The main causes of failure in removable dentures in Tripoli Libya

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■ **Abstract:**

The purpose of this study was to find out the main causes of failures in removable dentures, as well as the type and frequency of that failure in terms of several variables, in patients with removable dentures which had been supplied at private clinics. The study sample size were 50 patients with a mean age of (56.5years) distributed over nine private clinics, and the dentures were processed by three different dental laboratories. The medical conditions, complications and patient's information was recorded. Also types of dentures and types of defects ware determined. After Statistical analyses was performed The most common complication was loss of retention (36.5 %) followed by bad esthetic (24 %), Where the most complaints was due to a manufacturing errors (52 %). This study suggests that in most instances, removable denture patients present with complaints only when there is real design fault. Clinician must carefully evaluate the denture for faults in denture base, extension and horizontal and vertical jaw relationships

● **KEYWORDS:** Complication; Complete and partial dentures; Faults; Retention; stability.

■ **المستخلص:**

الغرض من هذه الدراسة هو معرفة السبب الرئيسي لفشل أطقم الأسنان المتحركة ونوع هذا الفشل وتكراره من حيث العديد من المتغيرات في المرضى المستعملين لها، وقد بلغ حجم عينة الدراسة 50 مريضا بمتوسط عمر (56.5) سنة تم تقييمهم من قبل تسع عيادات خاصة، وتم تجهيز أطقم الأسنان من قبل ثلاثة مختبرات للأسنان. حيث تم تسجيل الحالات الطبية ، والعلاقة بين المضاعفات ومعلومات المريض ، وأنواع أطقم الأسنان ، وأنواع العيوب التي تم تحديدها. .

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بعد إجراء التحاليل الإحصائية كانت المضاعفات الأكثر شيوعا هي حركة الاطقم السنية المتحركة وعدم ثباتها في الفم 5.36 ٪ يليها المظهر السيئ 24 ٪ ، وقد تبين من النتائج ان معظم الشكاوى كانت بسبب أخطاء التصنيع 52 ٪ .

تشير هذه الدراسة إلى أنه في معظم الحالات ، لا يقدم مرضى أطقم الأسنان المتحركة شكاوى إلا عندما يكون هناك خطأ حقيقي في التصميم. ومن هنا يجب على الطبيب السريري تقييم طقم الأسنان بعناية بحثا عن اي أخطاء حتى يتسنى للمرضى استعمال هذا النوع من الاطقم دون اي مضاعفات او اضرار

● **الكلمات المفتاحية:** التعقيد، أطقم الأسنان الكاملة والجزئية، الأخطاء، الاستبقاء، الاستقرار.

☐ Introduction:

Many practitioners will experience a situation, whereby a patient with newly fabricated removable dentures continues to experience difficulty in adapting to them. This can lead to a protracted period of discouraging "adjustment appointments" that may not result in the eventual resolution of the problem. Therefore it is often concluded that there is a fault in construction or some patient factor, either age, gender, medical history, that is hindering the success of treatment, Initially the patients face the problem of excessive salivation in first 12 to 24 hours of wearing dentures as the brain misinterprets it to be food. New dentures can also be the cause of sore spots as they compress the denture bearing soft tissues (mucosa). A few denture adjustments in the days following insertion of the dentures can take care of this problem. Gagging is another problem encountered by a minority of patients. At times, this may be due to a denture that is too loose, too thick or extended too far posteriorly onto the soft palate[1]. The use of removable dentures is associated with another Problems with communication of foods (inefficiency of chewing) or accumulation of food under the dentures and instability of a denture on its foundation (poor retention and stabilization) associated with pain sensations and difficulties in speech and unattractive appearance are the most frequently reported causes of treatment failure or denture discomfort The elderly people with dentures, and particularly removable dentures, frequently complain of a wide range of problems including: eating, social interaction and communication and these problems have a detrimental influence on their quality of life. There are few studies have been done to analyze the causes of removable-Denture faults,

and Often there is not total agreement between the patient and the dentist as to the adequacy of their dentures.(2'3'4'5)This differing perception of patient needs makes management more difficult The purpose of this study is to find out the Failure in removable and partial dentures and causes and how to correct that failure also to evaluate the association between denture wearing and complaints of older people in Tripoli/Libya, This study was designed to collect information about the various complications and the failure that occurs in the during fabrication and then after insertion.to reduce patient complaints.

