

## Evaluation of referral system to endodontists among a group of general dental practitioners

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### Original Article

#### Abstract

**BACKGROUND AND AIM:** The primary providers of health services are general dental practitioners (GDPs), who must routinely do the diagnosis and treatment planning except in complicated cases. The present study evaluation of a referral system to endodontists among a group of GDPs in Iran.

**METHODS:** This descriptive study was performed on 620 Iranian general dentists. A questionnaire with an accepted validity and reliability was chosen. A self-administrated questionnaire including demographic characteristics, general and the special question was distributed among GDPs participating in the 52<sup>th</sup> International Congress of Dentistry in Iran by a senior undergraduate student. Data was analyzed with a chi-squared test using SPSS.

**RESULTS:** Female dental practitioners were more likely to refer the patients to the Endodontists than males (96.3 vs. 94.3% -  $P = 0.040$ ). Canal obstruction was considered the most frequently factor (35.0% important and 60.0% very important) in making a decision to refer the case, followed by the presence of a perforation (40.0% important and 30.0% very important), complicated trauma (45.0% important and 35.0% very important), need for retreatment (40.0% important and 30.0% very important) and the presence of a post-and-core in combination with a crown or bridge (30.0% important and 35.0% very important).

**CONCLUSION:** This survey showed that many Iranian dentists had a positive attitude toward referral system, although in some circumstances. This system is not well-managed, and the dentists prefer to perform the specialty procedures by themselves. Therefore, it is recommended that the case selection and treatment planning as much as to be taught to the dentists for the prevention of the issues in complicated cases.

**KEYWORDS:** Endodontics, Dentists, Root Canal Therapy

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The primary providers of health services are general dental practitioners (GDPs). Moreover, GDPs initially involve in the most complicated cases very well but they must be

aware regarding the treatment of the complicated cases and refer them to specialists.<sup>1</sup>

Many patients refer to the GDP because of their low fee in comparison to specialists.<sup>2</sup> Since until 2013 year only 13.0% of the

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Iranian dentists are specialists, this problem becomes more sophisticated in dentistry, such that it is easier for patients to access a GDP.<sup>3</sup> Moreover, in many cases, the nature and property of treatments in dentistry is difficult.<sup>4</sup> For example, this decision is very hard for a patient with a toothache that treatment is suitable for him (a simple filling, a root canal therapy, a periodontal surgery or extraction).<sup>5</sup> Besides, the majority of patients who need health care seek advice from GDPs.<sup>6,7</sup>

According to many research studies,<sup>8,9</sup> it is found that doing some of special dental procedure by GDP leads to failure. Some reports<sup>10,11</sup> have demonstrated that many of the procedures performed by GDPs need retreatment. In most cross-sectional studies, the success rate of root canal treatments (RCTs) performed by GDPs are significantly found less than that those are performed by endodontists. Hence, researches that continuous education of GDPs regarding RCT is necessary.<sup>8-11</sup> Many cross-sectional studies in different countries showed that there is a high rate of apical periodontitis associated with endodontically treated teeth and a high frequency of radiographic evidence of inadequate root canal fillings.<sup>5,12-14</sup>

Before the reform in public health services in USA (1991), there was a little available information in relation to the referral patterns of hospital services.<sup>15</sup> Several studies revealed that significant differences exist among general practitioners (GPs) in their referral to the hospital. This factor forces the public health managers to schedule a managing system for general practitioners. But there is not any system for GPs.<sup>11-13</sup> Besides, in these few researches, only referral to orthodontists, surgeons and periodontists have been surveyed and their insufficient information regarding the other specialty.<sup>16</sup> For improving the success rate, in general, dental practice, it has been emphasized that more serious and high-quality educations are needed for both undergraduate students and

GPs. Furthermore, it has been noted that the referral of difficult cases to dentists with advanced knowledge and training in endodontics should be made possible for the benefit of patients.<sup>5,6,17</sup>

According to a survey among GPs, it was found that several factors affect the decision to refer. For example, perforation is an important factor to refer by 87.1% of respondents, followed by the need for retreatment (76.0%) and periradicular surgery (73.8%).<sup>6</sup> MC Andrew et al. found in their study that there are many dentists who refer the patients who are not ready for a procedure.<sup>18</sup> Moreover, it is demonstrated that differences in referral pattern among different regions and added factors such as cost, number of available specialists, personal and social communication skills of GPs and specialists can affect the referral pattern.<sup>19</sup>

