.8324	-42.7071	-5.8989	.003
		CDNEED	-3.5294	-22.0767	15.0180	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Regarding mean scores of Serum Fe, after six months of the intervention among the four groups, the “IODNEED” group, “IOD” group, “CDNEED” group and “CD control” group were 113.2424 \pm 27.7861, 83.9091 \pm 27.1585, 92.4688 \pm 30.4641, and 88.9394 \pm 26.0564, respectively.

There were significantly higher score in “IODNEED” group than “IOD” group, “CD” group, and “CDNEED control” group, with p-value <.001, <.001, and 0.019 respectively.

On the other hand, there were no significant different among “IOD” group, “CDNEED” group and “CD control” group with p-value >0.05. (Table 49)

Table 50 Pairwise comparisons among 4 groups for Post 6 months RBC ($\times 10^{12}$)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	4.9709 \pm .7637	IOD	0.6454	.2188	1.0721	.001
		CD	0.6267	.1973	1.0560	.001
		CDNEED	0.5115	.0743	.9487	.014
IOD	4.3255 \pm .4739	IODNEED	-6.4545	-1.0721	-.2188	.001
		CD	-0.1879	-.3390	.3014	1.000
		CDNEED	-0.1339	-.4653	.1974	.850
CDNEED	4.4594 \pm .5096	IOD	0.1339	-.1974	.4653	.850
		IODNEED	-0.51153	-.9487	-.0743	.014
		CD	0.11513	-.2199	.4502	.923
CD	4.3442 \pm .4855	IOD	0.01879	-.3014	.3390	1.000
		IODNEED	-0.6267	-1.0560	-.1973	.001
		CDNEED	-0.11513	-.4502	.2199	.923

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Dunnett T3

Regarding mean scores of red blood cells count, after six months of the intervention among the four groups, the “IODNEED” group, “IOD” group, “CDNEED” group and “CD control” group were 4.9709 \pm .7637, 4.3255 \pm .4739, 4.4594 \pm .5096, and 4.3442 \pm .4855, respectively.

There were significantly higher score in “IODNEED” group than “IOD” group, “CD” group, and “CDNEED control” group, with p-value <.001, <.001, and 0.014 respectively.

On the other hand, there were no significant different among “IOD” group, “CDNEED” group and “CD control” group with p-value >0.05. (Table 50)

Table 51 Pairwise comparisons among 4 groups for Post 6 months Hb (g/L)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	13.2788 \pm 1.7757	IOD	1.1455	-.3059	2.5968	.218
		CD	0.8394	-.6119	2.2907	.742
		CDNEED	0.8725	-.5901	2.3351	.674
IOD	12.1333 \pm 1.0723	IODNEED	-1.1455	-2.5968	.3059	.218
		CD	-0.3061	-1.7574	1.1452	1.000
		CDNEED	-0.2729	-1.7355	1.1897	1.000
CDNEED	12.4063 \pm 3.6156	IOD	0.2729	-1.1897	1.7355	1.000
		IODNEED	-0.8725	-2.3351	.5901	.674
		CD	-0.0331	-1.4957	1.4295	1.000
CD	12.4394 \pm 1.4948	IOD	0.3061	-1.1452	1.7574	1.000
		IODNEED	-0.8394	-2.2907	.6119	.742
		CDNEED	0.0331	-1.4295	1.4957	1.000

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Regarding mean scores of haemoglobin, after six months of the intervention, among the four groups were not significant different. The “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 13.2788 \pm 1.7757, 12.1333 \pm 1.0723, 12.4063 \pm 3.6156, and 12.4394 \pm 1.4948, respectively with p-value >0.05. (Table 51)

Table 52 Pairwise comparisons among 4 groups for Post 6 months Total lymphocyte ($\times 10^9$)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	42.7576 \pm 13.7932	IOD	10.6061	3.2377	17.9744	.002
		CD	8.8879	1.2450	16.5307	.015
		CDNEED	5.0701	-2.9164	13.0566	.421
IOD	32.1515 \pm 6.9625	IODNEED	-10.6061	-17.9744	-3.2377	.002
		CD	-1.7182	-6.8293	3.3929	.930
		CDNEED	-5.536	-11.1932	.1212	.058
CDNEED	37.6875 \pm 9.5544	IOD	5.536	-.1212	11.1932	.058
		IODNEED	-5.0701	-13.0566	2.9164	.421
		CD	3.8179	-2.2109	9.8465	.426
CD	33.8697 \pm 8.2850	IOD	1.7182	-3.3929	6.8293	.930
		IODNEED	-8.8879	-16.5307	-1.2450	.015
		CDNEED	-3.8178	-9.8465	2.2109	.426

Based on observed means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Dunnett T3

Regarding mean scores of total lymphocyte, after six months of the intervention, among the four groups, the “IODNEED” group, “IOD” group, “CDNEED” group, and “CD control” group were 42.7576 \pm 13.7932, 32.1515 \pm 6.9625, 37.6875 \pm 9.5544, and 33.8697 \pm 8.2850, respectively.

There were significantly higher mean score in “IODNEED” group than “IOD” group, and “CD control” group, with p-value .002 and .015, respectively.

On the other hand, there were higher mean score in “IODNEED” group than “CDNEED” group, but not statistically significance (p-value > 0.05). (Table 52)

Table 53 Pairwise comparisons among groups for Post 6 months (Test Statistics^{a,b})

Variable	Groups	n	Mean rank	X ²	df	Asymp.Sig
Plasma B12	IODNEED	33	86.14	12.903	3	0.005
	IOD	33	60.79			
	CDNEED	32	61.38			
	CD	33	55.56			
RBC	IODNEED	33	90.91	20.414	3	<0.001
	IOD	33	54.05			
	CDNEED	32	64.13			
	CD	33	54.86			
Lymphocyte	IODNEED	33	81.91	11.958	3	0.008
	IOD	33	51.23			
	CDNEED	32	70.44			
	CD	33	60.56			

a. Kruskal Wallis Test

b. Grouping Variable: Group GRP :

Additionally, in case of assumed not equal variance, kruskal Wallis test was also done apart from Dunnett T3, for plasma B₁₂, red blood cells count and total lymphocyte counts, also showed statistical significant different results (p-value <0.05). (Table 53)

4.1.2.6.2 Pairwise comparisons of mean scores among timing (within groups) and among groups (between groups) were analyzed by repeated measures. (4 factors * 4 groups)

Table 54 Pairwise comparisons among timing of (OHIP)

Times	Mean ± SD	Times	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
Pretest	78.471 ± 8.4331	1 month	-16.323	-19.724	-12.923	<.001
		3 months	-22.169	-25.985	-18.353	<.001
		6 months	-23.816	-27.638	-19.994	<.001
1 month	94.795 ± 6.2041	Pretest	16.323	12.923	19.724	<.001
		3 months	-5.845	-9.196	-2.495	<.001
		6 months	-7.493	-10.731	-4.255	<.001
3 months	100.640 ± 5.3769	Pretest	22.169	18.353	25.985	<.001
		1 month	5.845	2.495	9.196	<.001
		6 months	-1.647	-2.220	-1.075	<.001
6 months	102.288 ± 4.9271	Pretest	23.638	19.994	27.638	<.001
		1 month	7.493	4.255	10.731	<.001
		3 months	1.647	1.075	2.220	<.001

Based on estimated marginal means

OHIP: Oral Health Impact Profile

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Concl: 1. Pretest is significant lower than post 1 month, 3 months and 6 months

2. Post 1 month is also significant lower post from 3 months and 6 months

3. Post 3 months is significant lower than post 6 months

The analysis of the interview times on pretest, post 1 month, post 3 months and post 6 months, within groups, it was revealed that the mean ± standard deviation of sum of scores of oral health related quality of life among the four timing were 78.471 ± 8.4331, 94.795 ± 6.2041, 100.640 ± 5.3769, and 102.288 ± 4.9271, respectively. (Table 54)

It was found that pretest was significant lower than post 1 month, post 3 months and post 6 months (p-value <0.001). Whereas, post 1 month was significant lower from

post 3 months and post 6 months (p-value <0.001) and also post 3 months was significant lower from post 6 months (p-value <0.001).