☐ Methodology:

The study was done based on data collection of 50 patient's records From 9 clinics and 3 laboratories in Tripoli area. Data was arranged in table based on patent's gender, age, medical history (MH), type of denture (removable or partial), upper or lower jaw (U/L), type of defect, and cause of defect as following

NO	Gender	Age	MH	Denture	Jaw	defect	Cause
1	M	68	Diabetic	Complete	U/L	Loose	bone resorption
2	F	54	H	Complete	U	Rocking	construction
3	M	70	H	Complete	U/L	Irritation	sleeping with denture
4	F	55	asthma	Partial	u	Irritation	Mouth Breathing
5	F	60	free	Complete	U/L	Rocking	bone resorption
6	F	51	free	Partial	U/L	Esthetic	construction
7	F	63	Diabetic	Complete	U/L	Rocking	bone resorption
8	M	45	H	Partial	L	Irritation	construction
9	M	57	free	Partial	u	Irritation	construction
10	M	67	heart	Complete	u	Loose	bone resort
11	F	62	free	Partial	U/L	Esthetic	construction
12	M	74	Diabetic	Complete	U/L	Loose	bone resorption

NO	Gender	Age	MH	Denture	Jaw	defect	Cause
13	M	61	Diabetic	Complete	U/L	Loose	bone resorption
14	F	56	free	Partial	L	food imp	construction
15	M	54	Free	Partial	u	esthetic	smoking
16	F	45	Asthma	Partial	U/L	rocking	construction
17	M	77	h+d	Complete	U/L	loose	bone resorption
18	M	64	Diabetic	Partial	u/L	esthetic	smoking
19	M	68	Diabetic	Partial	U/L	loose	Old
20	F	59	Free	Partial	u	loose	Old
21	M	66	Heart	Complete	L	free	Free
22	M	32	Free	Partial	u	esthetic	bad
23	M	49	Free	Partial	L	rocking	construction
24	F	29	Free	Partial	L	esthetic	construction
25	F	60	Sinusitis	Partial	U/L	Irritation	Mouth berating
26	F	45	Free	Partial	U	esthetic	bad
27	F	46	Diabetic	Partial	U/L	esthetic	construction
28	F	49	Diabetic	Partial	u	rocking	construction
29	M	54	Free	Partial	u	esthetic	construction
30	M	55	Free	Partial	u	rocking	construction
31	M	72	d+ h+ h	Complete	U/L	loose	bone resorption
32	M	63	Hyp	c + part	U/L	loose	construction
33	M	77	Diabetic	Complete	U/L	loose	bone resorption

NO	Gender	Age	MH	Denture	Jaw	defect	Cause
34	F	60	Diabetic	Complete	u	loose	bone resorption
35	F	69	Hyp	Partial	U/L	Loose	bone resorption
36	M	56	Free	Partial	U	Loose	construction
37	F	45	Diabetic	Complete	U	Loose	construction
38	M	56	Free	Partial	Lower	rocking	construction
39	F	50	Trauma	Spoon	U	rocking	construction
40	M	65	h+h	Partial	U	Loose	construction
41	F	44	Free	Partial	L	rocking	construction
42	F	46	Diabetic	Complete	u/l	Loose	bone resorption
43	F	60	Diabetic	Complete	u/l	Loose	bone resorption
44	M	67	h+d	Complete	U	Loose	bone resorption
45	F	50	Heart	Partial	u/l	rocking	construction
46	F	52	Free	Partial	U	Esthetic	construction
47	M	54	Free	Partial	U	Esthetic	construction
48	F	60	Diabetic	complete+ part	u/l	loose +rooking	construction
49 **50**	F F	42 42	Trauma Trauma	Partial Partial	U Lower	Esthetic rocking	Construction Construction

h= hypertension

h+d= hypertension+ diabetic * d+h+h=diabetic+ heart+ hypertension

Statistical analysis:

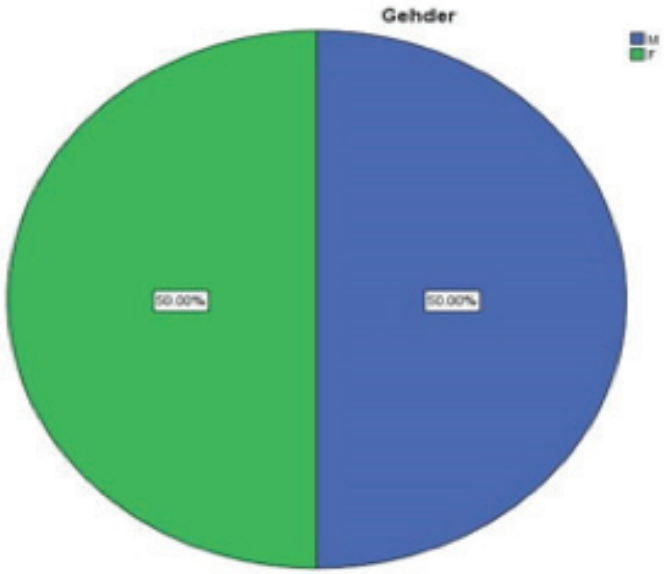


figure 1: distribution of the study sample according to gender

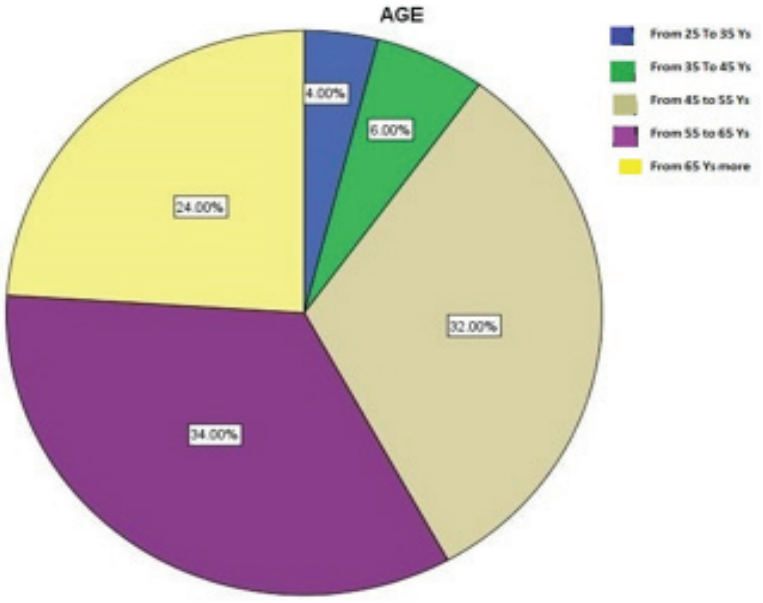


Figure 2: distribution of study sample according age

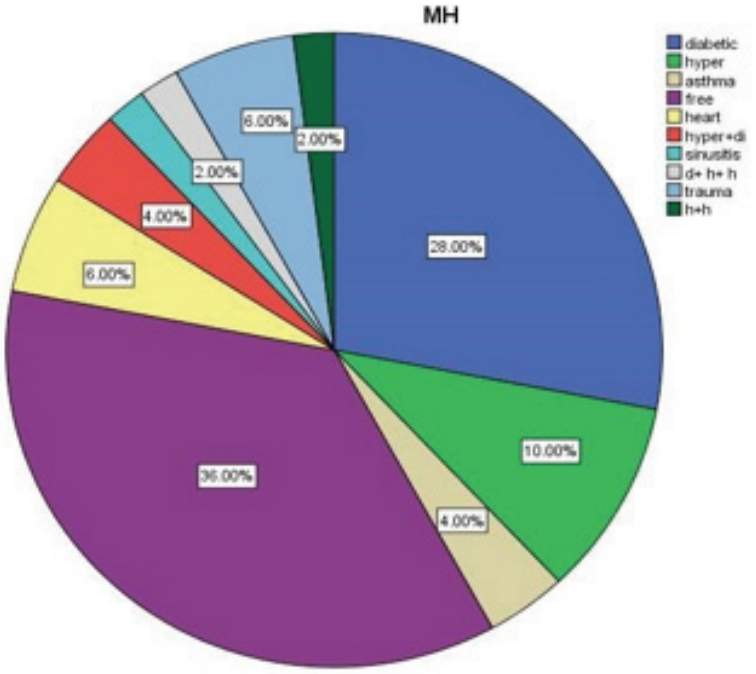


Figure 3: distribution of the study sample according to MH

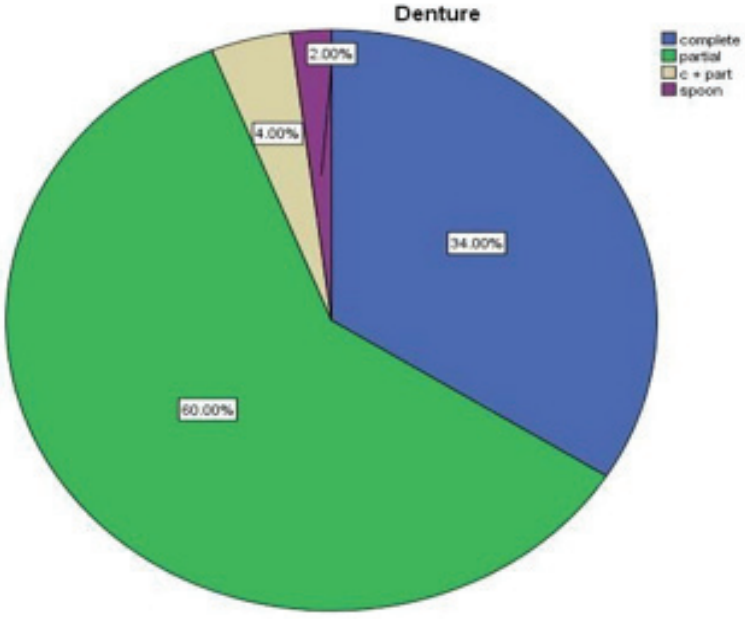


Figure 4: distribution of the study sample according to the denture

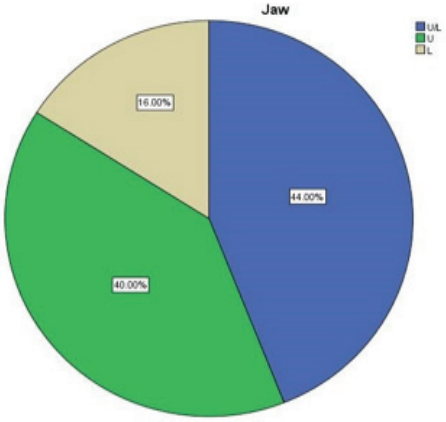


Figure 5: distribution of the study sample according to the jaw

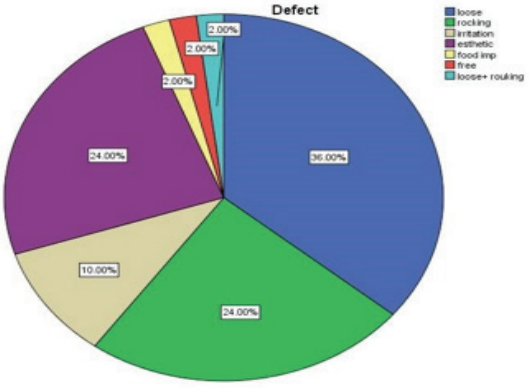


Figure 6: distribution of the study sample according to defect

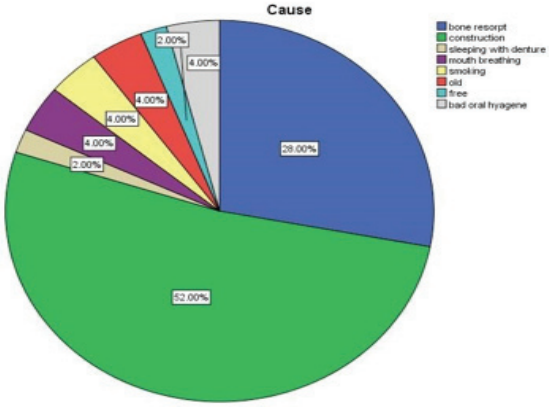


Figure 7: distribution of the study sample according to cause

☐ Results

This aspect of the analysis dealt with testing the hypotheses of the study to reach a decision on the hypothesis of the study, using the data obtained from some of people who participated in the study, using the appropriate statistical analysis, which is descriptive analysis using frequency and relative tables and a test like any square for independence -Square test of