IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 20, Issue 1 Ser.8 (January. 2021), PP 15-25
www.iosrjournals.org

Radiographic Bone Changes Following Socket Preservation In Mandibular Molars Using Deproteinized Bovine Bone Mineral Versus Using Beta Tri Calcium Phosphate

Dr. Wahid Yehia Al Azizy Al Hussiney:[1], prof. Dr. Amr Abd Al Azim[2], Dr. Mohammed Atef Abd Al Rassoul[3]

[1]*Master Degree of Oral Implantology Faculty of Dentistry, Cairo University*
[2]*Professor of Oral & Maxillofacial Radiology Faculty of Dentistry, Cairo University*
[3]*Lecturer of Oral and Maxillofacial Surgery, Faculty of Dentistry, Cairo University*

Abstract
Aim of the study*: This study was conducted for evaluation of the radiographic bone changes following socket preservation in mandibular molars using deproteinized bovine bone mineral versus using Beta tri calcium phosphate.*
Material and Methods:
Fourteen candidates (5 males, 9 females), suffering from non-restorable teeth and seeking implant rehabilitation, were selected and examined in the outpatient of the implant clinic in Faculty Dentistry Cairo University; they were divided into two groups.
Group A Control group who use deproteinized bovine bone mineral.
Group B study group who use beta tri calcium phosphate.
All the cases were evaluated using cone-beam computed tomography (CBCT) before extraction and 6 month postoperative.
The patients fulfilled the following criteria :
Presence of non-restorable mandibular molars, good oral hygiene, age from 25-60 years, both sexes, sufficient bone volume by bone caliper, no systemic condition that contraindicates tooth and extraction socket preservation, molar should be bounded by neighboring teeth and good socket with intact walls.
Results:*Socket width changed In group A: the mean socket width changed from 9.82±0.64 before extraction to 8.78±0.84 mm at 6 months postoperative, this was statistically significant p<0.001 In group B: the mean socket width changed from 10.2±0.66 before extraction to 8.19±0.94 mm at 6 months postoperative, this was statistically significant p=0.001 .*
Socket height changed In group A: the mean socket height changed from 26.15±3.58 before extraction to 24.1±3.21 mm at 6 months postoperative, this was statistically significant p<0.001 In group B: the mean socket height changed from 25.86±4.3 before extraction to 23.32±3.43 mm at 6 months postoperative, this was statistically significant p=0.001 .
Mean socket width percent reduction of group A was 10.73± 3.71 % compared to 19.85±6.35% in group B. This was statistically significant while the mean socket height percent reduction of group A was 7.77± 2.79 % compared to 9.59±2.95% in group B. This was statistically not significant.
Conclusion:
Deproteinized bovine bone mineral as a graft material for alveolar ridge preservation was able to limit but could not prevent the radiographic dimensional changes after teeth extraction100%.
Socket preservation using deproteinized bovine mineral is better to some extent than using beta tri calcium phosphate.

Date of Submission: 01-01-2021 Date of Acceptance: 13-01-2021

I. Introduction

In dentistry, extraction of teeth is considered one of the most widely performed procedure. The Indications for the tooth extraction are decided when restoration of the tooth becomes impossible and also cannot be preserved in tolerable situation for function, long-term health, or/ and esthetics.Occasionally teeth extraction is essential due to infection, pain, fracture of the badly decayed tooth or bone loss due to periodontitis. After extraction of the tooth, the socket is damaged by infection and disease resulting in the jaw deformities, shrinking and retraction of the gums and surrounding bone leading to lips, and cheek collapse (defect). Alveolar bone loss is referring to many factors as advanced periodontitis, advanced caries, endodontic

lesion, aggressive manipulation and facial trauma during extractions .Extraction of the teeth has a direct effect on the life quality by impairment function of the teeth and person cannot able to speak, masticate well and also social problems will occurs due to loss of esthetic view. Today this process has been historically well recorded that may stimulate considerable changes in dimensions of the alveolar ridge. The problems which face clinicians is how to manage socket after extractions of the teeth to maximize dimensions of the ridge for removable or fixed prosthesis fabrication or future dental implant placement. If the socket is performed insufficiently, the deformity which results can make great prevention to the phonetic, aesthetic and functional results that patients expect now. Acceleration of the bone loss after extraction in the first 6 months, gradually followed by a change in size or shape (modeling) and remodeling (change of existing bone) of the remaining bone, with as much as in the first 6 months 60% of alveolar width and 40% of the alveolar height lost . Prosthetic instability is a consequence of loss height of the ridge because of the crest of the ridge comes near mobile mucosa and muscle attachments. In advanced cases, the maxillary sinus or nasal cavity may be involved; this needs advanced reconstructive surgery for implant-supported or traditional prosthetics. Repair and prevention of Jaw deformity which resulted from extraction of the tooth done by a procedure termed socket preservation. This term means maintenance of the socket, preserving the width and height of the socket that is left after extraction of the tooth. Preservation of the socket markedly increase success rate for future dental implants and obtains the better smile's appearance.[2]

Xenografts (x) the grafting materials are harvested from other species (animals) the organic components are completely removed,so no immunological reactions will happen which are attributed to presence of organic components. The residual inorganic structure gives a natural architectural matrix as well as an excellent source of calcium. The inorganic material also maintains the physical dimension of the augmentation during the remodeling phases.[6] Alloplasts is synthetic inorganic inert materials which enhance of osseous ingrowth and share in osseous defects repair. The physical form, chemical composition, and differences in surface configuration lead to varying levels of bio resorbability. The change in nature of grafting materials (geometries, porosity, densities and differing solubilities) will determine the resorption of these calcium phosphate–based graft materials [7]

Aim of the study: Is to assess the Radiographic bone changes following socket preservation in mandibular molars using deproteinized bovine bone mineral (DBBM) versus using Beta tri calcium phosphate (ß-TCP).

