

Results

In this study, 12 patients were included (12 males patients) who had missing maxillary and mandibular anterior and premolar teeth. Patients were divided into two groups A&B.

The average age was 36 years. Past medical history taken from these patients reveals no medical condition that might affect osseointegration process.

The bone depth of the site of implant placement is adequate for primary stability as revealed by CBCT .Also the distance available for implant placement was evaluated without interfering with the primary stability of the implant.

The patients for Group A (6 males) used BGR membrane fixed by bone tacks or pins. Group B (6 males) used GBR membrane without fixation.

Post operative evaluation:-

1. Befor Loading:

The primary stability was achieved during implant placement . No post operative pain except for frist two or three days.

Inspection and palpation of the surgical area revealed no evidence of swelling ,edema, wound dehiscence or any signs of purulent infection.

2. After Loading

All implants were clinically and radiographically evaluated. the implant mobility and bleeding indices were used clinically , assess the implant success .

Additionally, the radiographic assessments were used to evaluate the implant after loading(base line) one month, 3 months and 6 months.

All Cases underwent clinical assessment. The following table (table1) shows (gender, age of each patient, implant length, diameter and site of its placement).

Table 1

Implant no	Gender	Age	Length(mm)	Diameter(mm)	Site
1	M	43	13	3.7	Lower LT LT 2
2	M	40	13	3.7	UPPER LT 2
3	M	34	13	4.7	UPPER LT 2
4	M	33	13	3.7	UPPER LT 3
5	M	34	13	3.7	UPPER LT 2
6	M	31	13	3.7	UPPER LT 2
7	M	33	13	3.7	UPPER LT 1
8	M	34	13	4.7	UPPER LT 2
9	M	39	13	3.7	UPPER LT 3
10	M	34	13	3.7	UPPER LT 2
11	M	36	13	3.7	lowerRT3
12	M	32	13	3.7	UPPER RT3

Clinical evaluation after loading:

As regards the gingival and periodontal health of the implants are parameters used in this study to evaluate the condition of the peri-implant tissues, including peri-implant sulcus depth, gingival bleeding index, and implant mobility measurements.

Implant Mobility and Discomfort

Primary stability at the time of implant placement has been recognized as an important prerequisite for the achievement of osseointegration. The establishment and maintenance of direct contact at the bone-implant interface are requirements for long-term implant success. Implant mobility is an indication of lack of osseointegration.

The implant mobility of all implants was assessed immediately post-operatively to evaluate implant primary stability. It was assessed again after 6 months to ensure bone healing

Plaque Assessment:

Microbial biofilms have been shown to form on inert biomaterial surfaces in an aqueous environment. Implants placed in the oral cavity represent artificial surfaces colonized by bacteria from saliva and ecologic niches such as periodontal pockets, tonsils, and crypts of the tongue.

Table 2 Indices Used to Assess Plaque Accumulation Around Oral Implants

Score	Mombelli et al (mPI)	Lindquist et al
0	No detection of plaque	No visible plaque
1	Plaque only recognized by running a probe across the smooth marginal surface of the implant	Local plaque accumulation
2	Plaque can be seen by the naked eye	General plaque accumulation greater than 25%
3	Abundance of soft matter	

Bleeding index (BI):

Presence or Absence of Bleeding BOP (notated in clinical records as BOP+) elicited after the insertion of a probe into the sulcus with light pressure (ie, 0.25 N) has been shown to detect the presence of an inflammatory lesion in the gingival around teeth with a normal and a healthy but reduced periodontium.

On the other hand, absence of bleeding on probing (BOP-) has been reported to represent periodontal health with a negative pused to assess peri-implant tissue conditions around implants.

Lekholm and colleagues found no correlation between BOP and histologic, microbiologic, or radiographic changes around implants.

These authors hypothesized that bleeding could have been caused by inappropriate force transmission from the periodontal probe tip to the peri-implant soft tissues.

The gingival bleeding index was used to evaluate the health of the peri-implant gingival tissues. The scores of the gingival bleeding index were the mean of scores of the four surfaces (buccal, lingual, mesial and distal). The bleeding index in this study was ranged between grad 0 and 2.