independence to study the causes and treatment of removable denture problems Failure of removable denture and what is causes of failure and how to correction Frequency and Relative Tables: The frequency and relative tables are tables consisting of two columns, the first representing the category or the answer, and the second representing the number or percentage for this answer. The frequency and relative tables were used to study the numbers and percentages of approval or not on the statements of the questionnaire newspaper. Chi-Square test of independence. The Chi-Square test of independence is used to study the relationship between two variables to find out whether there is a relationship between two variables.

☐ hypotheses of the study:

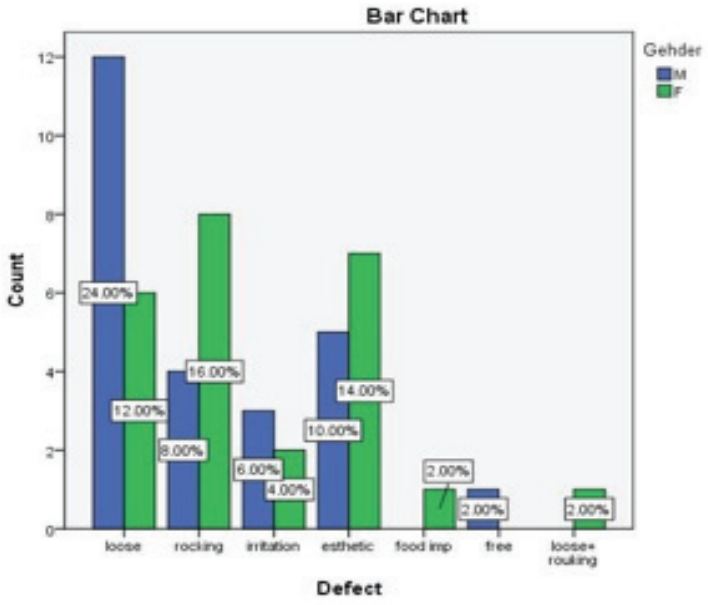
This hypothesis was studied in the study population by means of the study sample to test the question that states (there is no relationship between the gender variable and the defect problem) and this hypothesis was tested and the calculations were made using the SPSS statistical program and the results were as in Table no (.1)