Table 55 Pairwise comparisons among groups for (OHIP)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	98.114 ± 9.5245	IOD	0.0909	-6.1949	6.3767	1.000
		CD	9.4545	3.1688	15.7403	.001
		CDNEED	6.7152	.3805	13.0499	.031
IOD	98.023 ± 9.5245	IODNEED	-0.0909	-6.3767	6.1949	1.000
		CD	9.3636	3.0779	15.6494	.001
		CDNEED	6.6243	.2896	12.9590	.035
CDNEED	91.398 ± 9.6736	IOD	-6.6243	-12.9590	-.2896	.035
		IODNEED	-6.7152	-13.0499	-.3805	.031
		CD	2.7393	-3.5953	9.0740	1.000
CD	88.659 ± 9.5245	IOD	-9.3636	-15.6494	-3.0779	.001
		IODNEED	-9.4545	-15.7403	-3.1688	.001
		CDNEED	-2.7393	-9.0740	3.5953	1.000

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

OHIP: Oral Health Impact Profile

Pairwise comparison of the mean scores for oral health related quality of life, among the “IODNEED” group , “IOD” group, “CDNEED” group and “CD control” group; with pretest, post 1 month, post 3 months and post 6 months, revealed:

The highest mean scores was in “IODNEED” group 98.114 ± 9.5245, followed by “IOD” group 98.023 ± 9.5245, “CDNEED” group 91.398 ± 9.6736 and “Control” group 88.659 ± 9.5245.

There were significantly higher mean score in “IODNEED” group than “CDNEED” group, and “CD control” group, with p-value .031 and .001, respectively.

Moreover, there were significantly higher mean score in “IOD” group than “CDNEED” group, and “CD control” group, with p-value .035 and .001, respectively.

On the other hand, there were higher mean score in “IODNEED” group than “IOD” group, but not statistically significance (p-value > 0.05). (Table 55) (Figure 5)

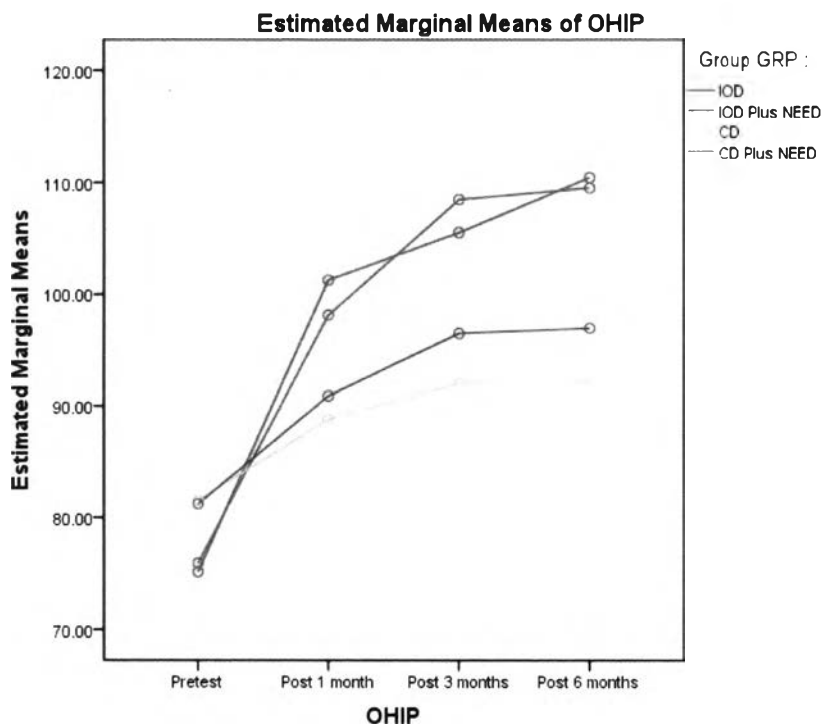


Figure 5 Pairwise comparisons within groups and among groups for oral health impact profile

Table 56 Pairwise comparisons among timing of (QMF)

Times	Mean \pm SD	Times	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
Pretest	70.481 \pm 8.7777	1 month	-19.76	-23.792	-15.728	<.001
		3 months	-28.953	-33.337	-24.569	<.001
		6 months	-32.585	-36.905	-28.265	<.001
1 month	90.241 \pm 7.2095	Pretest	19.76	15.728	23.792	<.001
		3 months	-9.193	-12.875	-5.512	<.001
		6 months	-12.825	-16.402	-9.249	<.001
3 months	99.434 \pm 6.4799	Pretest	28.953	24.569	33.337	<.001
		1 month	9.193	5.512	12.875	<.001
		6 months	-3.632	-4.248	-3.016	<.001
6 months	103.066 \pm 5.7360	Pretest	32.585	28.265	36.905	<.001
		1 month	12.825	9.249	16.402	<.001
		3 months	3.632	3.016	4.248	<.001

Based on estimated marginal means

QMF: Quality of Mastication Function

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Concl: 1. Pretest is significant lower than post 1 month, 3 months and 6 months

2. Post 1 month is also significant lower post from 3 months and 6 months

3. Post 3 months is significant lower than post 6 months

The analysis of the interview times on pretest, post 1 month, post 3 months and post 6 months, within groups, it was revealed that the mean \pm standard deviation of sum of scores of quality of mastication function among the four timing were 70.481 \pm 8.7777, 90.241 \pm 7.2095, 99.434 \pm 6.4799, and 103.066 \pm 5.7360, respectively. (Table 56)

It was found that pretest was significant lower than post 1 month, post 3 months and post 6 months (p-value <0.001). Whereas, post 1 month was significant lower from post 3 months and post 6 months (p-value <0.001) and also post 3 months was significant lower from post 6 months (p-value <0.001).

Table 57 Pairwise comparisons among groups for (QMF)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	99.538 \pm 10.5413	IOD	0.3561	-6.6000	7.3121	1.000
		CD	18.5833	11.6273	25.5394	<.001
		CDNEED	15.991	8.9809	23.0012	<.001
IOD	99.182 \pm 10.5413	IODNEED	-0.3561	-7.3121	6.6000	1.000
		CD	18.2273	11.2713	25.1833	<.001
		CDNEED	15.6349	8.6248	22.6451	<.001
CDNEED	83.547 \pm 10.7079	IOD	-15.6349	-22.6451	-8.6248	<.001
		IODNEED	-15.991	-23.0012	-8.9809	<.001
		CD	2.5923	-4.4178	9.6025	1.000
CD	80.955 \pm 10.5413	IOD	-18.2273	-25.1833	-11.2713	<.001
		IODNEED	-18.5833	-25.5394	-11.6273	<.001
		CDNEED	-2.5923	-9.6025	4.4178	1.000

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

QMF: Quality of Mastication Function

Pairwise comparison of the mean scores for quality of mastication, among the “IODNEED” group , “IOD” group, “CDNEED” group and “CD control” group: with pretest, post 1 month, post 3 months and post 6 months, revealed:

The highest mean scores was in “IODNEED” group 99.538 \pm 10.5413, followed by “IOD” group 99.182 \pm 10.5413, “CDNEED” group 83.547 \pm 10.7079 and “Control” group 80.955 \pm 10.5413.