II. Material And Methods:

Patient's selection:

Inclusion criteria:

- Presence of non-restorable mandibular molars.
- Good oral hygiene.
- Age from 25-60 years
- Both sexes
- Sufficient bone volume by bone caliper.
- No systemic condition that contraindicates tooth and extraction socket preservation
- Molar should be bounded by neighboring teeth.
- Good socket with intact walls.

Exclusion criteria:

- Extreme bone atrophy.
- Patients who have systemic disorders that might interfere with bone metabolism.
- Damaged socket follow extraction.
- Presence of signs of active infection or pus formation
- Pregnant patients.
- Bad oral hygiene.
- Patients with bone diseases.
- Patient with limited mouth opening.
- Patient age below 25 years.

Pre-operative Assessment

General operative procedures

Eligible patients will be randomized in equal proportions between control groups (alveolar ridge socket preserved using xenograft material (Bio-oss type) as a group A and study group (alveolar ridge socket preserved using alloplastic material beta tri calcium phosphate type) as a group B.

All patients will be evaluated by proper history taking and thorough clinical and radio graphical examination.

Patients of both groups will be subjected to standard panoramic radiographs, CBCT before tooth extraction.

Patient Interview
Each patient was interviewed in order to obtain a comprehensive history including a full medical and dental history.

Clinical Examination
Patients were inspected for adequate inter arch space, periodontal status of the adjacent teeth.
Soft tissue biotype and nature of the covering mucosa was assessed.
Intraoral photographs and dental impressions were taken for the selected candidates.
Radiographic examination: A preoperative digital panoramic radiograph with 1:1 magnification was taken for each patient fig.1

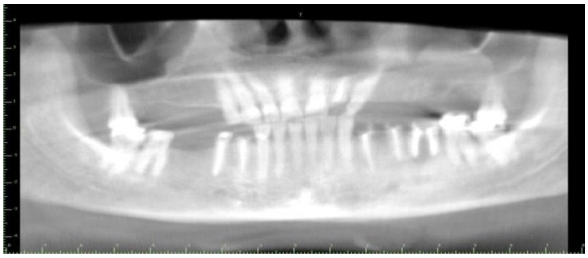
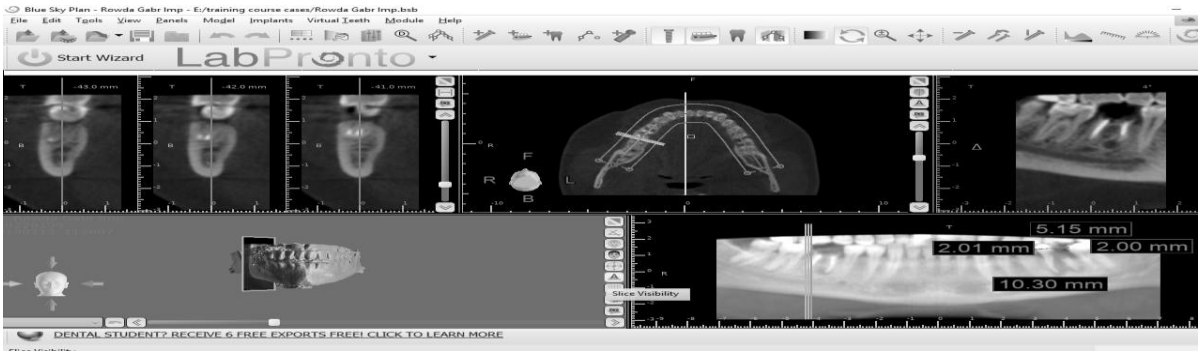
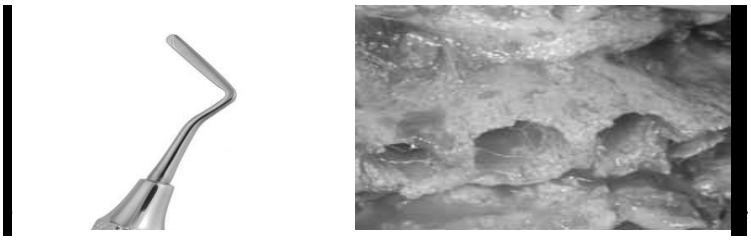


fig.1

A CBCT scan was ordered for all candidates to assess the dimensions of the socket measured before extraction and after 6 month healing period. Alveolar width and height was measured accurately from the reformatted cross-sectional images a panoramic view.fig.2



Surgical Procedure:
•Patients were asked to rinse their mouth with chlorohexidine HCl mouth wash
1.25% immediately before extraction.
•All surgical procedures were performed under strict aseptic conditions, all patients received infiltration local anesthesia (Articaine 4% 1:100 000 epinephrine)
• Scrubbing and draping of the patient will be carried out in a standard fashion for intra oral procedures.
• Using elevators for tooth extraction should be avoided because it usually damage margins of socket and its surroundings.
•Periotomes are widely used for luxation the tooth and preservation of dental papillae by its action (Push-pull movements) which breaks periodontal fibers which leads to reduction of mechanical retention of the tooth in the socket
(Atraumatic extraction).fig 3



When crown of tooth not easily breakable lead to damaged sockets it should excludes because radiographical measurements for length and width of the socket done before extraction.