Table 3 indices used to assess marginal mucosal conditions around oral implants:

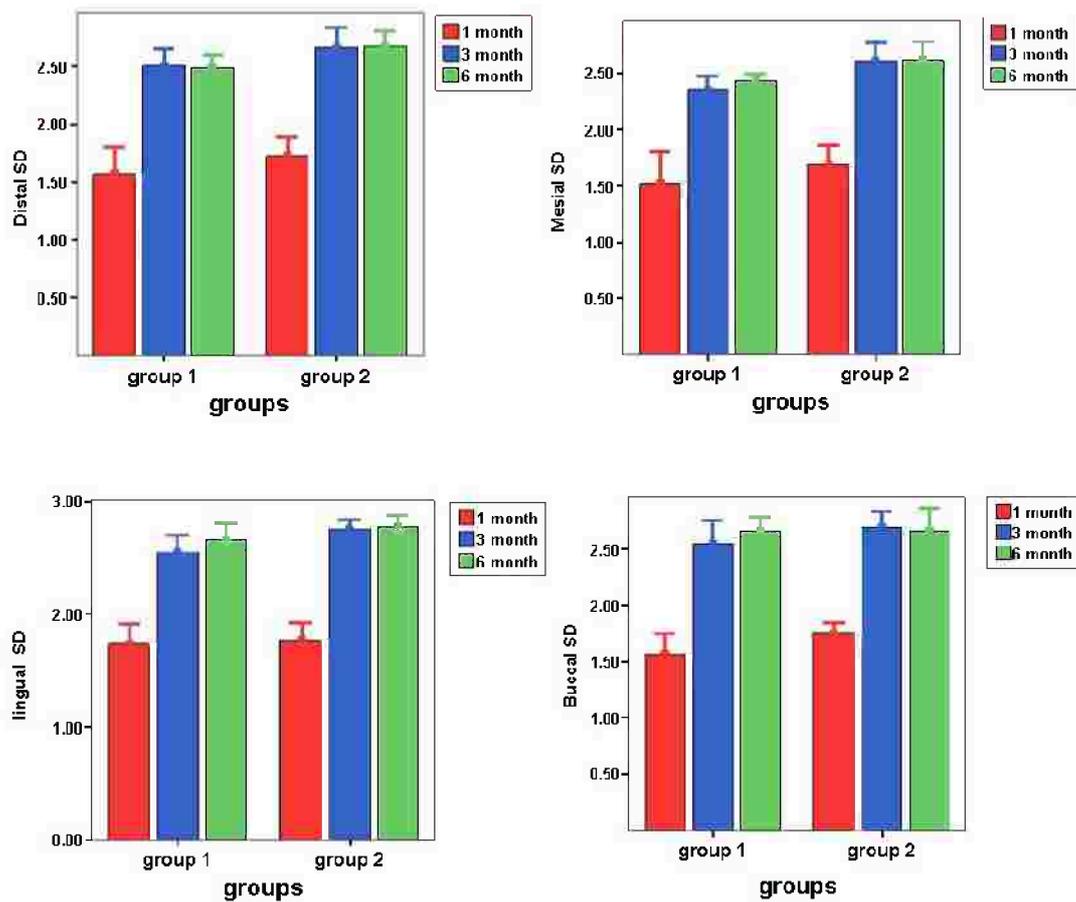
Score	Mombelli et al (mGI)	Apse et al
0	No bleeding when a periodontal probe is passed along the mucosal margin adjacent to the implant	Normal mucosa
1	Isolated bleeding spots visible	Minimal inflammation with color change and minor edema
2	Blood forms a confluent red line on mucosal margin	Moderate inflammation with redness, edema, and glazing
3	Heavy or profuse bleeding	Severe inflammation with redness, edema, ulceration, and spontaneous bleeding without probing

The highest score was recorded at one month from implant loading . While the values decreased after 3 and 6 months. This was related to clinical observations of no signs of inflammation at the peri- implant gingival tissue during the corresponding observation period.

