

ORIGINAL RESEARCH

Analyzing the correlation between the conventional complete denture occlusal contact points and patient's satisfaction

Nithiya Kalyani K^a, Sunantha Selvaraj^b, Dorairaj Jayachandran^d, Rajkumar G^c, Divya Krishnamoorthy^b

ABSTRACT

Background: Conventional complete dentures continue to be a vital and essential method for restoring oral function in edentulous adults. However, the quality of complete dentures influences the satisfaction level, thereby improves the psychological wellbeing of dentulous adults.

Aim: A prospective in vivo study aims to analyse the presence of conventional complete denture occlusal contact points significantly influence patients' satisfaction levels.

Materials and methods: Thirty patients who had received complete dentures were evaluated for their occlusal contact points on the day of insertion and 2 weeks later. Patient satisfaction questionnaire, which included subjective parameters such as initial adaptability, post insertion problems, aesthetics, masticatory ability, speech, retention was conducted at day 1 (day of insertion) and 2 weeks later.

Results: Number of contact points almost were same on day 1 and 2 weeks later. The overall satisfaction of the patient has improved during the time interval. But correlation of the occlusal contact points to the patient satisfaction has no statistically significant value.

Conclusion: Therefore, the overall satisfaction of the patient increased while using the complete denture from 1st day of denture insertion and after 14 days irrespective of number of contact points in the conventional complete denture with same occlusal scheme

Key words: convention complete denture, occlusal contact points, patient satisfaction.

How to cite this article: Nithiya Kalyani K, Sunantha Selvaraj, Dorairaj Jayachandran, Rajkumar G, Divya Krishnamoorthy. Analyzing the correlation between the conventional complete denture occlusal contact points and patient's satisfaction. *J Clin Prosth Impl* 2024;6(2):55-59. <https://doi.org/10.55995/j-cpi.2024012>

INTRODUCTION

Completely edentulous patients seek denture treatment to regain both function and aesthetics. Among the various principles crucial for the success of complete dentures, occlusion stands out as a paramount consideration.¹ Unlike natural teeth, complete dentures have distinct biomechanical characteristics, where force applied to one tooth is distributed across the entire denture, presenting a limitation.² To address this limitation, several occlusal concepts have emerged to control lateral forces, which can lead to denture instability.³ Some authors even suggest using flat teeth to minimize lateral forces and enhance denture stability, although this approach has its drawbacks in terms of aesthetics and function.⁴ Rehabilitating an edentulous mouth remains one of the most challenging tasks in dentistry. The primary objectives include preserving the health of the remaining structures in the masticatory apparatus, improving masticatory efficiency, aiding

phonation, enhancing aesthetics, and providing physical, psychological, and social comfort to the patient. Unfortunately, many patients may not fully comprehend the limitations of artificial substitutes, leading to complications such as denture sores, denture stomatitis, occlusal surface wear, increased residual ridge reduction, denture fractures, hypermobile ridge tissues, and epuli fissuratum, among others. Complete denture wearers represent a significant group of underserved dental patients.⁵ Typically, the rehabilitation of edentulous patients is accomplished through conventional complete dentures (CCD) which has a canine-guided occlusal scheme which is more preferred due to its simplicity, less time consumption, good masticatory performance, ease of fabrication and modification into bilateral balanced occlusion if required.⁶ On the other hand the mucosa on which dentures are fabricated is displaceable and compressible. This characteristic feature of mucosa is due to its resilient nature which Hanau has described as "Realeff" or

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resiliency like effect.⁷ “Realeff” can produce new discrepancies, that when corrected for, (via spot grinding) will provide a disharmonious occlusion and cause further masticatory dysfunction.⁷ The number of contact points established during CCD insertion is among the critical factors responsible for denture stability, significantly influencing patient expectations and satisfaction. Therefore, improving or augmenting contact points in conventional complete dentures may assist dentists in delivering successful and highly functional prostheses to their patients.⁸ This study aims to analyse whether there is any change in number of conventional complete denture occlusal contact points and their role in patient’s satisfaction.

MATERIALS AND METHOD

A prospective *invivo* study was done to evaluate any change in number of conventional complete denture occlusal contact points among the patients reporting to the Department of Prosthodontics Crown and Bridge. The institutional ethical clearance acquired numbered VMDC/IEC/Approval No. 307.

The objective of the study was to

1. To analyze the conventional complete denture occlusal contact points at the day 1 (day of insertion) and 2 weeks later.
2. To evaluate the patient satisfaction level in terms of masticatory ability, speech and retention at the day 1 (day of insertion) and 2 weeks later.
3. Correlating the number of contact points in complete denture and the patient satisfaction level at the day 1 (day of insertion) and 2 weeks later.