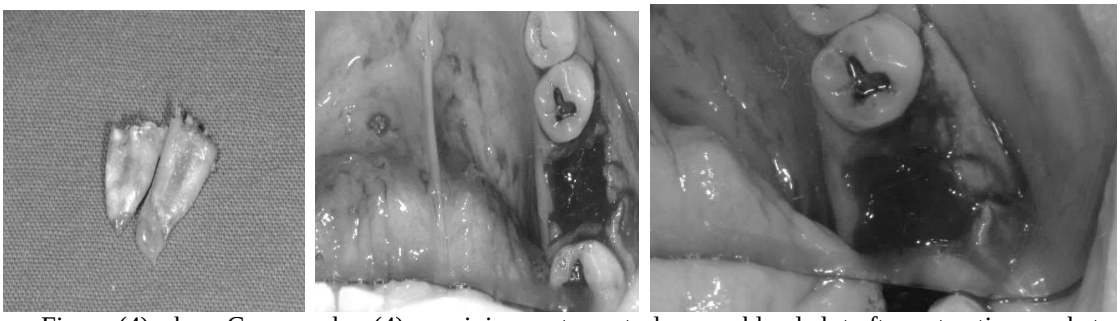
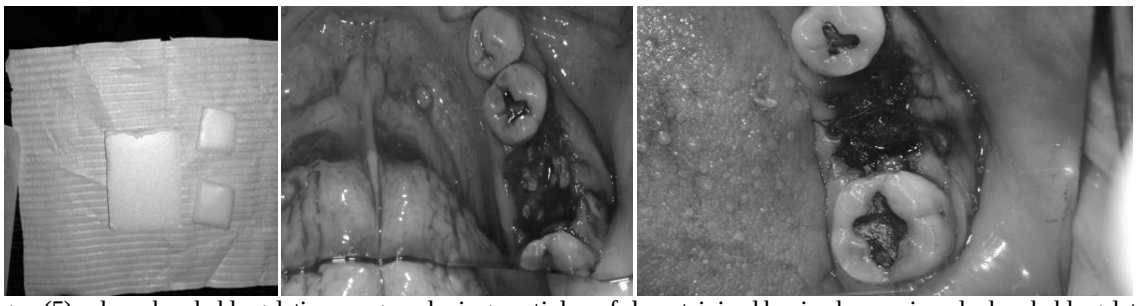


Figure (4)a, b, c: Case number (4) remaining roots control group, blood clot after extraction, socket after curettage

In the control group: tooth extraction with ridge preservation using deproteinized bovine bone mineral DBBM with Large Geistlich Bio-Oss® granules (1 – 2 mm).Granules put inside socket. Following preservation of socket, materials were applied inside the socket of both group covered by absorbable gelatin sponge, suturing to preserve material and haemostatic action. Fig 5



Figure(5): a,b,c absorbable gelatin sponge, placing particles of deproteinized bovine bone mineral, absorbable gelatin sponge cover &suturing.

In the comparators (study group): tooth extraction with ridge preservation using an alloplastic ceramic material beta tricalcium phosphate (ß-TCP) CERASORB® M with particles size ranged from 500-1000 µm. The bone substitute material was prepared according to the manufacturer's instructions and put inside socket absorbable gelatin sponge cover &suturing.fig 6

Fig. no.6 Case number (14) a,b,c study group badly decayed 1st molar, socket after extraction, Beta tricalcium phosphate particles inside socket

Fig. NO.7 Case number (14) study group Absorbable gelatin sponge, Beta tricalcium phosphate particles inside socket and suturing.

Postoperative Care and Follow up

Postoperatively Patients were instructed to have liquid or semiliquid diet for the first 3 days after surgery and to gradually return to their normal diet. The healing period was monitored to ensure sustained closure of the implant site and infection-free regeneration. After insertion, patients were prescribed amoxicillin 500 mg, three times per day, for 1 week starting at the day of surgery; ibuprofen 600 mg, anti-inflammatory/analgesic, twice a day for 2–3 days after surgery; and chlorhexidine 0. 12% mouthwash, oral rinses were prescribed twice a day for 2 weeks.

Post-operative assessment (Follow up)

Clinical assessment:

Patients were called for follow-up 1 week post-operative weekly for first monthly for six months, and were assessed for socket healing

***Radiographic assessment*:**

Pre-operative CBCT was ordered for all patient to act as base line for radiographic analysis.

After 6months all patient were recalled to obtain CBCT to assess Radiographic bone changes following socket preservation in mandibular molars using deproteinized bovine bone mineral versus using Beta tri calcium phosphate.

Measurements of radiographic changes (width and length) of socket: Panoramic curve should be passed on the center of teeth which will extracted and center of socket after extraction,2nd step in panoramic view tooth bounded by neighboring teeth, measurement of the socket preoperative and after 6 months drawn in 3points mesially and distally and in interseptal bone.The mean average of represented value of buccolingual dimensions of extracted tooth in 3 point is the final result.Line was drawn in panoramic view from occluso distal of 2nd premolar to occlosomesial of 2nd molar seen in and calculated then 2 point are made 2mm mesially and distally of occlusal of neighboring teeth figure (8)(9) (10)(11)

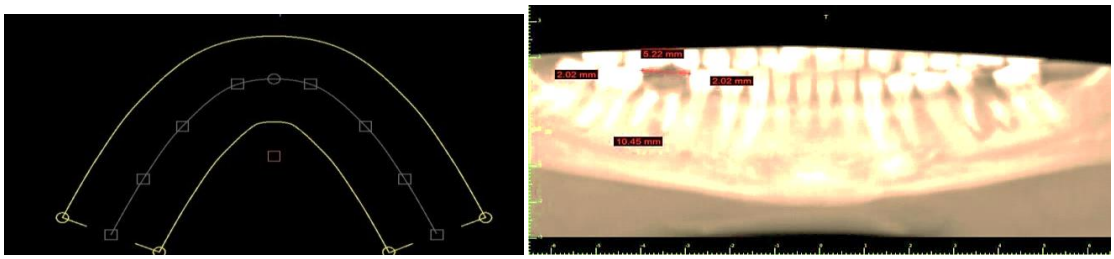


Figure (8), panoramic curve,cross section mesiodistally.