Prei- implant sulcus depth (PSD):

	group A	group b	
surface	mean±SD	mean±SD	p-value
mesial 1 month	1.52±0.28	1.69±0.16	0.23
mesial 3 month	2.35±0.11	2.60±0.17	0.01
mesial 6 month	2.43±0.6	2.61±0.17	0.05
distal 1 month	1.57±0.22	1.7±0.16	0.21
distal 3 month	2.5±0.15	2.6±0.17	0.13
distal 6 month	2.4±0.11	2.6±0.13	0.02
buccal 1 month	1.5±0.18	1.7±0.9	0.5
buccal 3 month	2.5±0.2	2.6±0.13	0.16
buccal 6 month	2.6±0.12	2.3±0.21	0.92
lingual 1 month	1.7±0.18	1.77±0.15	0.7
lingual 3 month	2.55±0.15	2.75±0.8	0.01
lingual 6 month	2.66±0.14	2.77±0.10	0.14

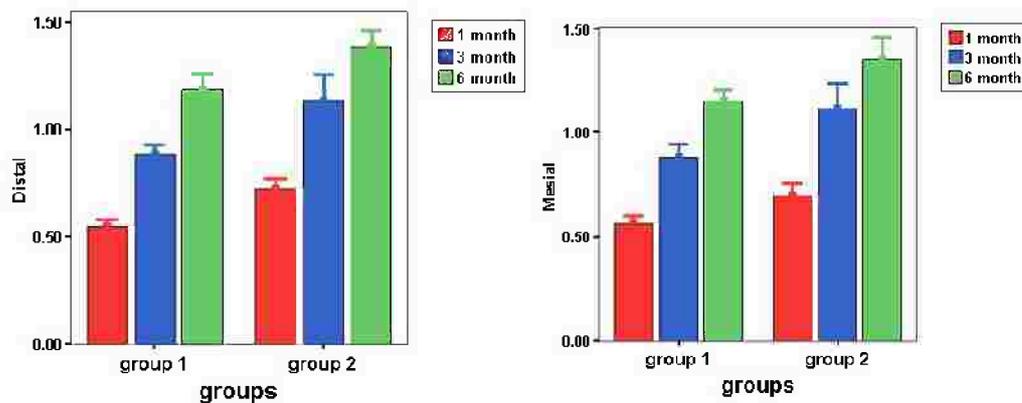
Table (4) the mean value standard deviation and student's t-test (p-value) of the peri-implant sulcus depth(PSD) in all surfaces around the implants.



(Figure 15) As we compare the probing depth at 1,3 and 6 months at the mesial, distal, buccal and lingual surface. As regards the mean ,stander deviation (S.D) and p- value of all surfaces. No significant difference was observed when comparing the values.

GROUP A	1 month	3 month	6 month	
	mean±SD	mean±SD	mean±SD	p-value
mesial SD	1.5±.28	2.3±0.11	2.4±0.06	0.00
Diestal SD	1.5±0.22	2.5±0.15	2.4±0.11	0.00
buccal SD	1.56±0.18	2.54±0.20	2.6±0.12	0.00
lingual SD	1.7±0.18	2.5±0.15	2.6±0.14	0.00
GROUP B	1 month	3 month	6 month	
	mean±SD	mean±SD	mean±SD	p-value
mesial SD	1.6±0.16	2.6±0.17	2.6±0.17	0.00
Diestal SD	1.7±0.16	2.6±0.17	2.6±0.131	0.00
buccal SD	1.75±0.09	2.69±0.13	2.65±0.21	0.00
lingual SD	1.7±0.15	2.7±0.08	2.7±0.10	0.00

Table (5) comparison between group A and group B.(The Peri-implant sulcus depth (PSD) in all surfaces around the implants.



(Figure 16) As we compare the probing depth at 1,3and 6 months at the mesial,distal,buccal,and lingual between group A and groupB result in slight difference in means and stander deviation .

significant P-value \leq 0.05.

The mean discrepancy between probe penteration and the location of the bone margine in radiographs was 1.17mm the successful implant allow probe penteration of approximately less than 3mm.

Radiographic evaluation:

Periapical radiographic images were recorded for each implant immediately post-operative (baseline), 3 months and 6 months after implant placement by direct digital radiography were used for linear (bone height) measurement of the peri-implant bone.

