

EFFECT OF DIFFERENT TYPES OF REINFORCEMENT DENTURE BASE MATERIALS ON IMPLANTS RETAINED OVERDENTURE

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ABSTRACT

Background: New types of reinforcement materials are currently used on wide scales to reinforce implant-retained overdentures as a substitute for conventionally non-reinforced overdentures; thus, further studies are needed to validate these materials.

Methodology: Fourteen edentulous male patients received 4 mini implants, in the anterior part of the mandible using the flapless surgical approach. Group I received seven mandibular implants retained overdenture reinforced with cobalt chromium(CoCr) meshwork while Group I received seven mandibular implants retained overdenture reinforced with poly-ether ketone(PEKK) meshwork, marginal bone loss was measured at the time of denture insertion, 6 months, and 12 months, The mesial buccal, distal buccal, mesial lingual, distal lingual, mid-buccal and mid-lingual marginal bone heights around the implants were evaluated, using the linear measurement system of the software with flat panel detector supplied by the cone beam computed tomography(CBCT) as well as patient satisfaction after 6 months of denture insertion by using a questionnaire to know their level of satisfaction.

Results: Regarding marginal bone loss: after 6 and 12 months (Group I) shows more bone loss than (Group II), but in patient satisfaction, it was found that there is no difference in patient satisfaction in both groups in the first part and second part of questions in the questionnaire and patients of both groups were satisfied with their denture.

Conclusion: (PEKK) meshwork reinforcement material provided less bone loss after 6 months and 12 months when compared with CoCr. meshwork reinforcement material while patient satisfaction in both groups was the same

KEYWORDS: Mini implants –Polyetherketoneketone- cobalt chromium –patient satisfaction - marginal bone loss

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INTRODUCTION

Implant overdentures offer various benefits that are not provided by conventional dentures. Patients with implant overdentures often report improved appearances, oral health-related quality of life, and satisfaction⁽¹⁾. Furthermore, implant overdentures offer increased biting forces over conventional dentures, enabling patients to eat a larger selection of foods, as well as preventing bone loss and muscle atrophy, common in edentulous patients⁽²⁾

Patients who show unhappiness with traditional dentures and have limitations regarding the insertion of normal conventional implants may benefit from the use of mini implants during their rehabilitation^(3,4,5). narrow/conventional diameter implants usually have a diameter of more than 3 mm, which is more than the mini implant diameter which is usually (<3 mm)⁽⁶⁾. this smaller diameter of the implant allows for its insertion in regions with poor bone thickness and allows the patients to follow fewer surgical procedures⁽⁴⁾. Similarly, opening flaps may not always be required, reducing morbidity in the postoperative phase⁽⁷⁾. These are some factors that make patient accept small implant procedures to maintain overdenture prosthesis⁽⁶⁾.

Different types of reinforcement denture base materials can be used to reinforce implant retained overdenture. The most common type is the metal reinforcement materials, while fiberglass-reinforced composite resin (FRC), Poly-ether-ketone(PEEK) .poly-ether ketone ketone(PEKK) materials can be used as recent reinforcement materials.⁽⁸⁾

PEKK material, one of the newest members of the PAEK (poly aryl ether ketones) family, is at the top of the thermoplastic quality pyramid. Unlike PEEK, PEKK material exhibits both crystalline and amorphous material properties, giving it unique physical, mechanical, and chemical properties^(9,10). PEKK material can be used for a wider range of applications than PEEK materials because it has an 80% higher compressive strength and a wider processing window.^(11,12)

Because of this, PEKK's wide range of material qualities make it perfect for a variety of dental applications. increasing the low modulus and high strength of PEKK products By incorporating fillers. stress-demanding applications can be realized as the properties of human tissues are substituted. For example, stiffness can be customized to human hard tissues by varying the filler concentration and choice as well as the method of processing the resulting composite recipe.^(13, 14). Excellent wear, fatigue, tensile strength, high flexural, perfect dimensional stability, and abrasion resistance are some of the most important qualities.^(15,16)

The aim of this study was to evaluate the effect of CoCr and PEKK reinforcement denture base materials on marginal bone height changes around the mini implants as well as the patient's stratification regarding both of them