There were significantly higher mean score in “IODNEED” group than “CDNEED” group. and “CD control” group, with p-value <.001 and <.001, respectively. Moreover, there were significantly higher mean score in “IOD” group than “CDNEED” group. and “CD control” group, with p-value <.001 and <.001, respectively.

On the other hand, there were higher mean score in “IODNEED” group than “IOD” group, but not statistically significance (p-value 1.000). (Table 57) (Figure 5)

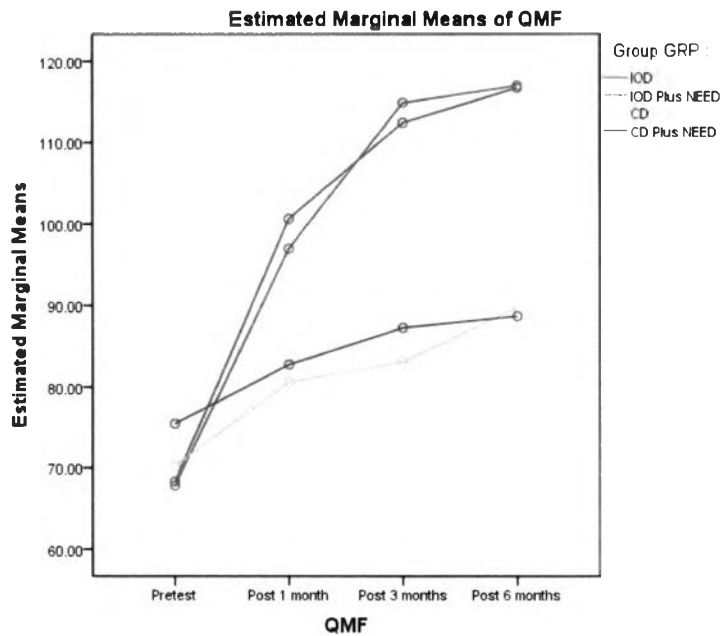


Figure 6 Pairwise comparisons within groups and among groups for quality of mastication function

Table 58 Pairwise comparisons among timing of (VASM_X)

Times	Mean ± SD	Times	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
Pretest	567.404 ± 51.8967	1 month	-75.4630	-95.889	-55.038	<.001
		3 months	-87.3340	-109.265	-65.402	<.001
		6 months	-87.0530	-108.838	-65.268	<.001
1 month	642.867 ± 34.3814	Pretest	75.4630	55.038	95.889	<.001
		3 months	-11.8700	-24.309	.568	.070
		6 months	-11.5900	-23.652	.472	.067
3 months	654.737 ± 34.0654	Pretest	87.3340	65.402	109.265	<.001
		1 month	11.8700	-.568	24.309	.070
		6 months	0.2810	-1.733	2.294	1.000
6 months	654.457 ± 33.8070	Pretest	87.0530	65.268	108.838	<.001
		1 month	11.5900	-.472	23.652	.067
		3 months	-0.2810	-2.294	1.733	1.000

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Concl: 1. Pretest is significant lower than post 1 month, 3 months and 6 months

2. Post 1 month is not significant from 3 months and 6 months

3. Post 3 months is not significant from 6 months

VASM_X: Visual Analogue Satisfaction Score for Maxilla

The analysis of the interview times on pretest, post 1 month, post 3 months and post 6 months, within groups, it was revealed that the mean ± standard deviation of sum of scores of satisfaction for Maxilla among the four timing were 567.404 ± 51.8967, 642.867 ± 34.3814, 654.737 ± 34.0654, and 654.457 ± 33.8070, respectively. (Table 58)

It was found that pretest was significant lower than post 1 month, post 3 months and post 6 months (p-value <0.001).

On the other hand, post 1 month was not significant lower from post 3 months and post 6 months (p-value >0.05). And also post 3 months was not significant lower from post 6 months (p-value >0.05).

Table 59 Pairwise comparisons among groups for (VASMx)

Groups	Mean ± SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	655.144 ± 64.9599	IOD	20.5606	-22.3015	63.4227	1.000
		CD	64.2348	21.3727	107.0970	.001
		CDNEED	16.3158	-26.8799	59.5115	1.000
IOD	634.583 ± 64.9599	IODNEED	-20.5606	-63.4227	22.3015	1.000
		CD	43.6742	.8121	86.5364	.043
		CDNEED	-4.2448	-47.4405	38.9509	1.000
CDNEED	638.828 ± 65.9652	IOD	4.2448	-38.9509	47.4405	1.000
		IODNEED	-16.3158	-59.5115	26.8799	1.000
		CD	47.919	4.7234	91.1147	.021
CD	590.909 ± 64.9599	IOD	-43.6742	-86.5364	-.8121	.043
		IODNEED	-64.2348	-107.0970	-21.3727	.001
		CDNEED	-47.919	-91.1147	-4.7234	.021

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

VASMx: Visual Analogue Satisfaction Score for Maxilla

Pairwise comparison of the mean scores of satisfaction for Maxilla, among the “IODNEED” group , “IOD” group, “CDNEED” group and “CD control” group: with pretest, post 1 month, post 3 months and post 6 months, revealed:

The highest mean scores was in “IODNEED” group 655.144 ± 64.9599, followed by “IOD” group 634.583 ± 64.9599, “CDNEED” group 638.828 ± 65.9652 and “Control” group 590.909 ± 64.9599.

There were significantly higher mean scores in “IODNEED” group than “CD control” group, “IOD” group than “CD control” group, and “CDNEED” group than “CD control” group, with p-value .001, .043 and .021, respectively.

On the other hand, there were higher mean score in “IODNEED” group than “IOD” group and “CDNEED” group, but not statistically significance ($p\text{-value} > 0.05$). (Table 59) (Figure 6)

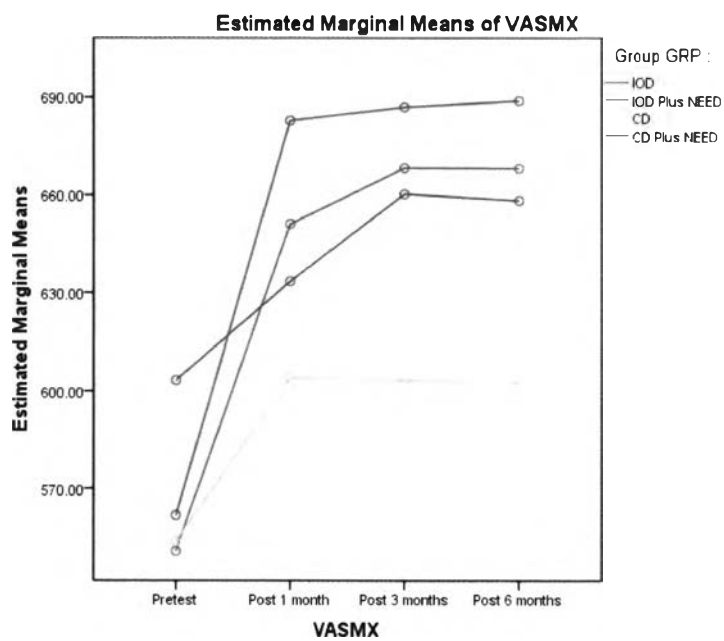


Figure 7 Pairwise comparisons within groups and among groups for satisfaction for Maxilla

Table 60 Pairwise comparisons among timing of (VASMD)

Times	Mean \pm SD	Times	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
Pretest	506.439 \pm 50.4663	1 month	-117.536	-139.589	-95.482	<.001
		3 months	-130.099	-155.778	-104.421	<.001
		6 months	-144.281	-167.495	-121.068	<.001
1 month	623.975 \pm 38.6267	Pretest	117.536	95.482	139.589	<.001
		3 months	-12.564	-29.837	4.709	.321
		6 months	-26.746	-41.738	-11.754	<.001
3 months	636.539 \pm 39.2299	Pretest	130.099	104.421	155.778	<.001
		1 month	12.564	-4.709	29.837	.321
		6 months	-14.182	-21.675	-6.689	<.001
6 months	650.721 \pm 32.0517	Pretest	144.281	121.068	167.495	<.001
		1 month	26.746	11.754	41.738	<.001
		3 months	14.182	6.689	21.675	<.001