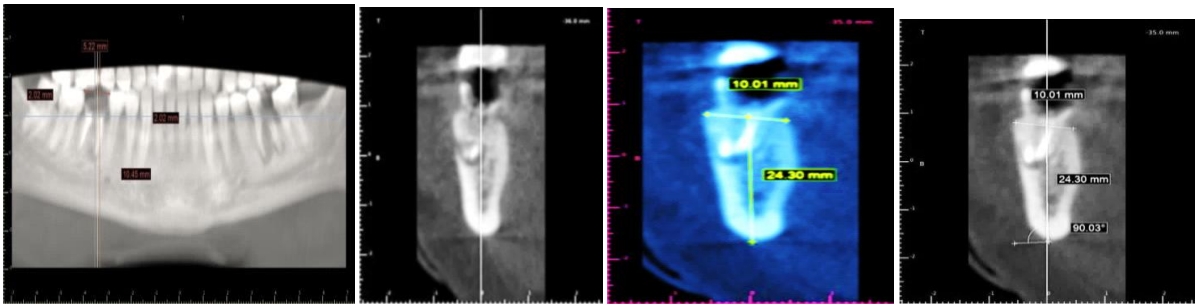
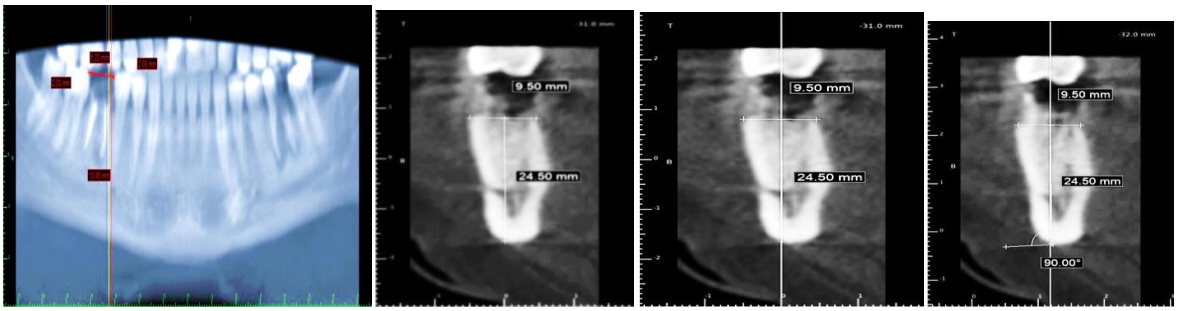
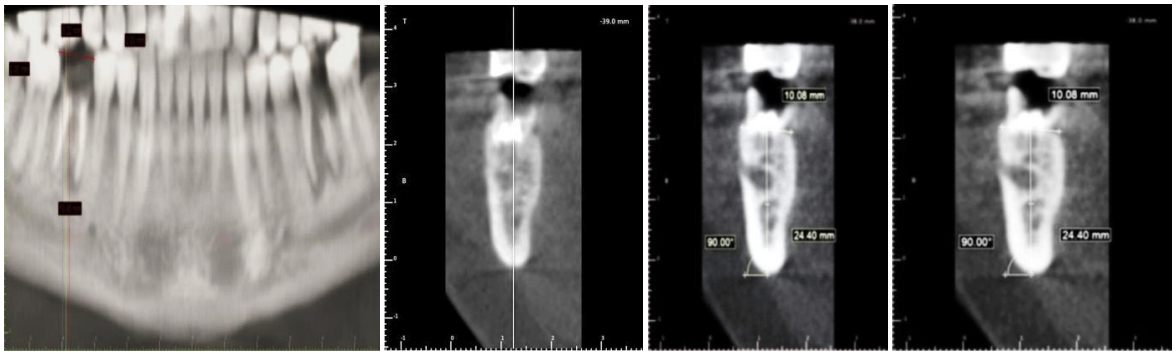


Figure 9 Case number (2)a ,b,c control group , cross section passed mid line before extraction



Case number (10) control group measurement width and length in 1st cross sections



After 6 month healing period

Line was drawn in panoramic view from occlusodistal of 2nd premolar to occlosomesial of 2nd molar seen in and calculated then 2 point are made 2mm mesially and distally of oclusal of neighboring teeth Figure(12) (13)(14):

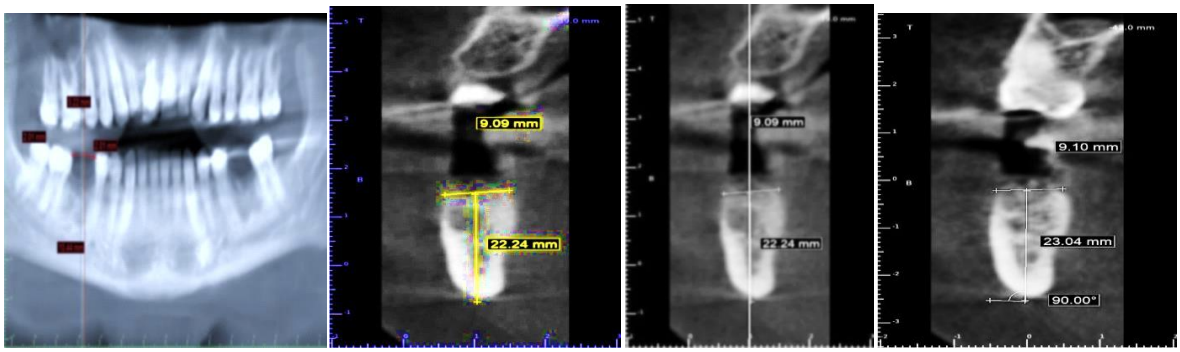


Figure (12) case no 2 control group cross section projection line passed mid line of tooth in panoramic view, width and length length in 1st cross sections