MATERIALS AND METHODS

Patient selection

Fourteen completely edentulous male patients were selected from the outpatient clinic, Prosthodontic Department Faculty of Dentistry Misr University for Science and Technology. Allocation followed a sequence of random numbers contained in sealed, opaque envelopes, which were prepared by a researcher without contact with other trial procedures. Numbers were generated by Microsoft Excel software (Microsoft Excel 2003; Microsoft Corporation) following a 1:1 ratio according to a simple randomization scheme and all patients will be selected, according to the following criteria:

Age ranged from 55–65 years, the lower residual ridges had adequate bone height covered by firm dense fibrous mucoperiosteum with no sharp bony spicules, Patients exhibited skeletal Angle's class-I maxillo-mandibular relationship and Patients had sufficient inter-arch distance, smoking, parafunctional habits, and systemic or

metabolic disease was excluded because it affects osseointegration.

These criteria were fulfilled through routine diagnostic procedures including history taking (medical and dental), clinical examination (extra-oral and intra-oral), laboratory investigation, and radiographic examination.

Patient education and approval

Faculty of Dentistry Misr University for Science and Technology ethical committee approved the protocol with approval number (2022/0034) all Patients were subjected to sessions of patient education about implant importance, needs, advantages, maintenance, and care. They agreed to cooperate and follow the recommendations and instructions of the clinician.

Implant selection and location

Four mini dental implants (3M dental implants-Italy) screw type one piece with 2.7mm in diameter and 13mm in length were selected for each patient. The modified radiographic stent (surgical stent) was used to mark the proper position of the four mini dental implants in the area between the mental foramina. The position of the most distal implant on each side was marked on the radiographic stent 5mm mesial to the mental foramen. The position of the other two implants was marked with nearly equal distances at least 6mm between each two marks

Patient preparation

Chlorhexidine mouthwash was prescribed one week before surgery. Augmentin 1gm one tablet every 12 hours was prescribed for the patient 24 hours before surgery. Ibuprofen 50mg was prescribed three times per day for one week after surgery as an analgesic. Alphentern was prescribed three times per day for one week after surgery as an anti-inflammatory.

Surgical procedures

Patients were instructed to rinse with Chlorhexidine Gluconate mouthwash at the time of operation. Field block anesthesia and bilateral mental nerve block using Mepivacaine Hydrochloride were given in the surgical field. The surgical stent was used for marking the proposed position of the four implants on the ridge in the symphyseal area.

At the marked implant site, the cortical drill was used to penetrate the cortical bone. A pilot drill of 1.7mm in diameter with a stopper at 13mm in length was held in a vertical direction and moved up and down during drilling with light intermittent finger pressure with internal and external irrigation, and at a speed of 800 RPM. Once the desired length was reached, the hole was calibrated by barreling pins for the desired length and inclination. The blister wrap of the implant glass vial was removed and the implant was inserted into the pilot opening through the mucosa and then rotated clockwise with the finger drive while exerting downward pressure. When resistance was felt the manual digma was used to insert the implant in the pilot opening. This procedure initiated the self-tapping process and was used until noticeable bony resistance was encountered. The ratchet wrench was grasped (with the directional arrow facing clockwise), and the final stage of implant placement was carried out with small incremental, carefully controlled ratchet turns for complete seating (using $\frac{1}{4}$ turn rotation with a 15-second pause between rotations. This reduces the frictional heat that may be detrimental to the bone. External irrigation was used during the insertion of the implants. Implant placement was carried out with protrusion of the full length of the abutment head from the soft tissues but with no threaded portion visible. The other three implants were placed with the same procedure (**Fig.1**).

The patients were instructed to take their postoperative medication as previously prescribed and to use cold fomentation on the implant site for

twelve hours. The patients were recalled two weeks after implant installments for denture construction.

Denture construction and the pick - up

Upper and lower alginate impressions (Cavex) were made in properly selected and adjusted stock trays and poured into dental stone to obtain a diagnostic cast. The impressions were made while the metal housings were seated on the ball heads of the four implants. Self-cure acrylic resin* special tray was fabricated, secondary impression was made by medium body rubber base (Zhermack, Italy) and poured to obtain master casts.

