

Original Article

Evaluation Of Efficiency In Cast Partial Dentures Versus Acrylic Partial Dentures- An Original Research

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ABSTRACT:

Introduction: In the present study we evaluated the efficiency in cast partial dentures versus acrylic partial dentures.

Materials and Methods: 50 adult partially edentulous patient seeking for replacement of missing teeth having Kennedy class I and II arches with or without modification areas were selected for the study. Group-A was treated with cast partial denture and Group-B with acrylic partial denture. Data collected during follow-up visit of 3 months, 6 months, and 1 year by evaluating retention, stability, masticatory efficiency, comfort, periodontal health of abutment. **Results:** One year comparison shows that cast partial denture maintained retention and stability better than acrylic partial denture ($p < 0.05$). The masticatory efficiency was significantly compromising from 3rd month to 1 year in all acrylic partial denture groups ($p < 0.05$). The comfort of patient with cast partial denture was maintained better during the observation period ($p < 0.05$). Periodontal health of abutment was gradually deteriorated in all acrylic denture group ($p < 0.05$). **Conclusions:** With adequate maintenance of oral and denture hygiene at a regular interval, cast partial denture compared with acrylic partial denture provides better results in terms of retention, stability, comfort and periodontal health of abutment.

Keywords: Dental prosthesis retention, Denture base, Masticatory efficiency, periodontal health of abutment, Removable partial denture.

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INTRODUCTION

Tooth replacement techniques have evolved considerably over years, however, patient acceptance to traditional prosthesis has never been foreseeable and is never complete and there has been a constant pursuit of achieving better ways of restoration. There are limited advantages that can be accomplished by the removable prosthesis for replacing the natural teeth, such as non-invasive and low-cost partial dentures can be constructed by heat cured acrylic resin solely known as all acrylic partial dentures, whereas cast partial denture has metallic framework

along with metallic denture base or acrylic resin denture base. The metal bases have several advantages like accuracy, durability, resistance to distortion, inherent cleanliness, reduced weight, and bulk (1-3). The distal extension denture has a tendency for lateral movement during the function. Loss of support and stability and ultimately loss of occlusion is accompanied by settling denture base, especially in distal extension cases because the tissue support in the distal extension denture predictably changes with time. Patient comes with complaints of denture loosening, movement of the denture during

mastication, unnatural feeling and even degradation of the periodontal condition of the remaining teeth such as gingival recession and mobility. Due to lack of epidemiological survey, it is often difficult to evaluate the impact of the different prosthetic options on the oral health, either it might be beneficial or have a higher failure rate. In the present study we evaluated the efficiency in cast partial dentures versus acrylic partial dentures

MATERIALS AND METHODS

Total 50 patients, partially edentulous patient were selected. Partially edentulous patient with Kennedy class I and II arches with or without modification areas. Samples were divided into two groups. Group A: 25 patients treated with cast partial denture. Group B: 25 patients treated with acrylic partial denture.

Study parameters: Retention & Stability recorded according to grading (7): 1 = Good (difficult to dislodge), 2 = Fair (some resistance to dislodge), 3 = Poor (minimal or no resistance to dislodge). The assessment of subjective masticatory efficiency and aspects of the patient were analysed by means of following questionnaire (8). Q. How much difficulty do you have in chewing with your removal partial denture? 1 = No difficulty in chewing (Good), 2 = some difficulty in chewing (Fair), 3 = Extreme difficulty in chewing (Poor). The qualitative assessment of Comfort was evaluated according to the patient's satisfaction limit (8). 1 = Good (Completely satisfied), 2 = Fair (Moderately satisfied), 3 = Poor (Less satisfied). Periodontal

health of the abutment was assessed on the basis of the amount of clinical attachment loss (CAL) as follows: Normal= CAL, Slight= 1-2 mm CAL, Moderate= 3-4 mm CAL, Severe \geq 5 mm CAL (9). Statistical analysis was done keeping the $p < 0.05$ as significant.

RESULTS

Assessment of clinical parameters at the baseline:

In group-A and B all the dentures had good scores for retention and stability (Table-I), masticatory efficiency (Table-II), most dentures were scored 'good' on comfort (88% & 92% respectively) (Table-III), normal periodontal health of abutment (96% & 92%, respectively) (Table-IV).

