

ORIGINAL RESEARCH



Radiographic Screening of Patients in a Dental School using the Prosthodontic Diagnostic Index

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ABSTRACT

Introduction: Organization of the findings associated with various diagnostic aids plays a key role in formulating the treatment plan of the patients undergoing dental and medical treatment. Enhanced consistency in diagnosing and classifying prosthodontic patients is the basic purpose of various classification systems. Hence, we planned this study to classify partially edentulous patients and completely dentate patients at the undergraduate clinics using the prosthodontic diagnostic index (PDI).

Materials and methods: This study included classification of 13,599 edentulous patients who attended the clinics of undergraduate students of all the levels. Screening of all the patients was done radiographically with a digital orthopantomograph (OPG), and the data were saved in the computer system. The intraoral periapical radiographs (IOPA) taken for all the affected areas were also saved in the system. Based on the OPG and IOPA, the patients were classified into various classes. All the data of the patients were recorded and analyzed.

Results: Total number of patients screened was 17,220, out of which 3,621 were under 18 years of age and were excluded from the study. Most of the patients belonged to the age group of 31 to 45 years: 5,360 (39.4%) patients (3,817 [43.0%] males and 1,543 [32.5%] females) were class I; 2,730 (20.0%) patients (1,729 [19.5%] males and 1,001 [21.1%] females) were class II; 4,576 (33.7%) patients (2,835 [32.0%] males and 1,741 [36.8%] females) were class III; and 933 (6.9%) patients (483 [5.5%] males and 450 [9.5%] females) were class IV.

Conclusion: There is a need to introduce PDI as a screening tool during the initial examination of the patient and to achieve

a proper distribution of the patients among various levels of students, interns, and postgraduates.

Clinical significance: Introduction of PDI will improve the treatment planning and prognosis of edentulous patients.

Keywords: American College of Prosthodontics, Prosthodontic diagnostic index, Survey.

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INTRODUCTION

Key role in formulating the treatment plan of the patients undergoing dental and medical treatment is the organization of the findings associated with various diagnostic aids. This also helps in classifying the patients according to their treatment needs. For the past few decades, literature lacked reliable clinical and diagnostic classification for the patients undergoing various prosthodontic treatment modalities. In 1995, the American College of Prosthodontists (ACP) formulated a system of classification to encounter this problem for prosthodontic patients.¹

After this, various modifications have been done by ACP in the same field and it took them nearly 25 years for formulating the modified system of three universal classifications in the field of prosthodontics.¹⁻³ These classifications systems included various classifications as proposed by McGarry et al¹⁻³ in 1999, 2002, and 2004.⁴

Prosthodontic diagnostic index (PDI) was the name given to the classification system in 2004. Glossary of prosthodontic terms is included in PDI in 2005.⁴ Prosthodontic diagnostic index classified the prosthodontic patients based on their findings on various diagnostic tests establishing the specific criteria for classification.

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The following advantages were offered by these classifications systems:^{5,6}

- Enhancement of consistency in giving the diagnosis,
- Improvement in the communication among health professionals,
- In dental schools, increased usage as a mass screening tool,
- Establishment of standard criteria for the assessment of treatment outcome and prognosis.

Enhanced consistency in diagnosing and classifying prosthodontic patients is the basic purpose of these classification systems.¹⁻³ Hence, we planned this study to classify partially edentulous patients and completely dentate patients at the undergraduate clinics of King Khalid University College of Dentistry (KKUCOD) using the PDI.

MATERIALS AND METHODS

This study was conducted in the undergraduate clinics of KKUCOD and included classification of 17,220 edentulous patients (out of which 3,621 were below 18 years and were excluded) who attended the KKUCOD clinics for treatment from January 2014 to December 2015. A total of 13,599 patients were included in the survey. The patients who attended the clinics of undergraduate students of all the levels (III year to internships), the postgraduate clinics, and the specialty clinics were screened. Contrary to the regular system of classification of patients according to PDI, which included the use of formatted questionnaires, physical findings, radiographic observations, history of prosthodontic treatment, and history of any known drug allergy, only a radiographic evaluation of the patients was performed. All the patients who attended the clinics of KKUCOD were mandatorily screened radiographically with a digital orthopantomograph (OPG), and the data were saved in the computer system. The intraoral periapical radiographs (IOPA) taken for all the affected areas

were also saved in the system. The software program also saved the basic information of the patient, such as name, age, and gender. These data of the two calendar years 2014 and 2015 were retrieved and were based on the basic information, the gender, and age groups. Based on the OPG and IOPA, the patients were classified into various classes. According to the information gathered, the patients were divided into four classes.