Table No. (1) shows the results of the statistical analysis of the initial hypothesis

Kai	Total	Gender			
		F	M		
	18	6	12	Loose	
	% 36.0	% 12.0	% 24.0		
	12	8	4	Rocking	
	% 24.0	% 16.0	% 8.0		
	5	2	3	Irritation	
	% 10.0	% 4.0	% 6.0		
	12	7	5	Aesthetic	

	% 24.0	% 14.0	% 10.0		
	1	1	0	food imp	
0.333	% 2.0	% 2.0	% 0.		**Defect**
	1	0	1	Free	
	% 2.0	% 0.	% 2.0		
	1	1	0	Loose +rocking	
	% 2.0	% 2.0	% 0.		

Through the results in the previous table, we find that It is clear from the previous table that there is no relationship between the type of defect and gender in the study sample, where the significance value was greater than 0.05. The type of problem for the problems of removable dentures and the graph shows the percentage of each type.



This hypothesis was studied in the study population by means of the study sample to test the question that states (there is no relationship between the age variable AGE and the defect problem) and this hypothesis was tested and

the calculations were made using the SPSS statistical program and the results were as in Table No. (2)

Table No. (2) Shows the results of the statistical analysis of the second hypothesis

Kai	Total	AGE						
		From 6_ 5 Over	From 55 less Than 65	From 45 less Than 55	From 35 less Than 45	From less 25 than 35		
	18	10	6	2	0	0	Loose	
	% 36.0	% 20.0	% 12.0	% 4.0	% 0.	% 0.		
	12	0	4	6	2	0	Rocking	
	% 24.0	% 0.	% 8.0	% 12.0	% 4.0	% 0.		
	5	1	3	1	0	0	Irritation	
	% 10.0	% 2.0	% 6.0	% 2.0	% 0.	% 0.		
	12	0	2	7	1	2	Aesthetic	
0.028								Defect
	% 24.0	% 0.	% 4.0	% 14.0	% 2.0	% 4.0		
	1	0	1	0	0	0	food imp	
	% 2.0	% 0.	% 2.0	% 0.	% 0.	% 0.		
	1	1	0	0	0	0	Free	
	% 2.0	% 2.0	% 0.	% 0.	% 0.	% 0.		
	1	0	1	0	0	0	1 oose +rocking	
	% 2.0	% 0.	% 2.0	% 0.	% 0.	% 0.		

Through the results in the previous table, we find that it is clear from the previous table that there is a relationship between the type of defect and the age in the study sample, where the significance value was less than 0.05. Saluting the type of problem for the problems of removable dentures and the graph shows the percentage of each type.

It is clear from the drawing that those over 65 years old are more likely to have a loose problem, i.e. an expansion of the denture , followed by those aged 55 to less than 65 have esthetic problems, the age group was from 45 to less than 55

This hypothesis was studied in the study population by means of the study sample to test the question that states (there is no relationship between the gender variable and the health status of the patient HM). This hypothesis was tested and the calculations were made using the SPSS statistical program and the results were as in Table No. (..3.)

Table (3): shows the results of the statistical analysis of the initial hypothesis

Kai	**Total**	Gender			
		F	M		
0.0051199	14	8	6	diabetic	**HM**
	% 28.0	% 16.0	% 12.0		
	5	2	3	hyper	
	% 10.0	% 4.0	% 6.0		
	2	2	0	asthma	
	% 4.0	% 4.0	% 0.		
	18	9	9	free	
	% 36.0	% 18.0	% 18.0		
	3	1	2	heart	
	% 6.0	% 2.0	% 4.0		
	2	0	2	hyper+di	
	% 4.0	% 0.	% 4.0		
	1	1	0	sinusitis	
	% 2.0	% 2.0	% 0.		
	1	0	1	d+ h+ h	
	% 2.0	% 0.	% 2.0		
	3	2	1	Trauma	
	% 6.0	% 4.0	% 2.0		
	1	0	1	h+h	
	% 2.0	% 0.	% 2.0		

Through the results in the previous table, we find that It is clear from the previous table that there is no relationship between the health status of the patient and gender in the study sample, where the significance value was greater than 0.05. The health status of the problems of removable dentures and the graph shows the percentage of each type.