A CAD/CAM machine (Ceramill Map400, Amann Girrbach AG, Koblach, Austria) was used to scan the cast. The reinforcement frame was designed with the device's software, saved as an STL file, and with a thickness of 1.0 mm to cover the crest of the ridge, and a relief room was provided for the attachment of the metal housing. For group I, a laser sintering system (EOSINT, Germany) was used to print the specified frame into castable resin using the additive method; for group II, CAD/CAM subtractive manufacturing was used to mill the frame into Pekton blocks.

For Group I, The castable resin frames were invested in and cast into cobalt-chromium metal frames (GC Pattern Resin, GC Corp, Tokyo, Japan) (Fig. 2).

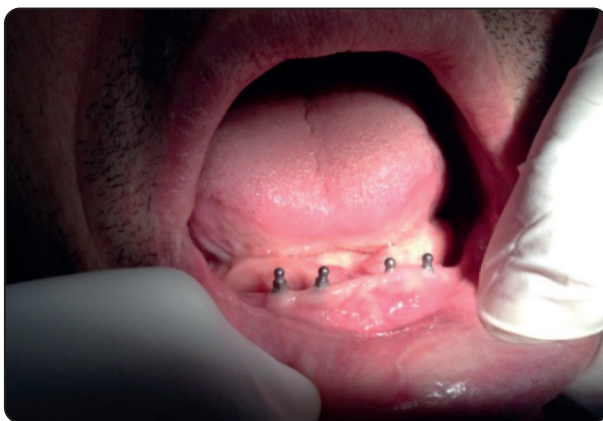


Fig.(1): Four mini implants were placed in the interforaminal region

For Group II, Frames were milled from modified Pekton discs (Bredent GmbH & Co.KG, Weißenhorner Str. 2, 89250 Senden, Germany), a high-performance polymer

Mandibular and maxillary dentures were processed in heat-cured acrylic resin following the long curing cycle. Upper and lower dentures were finished and polished after laboratory remounting. Clinical remount was carried out guided by the previously made face bow index and a new inter occlusal wax record to refine the occlusal contacts. An elastomeric shim (spacer) was placed over the cervical half of the implant head (to block out undercuts) while permitting the O-ball half of the implant to protrude uncovered. The stainless steel housings with the elastic retentive rubber caps (standard) were placed and accurately fitted to the ball heads of the four implants. Relief of the fitting surface of the lower denture was done opposite to the four metal housings seated on implant heads using an acrylic bur (Fig.3) The lower denture was tested intra-orally to confirm complete seating while in maximum intercuspation. The lower denture was placed over the assembly to verify that clearance was passive, and then the lower denture was removed, washed, and dried. The relieved areas were filled with pink, fast cold-cure acrylic (Duralay) resin mixed in the dough stage and the



Fig. (2): The castable resin frames were cast in a metal frame

denture was inserted in the patient's mouth under biting in maximum intercuspation till full curing to hard set. The denture was removed, and the flash was trimmed.

Patient's evaluation:

Marginal bone height evaluation

Patients were frequently recalled for inspection and post-insertion adjustments. Follow-visits were scheduled at the time of denture insertion, six and twelve months after denture insertion for making radiographic evaluation of the peri-implant marginal bone height changes. Radiographic evaluation Marginal bone height changes around the implants were evaluated using the linear measurement system supplied by the cone beam *computed tomography (CBCT) (kVp.85, mA. 16, Field of view 7x14.5x14.5 cm) The mesial buccal, distal buccal, mesial lingual, distal lingual, mid-buccal and mid-lingual marginal bone heights around the implants were evaluated, using the linear measurement system of the software (RomexisViewer_ Xray bat) with flat panel detector supplied by the cone beam computed tomography(CBCT) . From the coronal plane, the distal and mesial marginal bone heights around implants were evaluated. The measurements were carried out at the end of each follow-up period



Fig. (3): Finished denture with PEKK reinforcement materials

(at denture insertion, three, 6, and 12 months post insertion). The marginal bone loss at different intervals was obtained by calculating the difference in bone height at that interval from the baseline measurement.

Patient satisfaction:

Before distributing the surveys to the patients, a questionnaire ⁽¹⁷⁾ was used to know their level of satisfaction. To make the questionnaires easier for the patients to complete, all of the questions were translated into Arabic. They are divided into two sections. Patients were asked to answer five items (A through E) in the first section using an ordered scale with values ranging from 1 (very bad) to 9 (excellent). The patients respond with a yes or no to the five questions (F to J) in the second section.

