Effectiveness of pictorial sign boards for patient navigation in multidisciplinary Dental Facilities

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N Malhotra[1], ST Somashekar[2]

ABSTRACT

Objectives: Evaluation of the effectiveness of pictorial sign (symbol) boards in the identification of clinics/departments and in directing traffic in dental schools and hospitals.

Methods: Sign Boards (PSB's) were designed to illustrate dental clinical disciplines. 260 subjects were briefly instructed in the roles of these disciplines. A first questionnaire required participants to match PSB's with departments, and to identify the best PSB. A second questionnaire asked participants to rate how appropriate was the depiction of each department and to comment on the importance of PSB's in a multidisciplinary dental set-up.

Results: The PSB of of Oral & Maxillofacial Surgery (100%) was rated the most easily recognised, followed by the PSB's of Orthodontics & Dentofacial Orthopedics (99.6%), Public Health Dentistry (99.6%) and Oral Medicine & Radiology (99.2%). Least identifiable were the PSB's of Conservative Dentistry & Endodontics (86.2%) and of Periodontology (85.8%). The PSB's were generally approved, that for Orthodontics & Dentofacial Orthopedics gaining the highest rating, while those for Conservative Dentistry & Endodontics and for Periodontology scored the least. 97.3%-99.2% of the subjects agreed that PSB's would be valuable in dental clinics/hospitals to facilitate patient navigation.

Conclusion: Pictorial Sign Boards are indicated in dental facilities.

Key words: Sign, Symbol, Pictorial Sign Boards, Dentistry, Effectiveness, Navigation

INTRODUCTION

Patients in the health sector are consumers (or customers) who demand cost effective quality service delivered at their convenience. Therefore it is important for any health institution to render services with optimum efficiency. A prime objective is the prompt provision of information needed by patients to navigate the facility. An efficient and popular method, advocated by various hospitals, is through the introduction of relevant pictograms/symbols/signs at strategic locations.[1] They are an easy and efficient mode of non-verbal communication, and may be adapted for diverse purposes. In hospitals, symbols depicting specific body parts (such as eye, ear, bone, brain etc.) provide easy identification of individual disciplines by the patients, but of course the use of symbols is not limited to the medical profession.[2,3] Indeed, such symbols, including metonymic emblems, can illustrate the evolutionary path of dentistry as a profession.[2,4,5,6] However, it is complicated and possibly inappropriate to use a tooth as single universal symbol in the endeavour to depict the treatment rendered by the different specialties.

ACRONYM

PSB: Pictorial Sign Board

Departments in a dental facility are most frequently recognized by a number (1,2,3..), and/or by the speciality name (Endodontics, Prosthodontics etc.). However, not every patient is able to read nor be well versed in the scientific names of the different dental disciplines, which can be difficult to interpret, memorize, and/or recall, and in any event may not be precisely descriptive of the treatment rendered. The use of numbers can also be confusing. Thus it is quite possible that a patient has to be repeatedly directed to the particular department or departments.

The use of pictorial signs (symbols) to highlight a specific speciality in a multi-speciality facility may confer certain advantages:[1]

- Ease of interpretation
- Visual appeal
- Better memory retention
- Universally applicable
- Leaves a long-lasting impression

Thus, this study was designed and conducted to evaluate the effectiveness and importance of Pictorial Sign Boards (PSB's), for trafficking and/or navigation of patients/visitors, in multidisciplinary dental facilities like dental schools, clinics and hospitals.

1. **N Malhotra:** *MDS, PGDHHM.* Reader. Dept. of Conservative Dentistry and Endodontics I.T.S Dental College, Hospital & Research Centre, Greater Noida, U.P, India.
2. **ST Somashekar:** *BDS.* Ex-Junior Resident, Department of Conservative Dentistry and Endodontics, Manipal College of Dental Sciences, Mangalore, Manipal University, Karnataka.

Corresponding author

N Malhotra:
Dept. of Conservative Dentistry and Endodontics, I.T.S Dental College, Hospital & Research Centre, Greater Noida, U.P, India.
Mobile: +91 995 831 7299. E-mail: nmalhotra81@gmail.com

MATERIALS AND METHODS

The study was conducted at two dental clinics/hospitals associated with Manipal College of Dental Sciences, Manipal University, Mangalore City, Karnataka, India. Approval was obtained from the University Ethical committee before the commencement of the project. A total of 260 subjects, including patients and visitors, were selected randomly for the study. Informed consent was obtained from each participant. The study was conducted in three phases (Phase I, II, & III), Subjects were interviewed using two structured questionnaires based on simple terminologies for easy comprehension.