Assessment of clinical parameters after 3 months:

One patient from group-B lost to follow. Masticatory efficiency with the group-B patient had statistically significant lower performance. (Table-II)

Assessment of clinical parameters after 6 months:

One patient each from both groups lost to follow. Statistically significant difference in the retention and stability, masticatory efficiency and periodontal health of abutment between both groups. (Table I, II, III)

Assessment of clinical parameters after 1 year:

One patient from group-A lost to follow. The performance of denture in group-B patients at the end of 1 year showed deterioration in terms of retention, stability, masticatory efficiency, comfort, periodontal health of abutment and the results were statistically significant.

Table I: Distribution of the patients by retention & stability

	Baseline				
Characteristic	Group- A (n= 25)		Group-B (n= 25)		p- Value
Retention & Stability	%	95% C.I.	%	95% C.I.	*Significant (p<0.05)
Good	100	-	100	-	-
3 months					
	(n= 25)		(n= 24, 1 lost to follow)		
Good	96	± 7.68	83.33	± 14.91	0.132
Fair	4	± 7.68	16.67	± 14.91	
6 months					
	(n= 24, 1 lost to follow)		(n= 23, 1 lost to follow)		
Good	91.67	± 25.92	43.47	± 20.26	0.001*
Fair	4.16	± 25.1	34.78	± 19.46	
Poor	4.16	± 13.49	21.73	± 16.85	
1 year					
	(n= 22, 1 lost to follow)		(n= 23)		
Good	86.36	± 14.34	13.04	± 13.76	<0.001*
Fair	9.09	± 12.01	34.78	± 19.46	
Poor	4.54	± 8.7	52.17	± 20.41	

Table II: Distribution of patients by masticatory efficiency

Baseline					
Characteristic	Group- A (n= 25)		Group-B (n= 25)		p- Value
Mastication	%	95% C.I.	%	95% C.I.	*Significant (p<0.05)
Good	100	-	100	-	-
3 months					

(n= 25)			(n= 24, 1 lost to follow)		
Good	96	± 7.68	75	± 17.32	0.028*
Fair	4	± 7.68	25	± 17.32	
6 months					
(n= 24, 1 lost to follow)			(n= 23, 1 lost to follow)		
Good	83.34	± 1 4.91	39.13	± 19.95	0.001*
Fair	16.66	± 14.91	60.86	± 19.95	
1 year					
(n= 22, 1 lost to follow)			(n= 23)		
Good	77.27	± 17.51	8.69	± 11.51	< 0.001*
Fair	18.18	± 16.12	34.78	± 19.46	
Poor	4.54	± 8.7	56.52	± 20.26	

Table III: Distribution of the patients by the comfort

Baseline					
Characteristic	Group- A (n= 25)		Group-B (n= 25)		p- Value
Comfort	%	95% C.I.	%	95% C.I.	*Significant (p<0.05)
Good	88	± 12.74	92	± 10.63	0.636
Fair	12	± 12.74	8	± 10.63	
3 months					
(n= 25)			(n= 24, 1 lost to follow)		
Good	88	± 12.74	83.34	± 14.91	0.640
Fair	12	± 12.74	16.66	± 16.66	
6 months					
(n= 24, 1 lost to follow)			(n= 23, 1 lost to follow)		
Good	87.5	± 13.23	69.56	± 18.81	0.677
Fair	12.5	± 13.23	30.43	± 18.81	
1 year					
(n= 22, 1 lost to follow)			(n= 23)		
Good	81.8	± 16.12	17.39	± 15.49	< 0.001*
Fair	13.6	± 14.34	47.82	± 20.41	
Poor	4.54	± 8.7	34.78	± 19.46	

Table IV: Distribution of patients by the periodontal health of the abutment

Baseline Characteristic	Group- A (n= 25)		Group-B (n= 25)		p- Value
Periodontitis	%	95% C.I.	%	95% C.I.	*Significant (p<0.05)
Normal	96	± 7.68	92	± 10.63	0.548
Slight	4	± 7.68	8	± 10.63	
3 months					
(n= 25)			(n= 24, 1 lost to follow)		
Normal	96	± 7.68	91.67	± 11.06	0.524
Slight	4	± 7.68	8.33	± 11.06	
6 months					
(n= 24, 1 lost to follow)			(n= 23, 1 lost to follow)		
Normal	95.83		60.86	± 19.95	0.002*
		8			
Slight	4.16	± 7.99	39.13	± 19.95	
1 year					
(n= 22, 1 lost to follow)			(n= 23)		
Normal	90.9	± 12.02	34.78	± 19.46	< 0.001*
Slight	9.09	± 12.01	65.21	± 19.47	

