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The effect of design on Removable Partial Dentures

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Abstract

The importance of properly designed removable partial denture cannot be overemphasized, the execution of removable partial denture design may determine the success or failure of the appliance inadequate design assures its facility.

This study was done to confirm the effect of Kennedy classification and clinical examination on the removable partial design of group (A) dental technician and group (B) the dentists, and to be solved in future.

The result show 36% of the cases were modified and changed according to the cases related variables this high and significant number of munificent reinforces the position that RPD design should be decided and guided by the dentists.

The study conducted the effects of Kennedy classification and clinical examination on the RPD design marked by the dentists after providing the clinical examination played a very important role in changing the RPD designs.

Key words: RPD design, Kennedy classification and clinical examination.

Introduction

The removable partial denture is very important prosthesis in the life of partially edentulous patients.

Even though, recent reports have shown that one of five person (18-74) years of age were wearing a RPD, and stated that 60% of denture wears had at least on problem with denture [1].While other report found that the survival rate of RPD was 75% after 5 years and 50% after 10 years (half- life time) in taking replacement or not wearing the RPD as failure criteria [2].

The dentist may delegate the responsibility of fabrication of prosthesis to the laboratory technician which is a very small part in providing the patient with a satisfactory prosthetic restoration, but he cannot delegate the responsibility of designing the RPD in which he must visualize something much deeper and more complex than the pencil marking on the stone cast, these for purpose of assisting our management of partially edentulous patients [3,4].

All authors admonish that the entire responsibility for the design and fabrication of RPD is vested in the dentist, while other authors showed that the responsibility of RPD design was appeared to be delegated to the dental technician [5,6].

Several methods have been proposed to classify the partially edentulous arches on the basis of the potential combination of teeth and ridges to select the proper design.

The proper design of the RPD in consent with a well thought out and properly executed treatment plan will contribute to preservation of remaining structure as well as meticulous restoration of what is missing[7,8].

Such classification should allow longitudinal comparison of the incidence of the various classes of RPDs, moreover, the trends in the incidence of the various classes of RPDs being fabricated should be reviewed periodically to serve as teaching guidelines.

Materials and Methods

The study included (50) patients who were selected from patients attending the specialist clinic, institute of technical medicine, Foundation of technical education.

All patients were partially edentulous in both maxillary and mandibular arches except ten patients who had only maxillary partial edentulous arch opposed by a complete mandibular dentition. The patient were (22) males and (28) females.

The patients ages were ranged between (30-65) years with a mean (47.5) years. The examination where conducted in the patients from period of July 2011 to October 2012. The distribution of the cases according to Kennedy classification was a follow in (table-1).

Methods

Selected group from dental technician, the groups consist from five dental technician (they will be referred as group A). The other group consist from five dentists who take the impression from the patients mouth (they will be referred as group B), The clinical examination as a short medical history including patient name, age, sex, occupation, presence of chronic diseases or drug intake. Then dental history as the reasons of extracting teeth, previous prosthetic appliance, and the chief complain of the patient. Clinical examination was carried out using dental mirror, probe and tweezers. The following findings were recorded to make clinical examination from the missing teeth, the present restoration, the carious lesions, presence and location of tori and vitality test of teeth. Examination of periodontal tissue (gingivitis or periodontitis), tooth mobility, scores ranged from (0 to 4 degree) Rissin et al, [11], and periapical films were taken for the mobile teeth, tender teeth or the teeth with big filling and the crowns or bridges restoration. An impression was done for each partially edentulous case, then poured by dental stone. The casts' stone were given to the group of dental technician without any clinical examination which recorded in special case sheets, even the number of casts.

The group of dental technician were asked to select a design for partial denture which include acrylic RPD, Co- Ch RPD and fixed partial denture, after that the same cases were given to the groups of dentist with case sheet that contain the complete clinical examination, again they were asked to select the design for partial denture which include acrylic RPD, Co- Ch RPD and fixed partial denture.

Comparison was done for the designs that selected for the same cases from two groups without application of clinical examination and with clinical examination.

The comparison of the designs of the partial denture between group of dental technician and group of dentist. The change clearly effect on the designs generally, the number of cases that was decided to be casted in Cobalt- Chromium removable partial denture, acrylic removable partial denture and fixed prosthesis in two groups. The changes of designs from one type to another related to clinical diagnostic examination were recorded.

Results

The distribution and percentage of partially edentulous arches according to Kennedy classification is showed in (table-1) the maxillary class III cases were the most frequent class (24.5%), while the class IV was least one 2.1% but in the mandibular cases, class 1 was the most frequent class 15.3% and the frequent of class IV was zero. For the distribution of the removable partial denture design as related to upper and lower arches which designed from (group- A) dental technician, (table-2), the results indicated that the total acrylic type were more common in frequency in all the examined cases for maxillary and mandibular arches, followed by maxillary acrylic design 23.1%, Cobalt- Chromium design 21.7% and fixed design 4.2%, but for mandibular acrylic design 20.6%, Cobalt- Chromium design 13.5% and fixed design 1.2%, the changes between design of group (A), and group (B) was clearly found through the distribution of removable partial edentulous cases which show in (table-3) the results indicate a high difference between design group A and group (B) were the total Cobalt- Chromium design more common in all of examined cases for maxillary and mandibular arches, the maxillary Cobalt- Chromium design 29.4%, acrylic design 11.9% and fixed design 7.7% but for mandibular Cobalt-Chromium design 25.3% acrylic design 8.2%, and fixed design 1.2%. The results also indicated a high percentage of changes in the design of partial edentulous cases according to the relationship between dentist and clinical examination.