Radiographic examination revealed proper implants placement without any injury neither to adjacent teeth nor to surrounding vital structures it had been done immediately post operative also there was no any radiolucency recorded after implant loading.

Long-term preservation of crestal bone height around osseointegrated implants is often used as a primary success criterion for different implant systems. Originally, a mean crestal bone loss ≥ 1.5 mm during the first year after loading and ≥ 0.2 mm/year thereafter had been proposed as one of the major success criteria.

Marginal bone height measurements (linear analysis):

Any increase in this measurement denotes alveolar bone loss, while any decrease denotes alveolar bone gain.

Evaluation of marginal bone height in the mesial side: There was a statistically significant increase in mean bone loss from 1 to 3 months. But from 3 to 6 months, there was no statistically significant increase in mean bone loss. Through the whole study period (1 to 6 months) after loading, there was a statistically significant increase in mean bone loss.

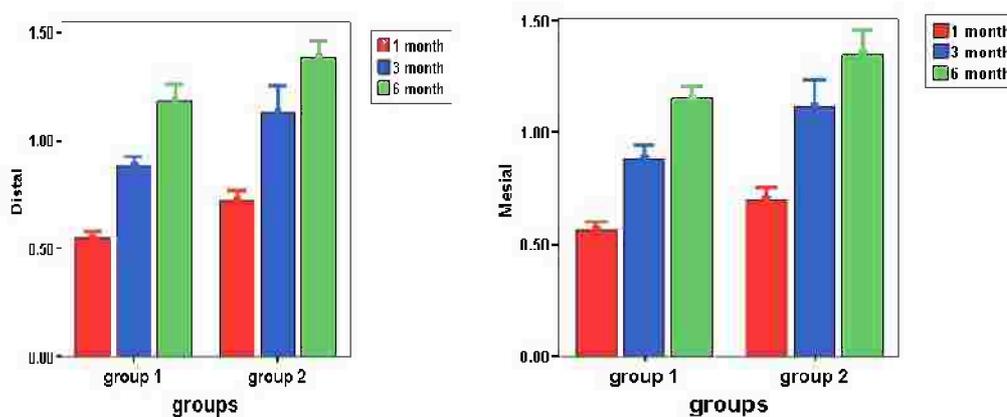
In the distal side: There was a statistically significant increase in mean bone loss through all period.

Comparison between mesial and distal side ,through all periods there was no statistically significant difference between mean bone loss in the mesial and distal sides. Bone loss around the implant neck occurred

during the first 3 months which gets slower there after.

Table (6) the mean differences, standard deviation (SD) value and results of paired-test for changes by time in mean bone loss at mesial and distal sides of the implants.

	group A	group b	
Surface	mean±SD	mean±SD	p-value
mesial 1 month	0.56±0.03	0.69±0.05	0.00
mesial 3 month	0.88±0.06	1.11±0.11	0.00
mesial 6 month	1.15±0.05	1.35±0.10	0.00
distal 1 month	0.54±0.03	0.71±0.05	0.00
distal 3 month	0.88±0.3	1.13±0.12	0.00
distal 6 month	1.18±0.07	1.38±0.07	0.00



(Figure 17) the mean differences, standard deviation (SD) value and results of paired-test for changes by time in mean bone loss at mesial and distal sides of the implants.

Table (7): comparison between group A and B (bone height by time for mesial and distal side of the implants.)

GROUP A	1 month	3 month	6 month	
	mean±SD	mean±SD	mean±SD	p-value
Mesial	0.5±0.03	0.88±0.06	1.15±0.05	0.00
Distal	0.54±0.03	0.88±0.03	1.18±0.07	0.00

GROUP B	1 month	3 month	6 month	
	mean±SD	mean±SD	mean±SD	p-value
Mesial	0.69±0.05	1.11±0.11	1.3±0.10	0.00
Distal	0.71±0.05	1.13±0.12	1.38±0.07	0.00

There was slight differences between group A and group B in the mean and stander deviation significant P-value \leq 0.05.

Long term preservation of crestal bone height around osseointegration implants in group A is better than that of group B. In group A fixation of GBR membrane by bone tacks or screw allow stabilization of the membrane which protect the clot from being disturbed by movement of the overlying flap during healing.