The total sample size is 30. Procedure involved was explained to the patient in-detail. Patient’s voluntary informed consent was obtained. The inclusion criteria for the sample selection were (i) only those subjects who have given consent, (ii) patient who have received the conventional complete denture with proper vertical dimension, occlusion and retention, (iii) age limit between 40-70yrs and (iv) Patient who were in House mental attitude classification class I & II were included in the study. The exclusion criteria being (i) Subjects who haven’t given consent form, (ii) Patient who had facial asymmetry, neurological problems and (iii) patient having house mental attitude classification class III & IV were excluded from the study. Two investigator were involved a general dentist and a prosthodontist. Thirty completely edentulous patients who had received complete denture with conventional occlusal scheme was included in study after the sample size calculation. The occlusal contact points was evaluated using articulating paper of

100 microns thickness (MDM articulating paper™) (Fig-1&2) on the day on complete denture insertion. Patient satisfaction was evaluated with a standard 5-point Likert scale questionnaire, which included subjective parameters such as initial adaptability, post insertion problems, aesthetics, masticatory ability, speech, retention. Patients were asked to respond to questions given in the questionnaire with scoring (9). Patient satisfaction questionnaire will be conducted at day 1 (day of insertion) and 2 weeks later. The values were tabulated.



Figure 1: Occlusal contact points in maxillary arch



Figure 2: Occlusal contact points in mandibular arch

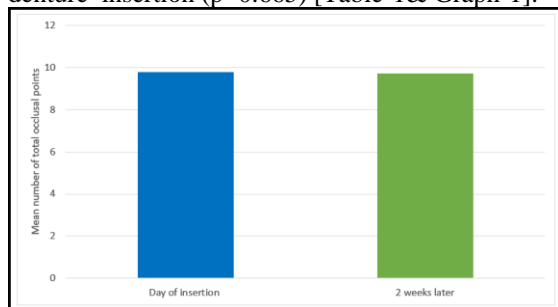
STATISTICAL ANALYSIS

Data regarding demographic characteristics, number of contact points in maxillary and mandibular arches (occlusal points) and the patient satisfaction criteria (5-point Likert scale) at the day of insertion of complete denture and 2 weeks later were entered into Microsoft Excel and analysed using IBM SPSS Statistics for Windows, Version 20 (IBM

Corp., Armonk, N.Y., USA). Data was investigated for normality using the Shapiro-Wilk test and it showed a that the data deviated from the normal distribution. Descriptive statistics were derived as mean, standard deviation, frequencies and percentages. Comparison for occlusal points and patient satisfaction on the day of insertion and after 2 weeks were analysed using Wilcoxon Signed Ranks Test. Association between occlusal points and patient satisfaction at different time periods were analysed using Spearman's Correlation test (rho value). The level of statistical significance was determined at $p < 0.05$.

RESULTS

Comparisons regarding the number of contact points on maxillary complete denture shows a mean value of 5.57 on the day of insertion and 5.47 after 14 days ($p=0.589$); 20 patients had equal number of contact points involved after 2 weeks compared to the day of insertion. The mean number of contact points on the mandibular denture was 4.20 on the day of insertion and 2 weeks later ($p=0.816$) with 16 patients having equal no. of contact points between these two time periods. In short, the mean no. of total occlusal points remained more or less the same (9.77 and 9.70) on and after 2 weeks after complete denture insertion ($p=0.665$) [Table-1& Graph-1].



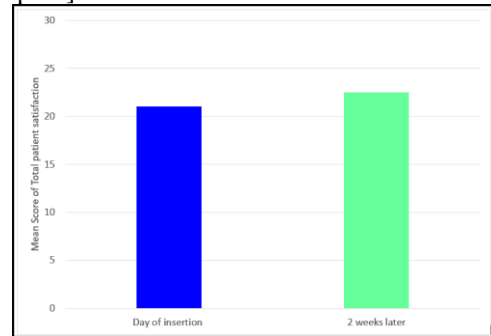
Graph 1: Total occlusal points on the complete denture on the day of insertion and after 2 weeks