- *Class I:* Optimal and favorable criteria of diagnosis and conventional techniques of prosthodontics can be used for the treatment of patients.
- *Class II:* Anatomy of denture-supporting tissues in moderately compromised states.
- *Class III:* Anatomy of denture-supporting tissue compromised at substantial levels, and therefore, there is a need of high demanding prosthodontic treatment.
- *Class IV:* Complex cases with worst prognosis that require surgical intervention for rehabilitation.²⁻⁴

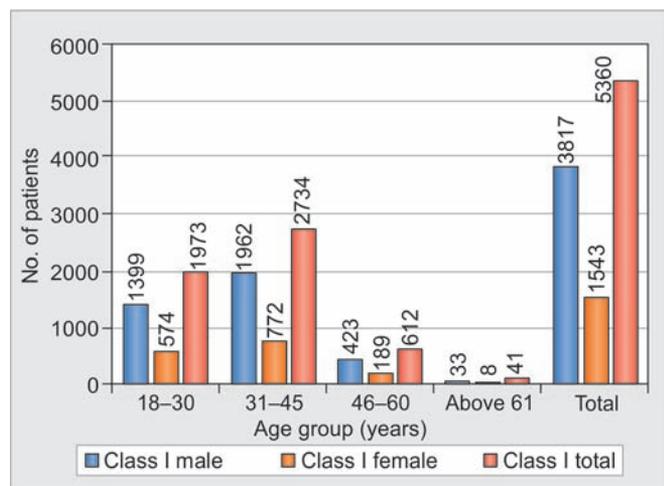
All the data of the patients were recorded and analyzed. Univariate regression curve was used for the assessment of the results.

RESULTS

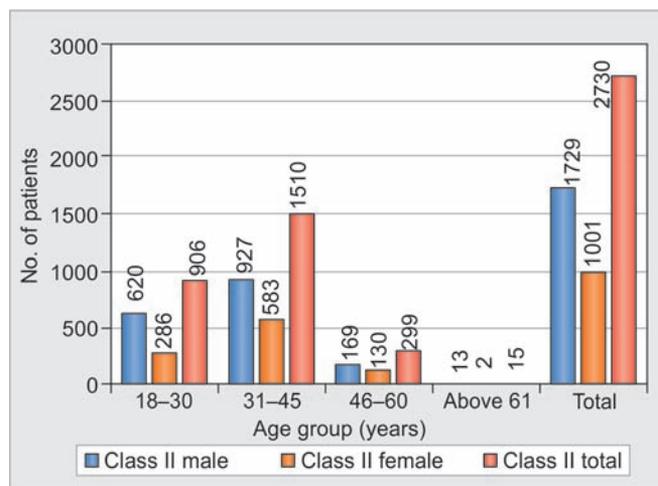
The total number of patients screened was 17,220, out of which 3,621 were under 18 years of age and were excluded from the study. A total of 13,599 patients were included in the survey, out of which 8,864 were male patients and 4,735 were females. Table 1 shows the age group distribution of the patients. Most of the patients belonged to the age group of 31 to 45 years. Graphs 1 to 4 show the

Table 1: Age group distribution of the patients

Age group (years)	Male	Female	Total
18–30	2,759	1,243	4,002
31–45	4,718	2,491	7,209
46–60	1,229	911	2,140
Above 61	158	90	2,48

