

## Frequency of Adjunctive Treatments Requiring Referrals among Patients at Prosthodontics Department in Pakistan

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### ABSTRACT

**Objective:** To report the frequency and types of adjunctive treatments requiring referral for patients in the Prosthodontics Department in Pakistan.

**Study Design:** Cross-sectional study.

**Place and duration of study:** The study was conducted in Prosthodontics Department, Peshawar Dental College, Peshawar from April 2020 to October 2020.

**Methodology:** The study involved 218 patients reporting to the outpatient department of the Prosthodontics department, both genders, with no prior prosthodontic experience. Following the establishment of the diagnosis, and treatment plan via history taking and examination, a decision for referral for adjunctive treatment required was made and noted in the patients' record file, and this data was collected in a pre-structured proforma.

**Results:** In total, 218 patients who attended the Department of Prosthodontics were evaluated. The referrals made to the Departments of Operative Dentistry and Endodontics were of 97(44.49%) patients, Oral and maxillofacial Surgery (OMFS) were 61(27.98%) patients, followed by Periodontology were 58(26.60%) patients, while Orthodontics for only 2(0.92%) patients. A statistically significant association of these referrals was observed with the gender as well as the oral hygiene status of the patients with a *p*-value of 0.001 and 0.021. However, the association of these referrals with the socioeconomic status of the patients was statistically insignificant with a *p*-value of 0.604.

**Conclusion:** Referrals needed to the Operative/Endodontics Department were more followed by Oral And Maxillofacial and Periodontics Department. The least referrals were those of Orthodontics.

**Keywords:** Adjunctive States/Treatment, Interdisciplinary Team Approach, Oral Hygiene, Prosthesis, Prosthodontics Treatment, Referral, Socioeconomic Status.

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### INTRODUCTION

Prosthodontics is a dental specialty pertaining to the diagnosis, treatment planning, rehabilitation, maintenance of the oral function, comfort, appearance, and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues by using biocompatible substitutes; often linked to other intraoral conditions which require various mouth preparations.<sup>1,2</sup> Such concurrent (adjunctive) states are identified through history and thorough clinical examination, where the role the dentist, in case a referral is required is obvious.<sup>2</sup>

It involves various preprosthetic adjunctive interventions, such as periodontal, conservative

dental, oral surgical, orthodontic, and medical preparatory interventions.<sup>3-5</sup> A study with an interesting finding concluded the most common reason for referral is lack of expertise than anything else (79.4%), which points incompetency. The next two most common reasons were patients complicated systemic health (37.9%) and poor treatment outcome obtained in the past (30.5%).<sup>6</sup> A higher volume of patients referred to the periodontology department highlights the significance of a specialist periodontologist,<sup>7</sup> which implies that a clear treatment plan and integrated coordination among all specialties are crucial for successful results.<sup>7,8</sup> A patient seeking prosthodontic consultation may need to be addressed for different preprosthetic adjunctive medical, periodontics, conservative dental, oral surgical and orthodontic preparatory interventions before the provision of a prosthesis.<sup>7,9</sup> In a study on patients reporting to prosthodontics department of a tertiary

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care dental hospital, the need of adjunctive therapies requiring referrals was seen in 70% subjects. The proportions of subjects requiring referral to various inter-disciplinary dental and medical specialists, respectively, were; periodontics (39%), orthodontics (7%), prosthodontics (4%) conservative dentistry (32%), oral surgery-oral medicine (35%) and medical specialists (6%).<sup>10</sup> A research study has been conducted by Ghani and Salim, 2010 in Khyber Dental College (KDC), Peshawar. The study clearly highlighted the importance of referrals of patients to appropriate departments through detailed clinical examination and history taking. However, that study had few limitations such as no details about description of provision of adjunctive therapies to the patients were provided.<sup>10</sup> Therefore, this highlights the need for another local study to collect informative data regarding frequency and types of referral of patient to 4 adjunctive therapies prior to prosthodontics treatments. This new and fresh insight will provide useful information relevant to dental procedure and to the achievement of better prosthodontics treatment outcomes as a conducive oral environment would have been created.