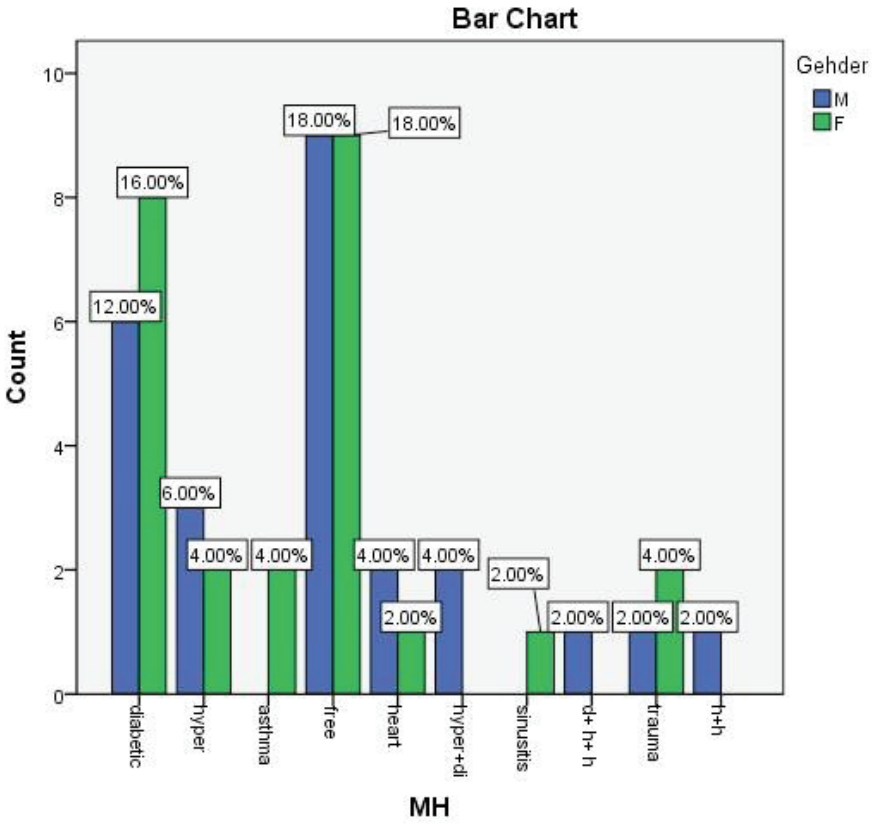


Figure 8 graph shows the percentage of medical history to gender

This hypothesis was studied in the study population by means of the study sample to test the question that states (there is no relationship between the health status variable HM and the defect problem) and this hypothesis was tested and the calculations were made using the SPSS statistical program and the results were as in Table No(4)

Table (4): shows the results of the statistical analysis the second hypothesis

Kai	Total	HM								
		loose	rocking	irritation	aesthetic	f o dimp	free	loose +rocking		
	14	9	2	0	2	0	0	1	Loose	
	28.0 %	18.0 %	4.0 %	.0 %	4.0 %	.0 %	.0 %	2.0 %		
	5	2	1	2	0	0	0	0	rocking	
	10.0 %	4.0 %	2.0 %	4.0 %	.0 %	.0 %	.0 %	.0 %		
	2	0	1	1	0	0	0	0	irritation	
	4.0 %	.0 %	2.0 %	2.0 %	.0 %	.0 %	.0 %	.0 %		
	18	2	5	1	9	1	0	0	aesthetic	
	36.0 %	4.0 %	10.0 %	2.0 %	18.0 %	2.0 %	.0 %	.0 %		
	3	1	1	0	0	0	1	0	food imp	
0.1320	6.0 %	2.0 %	2.0 %	.0 %	.0 %	.0 %	2.0 %	.0 %		**deft**
	2	2	0	0	0	0	0	0	Free	
	4.0 %	4.0 %	.0 %	.0 %	.0 %	.0 %	.0 %	.0 %		
	1	0	0	1	0	0	0	0	loose + rocking	
	2.0 %	.0 %	.0 %	2.0 %	.0 %	.0 %	.0 %	.0 %		

Through the results in the previous table, we find that It is clear from the previous table that there is no relationship between the type of defect and health status in the study sample, where the significance value was greater than 0.05. Saluting the type of problem for the problems of removable dentures and the graph shows the percentage of each type.