First part

- A. What is your opinion about your new implant retained overdenture in general?
- B. What about the retention of your overdenture when your denture is in place?
- C. Can you eat well with your new overdenture?
- D. Can you talk well with your new overdenture?
- E. What about the appearance of your implant retained overdenture in your opinion?

Second part

- F. Is there any problem when you contact people due to a problem in denture retention?
- G. Does your new denture bother your mind?
- H. Is there any food impaction occurring under your overdenture?
- I. Does your new overdenture achieve all your expectations?
- J. Would you do this treatment again?

RESULT

Statistical Analysis

The statistical analysis of the provided data was conducted utilizing IBM SPSS software package version 24.0 (Armonk, NY: IBM Corp) and GraphPad Prism 18. For qualitative data, a Chi-square test was performed while for quantitative data, including means and standard deviations, were generated for the groups. Group comparisons were carried out using the One-Way Analysis of Variance (One Way ANOVA) followed by Tukey's post hoc test for multiple comparisons, preceded by an assessment of normality through the Kolmogorov–Smirnov test and the Shapiro–Wilk test. The results of these tests indicated a normal distribution for the parametric data under consideration.

Evaluation of marginal bone height Changes:

Table (1) and Figure(4) present descriptive statistics in the form of means and standard deviations for bone loss change assessments of Co-Cr reinforced and PEKK-reinforced mandibular overdentures. The data is presented for three time points: at insertion, after 6 months, and after 12 months. Assessments were taken at 6 locations on each implant: mesial buccal (M.B), mid-buccal (MID.B), distal buccal (D.B), mesial lingual (M.L), mid-lingual (MID.L), and distal lingual (D.L).

At the time of insertion, the mean bone loss for the Co-Cr reinforced overdenture ranged from 10.86 to 11.43 mm, while the PEKK-reinforced overdenture had means between 10.71- and 11.57 mm. Standard deviations were similar between

TABLE (1) Evaluation of marginal bone height Changes of Different Reinforcement Materials of Mandibular Overdenture:

		Metal-reinforced mandibular overdenture		PEKK-reinforced mandibular overdenture	
		M	SD	M	SD
At the time of insertion	M.B	10.86	0.6901	10.86	0.6901
	MID.B	11.29	0.7559	11.57	0.5345
	D.B	11.43	1.134	11.29	0.9512
	M.L	10.86	0.8997	10.71	0.9512
	MID.L	11	1.155	11	1.155
	D.L	11	0.8165	11.14	0.8997
After six months	M.B	13.71	0.7559	12.57	0.5345
	MID.B	14.71	0.9512	13	1
	D.B	14.43	1.134	12.86	0.6901
	M.L	14.14	1.069	12.29	0.488
	MID.L	14.43	1.272	12.57	1.272
	D.L	14	1	12.71	1.113
After twelve months	M.B	14.57	0.7868	13.57	0.5345
	MID.B	15.57	0.7868	14	1
	D.B	15.29	0.9512	14	0.5774
	M.L	15	0.8165	13.29	0.488
	MID.L	15.14	0.8997	13.57	1.272
	D.L	14.86	0.8997	13.71	1.113

MD; Mean Difference,

SD; Standard Deviation, P; Probability Level

the two overdenture types, ranging from 0.5345 to 1.134 mm. This indicates there was not a large difference in bone loss between the two overdenture types when initially inserted.

After 6 months, the Co-Cr reinforced overdenture showed greater increases in mean bone loss change at all locations assessed, with means ranging from 13.71 to 14.71 mm compared to 12.29 to 13 mm for the PEKK-reinforced overdenture. The Co-Cr reinforced overdenture also had slightly higher standard deviations.

At 12 months, the gap in mean bone loss change between the two overdenture types widened even further, with the Co-Cr reinforced overdenture having means between 14.57 and 15.57 mm versus 13.29 to 14 mm for the PEKK-reinforced type. Again, standard deviations remained somewhat higher for the metal overdentures.

Overall, the data indicates a progressive increase in bone loss over time for both overdenture types, but with consistently lower bone loss for the PEKK-reinforced overdentures.