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Concl: 1. Pretest is significant lower than post 1 month, 3 months and 6 months

2. Post 1 month is not significant from 3 months but significant lower than 6 months

3. Post 3 months is significant lower than 6 months

VASMD: Visual Analogue Satisfaction Score for Mandibular

The analysis of the interview times on pretest, post 1 month, post 3 months and post 6 months, within groups, it was revealed that the mean \pm standard deviation of sum of scores of satisfaction for Mandibular among the four timing were 506.439 \pm 50.4663, 623.975 \pm 38.6267, 636.539 \pm 39.2299, and 650.721 \pm 32.0517, respectively. (Table 60)

It was found that pretest was significant lower than post 1 month, post 3 months and post 6 months (p-value <0.001). Whereas, post 1 month was significant lower from post 6 months (p-value <0.001) and also post 3 months was significant lower from post 6 months (p-value <0.001). On the other hand, post 1 month was not significant lower from post 3 months (p-value >0.05).

Table 6I Pairwise comparisons among groups for (VASMD)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	648.636 \pm 63.2940	IOD	25.3409	-16.4200	67.1018	.638
		CD	99.8864	58.1255	141.6473	<.001
		CDNEED	51.6442	9.5583	93.7301	.008
IOD	623.295 \pm 63.2940	IODNEED	-25.3409	-67.1018	16.4200	.638
		CD	74.5455	32.7846	116.3064	<.001
		CDNEED	26.3033	-15.7826	68.3892	.578
CDNEED	596.992 \pm 64.2706	IOD	-26.3033	-68.3892	15.7826	.578
		IODNEED	-51.6442	-93.7301	-9.5583	.008
		CD	48.2422	6.1563	90.3281	.016
CD	548.750 \pm 63.2940	IOD	-74.5455	-116.3064	-32.7846	<.001
		IODNEED	-99.8864	-141.6473	-58.1255	<.001
		CDNEED	-48.2422	-90.3281	-6.1563	.016

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

VASMD: Visual Analogue Satisfaction Score for Mandibular

Pairwise comparison of the mean scores satisfaction for Mandibular, among the “IODNEED” group , “IOD” group, “CDNEED” group and “CD control” group: with pretest, post 1 month, post 3 months and post 6 months, revealed:

The highest mean scores was in “IODNEED” group 648.636 \pm 63.2940, followed by “IOD” group 623.295 \pm 63.2940, “CDNEED” group 596.992 \pm 64.2706 and “Control” group 548.750 \pm 63.2940.

There were significantly higher mean score in “IODNEED” group than “CDNEED” group, and “CD control” group, with p-value .081 and <.001, respectively. Moreover, there were significantly higher mean score in “IOD” group than “CD control”

group, and “CDNEED” group than “CD control” group, with p-value <.001 and .016, respectively.

On the other hand, there were higher mean score in “IODNEED” group than “IOD” group, but not statistically significance (p-value > 0.05). (Table 61) (Figure 7)

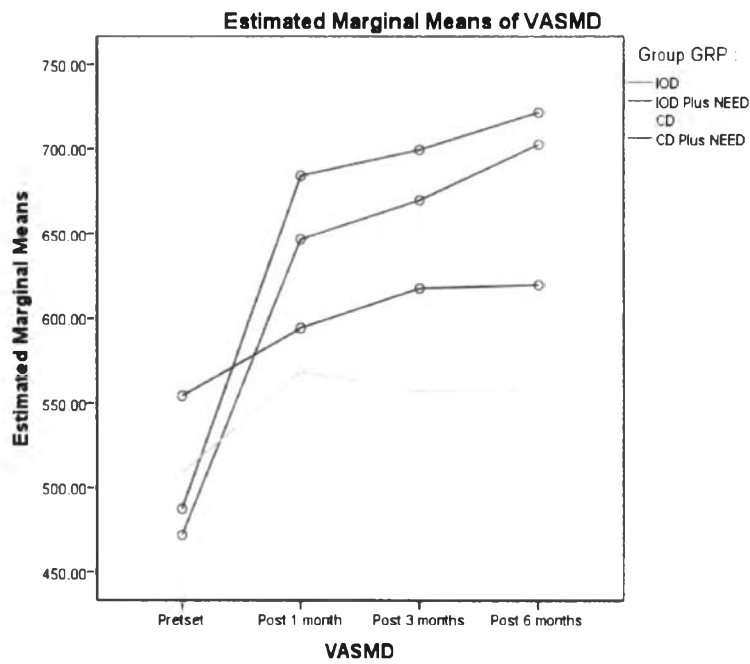


Figure 8 Pairwise comparisons within groups and among groups of satisfaction for Mandibular

Table 62 Pairwise comparisons among timing of (MNA)

Times	Mean \pm SD	Times	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
Pretest	25.975 \pm 1.4534	1 month	-1.898	-2.509	-1.287	<.001
		3 months	-2.188	-2.923	-1.454	<.001
		6 months	-2.359	-3.085	-1.634	<.001
1 month	27.874 \pm 1.1604	Pretest	1.898	1.287	2.509	<.001
		3 months	-0.29	-.768	.188	.639
		6 months	-0.461	-.941	.019	.067
3 months	28.164 \pm 1.0972	Pretest	2.188	1.454	2.923	<.001
		1 month	0.29	-.188	.768	.639
		6 months	-0.171	-.282	-.060	<.001
6 months	28.335 \pm 0.9617	Pretest	2.359	1.634	3.085	<.001
		1 month	0.461	-.019	.941	.067
		3 months	0.171	.060	.282	<.001

Based on estimated marginal means

MNA: Mini Nutritional Assessment

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Concl: 1. Pretest is significant lower than post 1 month, 3 months and 6 months

2. Post 1 month is not significant from 3 months and 6 months

3. Post 3 months is significant lower than 6 months

The analysis of the interview times on pretest, post 1 month, post 3 months and post 6 months, within groups, it was revealed that the mean \pm standard deviation of sum of scores of mini nutritional assessment among the four timing were 25.975 \pm 1.4534, 27.874 \pm 1.1604, 28.164 \pm 1.0972, and 28.335 \pm 0.9617, respectively. (Table 62)

It was found that pretest was significant lower than post 1 month, post 3 months and post 6 months (p-value <0.001). Whereas, post 3 months score was significant lower from post 6 months (p-value <0.001).

On the other hand, post 1 month was not significant lower from post 3 months and post 6 months (p-value >0.05).

Table 63 Pairwise comparisons among groups for (MNA)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value [†]
				Lower	Upper	
IODNEED	27.473 \pm 1.8440	IOD	-0.2955	-1.5123	.9214	1.000
		CD	-0.0455	-1.2623	1.1714	1.000
		CDNEED	-0.1125	-1.3387	1.1138	1.000
IOD	27.769 \pm 1.8440	IODNEED	0.2955	-.9214	1.5123	1.000
		CD	0.2500	-.9668	1.4668	1.000
		CDNEED	0.1830	-1.0433	1.4093	1.000
CDNEED	27.586 \pm 1.8727	IOD	-0.1830	-1.4093	1.0433	1.000
		IODNEED	0.1125	-1.1138	1.3387	1.000
		CD	0.0670	-1.1593	1.2933	1.000
CD	27.519 \pm 1.8440	IOD	-0.2500	-1.4668	.9668	1.000
		IODNEED	0.0455	-1.1714	1.2623	1.000
		CDNEED	-0.0670	-1.2933	1.1593	1.000

Based on estimated marginal means

†: The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

MNA: Mini Nutritional Assessment

Pairwise comparison of the mean scores for mini nutritional assessment, among the “IODNEED” group, “IOD” group, “CDNEED” group and “CD control” group; with pretest, post 1 month, post 3 months and post 6 months, revealed:

The highest mean scores was in “IOD” group 27.769 \pm 1.8440, followed by, “CDNEED” group 27.586 \pm 1.8727, “Control” group 27.519 \pm 1.8440, and “IODNEED” group 27.473 \pm 1.8440.