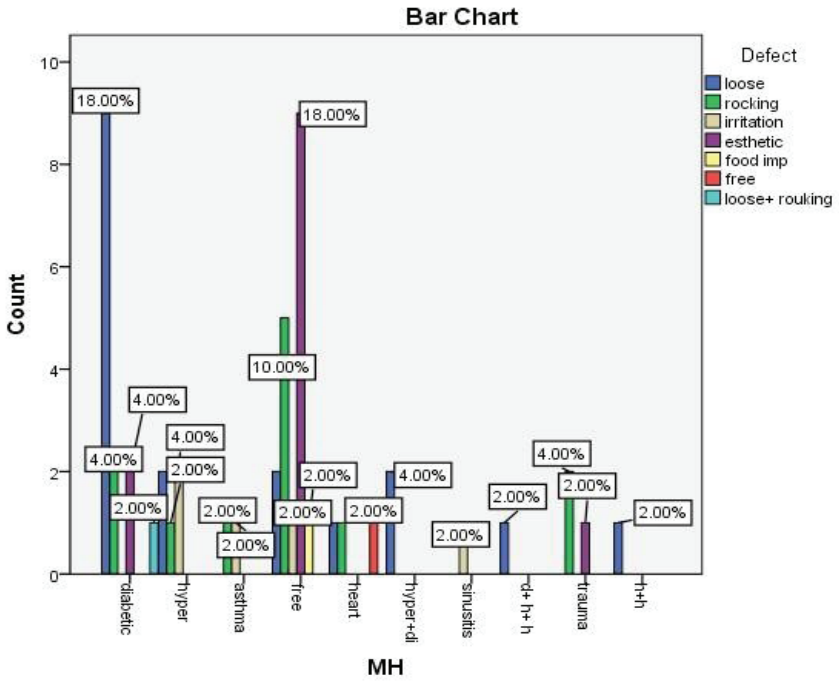


Figure9: graph shows the percentage of medical history to defect

■ Discussion

The study discovered that there was no statistically significant relationship between the number of complications, the kind of complications, and the prosthesis type. Because there are teeth present, detachable partial dentures are expected to have fewer difficulties than removable dentures. This results in more retentive dentures. The average age of the patients in this study was 56.5 years, which was close to the average ages reported in previous r studies. (53 to 65 years)[6'7'8'9)]

All patients seen at the dental clinic had at least one complaint; many patients

had multiple complaints, the most frequently encountered complication of the patients in this sample was loss of retention or looseness (36 %) Most of the patients complained about misfiting of their dentures followed by esthetic (24 %) and rocking (24 %) then irritation (10 %) in accordance with the results of previous studies [10'11'12'13]

These complications are the main reason of need for replacement of their dentures. The loss of retention of the dentures may have impaired the patients' ability to chew. The reason for the high prevalence of retention loss may have been ongoing bone atrophy.

Such atrophy occurs not only on the surface, but also involves height loss of the alveolar crest. Dentures tend to have long border extensions that have to be reformed by a relining procedure, since impaired adaptation of the denture base can cause loss of retention [14'15] Sheppard et al.[16] revealed denture looseness as the main cause of complaints of denture wearers which corroborates the results of our study. It is assumed that tipping, sliding or heavy horizontal forces during the function of dentures will accelerate resorption of the effected ridge site and this cause to Removable or Partial Denture looseness. Denture retention is a major requirement for patient satisfaction.

The border extensions of dentures, which play a key role in retention [17], are determined mainly by the clinicians who are responsible for obtaining a good impression Due to the influence of muscles and the compressibility of the mucosa, there will always be a certain amount of denture movement, Continuous reduction in the height of the alveolar ridges over a period of 25 years has been observed. There appears to be a marked reduction in the first year of denture use, and in the ensuing few years there is continuous loss averaging 1 mm per year. Over time, the loss in height of the anterior lower ridge is four times that of the upper ridge [18]

As a consequence of residual ridge reduction, and loss of sulcus width and depth with displacement of the muscle attachment closer to the crest, the denture base can appear to have extended borders, which also causes loss of retention, The morphological changes and the reduction of residual ridges in long-term wearers of removable dentures present serious problems to clinicians when deciding how to provide adequate support, stability and retention of new dentures [19'20]

When the fit is not exact, the forces are not distributed over the greatest possible surface of the bone, but are concentrated on certain spots and can cause ulceration. In the present study, we found that is, 13 cases out of the total number of loose complaints was caused by bone resorption, Resorption of bone results in loss of both occlusal and rest vertical dimension.

The former dimension is reduced to a greater extent, thus increasing the freeway space. Inappropriate occlusal vertical dimension is another important factor that diminishes masticatory force and makes chewing a tiring activity.