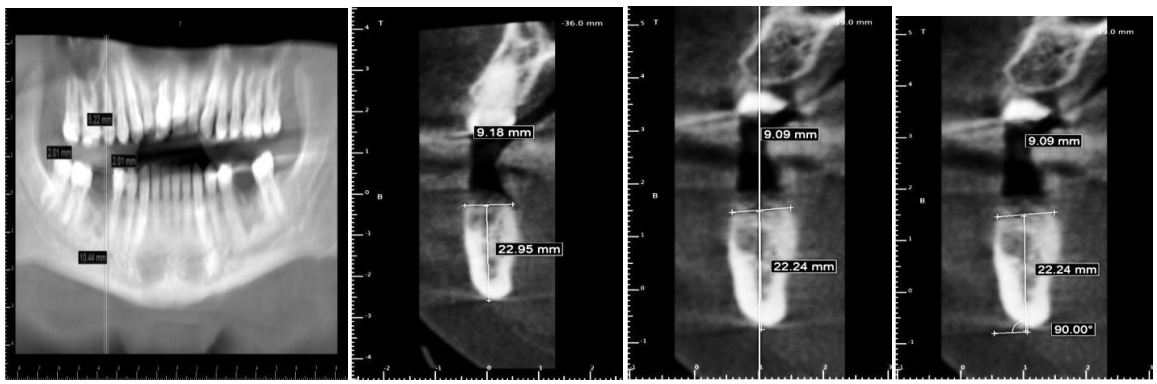


Figure 13) 2nd point 2 mm distal premolar through cross section projection line figure, width and length in 2nd cross sections.

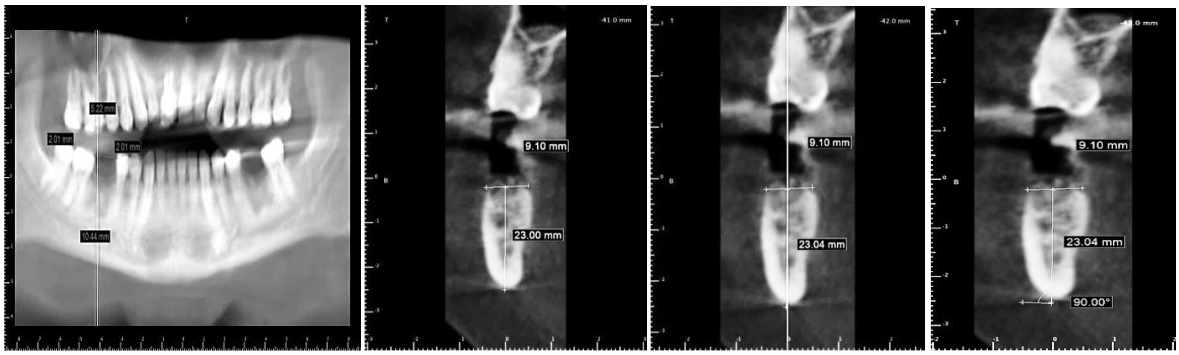


Figure (14) 3rd point 2 mm mesial premolar through cross section projection line, width and length in 3rd cross sections.

III. Results

Between groups the results of Amount of Socket width and height in both groups were presented in table (1) and figure (15)

I- Socket width and height before extraction

Socket width (mm): As shown in table (1) the mean socket width of group A was 9.82± 0.64 mm compared to 10.2±0.66 in group B. This was statistically not significant p=0.294

Socket height (mm): As shown in table () the mean socket height of group A was 26.15± 3.58 mm compared to 25.86±4.3 in group B. This was statistically not significant p=0.894

	Group A (Control)		Group B (study)		
Before extraction	**Mean**	**SD**	**Mean**	**SD**	**P value**
socket width (mm)	9.82	0.64	10.2	0.66	0.294
socket height (mm)	26.15	3.58	25.86	4.3	0.894

Table (1) Mean, SD and independent t test of socket width and height before extraction in the studied groups

SD: standard deviations, P≤0.05 is considered statistically significant

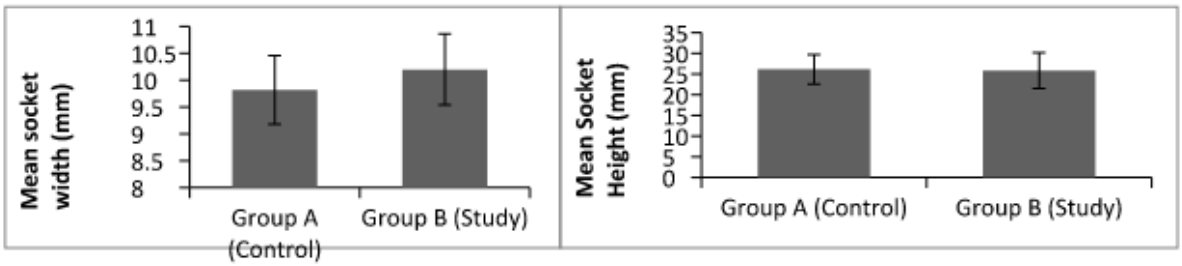


Figure (15): Bar chart representing mean and SD of socket width and height between the studied 2 groups before extraction.

