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Original Article

Mean Value of Probing Depth and Tooth Mobility of Abutment Teeth in Patients using Removable Partial Denture

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ABSTRACT

Removable partial dentures (RPDs) are a typical treatment for supplanting missing teeth. Notwithstanding, concerns exist in regards to their effect on the health of the abutment teeth supporting the dental replacement. **Objective:** To assess the impact of RPDs on the periodontal health of abutment teeth. **Methods:** This cross-sectional study included patients from the Prosthodontics department, Bacha Khan Medical College (Medical Teaching Institute, Mardan) between January 6th, 2020, to June 6th, 2020. Examining profundity (pocket depth among gum and tooth) and tooth versatility were assessed in patients utilizing RPDs. The probing depth was estimated at six focuses around every tooth, and a profundity of 1-3 mm was viewed as typical. **Results:** The study found no massive contrasts in testing profundity or tooth versatility in view old enough, sort of tooth (front or back), or orientation. Notwithstanding, a genuinely critical affiliation was seen between probing depth and tooth mobility, proposing a possible connection between these two proportions of periodontal wellbeing. **Conclusions:** This study recommends that while RPD plan itself could not straightforwardly impact explicit periodontal boundaries like probing depth and tooth mobility, keeping up with great oral cleanliness and guaranteeing fitting RPD configuration are pivotal for forestalling expected periodontal issues.

INTRODUCTION

Removable partial dentures (RPDs) are a typical and savvy dental reclamation choice used to supplant missing teeth and reestablish oral capability. While they assume a huge part in keeping up with oral wellbeing, their effect on the supporting periodontal tissues, especially the soundness of the abutment teeth, stays a subject of discussion [1]. Studies directed overall have yielded blended results [2, 3]. Glickman in 1948 noticed that decent prostheses are for the most part liked from a periodontal viewpoint, yet RPDs offer a feasible option in unambiguous clinical situations like Kennedy Class I and II edentulism [4]. McCracken stressed the significance of biomechanical standards in RPD plan to appropriate powers and guarantee stability, while additionally recognizing the requirement for hygienic plan standards to work with plaque control and forestall caries and periodontal issues [5]. In any case, concerns exist with respect to the expected adverse consequences of RPDs on periodontal wellbeing [6, 7]. RPDs ordinarily clasp onto abutment teeth, which can prompt expanded plaque gathering on these teeth and encompassing tissues. Studies have shown that RPDs are often inconvenient for patients and tooth mobility and probing death is expanded in patients wearing RPDs for long periods [8-10]. Higher probing depth demonstrates

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compromised periodontal wellbeing [11, 12].

This current cross-sectional study addressed this information gap by exploring the periodontal status, explicitly probing depth, in a neighborhood populace who have gotten ordinary oral prophylaxis following RPD addition. By assessing the particular populace inside this specific situation, this study tried to contribute important information and distinguished possible unfriendly impacts of RPDs that can be forestalled or relieved through appropriate periodontal support programs and compelling patient training with respect to oral cleanliness practice. The discoveries of this examination can add to the progression of information and illuminate proof based clinical practices in the administration of patients with RPDs.

METHODS

It is a cross-sectional study conducted at the department of Prosthodontics, Bacha Khan medical college (Medical teaching institute), Mardan, Pakistan, between January 6th, 2020, and June 6th, 2020. The sample size was determined utilizing the WHO sample size algorithms for contrasting means [13]. Taking into account a reference mean contrast in tooth mobility of 0.24 ± 0.43 mm, a 95% certainty stretch, and a 7% safety buffer, the determined example size was 145 [18]. A sequential, non-likelihood examining procedure was utilized because of the promptly accessible pool of patients in the department. Foundationally healthy participants of either gender, checked through history, assessment, and requests about any past therapy for ailments like diabetes, patients wearing RPDs for no less than a half year, matured somewhere in the range of 20 and 65 years and Pakistani patients affirmed through National Identity Card (NIC) were included. Patients who were pregnant, smokers, already on periodontal medications, with fixed partial dentures were excluded. Ethical endorsement was acquired from the hospital's ethical committee prior to beginning the study. Potential members who met the consideration rules were welcome to partake in this study. Subsequent to getting an itemized clarification of the study's motivation, techniques, dangers, and advantages, informed consent was gotten, guaranteeing understanding and intentional support. Furthermore, members were guaranteed of the privacy of their own data and any information gathered during the study. Following an exhaustive history taking, a far-reaching clinical assessment was performed under sufficient lighting utilizing a mouth reflect and a periodontal test. The essential clinical boundaries evaluated were probing depth and tooth mobility. All projection teeth were analyzed, and both probing depth and tooth mobility were estimated. Testing profundity was estimated at six destinations for every tooth (mesio-buccal, buccal, disto-buccal, disto-lingual, lingual, and mesio-lingual) utilizing an aligned periodontal test (Michigan Inc.) [14]. An examining profundity of 1 to 3 mm was viewed as ordinary. All estimations were taken immediately. Point by point functional meanings of all estimations were laid out to guarantee consistency and precision all through the information assortment process. Every single gathered dataset, including socioeconomics, clinical discoveries, and estimations, were kept in a pre-planned normalized information assortment structure for examination. The statistical investigation was led utilizing SPSS (Statistical Package for Social Sciences for Windows adaptation 20.0. For mathematical factors like age, pocket depth, tooth mobility, and span of RPD use, mean and standard deviation were determined. In the interim, for subjective factors like orientation, recurrence and rate appropriations were registered. To control frustrating variables, definition was performed in light old enough and span of RPD use utilizing the ANOVA test, while orientation and curve (maxilla and mandible) were delineated utilizing the student t- test. The importance level (p-esteem) was set at $p < 0.05$. The consequences of the examination will be introduced as outwardly educational charts and tables to work with a thorough comprehension of the connection between RPD qualities and periodontal wellbeing in projection teeth. This thorough statistical methodology guarantees powerful and solid experiences into the noticed patterns and contrasts inside the concentrated-on populace.