Statistical testing using ANOVA found significant differences in bone loss changes between the two overdenture types ($p < 0.0001$).

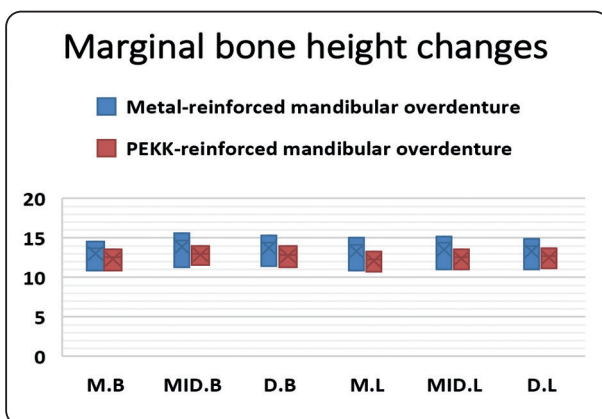


Fig. (4): Box and Whisker chart of marginal bone height Changes of Different Reinforcement Materials of Mandibular Overdenture

Table (2) and Figure(5) present the results of statistical analysis comparing the mean differences in bone loss change over time between Co-Cr reinforced and PEKK-reinforced mandibular overdentures. Multiple comparisons were made between the following time points: baseline to 6 months (0_6), baseline to 12 months (0_12), and 6 months to 12 months (6_12). Comparisons were made for each of the 6 assessment locations on the overdentures.

For the Co-Cr reinforced overdentures, the mean differences (MD) from baseline to 6 months ranged from 2.85 to 3.43 mm depending on the location. From baseline to 12 months, MDs were between 3.71 and 4.28 mm. The MDs from 6 to 12 months were smaller, ranging from 0.71 to 0.86 mm. Standard deviations (SD) for the MDs were consistent across time points and locations, in the 0.1 to 0.8 mm range.

For the PEKK-reinforced overdentures, the MDs were uniformly lower than the Co-Cr overdentures. From baseline to 6 months, MDs ranged from 1.43 to 1.71 mm. For baseline to 12 months, MDs were between 2.43 and 2.71 mm. The 6-to-12-month MDs ranged from 1 to 1.14 mm. SDs were also smaller for the PEKK overdentures, from 0.104 to 0.325 mm.

Co-Cr reinforced overdentures showed increases in bone loss change over time compared to PEKK-reinforced overdentures, with smaller SDs

Statistical testing using ANOVA found significant differences in bone loss changes between the two overdenture types at each time interval and location ($p < 0.0001$).

Patient Satisfaction Evaluation:

Table (3) and Figure(6) present patient satisfaction scores on a 1-9 scale for two groups receiving different mandibular overdenture treatments. Seven questions were asked covering overall satisfaction, retention, eating, talking, and appearance. Each question was answered by 7 patients per group.

TABLE (2) Multiple Comparisons of Mean Difference of marginal bone height changes of Different Reinforcement Materials of Mandibular Overdenture:

	metal-reinforced mandibular overdenture						PEKK-reinforced mandibular overdenture						P-value
	0_6		0_12		6_12		0_6		0_12		6_12		
	MD	SD	MD	SD	MD	SD	MD	SD	MD	SD	MD	SD	
M.B	2.85 A	0.506	3.71	0.704	0.86 B	0.163	1.71	0.325	2.71 A	0.515	1 B	0.168	<0.0001*
MID.B	3.42	0.608	4.28	0.813	0.86 A	0.307	1.43 A	0.272	2.43	0.462	1 A	0.213	<0.0001*
D.B	3 A	0.533	3.86	0.733	0.86 B	0.267	1.57 B	0.299	2.71 A	0.558	1.14 B	0.192	<0.0001*
M.L	3.28 A	0.583	4.14	0.786	0.86 B	0.101	1.58 B	0.301	2.58 A	0.491	1 B	0.104	<0.0001*
MID.L	3.43 A	0.609	4.14 A	0.786	0.71 B	0.165	1.57	0.204	2.57	0.422	1 B	0.269	<0.0001*
D.L	3 A	0.533	3.86	0.732	0.86 B	0.255	1.57 B	0.266	2.57 A	0.469	1 B	0.156	<0.0001*