Figure (15): Bar chart representing mean and SD of socket width and height between the studied 2 groups before extraction.

I- Socket width and height 6 months after

Socket width (mm): As shown in table (4) the mean socket width of group A was 8.78± 0.84 mm compared to 8.19±0.94 in group B. This was statistically not significant p=0.237

Socket height (mm): As shown in table (4) the mean socket height of group A was 24.1± 3.21 mm compared to 23.32±3.43 in group B. This was statistically not significant p=0.671

	Group A (Control)		Group B (study)		
6 months	**Mean**	**SD**	**Mean**	**SD**	**P value**
socket width (mm)	8.78	0.84	8.19	0.94	0.237
socket height (mm)	24.1	3.21	23.32	3.43	0.671

Table (4) Mean, SD and independent t test of socket width and height after 6 months in the studied groups

SD: standard deviations, P≤0.05 is considered statistically significant

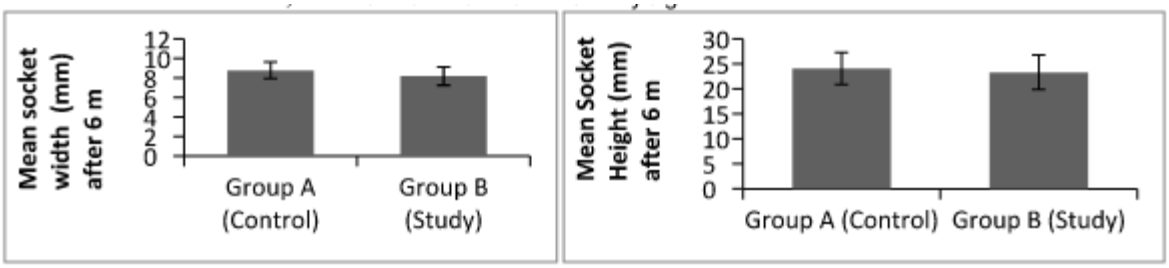


Figure (16): Bar chart representing mean and SD of socket width and height between the studied 2 groups after 6 months

I- Socket width and height percent reduction

Socket width (%): As shown in table (5) the mean socket width percent reduction of group A was 10.73± 3.71 % compared to 19.85±6.35% in group B. This was statistically significant p=0.007; being more in the study group

Socket height (mm): As shown in table (5) the mean socket height percent reduction of group A was 7.77± 2.79 % compared to 9.59±2.95% in group B. This was statistically not significant p=0.258

Table (2) Mean, SD and independent t test of socket width and height percent reduction after 6 months in the studied groups

	Group A (Control)		Group B (study)		
percent reduction	**Mean**	**SD**	**Mean**	**SD**	**P value**
socket width	10.73	3.71	19.85	6.35	0.007
socket height	7.77	2.79	9.59	2.95	0.258

II- SD: standard deviations, P≤0.05 is considered statistically significant

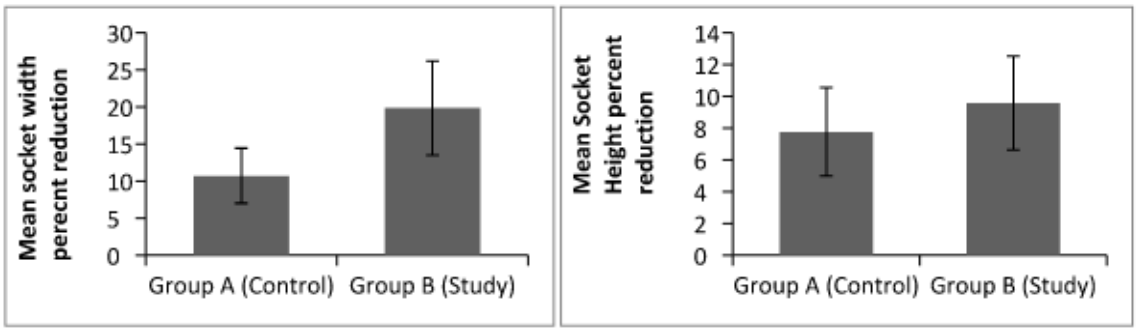


Figure (17): Bar chart representing mean and SD of socket width percentage of reduction between the studied 2 groups.

I- Socket width and height percent reduction

Socket width (%): As shown in table (5) the mean socket width percent reduction of group A was 10.73± 3.71 % compared to 19.85±6.35% in group B. This was statistically significant p=0.007; being more in the study group

Socket height (mm): As shown in table (5) the mean socket height percent reduction of group A was 7.77± 2.79 % compared to 9.59±2.95% in group B. This was statistically not significant p=0.258

Table (3) Mean, SD and independent t test of socket width and height percent reduction after 6 months in the studied groups

	Group A (Control)		Group B (study)		
percent reduction	**Mean**	**SD**	**Mean**	**SD**	**P value**
socket width	10.73	3.71	19.85	6.35	0.007
socket height	7.77	2.79	9.59	2.95	0.258