In addition, During denture construction, all factors including ratio, handling and inclusion of acrylic resin as well as curing, finishing and polishing are fundamental.[21] Smooth and highly polished surfaces are of utmost importance for patient comfort, aesthetic, hygiene and restoration longevity, many cases complaining of looseness were due to a defect in construction, there are26 patients (52 %) in the sample had loose or rocking or esthetic's complaints in their dentures was caused by errors during construction , Errors in horizontal and vertical positioning of either anterior or posterior teeth, errors in jaw relationships, errors in bases either under extended or overextended, Incorrect occlusal vertical dimension ,displayed an inadequate posterior palatal sea.

there are still no reliable methods to predict the outcome of removable denture faults and there are many problems related to construction faults with removable dentures ,Laurina and Soboleva [22] found that in most instances, removable denture patients present with complaints only when there is a real design fault ,Not surprisingly, significant relationships were observed between the presence of denture construction faults relating to retention and patient complaints of loose dentures, as well as construction faults relating to jaw relationships and complaints of difficulty eating and wrong position, shape, size of teeth relating to complaints of bad esthetic appearance.

These results are in accordance with those of Smith and Hughes, [23] who observed universally present errors in denture base extension, and generally poor retention. The frequency of fracture of denture in this sample was very few when compared to other studies such as Khasawneh and Arab (2003),[24] Darbar et al in 1994 [25], Where the number of patients who had fracture in their dentures only three out of 50 cases, and the cause of the fracture was

trauma. Irritation was also a common finding in this study (10 %) were one patient having the habit of sleeping with denture and two

Cases suffered from asthma and sinusitis that cause to them mouth breathing habit, as for the other two cases, the irritation was due to a construction defect.

Finally, the various faults in denture construction and the frequency of their occurrence were addressed. Although the literature contains references that describe how to identify construction faults and procedures for their rectification, [26, 27] there are few reports describing the commonly observed construction faults seen in existing removable dentures.

however, Statistical testing in this study failed to identify any relationship between patient gender and the number or type of complaints regarding their removable dentures.(table I) This conflicts with the accepted views that older patients are more likely to experience difficulties with their dentures and complain more frequently (66,71) Muller and Hassel-Sander[28] reported that oral motor abilities and the capability of adaptation to new dentures are not clearly age related and concluded that aging is a biologic process and not simply chronologic, which leads to considerable individual variation in oral motor and adaptation abilities ,The failure to observe a significant relationship between gender and number or type of complaints would tend to challenge the reports of Powter and Cleaton-Jones[29] Winkler,[30] and Heartwell.[31] However, the results of our study supports the findings of Langer et al.[32] and Berg,[33] who observed no significant patient age or gender relationships on denture acceptance.

By taking medical history from patients, we discovered in this study that twenty-seven patients in the sample suffered from a condition that was categorized as a chronic illness, and many experienced more than one disease state or systemic disorder.

A majority of these patients (36 %) fourteen sample patients suffered from diabetic and (10 %) suffering with hypertension , three patients suffered from heart disease was (6 %) and three patients had trauma to their dentures , four patients had more than one of chronic illness (4 %) was hyper+di and (2 %)

For each of the d+h+h and h+h, were one patient had sinusitis, and two patient had asthma, As for patients who did not suffer from any chronic disease, their percentage was (36 %) and their number was 18 patient, Chi-square testing was conducted to determine whether there was a relationship

between patients suffering with chronic illness and the type of complaint they presented with (Table 4).

No significant relationship was observe (where the significance value was greater than 0.05) the number of complaints from patients suffering with chronic pain was near for those without chronic pain. A chi-square test was carried out that failed to demonstrate a significant relationship between patients suffering from chronic pain and the type of complaint

■ Limitation

The major limitation of this study is that the sample group consists of patients having sought prosthodontics treatment or repair service at private clinics in limited place and the number of cases is small and another limitation of this study is the lack of data collection.

■ Conclusion

The results may vary in the general population wearing removable dentures. -To be able to generalize the results, more studies in different centers with higher case numbers which would provide valuable information should be accomplished. The evaluation - of recently delivered dentures in various clinics would additionally elicit valuable data .However, within the limitations of the present study, it can be concluded that in any give population seeking new removable dentures This study found that Removable denture patients experiencing difficulties with their dentures most frequently complained of bad ecstatic appearance and discomfort, difficulty with eating, and looseness of their dentures. There were no significant relationships between the patient's gender and general medical condition and the type or number of - complaints. A significant relationship was observed between the patient's age and the type or number of complaints. There were significant relationships ages and difficulty eating, respectively

■ Recommendation

The results of this study suggest that the dissatisfied removable denture patient in most instances experiences difficulties with his or her dentures due to an identifiable cause. This study would suggest that the clinician carefully evaluate the denture for faults in the denture base extension and horizontal and vertical jaw relationships before concluding that the

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