Occlusal points on complete denture (n = 30)		Mean ± SD	Min. - Max.	2 weeks later - Day of insertion	n	Mean Rank	Sum of Ranks	Test value ^f (p-value)
No. of Contact Points on Max. CD	Day of Insertion	5.57 ± 2.01	3 - 12	Negative Ranks	6 ^a	5.42	32.50	-0.540 ^d (0.589) [NS]
		Positive Ranks		4 ^b	5.63	22.50		
	2 weeks later	5.47 ± 2.04	3 - 11	Ties	20 ^c			
		Total		30				
No. of Contact Points on Mand. CD	Day of Insertion	4.20 ± 1.15	3 - 7	Negative Ranks	7 ^a	7.00	49.00	-0.233 ^d (0.816) [NS]
		Positive Ranks		7 ^b	8.00	56.00		
	2 weeks later	4.23 ± 1.16	2 - 7	Ties	16 ^c			
		Total		30				
Total Occlusal points	Day of Insertion	9.77 ± 2.59	6 - 18	Negative Ranks	11 ^a	10.55	116.00	-0.432 ^d (0.665) [NS]
		Positive Ranks		9 ^b	10.44	94.00		
	2 weeks later	9.70 ± 2.80	6 - 17	Ties	10 ^c			
		Total		30				

Table 1: Comparison of Occlusal points at the day of insertion and 2 weeks later

The mean score of overall patient satisfaction on improved from day 1 to day 14 (21.03 and 22.50 respectively), with 23 patients having a better feeling wearing the complete denture after 2 weeks

than its initial days ($p = 0.000$). The mean score of initial adaptability, post insertion problems, masticatory ability and speech increased steadily over the 2 weeks' time period with notable number of patients feeling satisfied at the end of 14 days ($p < 0.05$). The aesthetics criteria of the complete denture had an appreciable mean score of 3.83 throughout the study duration. Likewise, retention of the complete denture also proved to meet the patients' expectations from the day 1 onwards (mean score: 3.53 to 3.57) [Table-2& Graph-2].



Graph 2: Total Patient Satisfaction on day 1 and after 2 weeks of complete denture insertion

Patient satisfaction criteria (n = 30)	Mean ± SD	Min. - Max.	2 weeks later - Day of insertion	n	Mean Rank	Sum of Ranks	Test value ^f (p-value)	
Initial adaptability	Day of Insertion	3.70 ± 0.46	3 - 4	Negative Ranks	0 ^a	.00	.00	-3.000 ^d (0.003)*
		Positive Ranks		9 ^b	5.00	45.00		
	2 weeks later	4.00 ± 0.00	4 - 4	Ties	21 ^c			
		Total		30				
Post insertion problems	Day of Insertion	3.50 ± 0.50	3 - 4	Negative Ranks	0 ^a	.00	.00	-3.742 ^d (0.000)*
		Positive Ranks		14 ^b	7.50	105.00		
	2 weeks later	3.97 ± 0.18	3 - 4	Ties	16 ^c			
		Total		30				
Aesthetics	Day of Insertion	3.83 ± 0.37	3 - 4	Negative Ranks	0 ^a	.00	.00	0.000 ^d (1.000) [NS]
		Positive Ranks		0 ^b	.00	.00		
	2 weeks later	3.83 ± 0.37	3 - 4	Ties	30 ^c			
		Total		30				
Masticatory ability	Day of Insertion	3.30 ± 0.46	3 - 4	Negative Ranks	1 ^a	7.00	7.00	-3.051 ^d (0.002)*
		Positive Ranks		12 ^b	7.00	84.00		
	2 weeks later	3.67 ± 0.47	3 - 4	Ties	17 ^c			
		Total		30				
Speech	Day of Insertion	3.17 ± 0.37	3 - 4	Negative Ranks	1 ^a	6.00	6.00	-2.714 ^d (0.007)*
		Positive Ranks		10 ^b	6.00	60.00		
	2 weeks later	3.47 ± 0.50	3 - 4	Ties	19 ^c			
		Total		30				
Retention	Day of Insertion	3.53 ± 0.50	3 - 4	Negative Ranks	1 ^a	5.00	5.00	-0.707 ^d (0.480) [NS]
		Positive Ranks		4 ^b	2.50	10.00		
	2 weeks later	3.57 ± 0.67	1 - 4	Ties	25 ^c			
		Total		30				
Patient satisfaction	Day of Insertion	21.03 ± 1.40	18 - 24	Negative Ranks	1 ^a	4.50	4.50	-4.225 ^d (0.000)*
		Positive Ranks		23 ^b	12.85	295.50		
	2 weeks later	22.50 ± 1.22	19 - 24	Ties	6 ^c			
		Total		30				

Table 2: Comparison of patient satisfaction criteria at the day of insertion and 2 weeks later

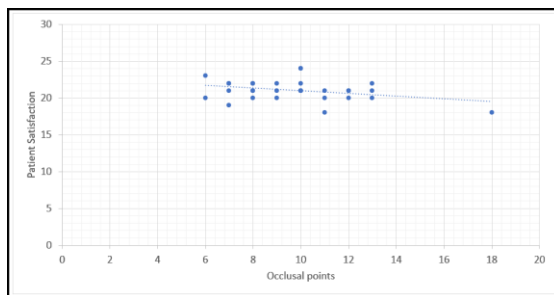
There is a weak negative correlation between total number of occlusal points (1st day of insertion) and patient satisfaction ($\rho = -0.246$; $p = 0.189$); and also, between total number of occlusal points (2 weeks later) and patient satisfaction ($\rho = -0.056$; $p = 0.767$). [Table 3, Graph-3& Graph-4]. A negative value of Rho indicates that the variables are

inversely related, therefore no significant correlation between the contact points and patient satisfaction in both the time intervals.