DISCUSSION

In assessing the past dental history, it was found that out of 50 patients, 17 patients had the previous denture. Out of which 2 discontinued to wear their prosthesis, 10 of them felt discomfort after wearing

and were not satisfied with their previous denture, 5 needed denture replacement due to the old prosthesis. In this study, the retention and stability of the APD showed degradation at 6 months follow-up and at one year only a few dentures were usable. Primary

retention for the removable partial denture is accomplished mechanically by placing retaining elements on the abutment teeth (tip of the retaining arm, guiding planes, bar clasps). Secondary retention is provided by the intimate relationship of the denture bases and major connector with the underlying tissue. Moreover cast circumferential clasps offer greater stability because it has a rigid shoulder (10). Whereas wrought wire clasps have a flexible shoulder and bar clasps do not have a shoulder hence, they offer a lower stability (11). Despite the satisfactory acceptance of the APD, during the third month of evaluation, the masticatory efficiency was started deteriorating. Lack of stability of denture is a common complaint of denture wearers, and inability to chew is related to the instability of dentures and advanced reduction of the number of natural teeth. The qualitative assessment of comfort in this study showed no statistically significant difference between two groups initially. However, during the subsequent follow-up period, patients wearing acrylic partial denture showed poor comfort (34.78%) compared to patients treated with cast partial denture our findings are in accordance with Watson CL et al. (12) they indicated that distal extension prostheses are often not well tolerated and that acrylic dentures give more problems.

RPD should maintain the health of the remaining dentition and surrounding oral tissue. Observation showed that in subsequent follow-up visit periodontal health of abutment was maintained in group-I patients, which was statistically significant, and the condition was degraded gradually in group-II patients. The horizontal and lateral stress on the abutment teeth may cause breakdown of periodontal tissue and increase the tooth mobility. The consequence may lead to losing more number of teeth, thus the edentulous span of the patient may increase. Studies by Runov et al. (13) Chandler & Brudvik (14) and Nada et al. (15) indicated more severe gingival tissue reactions when the gingiva was covered by the denture, whereas an open space design of minor connectors was less conducive to increase in crevicular temperature, plaque accumulation, gingival inflammation and pocket depth. Lappalainen et al. (16) observed an increase in depth of the pocket in RPD users. Markkanen et al. (17) observed an increase in the number and in the depth of the pockets.

Studies reported that only increase in tooth mobility could be considered as a major factor or variable affected by the presence of an RPD (18). So it may be necessary to evaluate the mechanism of retention and support taken from the abutment teeth and position of clasp assembly in every follow-up visit to ascertain that whether it is working in the same manner as it was planned during the fabrication of the prosthesis. Clinical observations by Carr et al. (2) demonstrated that the inherent cleanliness of the cast metal contributes to the health of the oral tissue when

compared with acrylic resin base. Zarb GA et al. (19) stated that the presence of denture deposit and their rate of accumulation are directly related to the presence of protein-rich saliva and microporous nature of the polymeric base, which facilitates microbial plaque formation and ensuring calculus deposition. The RPD may contribute to the formation of biofilm and consequently, an increase in the incidence of caries and periodontal disease (20). Such a large proportion of denture wearers shows significant burden to the healthcare and demands improvement in materials and methods to meet patient satisfaction. Thus, improvements in the technique and materials must be everlasting. The prognosis of the prosthetic rehabilitation, advantages and disadvantages of the prosthesis, and possibilities for re-treatment in the case of failure must be addressed and discussed with the patient.

CONCLUSION

Overall study findings established that, with adequate maintenance of oral and denture hygiene at a regular interval, cast partial denture provides better results in terms of retention, stability, masticatory efficiency, comfort and periodontal health of abutment. So, it can be concluded that use of cast partial denture serves better prosthesis as functional, stable and suitable biological restoration.

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