There were no significant different among four groups with p-value >0.05. (Table 63) (Figure 8)

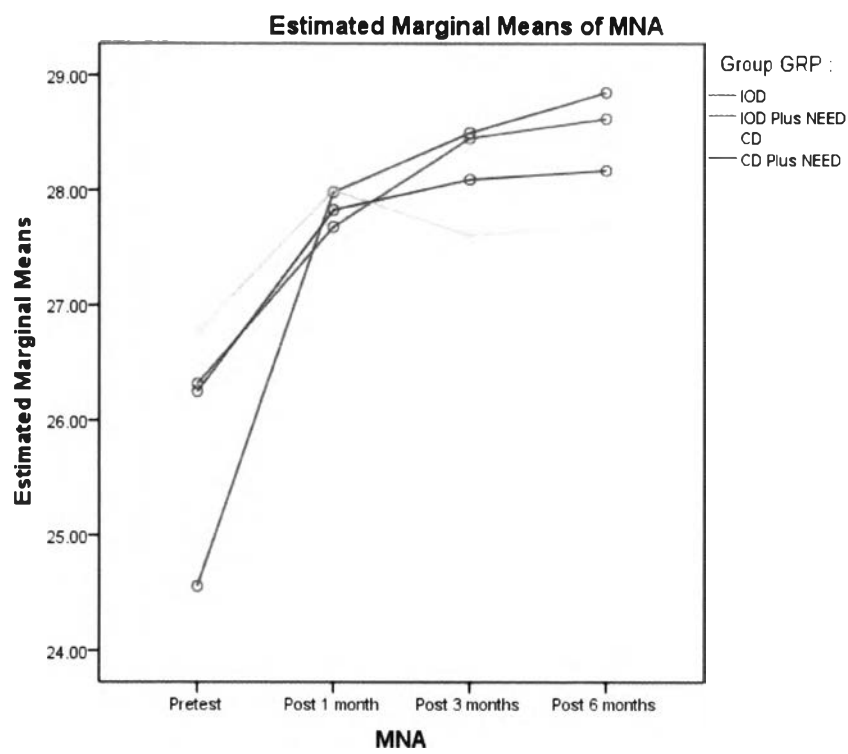


Figure 9 Pairwise comparisons within groups and among groups for mini nutritional assessment

Table 64 Pairwise comparisons among timing of (BMI)

Times	Mean \pm SD	Times	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
Pretest	24.546 \pm 2.2461	1 month	-0.3520	-.724	.021	.076
		3 months	-0.6640	-1.063	-.264	<.001
		6 months	-0.9700	-1.389	-.551	<.001
1 month	24.898 \pm 2.1715	Pretest	0.3520	-.021	.724	.076
		3 months	-0.3120	-.520	-.104	.001
		6 months	-0.6180	-.869	-.367	<.001
3 months	25.210 \pm 2.1600	Pretest	0.6640	.264	1.063	<.001
		1 month	0.3120	.104	.520	.001
		6 months	-0.3060	-.457	-.155	<.001
6 months	25.516 \pm 1.9912	Pretest	0.9700	.551	1.389	<.001
		1 month	0.6180	.367	.869	<.001
		3 months	0.3060	.155	.457	<.001

Based on estimated marginal means

BMI: Body Mass Index

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

Concl: 1. Pretest is significant lower than 3 months and 6 months

2. Post 1 month is significant lower from 3 months and 6 months

3. Post 3 months is significant lower than 6 months

The analysis of the interview times on pretest, post 1 month, post 3 months and post 6 months, within groups, it was revealed that the mean \pm standard deviation of sum of scores of body mass index among the four timing were 24.546 \pm 2.2461, 24.898 \pm 2.1715, 25.210 \pm 2.1600, and 25.516 \pm 1.9912, respectively. (Table 64)

It was found that pretest was significant lower than post 3 months and post 6 months (p-value <0.001). Whereas, post 1 month was significant lower from post 3 months and post 6 months (p-value <0.001) and also post 3 months was significant lower from post 6 months (p-value <0.001). On the other hand, pretest was not significant lower from post 1 month (p-value >0.05).

Table 65 Pairwise comparisons among groups for (BMI)

Groups	Mean \pm SD	Groups	Mean Difference	95% CI ^a		p-value ^a
				Lower	Upper	
IODNEED	25.096 \pm 4.2050	IOD	0.6033	-2.1719	3.3785	1.000
		CD	-0.0061	-2.7813	2.7691	1.000
		CDNEED	-0.3817	-3.1785	2.4151	1.000
IOD	24.493 \pm 4.2050	IODNEED	-0.6033	-3.3785	2.1719	1.000
		CD	-0.6095	-3.3847	2.1657	1.000
		CDNEED	-0.985	-3.7818	1.8118	1.000
CDNEED	25.478 \pm 4.2740	IOD	0.985	-1.8118	3.7818	1.000
		IODNEED	0.3817	-2.4151	3.1785	1.000
		CD	0.3755	-2.4212	3.1723	1.000
CD	25.102 \pm 4.2050	IOD	0.6095	-2.1657	3.3847	1.000
		IODNEED	0.0061	-2.7691	2.7813	1.000
		CDNEED	-0.3755	-3.1723	2.4212	1.000

Based on estimated marginal means

I : The mean difference is significant at the 0.05 level

^a Adjusted for multiple comparisons: Bonferoni

BMI: Body Mass Index

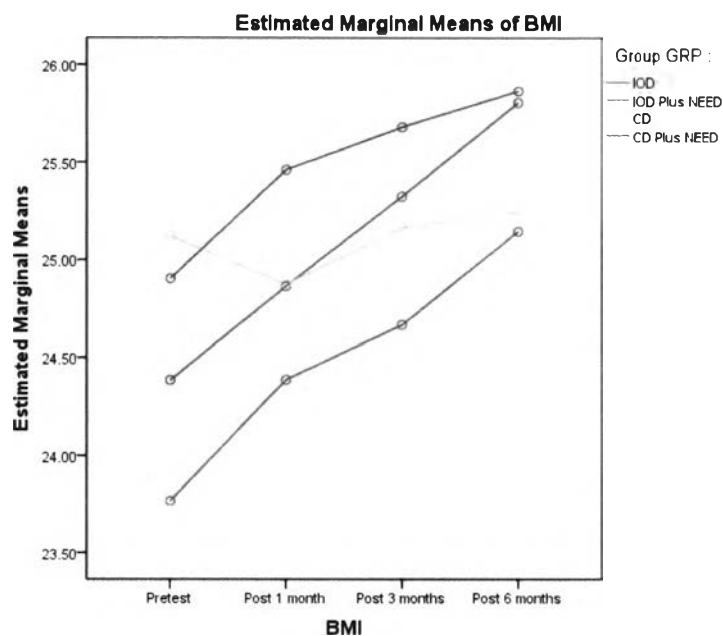


Figure 10 Pairwise comparisons within groups and among groups for body mass index

Pairwise comparison of the mean scores for body mass index, among the “IODNEED” group , “IOD” group, “CDNEED” group and “CD control” group; with pretest, post 1 month, post 3 months and post 6 months, revealed:

The mean scores were in “IODNEED” group 25.096 ± 4.2050 , followed by “IOD” group 24.493 ± 4.2050 , in “CDNEED” group 25.478 ± 4.2740 and followed by “Control” group 25.102 ± 4.2050 .