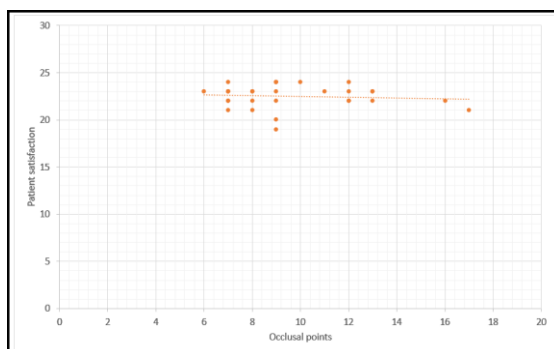
Spearman's Correlation Coefficient (rho)		Patient satisfaction	p-value
Occlusal points	Day of Insertion	-0.246	0.189 [NS]
	2 weeks later	-0.056	0.767 [NS]

NS – Not Statistically Significant

Table 3: Association between occlusal points and patient satisfaction at different time periods



Graph-3: Correlation between Occlusal points and patient satisfaction on the day of insertion



Graph -4 : Correlation between Occlusal points and patient satisfaction after 2 weeks

DISCUSSION

Previous studies has compared the various occlusal concepts like the Bilateral Balanced Occlusion (BBO) & Canine guided occlusion (CGO) on patient satisfaction in complete denture patients.^{1,5,8} The statement of Grunert and Bosch that canine-guided dentures provide better aesthetics than balanced dentures.⁹ Regarding masticatory efficiency, results were in agreement with that of Neto's study, in which masticatory efficiency was evaluated objectively, where in CGO showed equal masticatory efficiency with BBO.^{1,10,11} Previous study states after insertion, initial adaptation was better for BBO dentures, reason for this being BBO minimizes movements during protrusive and lateral movements and it reduces neuronal stimuli when compared to CGO.^{12,13} This study aimed to evaluate the influence of occlusal contact points on patient satisfaction which included subjective parameters

such as initial adaptability, post insertion problems, aesthetics, masticatory ability, speech, retention. The mean number of total occlusal points remained more or less the same on and after 2 weeks after complete denture insertion. On the day of insertion, 30% patients had a neutral opinion regarding the initial adaptability of their complete denture and 70% patients were satisfied. Whereas, 14 days later there was 100% satisfaction on adaptability. There were 40-50% of patients facing post insertion problems on the 1st day, while maximum patients (96.7%) had a satisfied feeling 2 weeks later. Equal number of patients (83.3%) had the same level of satisfaction about aesthetics on day 1 and after 14 days. There was no statistical significance in the level of satisfaction in aesthetics between day 1 and after 14 days of complete denture insertion. The proportion of patients feeling satisfied about their masticatory ability and speech, 2 weeks after complete denture insertion increased tremendously (66.7% and 46.7% respectively). Retention of the denture also gradually improved the satisfactory level of the patients after 14 days (63.3%). Therefore, the overall satisfaction of the patient increased while using the complete denture from 1st day of denture insertion and after 14 days irrespective of number of contact points in the conventional complete denture with same occlusal scheme.

CONCLUSION

Various factors contribute to the stability of dentures, which significantly impact patient expectations and satisfaction with conventional complete dentures. Among these factors, the number of contact points established during denture insertion is crucial. Current evidence suggests that there are no significant differences in the number of occlusal contact points over time due to reallow effect. The study revealed that the level of patient satisfaction within the time interval in regard to post insertion problem, mastication, retention and speech has improved and level of patient satisfaction in esthetics remained the same in between the time interval. The notion that occlusal points have influence on patient satisfaction was not statistically significant, therefore this study reveals that there is no influence between the number of contact points in convention complete denture and patient satisfaction. Nevertheless, there is a requirement for further clinical research, including longer-term studies with larger sample sizes, randomization, blinding, and comprehensive evaluation of all relevant variables to assess the quality of life in complete denture wearers.

CONFLICT OF INTEREST:

There was no conflict of interest

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