II- SD: standard deviations, P≤0.05 is considered statistically significant

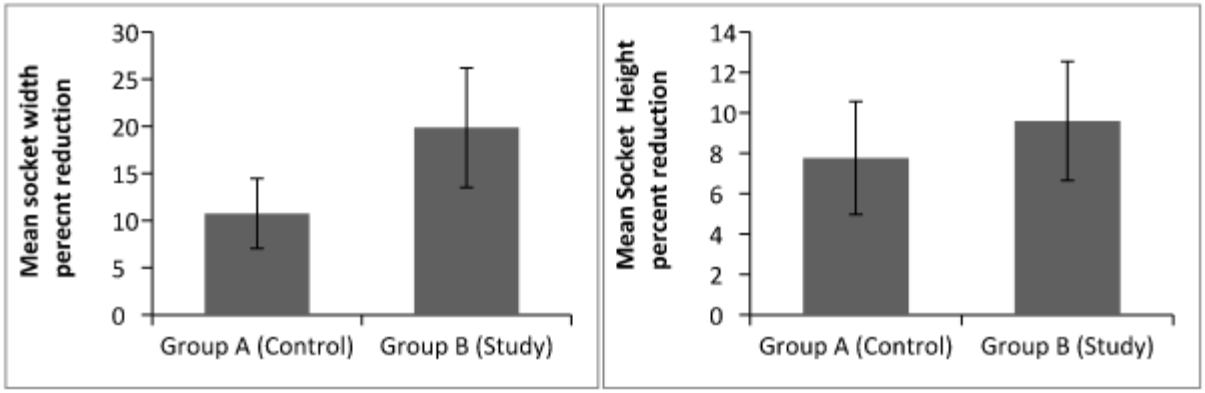


Figure (18): Bar chart representing mean and SD of socket width percentage of reduction between the studied 2 groups

Socket width

In group A: the mean socket width changed from 9.82±0.64 before extraction to 8.78±0.84 mm at 6 months postoperative, this was statistically significant p<0.001

In group B: the mean socket width changed from 10.2±0.66 before extraction to 8.19±0.94 mm at 6 months postoperative, this was statistically significant p=0.001

Table (4) Mean, SD and paired t test for comparing bone width overtime in each of the studied groups

	Before extraction		6 months after		
Socket width	**Mean**	**SD**	**Mean**	**SD**	**P value**
Group A (Control)	9.82	0.64	8.78	0.84	<0.001
Group B (Study)	10.2	0.66	8.19	0.94	0.001

SD: standard deviations, P≤0.05 is considered statistically significant

Socket Height

In group A: the mean socket width changed from 26.15±3.58 before extraction to 24.1±3.21 mm at 6 months postoperative, this was statistically significant p<0.001

In group B: the mean socket width changed from 25.86±4.3 before extraction to 23.32±3.43 mm at 6 months postoperative, this was statistically significant p=0.001

Table (5) Mean, SD and paired t test for comparing bone width overtime in each of the studied groups

	Before extraction		6 months after		
Socket height	**Mean**	**SD**	**Mean**	**SD**	**P value**
Group A (Control)	26.15	3.58	24.1	3.21	<0.001
Group B (Study)	25.86	4.3	23.32	3.43	0.001

SD: standard deviations, P≤0.05 is considered statistically significant

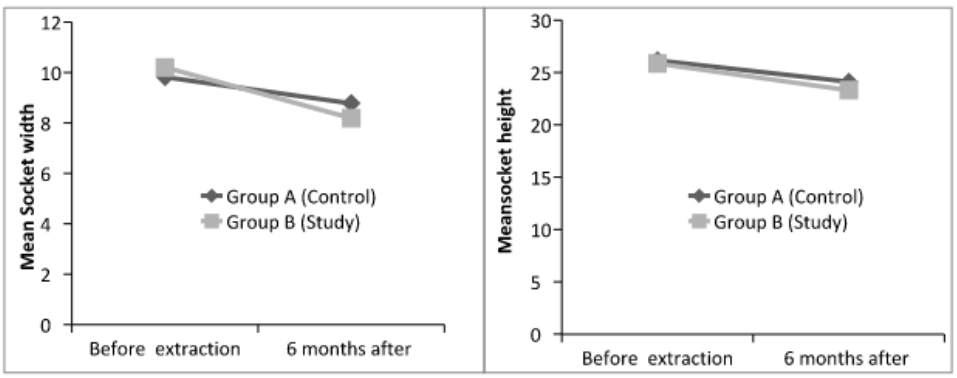


Figure (19): line graph representing mean Amount of Socket width&height changes in each group

IV. Discussion:

The Indications for the tooth extraction are decided when restoration of the tooth becomes impossible and also cannot be preserved in tolerable situation for function, long-term health, or/ and esthetics[1].

The present study was done to evaluate and compare the radiographic changes of the alveolar ridge following application of ridge preservation grafting material 6 months after tooth extraction. The width and height of the socket evaluated and comparison between two different grafting materials, xenograft (Bio-Oss) in the control group and ß-tricalcium phosphate (ß-TCP) in the study group. Atraumatic tooth extraction is one of the key factors to achieve successful socket preservation and future implant placement to aid in maintenance of maximum amount of bone. Various methods can be used for atraumatic tooth extraction such as the use of periotomes, dental luxators, vertical root distractors and peizo-surgery[8]. In the present study atraumatic tooth extraction by the use of periotomes, dental luxators, vertical root distractors for all patient and when crown of tooth not easily breakable and socket damaged it should be excluded because radiographic measurements (length and width) of the socket done before.

Lekovic V et al. in a study was demonstrated that resorption of the alveolar ridge was observed after extraction of the tooth in an otherwise healthy person. They observed probe penetration was resistant at 6 months to and appear to be well attached to the walls of the previous socket. Frequently it could not possible to recognize the previous walls of the socket and the new formed tissue.[9]

Schropp et al notified that the crestal bone loss in width and height mainly take place within the first 3 months after extraction of the tooth, there is no changes were occured according to location (maxilla or mandible).[10] In present study the selection 6-month period after preservation of the socket for mandibular molars 3 month more Schropp et al. and similar *to Lekovic V et al.* to measure width and height precisely and following ridge alterations.