Designing Pictorial Sign Boards (PSB's).

For the study, Pictorial Sign Boards (PSB's) were designed to represent the eight clinical specialties in dentistry as recognized by the Dental Council of India *(Copyright: "Malhotra's Dental Specialties Pictorial Signs". Reg No.: A-97826/2013)* (Figure 1). The PSB's were designed to emphasise the most important treatment function of the concerned departments and not to attempt to describe the whole array of treatments which may have been rendered by that particular dental speciality. The study aims to test the effectiveness of these individually designed PSB's.

Phase I

The subjects were informed and/or educated, in a language of their choice, regarding the eight different dental clinical specialties/departments. General layman terms were used to ensure that each subject understood the role of each speciality/department (Table 1). A notice board was installed in the patient reception area, displaying, in both the local language and in English, information regarding the different departments, their scientific names and the treatment rendered.

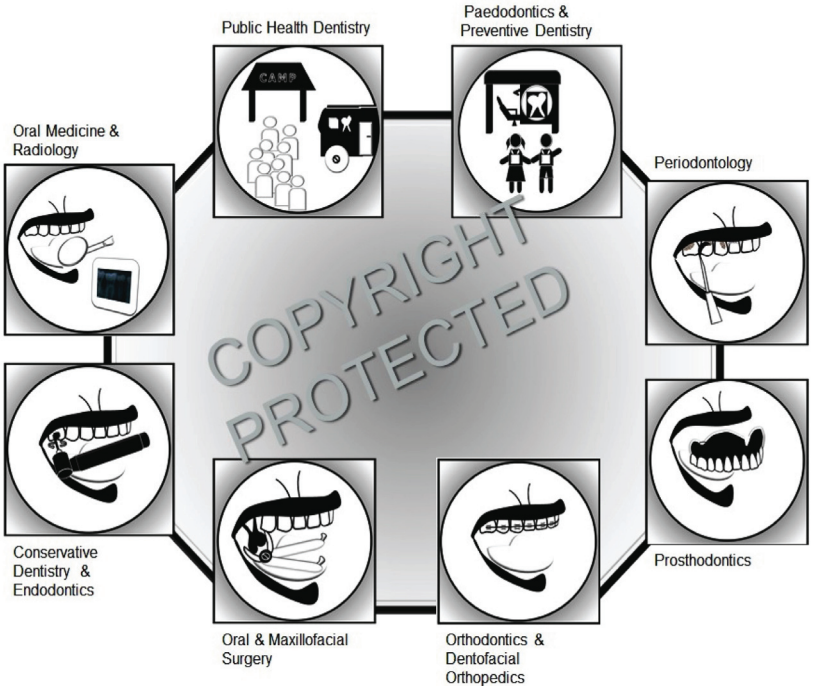

Figure 1: Designed Pictorial Sign Boards (PSB's)* depicting the eight clinical specialities
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Table1: Individual Speciality Description and their Pictorial Sign/Symbols

Speciality Name (as recognised by DCI)	Treatment Rendered	
	Technical Terms	Layman Terms
Oral Medicine & Radiology	Initial Clinical Examination Dental Records Radiographs	General Check-up X-rays
Conservative Dentistry & Endodontics	Operative Procedures Root Canal Treatment	Tooth filling Dead tooth treatment
Oral & Maxillofacial Surgery	Extraction/Impaction Maxillofacial Surgeries	Tooth Removal Jaw Fracture Treatment
Orthodontics & Dentofacial Orthopedics	Correction of Tooth Alignment & Occlusion	Tooth Straightening Wire Treatment
Prosthodontics and Crown & Bridge	Complete Dentures Removable Partial Denture Fixed Partial Dentures	Replacement of Missing/ Lost Teeth
Periodontology	Treatment of Gingival and Periodontal Problems	Teeth Cleaning Treatment of Gum Diseases
Paedodontics & Preventive Dentistry	Dental Treatment Aspect of Children up to 14years of Age	Child Dental Treatment
Public Health Dentistry	Community Dental Health Dental Health Awareness School Dental Programs	Organization of Camps at Community Health Center and Schools

Table 2: Questionnaire I

Question 1.	If you want a **dental check-up / X-ray,** which department would you go to?	Picture number_____
Question 2	If you want **cleaning of your teeth and gum treatment**, which department would you go to?	Picture number_____
Question 3	If you want a **tooth removal**, which department would you go to?	Picture number_____
Question 4	If you want a **tooth filling,** which department would you go to?	Picture number_____
Question 5	If you want **false teeth sets /dentures or crowns**, which department would you go to?	Picture number_____
Question 6	If you want **dental treatment for your child**, which department would you go to?	Picture number_____
Question 7	If you want **wire/ braces for straightening of teeth**, which department would you go to?	Picture number_____
Question 8	If you want to **organize a dental camp**, which department would you go to?	Picture number_____

Phase II (Questionnaire I)

The subjects were shown eight PSB pictures representing the eight different clinical dental specialties. The pictures were numbered from 1-8 in no particular order. Participants were asked to complete Questionnaire I, which was provided with layman terms describing each of the eight departments (Table 2). The subjects were asked to write, below each of the eight questions, the PSB picture number that best suited the description of the department in question.