Discussion

The distribution of RPD design as related to the maxilla and mandible arches, group (A) dental technician, whose depend and uses the Kennedy classification only due to the purpose of Kennedy classification to make designs of removable partial edentulous cases were simplify the combinations of teeth to ridges, In the present study, the Kennedy classification was preferred to fulfill this purpose, one of the principle advantages of the Kennedy classification is that it permits the immediate visualization of partially edentulous arch, and enables a logical approach to the problems of design, and therefore a logical method of classification (7), (8), and the most widely accepted classification of partially edentulous arches, these finding being in agreement with Sadig et al [12]while the distribution of the acrylic RPD design was more frequency than other designs, these finding are with line of results of present study indicated that the greater frequency of removable partial edentulous cases are the acrylic design, which is a very small part in providing the patient with satisfactory prosthetic restoration [13] but for designs Co- Ch and fixed were least frequent cases, because this designs needs the clinical examination to study the condition of oral structures and abutment teeth who is recorded in the case sheet, which is very important to select proper scientific design or designs [14], these finding could be explain on the basis of Co- Ch p.d and fixed design, the high modification of the design should be decided and guided by the dentist, who understand the biomechanical principle of different RPD designs.

On the other hand the distribution of RPD design for group (B) the dentists, the changes were very clear about 36%, the results show that the frequency of Co- Ch designs increase more than other types of designs. The present study revealed on increased in the incidence of Co- Ch design compared with the incidence of acrylic

design [15]. This rise in the frequencies of Co- Ch design consistence with the tends of Co- Ch p.d is the permanent prosthesis, but acrylic p.d which is the primary p.d. and other study's stated that many of the acrylic RPD are so badly designed that act as gum strippers or teeth removers, this agreement with (Burns et. al [10], Uenot et. al [16].

Also the group (B) (dentists) have the diagnostic clinical examination which give more thought about the oral structures and abutment teeth which help the dentist to select proper scientific design or designs. These finding could be explain on the basis of Co- Ch p.d and fixed design, due to long clinical experience in prosthetic has proved to have a significant effect in the role of changing the designs in relation to the diagnostic examination.

The result not agreed with present study, which could be the most patient prefer to do p.d acrylic without any treatment restorative. While the fixed designs were least for both arches maxilla and mandible cases in two groups. These finding could be explain on the basis of greater loss of the posterior teeth, and due to low dental education among our society, most patients prefer to do extraction of posterior teeth rather than making a restorative treatment, but they restore the anterior teeth for esthetic reason, in addition to the restoration of anterior teeth by fixed p.d. make the incidence of class IV cases is the least compared to other partial edentulous cases, the finding supported by Sadig et al [12], arbabi et.al [8].

Conclusions

1- The Dental technician depends only to select the designs of RPD on the Kennedy classification.
2- The acrylic p.d design more than other design in group (A) due to loss of clinical examination.
3- The increase of Co- Ch design in group (B) because the dentists have the clinical examination and Co-Ch designs are the permanent RPD.
4- The low frequency of fixed p.d in both group indicated with least frequency of class IV.
5- The result indicated a dentist should be decided and guided the proper scientific design due to relation to the diagnostic examination.

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Table-1: Distribution of the cases according to kennedy classification

arch	Cl I	Cl II	Cl III	Cl IV	Total
Maxilla	11	15	20	4	50
mandible	15	12	13	0	40

Table-2: Distribution and percentage of RPDs design related to maxilla and mandible arches (group A) dental technician.

Archesand design of RPD Classes	Maxilla			Mandible		
	acrylic	Co-Ch	fixed	acrylic	Co-Ch	fixed
Class I	7	4	0	10	5	0
Class II	5	10	0	8	4	0
Class III	9	9	2	9	2	2
Class VI	2	1	1	0	0	0
Total	23	24	3	27	11	2
Percentage	23.1	21.7	4.2	20.6	13.5	1.2

Table-3: Distribution and percentage of RPDs design related to maxilla and mandible arches (group B) dentist.

Arches and design of RPD Classes	Maxilla			Mandible		
	acrylic	Co-Ch	fixed	acrylic	Co-Ch	fixed
Class I	5	6	0	5	10	0
Class II	6	9	0	2	10	0
Class III	5	10	5	2	9	2
Class VI	0	2	2	0	0	0
Total	16	27	7	9	29	2
Percentage	11.9	29.4	7.7	8.2	25.3	1.2