MD; Mean Difference, SD; Standard Deviation, P; Probability Level
 Means with the same letters were insignificant different using Tukey's post hoc test for multiple comparisons.
 *; Significant Difference using One Way ANOVA test

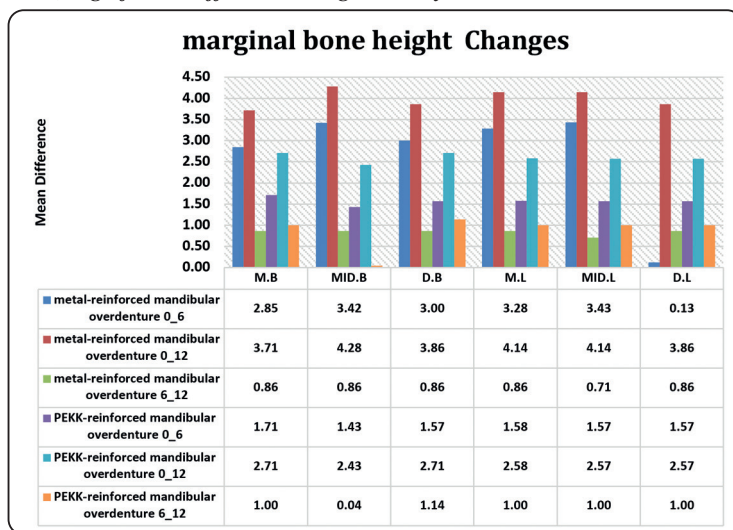


Fig. (5): Bar Chart of Mean Difference of marginal bone height change of Different Reinforcement Materials of Mandibular Overdenture

To statistically compare the groups, a chi-square test was run for each question. The chi-square test determines if the distribution of scores differs between the two groups. All p-values were above 0.05, indicating no statistically significant difference between the groups.

Table (4) and Figure (7) summarize yes/no responses to 5 patient satisfaction questions across 2 treatment groups with 7 patients each. A chi-square

test was used to compare the percentage of “yes” responses between groups for each question.

For the first question on avoiding contact due to fear of losing the denture, 1 out of 7 patients per group answered yes, resulting in a p-value of 1.000 indicating no significant difference.

The second question asked if the new denture bothers patients, and no patients in either group answered yes, so no analysis could be performed.

TABLE (3) Multi-grades Patient Satisfaction Assessment of Different Reinforcement Materials of Mandibular Overdenture After Six Months:

Question	Groups	Satisfaction Scale									P-value
		1 (very bad) to 9 (excellent)									
		1	2	3	4	5	6	7	8	9	
A. What is your opinion about your new implant retained overdenture in general?	Group I	0	0	0	0	0	0	1	4	2	0.1068 (NS)
	Group II	0	0	0	0	0	0	1	4	2	0.1068 (NS)
B. What about the retention of your overdenture when your denture is in place?	Group I	0	0	0	0	0	0	1	4	2	0.1068 (NS)
	Group II	0	0	0	0	0	0	1	4	2	0.1068 (NS)
C. Can you eat well with your new overdenture?	Group I	0	0	0	0	0	0	2	3	2	0.5908 (NS)
	Group II	0	0	0	0	0	0	2	3	2	0.5908 (NS)
D. Can you talk well with your new overdenture	Group I	0	0	0	0	0	0	2	3	2	0.5908 (NS)
	Group II	0	0	0	0	0	0	2	3	2	0.5908 (NS)
E. What about the appearance of your implant retained overdenture in your opinion?	Group II	0	0	0	0	0	0	2	3	2	0.5908 (NS)
	Group I	0	0	0	0	0	0	2	3	2	0.5908 (NS)