In Pakistan, there are limitations in information regarding referrals for adjunctive therapies from prosthodontic departments.<sup>4</sup> The current study aims to improve existing statistical knowledge and enhance the literature on this topic.

## METHODOLOGY

The study was a cross-sectional study conducted in the out patient department (OPD) of Prosthodontic Department of Peshawar Dental College (PDC) from April 2019 to October 2019. The total sample size was 218 patients which included 99 males and 199 females. This sample size was calculated by using WHO sample size calculator and the anticipated population proportion of 22%. Sample size was calculated at 95% Confidence Level and Margin of Error of 5. The sampling technique was non-probability convenience sampling technique. All these referrals were categorized on the basis of the socioeconomic status, age range, and oral hygiene status of the referred patients to determine their correlation among each other.

**Inclusion Criteria:** Patients of either gender, with no previous experience of prosthodontic treatment, between the age of 18-65 years who consented to participate in the study were included in the study.

**Exclusion Criteria:** Patients with compromised psychological or systemic health status, or who had some previous prosthodontics treatment experience and those patients who did not consent to participate in this study were excluded.

An ethical approval was taken from the Institutional Review Board (IRB) of Peshawar Dental College (Reference No. Prime/IRB/2019-491) on 01/03/2019. For the selected cases, informed consent forms were signed and confounding factors were excluded by firmly following the exclusion and inclusion criteria. The data were collected on a pre-structured proforma (Annexure-I) which contained reason(s) for consultation, detailed medical and dental history, clinical examination and relevant investigations (x-rays) done for each participant. The patient were seated on the dental chair under well-illuminated light and thoroughly examined for any need to adjunctive treatment requiring referral.

Statistical Package for the Social Sciences version 24.0 was used for statistical analysis. Quantitative variable (age) was presented as mean and standard deviation and qualitative variables (gender, socio-economic status, and oral hygiene status, as well as the referrals made to different clinical departments) were presented as frequency and percentages. The oral hygiene status was determined and classified as unsatisfactory, satisfactory, or good. Patients were classified based on their socioeconomic status, with "Poor" indicating a monthly income of less than PKR 10,000, "Average" and "Good" between PKR 10,000 and 30,000, and for more than PKR 30'000 respectively. To compare results and assess the significance of data, Chi-Square Test was applied. A value of  $\leq 0.05$  was considered a significant *p*-value.

## RESULTS

A 7-month cross-sectional study of 218 patients, with 45% males (n=99) and (54.58% females (n=199), estimated the true population proportion of complications within a 5.5% margin of error at 95% confidence level.

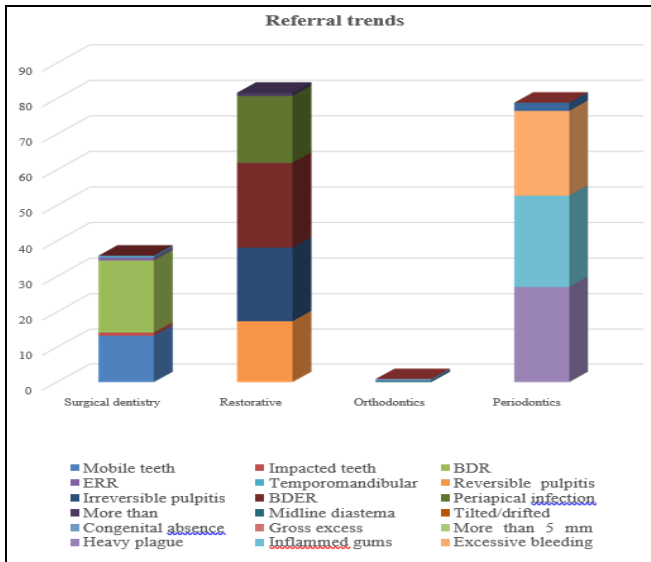
The study found a significant relationship between gender and referrals for adjunctive treatments, with female patients receiving more referrals (47.05%) to Operative Dentistry/Endodontics (41.41% males) and more males to Oral & Maxillo Facial Surgery (OMFS) (38.38%). Female patients received more referrals for adjunctive treatment to

Periodontics (33.61%), while males received only two referrals to orthodontics (Table - I).