There were no significant different among four groups with p-value >0.05 . On the other hand, there were higher mean score in “IODNEED” group than “IOD” group, and “CDNEED” group than “CD control” group, but not statistically significance (p-value >0.05). (Table 65) (Figure 9)

4.1.2.7. To determine the cost-effectiveness among the four groups.

Hypothesis: The cost-effectiveness in intervention group I (IODNEED) will be better than intervention group II (IOD).

The cost-effectiveness in intervention group I (CDNEED) will be better than intervention group II (CD).

Table 66 Descriptive statistics of mean score for total cost (Baths) in four groups

Groups	Mean \pm SD	n
IODNEED	9565.45 \pm 792.48	33
IOD	9091.18 \pm 479.25	33
CDNEED	1749.78 \pm 280.35	33
CD	1562.36 \pm 341.99	33

In IODNEED group, total cost for one person was combination of unit cost for dental implant with NEED program cost for one person (52 baths). In the IOD group, total cost for one person was the unit cost for dental implant only. Same as in CDNEED group, total cost for one person was combination of unit cost for conventional denture with NEED program cost for one person (52 baths) and in the CD group, total cost for one person was the unit cost for conventional denture only.

The mean total cost in Thai Baths were in “IODNEED” group 9565.45±792.48, followed by “IOD” group 9091.18±479.25, in “CDNEED” group 1749.78±280.35 and “Control” group 1562.36±341.99.

Table 67 Correlation between Total cost and Oral Health Related Quality of Life

Variables	R	R ²	Constant	b (slope)	t	95% CI		p-value
						Lower	Upper	
P1 OHIP	.380 ^a	0.145	87.799	0.001	4.689	84.12 0.001	91.47 0.002	<.001
P3 OHIP	.497 ^a	0.247	91.962	0.002	6.537	88.71 0.001	95.22 0.002	<.001
P6 OHIP	.614 ^a	0.377	91.302	0.002	8.842	88.29 0.002	94.32 0.002	<.001

^a Predictors: (Constant) Total cost

Red: 95% CI of Constant

Blue : 95% CI slope "b"

$$\hat{y} = a + bX$$

Regarding the analysis for cost-effectiveness in the time period of 6 months after post intervention, correlation between total cost and oral health related quality of life. it was revealed that, there were Pearson Correlation Coefficient .380, constant (a) 87.799 , and slope (b) 0.001 at post one month intervention, the Pearson Correlation Coefficient .497, constant (a) 91.962 , slope (b) 0.002 at post three months intervention, and the Pearson Correlation Coefficient .614, constant (a) 91.302, slope (b) 0.002 at post six

months intervention (p-value <.001). (Table 67) (It means the higher the Correlation Coefficient, the stronger the linear relation between the two variables.)

It could be concluded that (1) if cost 1000 Baths increase, there would have (1 score) increased in OHIP (oral health related quality of life) in one month post intervention (2) if cost 1000 Baths increase, there would have (2 scores) increased in OHIP (oral health related quality of life) in three months post intervention (3) if cost 1000 Baths increase, there would have (2 scores) increased in OHIP (oral health related quality of life) in six months post intervention.

According to mean total cost in different studied groups (Table 66), it could be calculated by the formula $\hat{y} = a + bX$ that the cost-effectiveness of "NEED" programme was (0.5 score) OHIP (oral health related quality of life) increased in "IODNEED" group than "IOD" group at one month post intervention, then (1 score) OHIP (oral health related quality of life) increased in "IODNEED" group than "IOD" group at three months post intervention. But there was no change in score increased at post 6 months intervention than from post 3 months, even though there had the stronger the linear relation between the two variables, as $r=.614$. (Table 67) (Figure 12, 13, 14)

According to mean total cost in different studied groups (Table 66), it could be calculated by the formula $\hat{y} = a + bX$ that the cost-effectiveness of "NEED" programme was (0.2 score) of OHIP (oral health related quality of life) increased in "CDNEED" group than "CD" group at one month post intervention, then (0.4 score) of OHIP (oral health related quality of life) increased in "CDNEED" group than "CD" group at three months post intervention. But there was no change in score increased at post 6 months

intervention than from post 3 months, even though there had the stronger the linear relation between the two variables, as $r=.614$. (Table 67) (Figure 11, 12, 13)

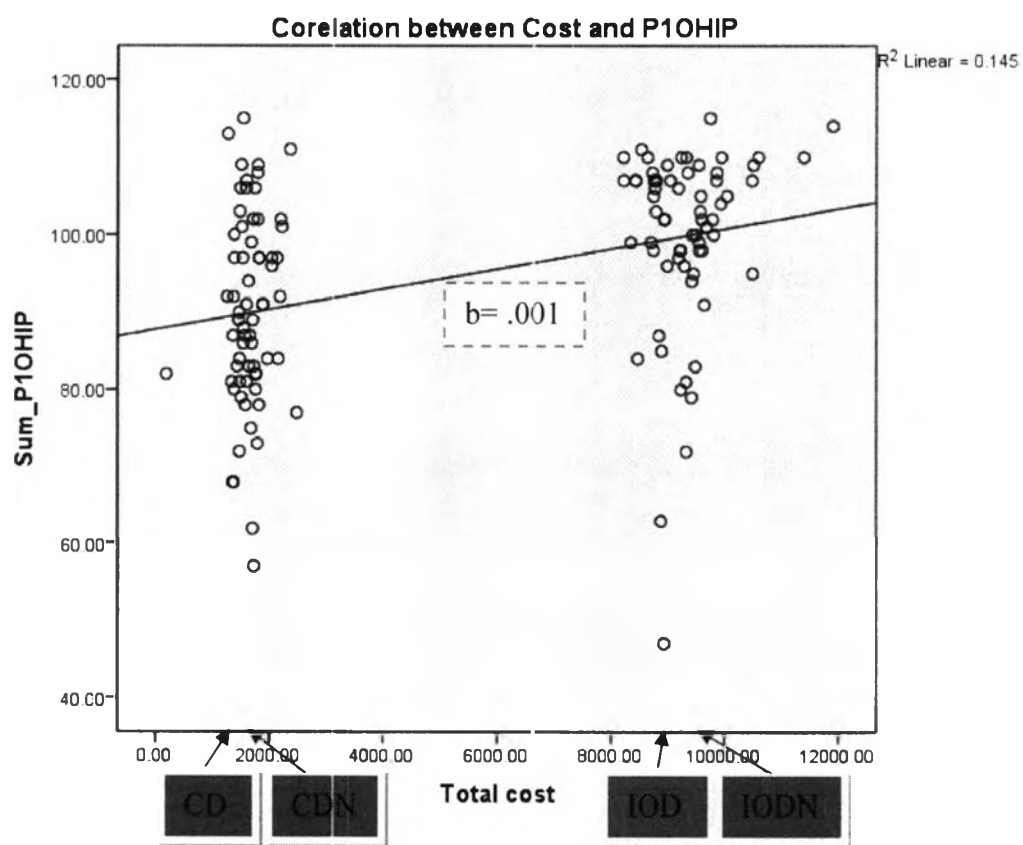


Figure 11 Correlation between total cost and post 1 month oral health related quality of life