Phase III (Questionnaire II)

The last phase involved the completion of Questionnaire II by the subjects. There were a total of 11 questions. The first eight questions required the participant to rate the PSB provided for each of the eight departments, for each of which was recorded the correct name, picture number, and the treatment rendered, the latter in layman's terms. A Likert-type rating on a 1 to 5 scale was used to grade the response as follows:[7]

1- Strongly disagree
2- Disagree
3- Don't know
4- Agree
5- Strongly agree

The responses for questions 9-11 were graded as either *"yes", "no", or "do not know".* Questions 9 sought an opinion on the need for introducing PSB's for individual departments as an identification tool for patients/visitors. Question 10 enquired whether the PSB would help the patient to easily identify the department. Finally the subjects were asked whether they considered it better to have individual signs/symbols rather than the conventional display of Names and Numbers of each individual department/speciality.

The data collected from the structured questionnaire was subjected to statistical analysis using statistical software *SPSS11 package* (SPSS for Windows, Version 11.0.0; SPSS Inc, Chicago, Ill). The comparison of the Likert Scale Ratings for the various PSB's was done using the chi-square test ($p< 0.05$).

RESULTS

Questionnaire I

The frequency and percentage of correct identification of the PSB's of individual departments are summarized in Table 3.

All 260 subjects correctly identified the sign board of the Department of Oral & Maxillofacial Surgery (Tooth Removal/Fracture Treatment). This was followed by a

Table 3: Correct Response Rate & Percentages of Questionnaire I

Question No.	Treatment Description	Department	Correct Response	Percentage (%)
1	Dental Check Up/X-Ray	Oral Medicine & Radiology	258	99.2
2	Cleaning Of Teeth	Periodontology	223	85.8
3	Tooth Removal/Fracture Treatment	Oral & Maxillofacial Surgery	260	100.0
4	Tooth Filling/Dead Tooth Treatment	Conservative Dentistry & Endodontics	224	86.2
5	False Teeth Sets/ Crowns	Prosthodontics and Crown & Bridge	257	98.8
6	Child Dental Treatment	Paedodontics & Preventive Dentistry	257	98.8
7	Straightening of Teeth	Orthodontics & Dentofacial Orthopedics	259	99.6
8	Organize Dental Camp	Public Health Dentistry	259	99.6

Table 4: Response Rate & Percentage of Likert Scale Rating's for Question 1-8 of Questionnaire II

Question No.	Department	Likert Scale rating				
		5 Strongly Agree	4 Agree	3 Don't know	2 Disagree	1 Strongly Disagree
Q1	Oral Medicine & Radiology	57 21.9%	201 77.3%	2 0.8%	-	-
Q2	Periodontology	32 12.3%	184 70.8%	32 12.3%	10 3.8%	2 0.8%
Q3	Oral & Maxillofacial Surgery	116 44.6%	141 54.2%	3 1.2%	-	-
Q4	Conservative Dentistry & Endodontics	42 16.2%	189 72.7%	19 7.3%	9 3.5%	1 0.4%
Q5	Prosthodontics and Crown & Bridge	47 18.1%	203 78.1%	8 3.1%	2 0.8%	-
Q6	Paedodontics & Preventive Dentistry	60 23.1%	197 75.8%	1 0.4%	2 0.8%	-
Q7	Orthodontics & Dentofacial Orthopedics	123 47.3%	136 52.3%	-	1 0.4%	
Q8	Public Health Dentistry	66 25.4%	188 72.3%	1 0.4%	5 1.9%	-

Table 5: Result of Chi-square Test as applied to Questions 1-8 of Questionnaire II

Department	Chi-square value	df	p
Oral Medicine & Radiology	0.243	1	0.622
Periodontology	1.332	1	0.248
Oral & Maxillofacial Surgery	-	-	-
Conservative Dentistry & Endodontics	0.423	1	0.515
Prosthodontics and Crown & Bridge	0.366	1	0.545
Paedodontics & Preventive Dentistry	0.366	1	0.545
Orthodontics & Dentofacial Orthopedics	0.121	1	0.728
Public Health Dentistry	0.121	1	0.728
P < .05 denotes statistically significant difference			