P; Probability Level NS; Insignificant Different using Chi Square Test

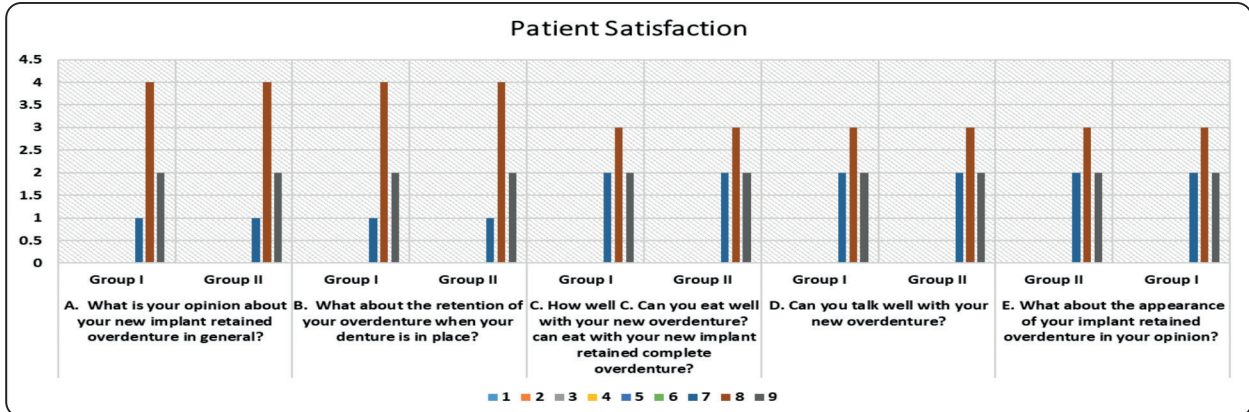


Fig. (6): Bar chart of Multi-grades Patient Satisfaction Assessment of group I Question of Different Reinforcement Materials of Mandibular Overdenture after Six Months

For food impaction under the denture in question three, no patients in either group reported issues, again with no differences.

Question four asked if expectations were met with the new denture. 4 out of 7 patients in group I said yes compared to 5 out of 7 in group II, yielding a non-significant p-value of 0.852.

The final question asked about willingness to repeat the treatment. 4 out of 7 in group I said yes,

versus 7 out of 7 in group II. The p-value of 0.237 indicates this difference is also not statistically significant.

In summary, the data does not show that there are differences between the two treatments in terms of the yes/no patient satisfaction assessments. Based on these findings, statistical equivalency cannot be ruled out.

TABLE (4) Yes/No Patient Satisfaction Assessment of Different Reinforcement Materials of Mandibular Overdenture After Six Months:

Question	Groups	Patient Satisfaction		P-value
		Yes	No	
F. Is there any problem when you contact people due to a problem in denture retention	Group I	1	6	1.000 (NS)
	Group II	1	6	
G. Does your new denture bother your mind?	Group I	0	7	1.000 (NS)
	Group II	0	7	
H. Is there any food impaction occurring under your overdenture?	Group I	0	7	1.000 (NS)
	Group II	0	7	
I. Does your new overdenture achieve all your expectations?	Group I	4	2	0.852 (NS)
	Group II	5	2	
J. Would you do this treatment again?	Group I	4	3	0.237 (NS)
	Group II	7	0	