**Table-I: Gender wise Referrals from Prosthodontics for Adjunctive Treatments**

Gender n(%)	Endodontics n(%)	Surgical n(%)	Orthodontics n(%)	Periodontics n(%)	p-value
Male 99(45.41)	41(41.41)	38(38.38)	02 (2.02)	18(18.18)	0.001
Female 119(54.58)	56(47.05)	23(19.32)	0	40(33.61)	
Total 218 (100)	97(44.49)	61(27.98)	2 (0.92)	58(26.60)	

Most patients were referred to the Department of Operative Dentistry & Endodontics 97(44.49%), followed by Oral & Maxillofacial Surgery (OMFS) 61(27.98%), and Periodontology Department 58(26.60%). Least number of referrals were observed for Orthodontics Department, which comprised of only two patients (0.92%) (Figure-1).



**Figure-1: Interdepartmental Referral Trends**

Among referrals made to Oral & Maxillofacial Surgery Department (Figure-1), 44(20.18%) were for broken down root and 29(13.30%) for mobile teeth. Two referrals were for impacted teeth and extremely resorbed ridge each. One referral was for temporomandibular disorders (Table-III).

Among Operative Dentistry & Endodontic referrals (Figure-1), broken down existing restoration (BDER) 52(23.85%), irreversible pulpitis 45(20.64%), reversible pulpitis 38(17.43%) and periapical infections 41(18.80%), insufficient ferrule for crown preparation 2(0.92%) were the causes (Table-II).

The adjunctive referrals to periodontics (Figure-1) were because of heavy plaque and calculus 59(27.06%), inflamed gums 56(25.68%), excessive bleeding of gums 52(23.85%), and gums recession 5(2.29%) (Table-II).

Only two patients were referred to Orthodontic Department (Figure-1) that were of midline diastema and congenital absence of anterior teeth (Table-II).

The study analyzed oral hygiene status among patients, dividing them into "Unsatisfactory" (56.42%, n=123), "Satisfactory" 77(35.32%) and "Good" 18(8.25%), categories. A majority of "Unsatisfactory" patients were referred to Operative Dentistry & Endodontics, "Satisfactory" patients to Oral & Maxillofacial Surgery (OMFS), and "Good" patients to Periodontics. The relationship between oral hygiene status and referrals was significant, with a p-value of 0.021. Patients with "Good" oral hygiene were also referred to Operative Dentistry & Endodontics, OMFS, and Periodontics as well (Table -III).

The study categorized patients into "Poor" 108(49.54%), "Average" 96(44.03%) and "Rich" 14(6.42%) based on their socioeconomic status (SES).

The study found that 17.52% of referrals to endodontics were "Poor" and 78.41% were "average" or "rich". 27.86% of referrals to Oral & Maxillofacial Surgery were "poor" and 44 (72.13%) were "Average." The majority of referrals to orthodontics and periodontics were "Average" or "Rich." The relationship between socioeconomic status and referrals was not significant as the p-value was found to be 0.604 (Table-III).

The majority of subjects requiring adjunctive treatments were aged 31-50 years 93(42.66%) with age ranges of 18-30 years 62(28.44%) and 51-65 years 63(28.89%) being almost similar. Age did not significantly affect referral patterns to the specialized departments.