99.6% correct identification of the PSB of Orthodontics & Dentofacial Orthopedics (Straightening of Teeth), and of Public Health Dentistry (Organized Dental Camp) whilst the PSB showing Dental Check Up/X-Ray scored a 99.2% correct identification of the Department of Oral Medicine & Radiology. This was closely followed by scores of 98.8% for the PSB's of the departments of Prosthodontics and Crown & Bridge (False Teeth Sets/ Crowns) and of Paedodontics & Preventive Dentistry (Dental care for children). The least correct responses were observed for the PSB's of the Department of Conservative Dentistry & Endodontics (Tooth Filling) (86.2%) and the Department of Periodontology (Cleaning of Teeth) (85.8%).

Questionnaire II

The Likert scale scores obtained from the ratings of the PSB's of individual departments are summarised in Table 4. The preponderance of opinions rate the PSB's favourably with opinions of either strongly agree (47.3% -12.3%) or agree (52.3%-78.1%). The maximum agreement was observed for the PSB of the Dept. of Orthodontics & Dentofacial Orthopedics (Score 5= 47.3%; Score 4=52.3%) followed by the PSB's of the Depts. of Oral Medicine and Radiology, Oral & Maxillofacial Surgery, Paedodontics & Preventive Dentistry and Public Health Dentistry. However, there were those who disagreed and a score of less than 3 was obtained for the PSB's of all departments except for the Dept. of Oral Medicine and Radiology and the Dept. of Oral & Maxillofacial Surgery. Least agreement was observed for the PSB's of the Dept. of Conservative Dentistry & Endodontics and the Department of Periodontology with a few subjects awarding Score 2 (3.8% and 0.8% respectively) and Score 1 (3.5% and 0.4% respectively) for these two departments.

For the purpose of statistical analysis and to make the results more sensitive, the variables were dichotomized and only the scores for the frequency of the Strongly Agree and Agree responses were taken into consideration (Table 5). A chi-square test was applied to derive the association between the total frequencies of Strongly Agree and Agree responses for the PSB's of individual departments. No statistically significant difference was observed (Table 5).

The response rate for Questions 9-11 is summarized in Table 6. An overwhelming majority (99.2% n=258) of the subjects agreed that PSB's are needed and should be introduced in a dental clinic/hospital. Regarding department identification via PSB, 97.3% of the respondents agreed that the system will definitely help the patients/visitors to identify the respective departments more easily. However only 91.5% of the subjects agreed that the display of a PSB is better than the display of individual Department Name and Number, with a statistically significant difference (p=0.034) between the subjects who strongly agree and who agree.

DISCUSSION

Symbology is the study of symbols,[8] which is considered as the oldest language of humans.[9] Symbols/signs play an important role in our day-to-day life and activities.[10] Use of symbols/signs/emblems/pictograms is not new in health sciences as they are of value to enrich the personal as well as professional life.[4,6] They have also been an important means of non-verbal communication for the public in general; whether for the easy interpretation of data/ statistics or to signify the goals, standards and principles of an organisation/association. Based on the same analogy, the majority of the subjects in this study (97.3%) agreed that the shown Pictorial Sign Board (PSB) will help to identify the individual departments while 99.2% considered that the system should be introduced in a multi-speciality dental facility (School/Clinic/Hospital). The literature supports the importance of such visual representations as an effective means of non-verbal communication.[1,6,11] This reduces the duplication and ambiguity that are inevitable when individuals use different words to signify similar things. PSB's may also reduce the confusion about the various departments and their locations in a clinical set-up and the time spent in explanations to patients. In any multispeciality dental facility, the most common and perhaps preferred route of department identification is through the display of the individual speciality names and office number. Despite the basic drawbacks, the patients and/or visitors are highly accustomed to this conventional identification system. This familiarity may explain why 8.5% of the subjects did not consider the introduction of PSB's to be better than the use of department names and office number for their identification.