The present study was done to evaluate and compare the radiographic changes of the alveolar ridge following application of ridge preservation grafting material 6 months after tooth extraction. The width and height of the socket evaluated and comparison between two different grafting materials, xenograft (Bio-Oss) in the control group and ß-tricalcium phosphate (ß-TCP) in the study group.

Atieh et al. conclude in recent systematic review which included 8 randomized controlled clinical trials (RCTs), that the selection of grafting material does not appear to impact on the ridge preservation outcome at 3 months, producing similar space maintaining abilities which happened in the initial stages of healing. They made comparison between all grafting materials and techniques which produced a statistically considerable reduction in ridge height and width loss compared to extraction alone[11]. While **Jambhekar et al.** proposed in their systematic review of 32 RCTs, that allografts and xenografts materials preserved ridge dimensions more than alloplastic materials.[12] Contrary to review of Atieh et al. In concordance with ***Jambhekar et al.*** The present study found dimensional changes in preserved socket when use 2 different grafting materials, xenograft DDBM bio oss and ß-TCP as Alloplasts, When use bio oss as a grafting materials for socket preservation after tooth extraction. The mean socket width percent reduction of group DDBM was 10.73± 3.71 % compared to 19.85±6.35% in group ß-TCP. ***Tan et al.*** 2012 demonstrate the tooth extraction without the use of grafting material (not preserved socket) result in a high percentage of horizontal dimensional changes of 29–63% after 6–7 months.[13]This is in agreement with present study demonstrating a ridge width reduction. By using a slowly resorbing grafting material (DBBM), the amount of horizontal bone loss could be significantly reduced to 10.73±3.71% for DBBM bio oss and also by using alloplastic grafting material reduced to 19.85±6.35% for ß-TCP.

SUMMARY: This study was conducted for evaluation of the radiographic bone changes following socket preservation in mandibular molars using deproteinized bovine bone mineral versus using Beta tri calcium phosphate.Fourteen candidates (5 males, 9 females) age from 25-60 years, suffering from non-restorable teeth and seeking implant rehabilitation, were selected from the outpatient they were divided into two groups: ***Group A*** Control group who use deproteinized bovine bone mineral ,***Group B*** study group who use beta tri calcium phosphate.All the cases were evaluated using cone-beam computed tomography (CBCT) before extraction and 6 month postoperative.

V. Conclusion:

Deproteinized bovine bone mineral as a graft material for alveolar ridge preservation was able to limit but could not prevent the radiographic dimensional changes after teeth extraction100%

Socket preservation using deproteinized bovine mineral is better to some extent than using beta tri calcium phosphate.

Refrences:

[1]. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst EM, Creugers NH (2010).Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. Health Qual Life Outcomes 8:126.

[2]. Irinakis T. Rationale for Socket Preservation after Extraction of a Single-Rooted Tooth when Planning for Future Implant Placement, J Can Dent Assoc. 2006;72(10):917-22.

[3]. Horowitz R, Holtzclaw D, Rosen PS (2012) A review on alveolar ridge preservation following tooth extraction. J Evid Based Dent Pract 12 (Suppl 3):149–160. doi:10.1016/S1532-3382(12)70029-5

[4]. Lekovic V, Camargo PM, Klokkevold PR, et al. Preservation of alveolar bone in extraction sockets using bioresorbable membranes. *J Periodontol.*1998;69:1044–1049.

[5]. 5-Xie Q, Wolf J, Tilvis R, Ainamo A. Resorption of mandibular canal wall in the edentulous aged population. *J Prosthet Dent.* 1997;77:596–600.

[6]. Zaner DJ, Yukna RA. Particle size of periodontal bone grafting materials. J Periodontol. 1984;55:406–409.

[7]. Rabalais ML, Yukna RA, Mayer ET. Evaluation of durapatite ceramic as an alloplastic implant in periodontal osseous defects. I. initial six month results.J Periodontol. 1981;52:680–689.

[8]. SD Sharma, B Vidya, M Alexander Periotome as an Aid to Atraumatic Extraction: A Comparative Double Blind Randomized Controlled Trial Journal of Maxillofacial and Oral Surgery September 2015, Volume 14, Issue 3, pp 611–615.

[9]. Lekovic V, Kenney EB, Weinlaender M, Han T, Klokkevold P, Nedic M, et al. A bone regenerative approach to alveolar ridge maintenance following tooth extraction.Report of 10 cases. Journal of periodontology. 1997;68(6):563-70.

[10]. Schropp L, Wenzel A, Kostopoulos L, Karring T. Bone healing and soft tissue contour changes following single-tooth extraction: A clinical radiographic 12-month prospective study. Int J Periodontics Restorative Dent 2003;23:313–323.

[11]. Atieh MA, Alsabeeha NH, Payne AG, Duncan W, Faggion CM, Esposito M. Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development. Cochrane Database Syst Rev. 2015(5):CD010176.

[12]. Jambhekar S, Kernen F, Bidra AS. Clinical and histologic outcomes of socket grafting after flapless tooth extraction: a systematic review of randomized controlled clinical trials. J Prosthet Dent. 2015;113(5):371-82.

[13]. Tan WL, Wong TL, Wong MC, Lang NP. A systematic review of postextractional alveolar hard and soft tissue dimensional changes in humans. Clinical oral implants research. 2012;23 Suppl 5(1600-0501 (Electronic)):1-21.

Dr. Wahid Yehia Al Azizy Al Hussiney, et. al. "Radiographic Bone Changes Following Socket Preservation In Mandibular Molars Using Deproteinized Bovine Bone Mineral Versus Using Beta Tri Calcium Phosphate." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(01), 2021, pp. 15-25.