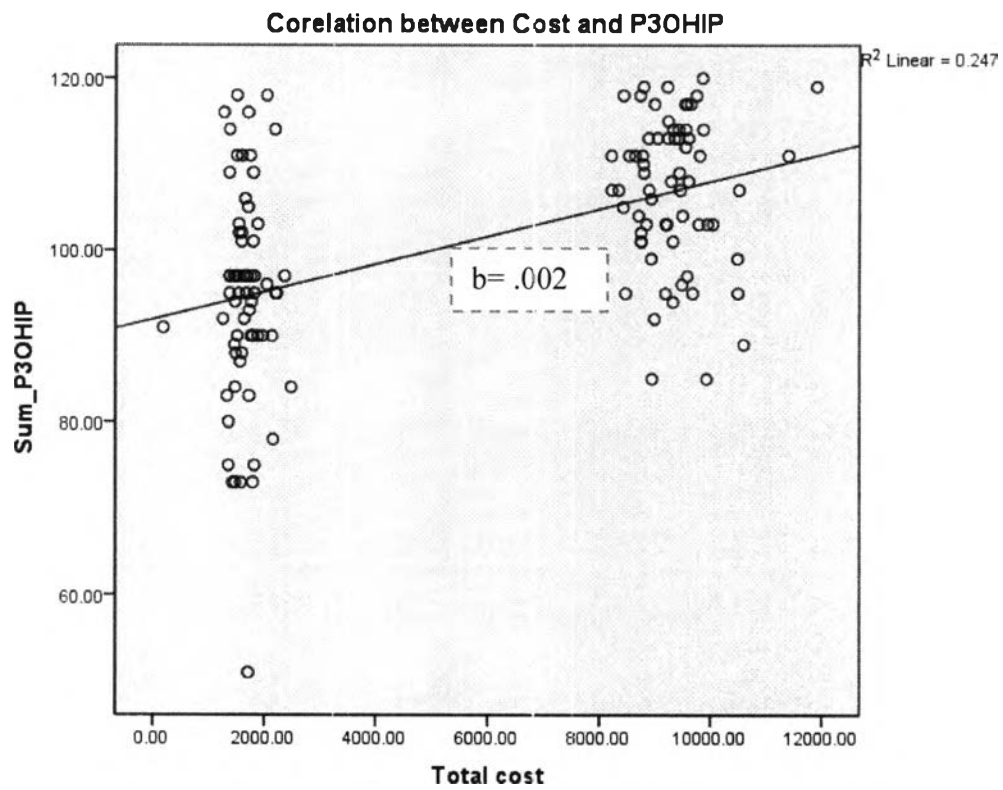


Figure 12 Correlation between total cost and post 3 months oral health related quality of life

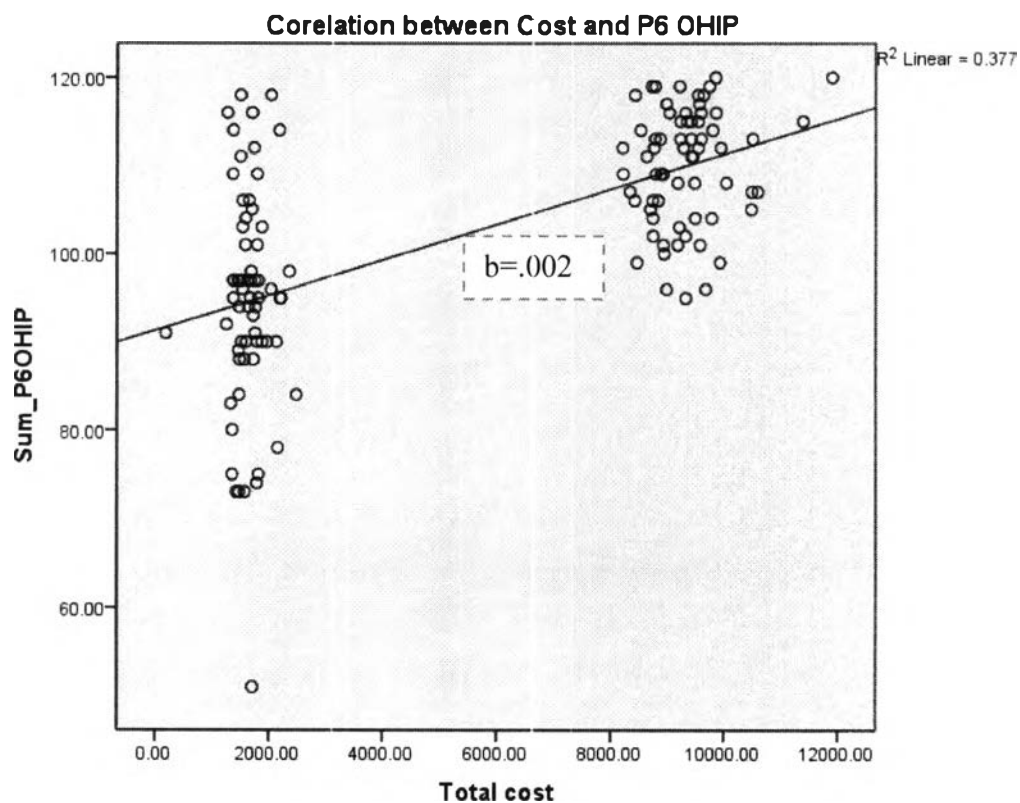


Figure 13 Correlation between total cost and post 6 months oral health related quality of life

Table 68 Correlation between Total cost and Satisfaction for Mandibular

Variables	R	R ²	Constant	b (slope)	t	95% CI		p-value
						Lower	Upper	
P1 VASMD	.478 ^a	0.229	564.83	0.011	6.205	541.62 0.007	588.04 0.014	<.001
P3 VASMD	.521 ^a	0.272	567.38	0.013	6.967	543.29 0.009	591.47 0.016	<.001
P6 VASMD	.677 ^a	0.459	562.29	0.016	10.460	541.81 0.013	582.78 0.019	<.001

^a Predictors: (Constant) Total cost

Red: 95% CI of Constant

Blue : 95% CI slope "b"

Regarding the analysis for cost-effectiveness in the time period of 6 months after post intervention, correlation between total cost and satisfaction score for mandibular, it was revealed that, there were Pearson Correlation Coefficient .478, constant (a) 564.83 , and slope (b) .011 at post one month intervention, the Pearson Correlation Coefficient .521, constant (a) 567.38 , slope (b) 0.013 at post three months intervention. and the Pearson Correlation Coefficient .677, constant (a) 562.29, slope (b) 0.016 at post six months intervention (p-value <.001). (Table 67)

It could be concluded that (1) if cost 1000 Baths increase there would have (11 scores) increased in satisfaction score for mandibular in one month post intervention (2) if cost 1000 Baths increase there would have (13 scores) increased in satisfaction score for mandibular in three months post intervention (3) if cost 1000 Baths increase there would have (16 scores) increased in satisfaction score for mandibular in six months post intervention.

According to mean total cost in different studied groups (Table 66), it could be calculated by the formula $\hat{y} = a + bX$ that the cost-effectiveness of “NEED” programme was (5.5 scores) satisfaction score for mandibular increased in “IODNEED” group than “IOD” group at one month post intervention, then (6.5 scores) satisfaction score for mandibular increased in “IODNEED” group than “IOD” group at three months post intervention. Moreover, (8 scores) satisfaction score for mandibular increased in “IODNEED” group than “IOD” group at six months post intervention. (Table 68) (Figure 14, 15, 16)

According to mean total cost in different studied groups (Table 66), it could be calculated by the formula $\hat{y} = a + bX$ that the cost-effectiveness of “NEED” programme

was (2.2 scores) satisfaction score for mandibular increased in “CDNEED” group than “CD” group at one month post intervention, then (2.6 scores) satisfaction score for mandibular increase in “CDNEED” group than “CD” group at three months post intervention. Moreover, (3.2 scores) satisfaction score for mandibular increased in “CDNEED” group than “CD” group at six months post intervention. (Table 68) (Figure 15, 16, 17)