Table 6: Response rate, Chi-square- and p-values for Questions 9-11 of Questionnaire II

Question No.	Question	Response		Chi-square	p
		Yes	No		
Q9	Introduction of PSB signage is needed in dental hospital	258 99.2%	2 0.8%	3.278	0.070
Q10	Signage will help the patient to identify the department more easily	253 97.3%	7 2.7%	0.276	0.600
Q11	Signage is better than Names (Prosthodontics, Orthodontics) and No's (1,2,3 etc.) for easy identification of the department by the patient	238 91.5%	22 8.5%	4.501	0.034

As the general population may not be fully aware of the dental specialties (and the treatment rendered by them); the subjects were pre-educated in Phase I to avoid confounding responses. It may be partly due to this preliminary phase that strong agreements were recorded for many departments, but it is clear that there is a definite association and a close co-relation between the depiction by the PSB's of the specialties and the treatment rendered by these departments. That association is demonstrated by:

a. The wire and brackets on teeth shown in the PSB of the Department of Orthodontics & Dentofacial Orthopedics clearly indicates the specific type of treatment offered by the Department.
b. The extracted tooth with forceps in the PSB of the Department. of Oral & Maxillofacial Surgery illustrates an extraction procedure.
c. The picture of two school children going to a dental clinic suggests the treatment aspect of the Department of Paedodontics & Preventive Dentistry.
d. The PSB for the Department of Prosthodontics and Crown & Bridge shows an artificial complete denture (similar to false teeth) in the oral cavity.
e. The use of mouth mirror and a radiograph is a representation of the examination and diagnosis aspect of the Department of Oral Medicine & Radiology.
f. Finally to emphasise the role of community service by the Department of Public Health Dentistry, a group of people going to a camp were shown in the PSB.

The maximum disagreement was observed, in both the questionnaires, for the PSB's of the Department of Periodontology (Score 2= 10; Score 1= 2) and the Department of Conservative Dentistry & Endodontics (Score 2= 9; Score 1= 1). This poor identification can be attributed to the following reasons:

a. The PSB of the Periodontology Department shows an ultrasonic scaler cleaning plaque and calculus. This picture may not have highlighted correctly the "gum treatment" as written on the patient information board displayed in the reception area and as explained to the subjects during Phase I for the study.
b. The PSB showing a scaler removing the calculus/plaque could have been confused as a dental instrument/tool removing decayed portions of the teeth.
c. The PSB of the Department of Conservative Dentistry & Endodontics shows the drilling procedure rather than the restoration and in this respect varied from what was explained to the subjects in Phase I.
d. As dentists are seen to be mainly associated with teeth cleaning and filling, the subjects would have expected a single department which was providing both treatments.

It is not an uncommon scenario in a multispeciality dental hospital to find patients looking for a particular speciality department (or specialists) standing just in front of the department they seek. This can occur irrespective of their socio-economic level or frequency of visits to the dental clinics. There may be two main reasons. Firstly, the formal names of the different dental specialties do not give any hint/clue to a layman regarding the kind of treatment rendered by a particular department. Secondly, names and numbers are more difficult to memorize and remember as compared with a PSB that can be much easily recognized and recalled. Thus these PSB's, together with the display of name and number, could have an added beneficial effect to make department navigation and identification easy for the general public.

Further scope of the study lies in gauging the response of the patients/visitors to the introduction of PSB's in a dental facility. Modifying and refining the PSB's may render them widely acceptable.

CONCLUSION

It can be recommended that such Pictorial Sign Boards should be displayed along with the formal names and the allotted office numbers for the departments in a multispeciality dental clinical facility.

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References

1. Park K. Health information and basic health statics. In Park K, ed. Preventive and Social Medicine. Missouri: Saunders, 2003: 742-76.
2. Rosen J. Of serpents and symbols. J Am Dent Assoc 1984; 108:534-6.
3. Menon A, Kuruvilla A. Red Cross emblem and the medical profession- the Indian scenario. J Clin Forensic Med 2005; 12:18-20.
4. Garrison F H. Renaissance, revival of learning and reformation. In: Saint Appollonia, eds. An Introduction to the History of Medicine. Philadelphia:WB Saunders Coy, 1929: 242.
5. Dewel B F. The association's current logo and traditional seal: AAO emblems, symbols, and concepts. Am J Orthodont Dentofacial Ortho 1988; 94:181-3.
6. Pearn J. Enduring symbols of dentistry: international metaphors of dental science. Br Dent J 2008; 205:615-21.
7. Kothari C R. Measurement and scaling techniques. In: Kothari C R, ed. Research methodology. Methods and Techniques. India: New Age International (P) Limited, 2001:69-94.
8. Dreyfuss H. Symbol Sourcebook: An Authoritative Guide to International Graphic Symbols. John Wiley & Sons, 1984.
9. Jorda E G. Symbols and Myths. Clinical & Translational Oncology 2008; 10:70-72.
10. Rollo M. Values, Myths and Symbols. American Journal of Psychiatry 1975; 132:703-6.
11. Names and other symbols. Editorial. An Orthodont 1983;53:93-6

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