**DISCUSSION**

The study investigates the frequency of adjunctive treatment referrals to specialist departments from the department of prosthodontics in Pakistan. In one study greater number of patients were referred to periodontists, the reason is impact of prosthodontic prosthesis on periodontium, which may sometimes badly effect the oral health. This signifies the need for great harmony between the prosthesis and periodontium for improved esthetics, durability and health of periodontium.<sup>11</sup> There is an evidence of

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**Table II: Referrals to Clinical Departments of Dentistry**

Referrals to Oral and Maxillofacial Surgery (OMFS) Department											
Response	Broken Down Roots		Mobile teeth		Impacted Teeth		Extremely Resorbed Ridge		Temporomandibular Disorders		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Yes	44	20.18	29	13.30	2	0.92	2	0.92	1	0.45	
No	190	79.81	189	86.69	216	99.08	216	99.08	217	99.54	
Total	218	100	218	100	218	100	218	100	218	100	
Referrals to Operative Dentistry & Endodontics											
Response	Broken down existing restoration		Irreversible pulpitis		Reversible pulpitis		Periapical infections		Insufficient ferrule for crown preparation		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Yes	52	23.85	45	20.64	38	17.43	41	18.80	2	0.92	
No	181	76.14	173	79.35	180	82.56	177	81.19	216	99.08	
Total	218	100	218	100	218	100	218	100	218	100	
Referrals to the Department of Periodontics											
Response	Heavy Plaque and Calculus		Inflamed Gums		Excessive Bleeding of Gums		Gums Recession		Crown lengthening		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Yes	59	27.06	56	25.68	52	23.85	5	2.29	0	0	
No	159	72.93	177	74.31	166	76.14	213	97.70	218	100	
Total	218	100	218	100	218	100	218	100	218	100	
Referrals to Orthodontics											
Response	Midline Diastema		Congenital Absence of Anterior Teeth		Rotation in Teeth		Gross Excess of Space in Both Arches		More than 5mm Crowding		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Yes	1	0.45	1	0.45	0	0	Yes	1	0.45	1	0.45
No	217	99.54	217	99.54	218	100	No	217	99.54	217	99.54
Total	218	100	218	100	218	100	Total	218	100	218	100

**Table III: Oral Hygiene Wise Referrals & Socio-Economic Status (SES) Wise Referrals from Prosthodontics For Adjunctive Treatments**

Oral hygiene wise referrals from Prosthodontics for adjunctive treatments.					
Oral hygiene	Endodontics. No. (%)	OMFS No. (%)	Orthodontics. No. (%)	Periodontics. No. (%)	<i>p</i> -value
Good	5(5.15)	0	0	03(5.17)	0.021
Satisfactory	44(45.36)	19(31.14)	02(100)	18(31.03)	
Unsatisfactory	48(49.48)	42(68.25)	0	37(63.79)	
Total	97(44.49)	61(27.98)	02(2.92)	58(26.60)	
Socio-Economic Status Wise Referrals from Prosthodontics for Adjunctive Treatments					
SES	Endodontics. No. (%)	OMFS. No. (%)	Orthodontics. No. (%)	Periodontics. No. (%)	<i>p</i> -value
Poor	17(17.52)	17(27.86)	0	13(22.41)	0.604
Average	78(80.41)	44(72.13)	02(100)	45(77.58)	
Rich	02(2.06)	0	0	01(1.72)	
Total	97(44.49)	61(27.98)	02(2.92)	58(26.60)	

higher number of patients referred to periodontist, highlighting great need of specialist periodontist. In a study where dentist was asked to rate the top five procedures they most frequently refer to a periodontist, reported; generalized periodontal diseases on top (78.1%), followed closely by treatment of localized periodontal disease (69.3%). Just over half of the respondents (56.1%) indicated they referred soft tissue grafting and (51.9%) indicated they referred for