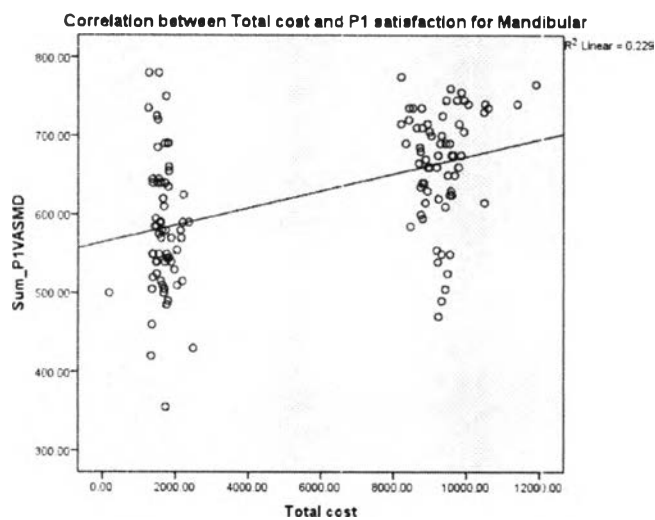


Figure 14 Correlation between total cost and post 1 month satisfaction score for mandibular

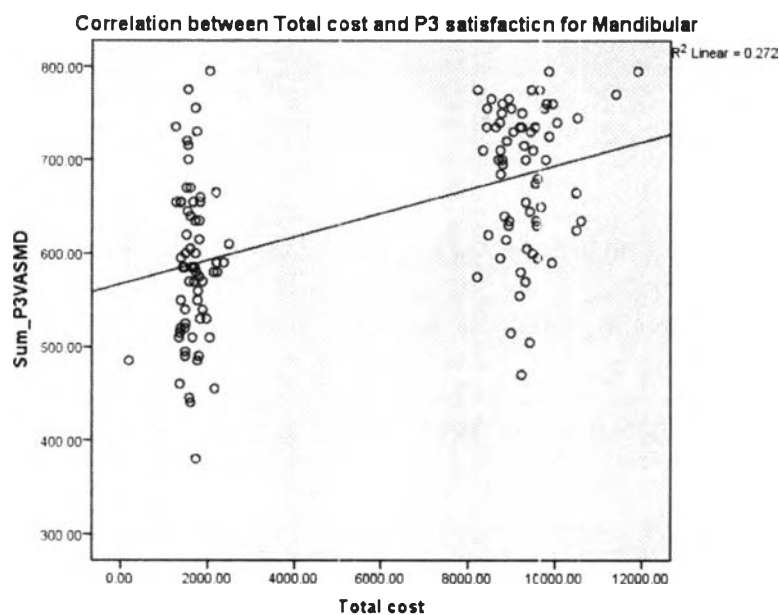


Figure 15 Correlation between total cost and post 3 months satisfaction score for mandibular

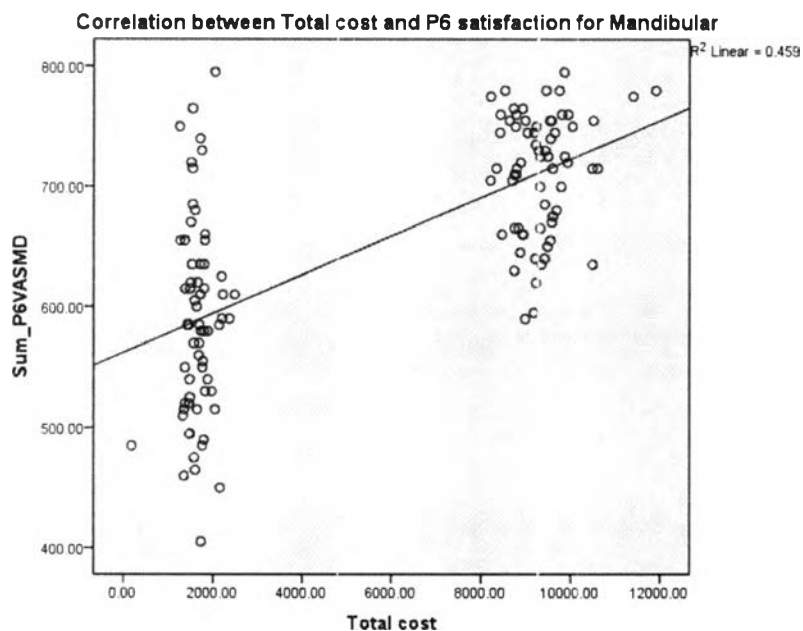


Figure 16 Correlation between total cost and post 6 months satisfaction score for mandibular

Table 69 Correlation between Total cost and Quality of Mastication function

Variables	R	R ²	Constant ^a	b (slope)	t	95% CI		p-value
						Lower	Upper	
P1 QMF	.525 ^a	0.276	78.01	0.002	7.04	0.002	0.003	<.001
P3 QMF	.733 ^a	0.538	79.72	0.004	12.295	0.003	0.004	<.001
P6 QMF	.767 ^a	0.589	83.58	0.004	13.598	0.003	0.004	<.001

^a Predictors: (Constant) Total cost

Bold : 95% CI slope "b"

Regarding the analysis for cost-effectiveness in the time period of 6 months after post intervention, correlation between total cost and quality of mastication function, it was revealed that, there were Pearson Correlation Coefficient .525, constant (a) 78.01 , and slope (b) .002 at post one month intervention, the Pearson Correlation Coefficient .733, constant (a) 79.72 , slope (b) 0.004 at post three months intervention, and the Pearson Correlation Coefficient .767, constant (a) 83.58, slope (b) 0.004 at post six months intervention (p-value <.001). (Table 69)

It could be concluded that (1) if cost 1000 Baths increase there would have (2 scores) increased in quality of mastication function in one month post intervention (2) if cost 1000 Baths increase there would have (4 scores) increase in satisfaction score for mandibular in three months post intervention (3) if cost 1000 Baths increase there would have (4 scores) increase in satisfaction score for mandibular in six months post intervention.

According to mean total cost in different studied groups (Table 66), it could be calculated by the formula $\hat{y} = a + bX$ that the cost-effectiveness of "IOD" programme and "CD" programme was (18 scores) quality of mastication function increased in "IOD"

group and (3 scores) increased in “CD” group at one month post intervention, then (36 scores) quality of mastication function increased in “IOD” group and (6 scores) increased in “CD” group at three months post intervention. But there was no change in score increased at post 6 months intervention than post 3 months, even though there had the stronger the linear relation between the two variables, as $r=.767$. (Table 69)

Table 70 Pairwise comparisons among 4 groups for Post 6 months (Summary)

Groups	IOD	p-value	CDNEED	p-value	CD	p-value
IODNEED	↓ BFAT%	.044	OHIP ^a	<.001	OHIP ^a	<.001
	Se Albu ^a	<.001	QMF ^a	<.001	QMF ^a	<.001
	Se Fe ^a	<.001	VASMD ^a	<.001	VASMX ^a	<.001
	RBC ^a	.001	Se Albu ^a	<.001	VASMD ^a	<.001
	Lympho ^a	.002	Se Folat ^a	.010	Se Albu ^a	<.001
	DIET ^a	.029	Se Fe ^a	.019	PI B ₁₂ ^a	.005
			RBC ^a	0.014	Se Folat ^a	<.001
					Se Fe ^a	<.001
					RBC ^a	.001
					Lympho ^a	.015
IOD			OHIP ^a	<.001	OHIP ^a	<.001
			QMF ^a	<.001	QMF ^a	<.001
			VASMD ^a	<.001	VASMX ^a	.001
				VASMD ^a	<.001	
CDNEED					VASMX ^a	.007
					VASMD ^a	.001

MNA and EMI were not significant difference among the groups

^a Adjusted for multiple comparisons: Bonferoni

Most of the variables agreed the hypothesis.