P; Probability Level

NS; Insignificant difference using Chi-Square Test

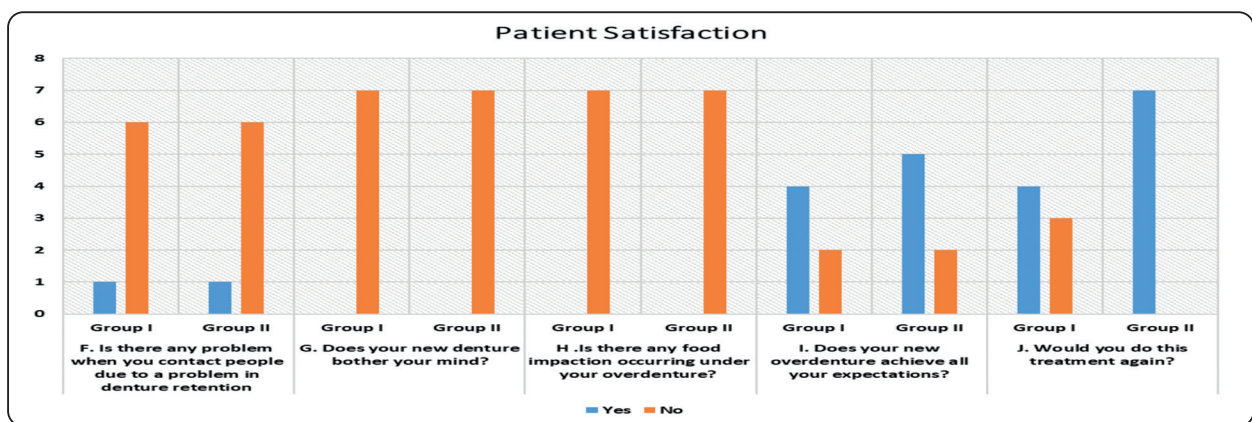


Fig. (7) Bar chart of Multi-grades Patient Satisfaction Assessment of group II Question of Different Reinforcement Materials of Mandibular Overdenture after Six Months.

DISCUSSION

The results showed statistically significant differences between both groups. It was found that there is an increase in mean bone loss change at all locations for the Co-Cr reinforced overdenture when compared to the PEKK-reinforced overdenture which shows less in mean bone loss change at all locations at the 0-6 and 0-12 time points and could be attributed to low modulus of elasticity of PEKK which is almost comparable to that of bone⁽¹⁹⁾ are important factors that directly affect the amount of

pressure transmitted by the material as it absorbs the load and decreases stress on the implants^(20,21) as well as it causes favorable stress distribution and all this factor will lead to less bone resorption. ^(22,23)

For both groups, it was found that there was a statistically significant difference between different interval periods (0-6,6-12) within the same group, it was found that the increases in the mean bone loss change at all locations at the interval periods (0-6) are more than that increases in the mean bone loss change at all locations the interval period

(6-12) within the same group the increase in bone loss around the implants at the interval period (0-6) in both groups is due to bone remodeling which occurs within the first 6 months^(24,25,26) after loading while the increase of bone loss that occurs at the interval periods (6-12) in both groups due to undesirable occlusion forces subjected to the prosthesis^(27,28,29)

Some studies agree with our study as the authors used the PEKK framework partial denture over the abutments and it was found that the PEKK framework will produce less stress and good stress distribution on the abutments⁽³⁰⁾.

Another study also agrees with our study that using PEKK materials as clip-of bar attachments in implant-retained overdenture it was found that PEKK clip preserves bone around the implants and decreases strain on it due to its flexibility and elasticity⁽³¹⁾.

For patient satisfaction which was done after 6 months of denture insertion it was found that The first part and the second part of the questionnaire showed statistically insignificant differences between both groups ($P > 0.05$)

The first part of the Questionnaire consisted of five questions (A through E) using an ordered scale with values ranging from 1 (very bad) to 9 (excellent). For overall satisfaction, retention, eating, talking, and appearance questions, Both groups reported primarily high satisfaction levels of 7-9 on a 9-point scale. These data do not indicate a statistically significant difference in satisfaction between the two overdenture treatments. Overall, both treatments appear to provide a high level of patient satisfaction based on this self-reported survey this is because retention is related to the type of attachment used⁽³²⁾ and eating is related to the type of teeth and type of occlusion⁽²³⁾ used while talking related to setting of teeth as well as the appearance related to the shape and color of teeth and the color of denture base⁽³³⁾ and all these factors are common in both groups.

The second part of the questionnaire consisted of five yes/no questions from (F to J). The yes/no responses indicate that most patients did not report problems with fear of losing the denture, food impaction, or the denture being bothersome, and treatment repetition, These data do not indicate a statistically significant difference in satisfaction between the two overdenture treatments although the question related to the repetition of the treatment shows higher rate though group II this higher rate in group II is due to the that the weight of the PEKK reinforcement materials is less than the weight of CoCr reinforcement materials as the density of PEKK is more than the density of CoCr⁽³⁴⁾ and this lead to more patient comfortable as well as the color of the PEKK, although this color did not appear as it is in the fitting surface of the denture base , it lead to more patient satisfaction.

Some studies agree with our study that after 6 months of denture insertion patient satisfaction will normally increase due to increased stability and retention as well as speech and aesthetic⁽³⁾

CONCLUSION

- 1) (PEKK) meshwork reinforcement material shows less bone loss when compared with CoCr. meshwork reinforcement material after 6 months and 12 months.
- 2) Patients in both groups were satisfied with their dentures after 6 months of denture insertion and there was no signification difference between the two groups

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