implant placement procedures. Crown lengthening procedures (49.5%) accounted for the fifth most common referral.<sup>12</sup> Pre-prosthetic mouth preparations to major complex surgeries of implant placement are usually essential before fabrication of denture. Preprosthetic surgical procedures include basic procedures such as alveoloplasty, vestibuloplasty, toriectomy and exostosis, hyperplastic tissue excision, and sophisticated techniques such as augmentation of



ridge through grafts, osteotomies and distraction osteogenesis, and sinus lifts for implants. Thus it cannot be overemphasized that the establishment of a clear treatment plan and close coordination among all specialties involved in the reconstructive effort are essential to achieve the best overall result.<sup>13</sup> The research found that female patients were more likely to have oral diseases, particularly due to immune-mediated conditions, hormonal changes, and genetic predisposition to dental caries as was found in the studies done in clinics of the School of Dentistry at the Federal University of Santa Maria (Brazil) in 2020, and Jeddah city, Saudi Arabia by Rajeh, 2022.<sup>14,15</sup> The oral hygiene status of patients was found unsatisfactory in 56.42% of cases, indicating negligence in dental care. However, the association between gender and oral health status was statistically non-significant, contrasting with other studies in England and Nigeria.<sup>16,17</sup> The majority of subjects requiring adjunctive treatments were aged between 31-50 years, with the age range of 18-30 and 51-65 years of the subjects being 28.44 and 28.89% respectively, which was closer to the findings of a research study conducted in Ireland that also reported the mean age of the patient as 46.6%.<sup>18</sup> The study suggests that primary healthcare providers and geriatric healthcare professionals should be aware of common oral conditions, risks, and healthy behavioral measures to improve oral health.<sup>19</sup>

The study aimed to investigate the relationship between various variables and referral trends in dental care. The results showed that gender-wise referrals were highly significant, with more females being referred to periodontics and endodontics than males which is in compliance with our results.<sup>5,20</sup> Male referrals were high to oral and maxillofacial surgery (OMFS), with periodontics referrals being more for females due to their greater tendency toward esthetics which is in compliance with some other studies.<sup>5,21,22</sup>

The oral hygiene status of the subjects and referrals to specialized departments for adjunctive treatments had a significant association. The highest number of referrals to specialized departments for adjunctive treatments was associated with unsatisfactory oral hygiene status, indicating the association between poor oral hygiene and subsequent need for referral to seek dental treatment at concerned departments.<sup>19</sup>

Many patients needed operative/endodontic related adjunctive procedures, with 97 (44.49%) of 218

patients needing these procedures. Other research studies have reported high numbers of patients referred to periodontics, but this study focused on endodontic and periodontal treatments.<sup>16,22</sup>

Another study reported low referrals to orthodontics, while the number of subjects referred to oral and maxillofacial surgical departments was 61(27.98%).<sup>23</sup> The main causes for various adjunctive treatments in oral and maxillofacial surgery department in multiple studies in the literature were: broken down roots, mobile, and impacted teeth, extremely resorbed residual ridges for ridge augmentation, and temporomandibular joint disorders (TMD).<sup>4,23,24,25</sup>

In contrast, some other studies found that none of the subjects were referred for crown lengthening procedures, as prosthodontists often less frequently consider tooth recovery after crown lengthening due to poor prognosis.<sup>9,8,22,25</sup>

### LIMITATIONS OF THE STUDY

Some of the limitations of this study were that the data collection was undertaken at only one out of four major teaching dental hospital centers of Peshawar, the study duration was short, and no follow-ups were conducted for these patients after provision of adjunctive treatment. Further studies on this topic may improve its literature review aspect.

### CONCLUSION

Our study concludes that the referrals needed to operative/endodontics department were more followed by oral and maxillofacial and periodontics department. The least referrals were those of orthodontics.

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**Funding Source:** None.

### Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

AWQ & AS: Conception, study design, drafting the manuscript, approval of the final version to be published.

SWB & AA: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

SHI & NK: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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