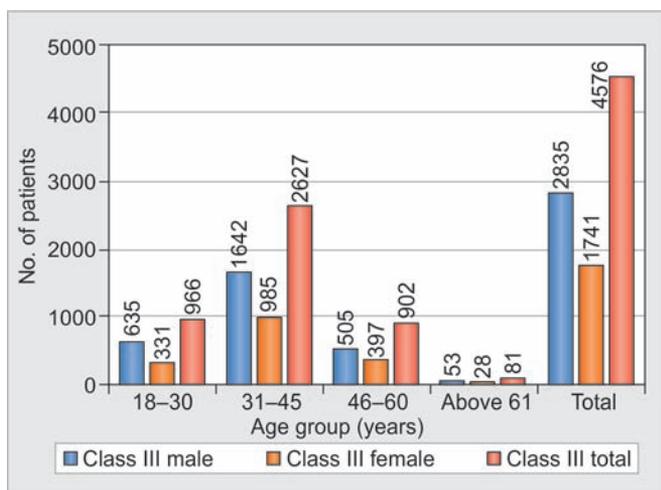


Graph 1: The distribution of class I of PDI among the patients

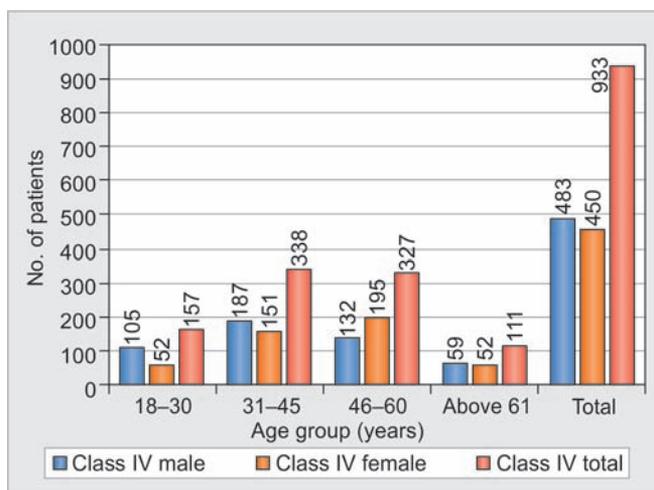


Graph 2: The distribution of class II of PDI among the patients

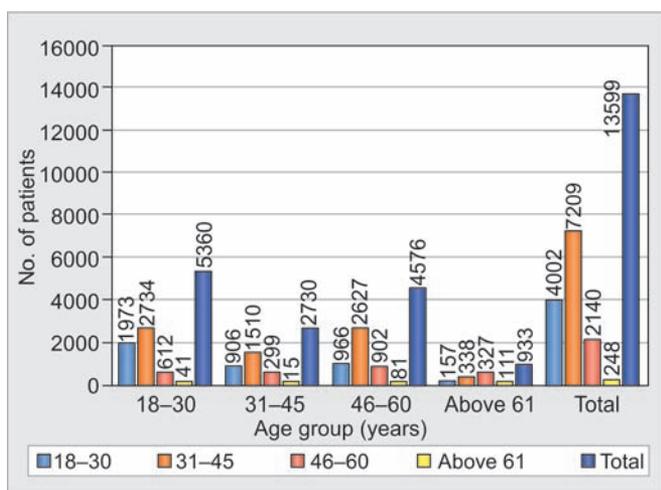




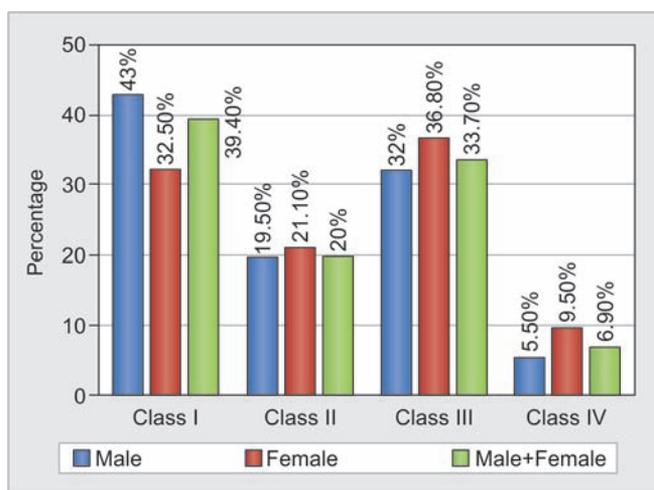
Graph 3: The distribution of class III of PDI among the patients



Graph 4: The distribution of class IV of PDI among the patients



Graph 5: Distribution of various classes among various age groups and gender



Graph 6: The distribution of various classes of PDI among the patients

distribution of classes I to IV of PDI index among the patients of the present study. Graph 5 shows the distribution of various classes among various age groups and gender. Graph 6 shows the distribution of various classes of PDI index among the patients. The proportion of patients displaying various classes of PDI is as follows:

- 5,360 (39.4%) patients (3,817 [43.0%] males and 1,543 [32.5%] females) were class I
- 2,730 (20.0%) patients (1,729 [19.5%] males and 1,001 [21.1%] females) were class II
- 4,576 (33.7%) patients (2,835 [32.0%] males and 1,741 [36.8%] females) were class III
- 933 (6.9%) patients (483 [5.5%] males and 450 [9.5%] females) were class IV

DISCUSSION

Many advantages are offered in treatment planning of the patients when we use the appropriate classification system for classifying prosthodontic patients. Initially, high levels of accurate diagnosis are established by PDI,

which forms the basis on which appropriate treatment protocol is planned. As definite terminologies are established, it facilitates easy and convenient communication between the dentist and the specialist. In cases of reimbursement, specialty fees are justified by the use of these indices, thereby helping the needy patients.^{4,7,8}

In private practices also, these indices are of great help. It allows more authentic and genuine levels of treatment to occur by allowing better communication between the dentist and the specialist. These also result in decrease in the incidence of retreatment and treatment failures. These indices also help in raising the levels and standards of research and treatment.⁹⁻¹³

Even though prognosis and success cannot be predicted by the use of PDI, confirmation of diagnosis and definite treatment planning among edentulous patients can be easily achieved.¹³ Accreditation Standards for Advanced Specialty Education Programs have included these indices systems in the field of prosthodontic dentistry, which shows the significance and utility of these systems.¹⁴

The standards set by these systems have become universal in the sense that all research articles or case reports which are sent to the prosthodontic journals are not accepted unless they classify patients in their cases based on the PDIs.⁴

It is an accurate method of organizing the diagnostic data but it is a far more complex system in comparison to various other classification systems available for prosthodontic patients.⁹

In this study, we included only radiographic method of evaluation of the patients. We did not include other evaluation criteria, such as clinical examination and medical history. Radiographic evaluation gave a fair amount of information to classify the patient. As the procedure is simpler than considering all the criteria, it facilitated screening a very large number of patients.^{4,7,8}

In this study, the majority of the patients were found to be of class I (39.4%). The male patients displayed more number of class I (43%) than female patients (32.5%). Among the class I cases, 36.8% were from the age group of 18 to 30 years, 51% were from the age group of 31 to 45 years. Only 11.4% were from the age group of 46 to 60 years and a mere 0.8% were from the age group of above 61 years. The resultant statistics signifies that a good number of patients under the age of 45 displayed a healthy dentition and lesser complicated prosthodontic treatment needs.

Those patients often face the possibility of undergoing orthosurgical treatment when craniofacial growth is finished since the face tends to reveal an unfavorable growth pattern over time.

In classes III and IV patients, there is the craniofacial growth pattern, i.e., unfavorable with predominant skeletal discrepancy, making the treatment more complex.

A significant proportion of the patients attending clinics (40.6%) displayed a complex prosthodontic condition (classes III and IV); 77.4% of the patients above the age of 61 years displayed a complex prosthodontic condition (32.7% of class II and 44.7% of class IV). A significant proportion (57.4%) of the patients in the age group of 46 to 60 years displayed complex prosthodontic conditions (42.1% class III and 15.3% class IV). Considering the projected increase in the geriatric population worldwide including the Kingdom of Saudi Arabia,¹⁴ the proportion of complex prosthodontic cases and the absolute number of cases are going to increase in the future. While evaluating the prevalence of complex cases, the female patients showed more complex classes (36.8% class III and 9.5% class IV cases) in comparison to male patients (32% class III and 5.5% class IV cases). This might be because of lack of adequate means of transportation for the female patients to avail the dental facilities in this region. Our

results were in correlation with the results obtained by Ntala et al⁶ and Singh et al¹⁵ who reported similar findings in their study.

High frequency of complex classes III and IV cases were found to be undertaken by undergraduate students. Even though postgraduate staff supervise the treatment of such cases, these kinds of complex cases should be handled by postgraduate faculty. Such instances could result in inappropriate patient management. Therefore, at the initial stages of the diagnosis and treatment planning only, the PDI should be used. The patient can then be referred to an appropriate level for prosthodontic treatment. Furthermore, the data suggest that there is an urgent need to introduce postgraduate courses in the region to satisfy the increasing demand for treating complex prosthodontic conditions.^{4,7}

CONCLUSION

There is a need to introduce PDI as a screening tool during the initial examination of the patient and to achieve a proper distribution of the patients among various levels of students, interns, and postgraduates.

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