RESULTS

A sum of 145 patients with removable halfway false teeth (RPDs) took part in the study. The age range of the participants was 40-64 years, with 28 females and 36 males. The pocket depth (PD) was found as 0.28+ 0.04 mm, whereas tooth mobility was calculated as 0.26+0.03 mm. The average duration of RPD use was 3.37+1.21 months (Table 1). Straight (47.8%) and three-sided (22.8%) were the most regular sorts of dental replacement support, while quadrangular (6.5%) and one-point (4.3%) were the most un-normal. Kennedy Class I (counting modifications) was the most predominant edentulous pattern (over half), trailed by Class IIA (13.2%), Class II and Class IIB (11% and 4.4%, separately), with Class III and Class IV having a negligible presence.

Table 1: Descriptive statistics of studied participants

Numerical Variables (n=145)	Minimum	Maximum	Mean +SD
Age	25	66	48.63 + 11.067
Pocket Depth	.25	.35	.2845 + .03553
Tooth Mobility	.23	.35	.2654 + .03346
Duration of RPD Use	1	6	3.37 + 1.219

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RPDs were put on maxillary arch (52.4%), and 50 on the mandibular arch (47.6%) as shown in table 2.

Table 2: Type of Tooth (Arch) (n=145)

Type of Tooth (Arch)	Frequency (%)
Mandible	69 (47.6)
Maxilla	76 (52.4)
Total	145 (100)

Significant association was found between pocket depth and gender (p = 0.04) whereas no significant association was observed with age group and tooth arch (table 3).

Table 3: Pocket Depth with respect to age groups, gender and type of tooth

		Sum of Squares	Df	Mean Square	F	Sig.*
Age Groups	**Between Groups**	.120	3	.040	.158	.924
	Within Groups	35.742	141	.253		
	Total	35.862	144	-		
Gender	**Between Groups**	2.039	3	.680	2.843	.040
	Within Groups	33.712	141	.239		
	Total	35.752	144	-		
Type of tooth (arch)	**Between Groups**	.243	3	.081	.319	.812
	Within Groups	35.922	141	.255		
	Total	36.166	144	-		

ANOVA test

Paired sample t-test results showed a significant association between pocket depth and tooth mobility ($p<0.05$) (table 4).

Table 4: Paired t test with respect to Pocket Depth and Tooth Mobility

		Paired Differences				t	df	Sig. *(2-tailed)
		Mean + SD	Std. Error of Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	**Pocket Depth-Tooth Mobility**	.01910 + 0.04590	.00381	.01157	.02664	5.012	144	.000

*Paired Sample t test

DISCUSSION

This study explored the effect of removable partial dentures on the periodontal soundness of abutment teeth. While the discoveries propose insignificant generally speaking adverse consequences, a more intensive look uncovers a few subtleties. The typical pocket depth (0.28 mm) and tooth mobility (0.26 mm) in this study fell inside clinically acceptable ranges. Age and sort of tooth didn't essentially impact these estimations. Orientation, in any case, showed a measurably huge relationship with pocket depth, with females having somewhat more deep pockets than males. Contrasted with past studies [15-18], this study found lower values for both pocket depth and tooth mobility in RPD wearers. This error may be because of contrasts in example size, socioeconomics, RPD plan, and oral cleanliness practice between studies. A study assessed periodontal status in Saudi adult females with fixed partial dentures, finding abutment teeth exhibited higher plaque, gingival indices, and probing pocket depth. Sub-gingivally placed crown margins showed lower periodontal parameters compared to supra-gingival margins [19]. Correia et al., found that abutment teeth of patients with removable partial dentures exhibited poorer periodontal status compared to non-abutment teeth, emphasizing the importance of regular follow-up appointments for RPD wearers [20]. Generally, the outcomes recommend that RPDs in this study adversely affected periodontal wellbeing. The noticed distinction in sexual orientation in pocket depth warrants further examination, and the slight expansion in tooth mobility contrasted with a few different examinations features the potential for concern. This study's cross-sectional plan limits decisions about circumstances and logical results connections between RPD use and periodontal wellbeing. Individual varieties in oral cleanliness habits and previous periodontal circumstances were not controlled for. In light of the discoveries, RPDs in this study appear to adversely affect by and large periodontal wellbeing. In any case, taking into account the slight expansion in tooth mobility and conflicting proof from different examinations, careful oral cleanliness and normal dental follow ups are critical for RPD wearers to guarantee ideal periodontal wellbeing.

CONCLUSIONS

This study observed that removable partial dentures with clasp can add to expanded gum aggravation (gingival irritation) around the teeth they clasp and the regions covered by the base of denture. Notwithstanding, this hazard can be altogether diminished through cautious preparation and execution of the prosthetic treatment. RPDs design should be in that way that ensure proper functioning and proper resistance to dislodgement as well as in view of natural standards, limiting the effect on gum wellbeing. Keeping up with great oral cleanliness and cleaning the denture consistently are significant to avoid gum irritation around the teeth supporting the RPD. By following these proposals, dental experts can work on the drawn-out progress of RPD treatment and limit the gamble of gum irritation in patients.

Authors Contribution

Conceptualization: HU, AM
Methodology: HU, AM, SA
Formal analysis: AN
Writing-review and editing: MR, WN

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All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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