Barnes et al. showed that the practice location, reputation of communication and patient management are the main factors for referring by the endodontist.<sup>20</sup> GPs and endodontists do not always agree on reasons for referral, and some disagreement might occur. Caplan et al. reported that 100% of endodontists considered the presence of radiographic evidence of a calcified canal as a condition in which "most of the time" referral is indicated, whereas 61.0% of GPs thought so. Another difference in indications for referral was the condition in which the source of the pain could not be determined. Again, 100% of endodontists considered this a condition in which GPs "always or most always" should refer. Of general practitioners, 37.0% had the same point of view.<sup>21</sup>

Since there is no study available, regarding referral pattern among GDP in Iran, this study was performed to evaluate the referral system to endodontists among a group of GPs in Iran during 2011-2012.

## Methods

In this cross-sectional descriptive study, the

subjects were selected using a simple sampling method. A self-administrated questionnaire, including demographic data (age, sex, years elapsed since graduation, etc) was distributed among GDPs participating in the 52<sup>th</sup> International Congress of Dentistry in Iran by a senior undergraduate student. A questionnaire, containing 38 questions, was designed to investigate the factors that the decision to refer and the frequency of referring. This questionnaire was designed based on the other studies.<sup>4,16,18,19</sup> In the current questionnaire, questions from previous studies were combined with some new designed questions

Validity of the questionnaire was assessed by a pre-test assay of the questionnaire containing 42 questions. This questionnaire was distributed among 7 faculty endodontists Kerman Dental School, Iran, who were asked to express their opinion about each question by choosing the following items: totally appropriate, appropriate, no idea, inappropriate and totally inappropriate. The endodontists found that the four questions, therefore the final questionnaire was considered with 38 questions and were inappropriate or totally assessed by test-retest method. Then the questionnaires were given to 15 GDPs who were the target group and requested them to answer the questions. Then 10 days later, the questionnaire was given to the same GDPs and asked for completing it. The second answers were compared to the first ones to determine the reliability coefficient of the questionnaire. After data collection, the general agreement percent was 89% (Cronbach's alpha = 0.89) and for each of the questions was 80-93% (Cronbach's alpha = 0.80-0.93).

The questionnaire consisted of demographic questions (age, sex, years since graduation and years of dental office establishment), general questions (Endodontic diagnosis, RCT, retreatments, apical surgery, procedural accidents, etc) were distributed among GDPs participating

in the 52<sup>th</sup> International Congress of Dentistry in Iran (2012) by a senior undergraduate student. Sample size of 675 GDPs was calculated according to the formula ( $N = Z^2 \times P(1-P)/d^2$ ,  $Z = 1.96$ ,  $P = 0.400$ ,  $d = 0.04$ ).

Furthermore, a written consent was obtained from each participant. They were all assured about the confidentiality of their replies. If a questionnaire was not filled totally, it was excluded. After Collecting the data, the final 620 questionnaires were encoded and t-test, chi-squared test were used for data analysis using SPSS software (version 13.5, SPSS Inc., Chicago, IL, USA).

## Results

Of 675 questionnaires, 620 (91.8%) were filled and returned [350 males (56.4%) vs. 290 females (43.6%)]. The average age of the participants was  $35.21 \pm 4.70$  years [males ( $40.62 \pm 7.12$ ) vs. females ( $30.84 \pm 3.42$ )] with an age range of 27-70 years [males (28-72) vs. females (27-55)]. The average years since graduation the participants was  $23.02 \pm 2.22$  years [males ( $21.96 \pm 3.32$ ) vs. females ( $24.08 \pm 1.12$ )] with a range of 1-39 years [males (4-39) vs. females (1-28)]. Also, the average years of dental office establishment was  $17.42 \pm 3.15$  years [males ( $22.06 \pm 3.15$ ) vs. females ( $12.78 \pm 3.15$ )] with an age range of 0-38 years [males (2-38) vs. females (0-25)].

In this study, some general questions were asked; table 1 presents the answers to the questions by gender. Thirty respondents (4.8%) disagreed with the patient referral due to the following reasons: the full capability to perform any procedure, the possibility of losing the patient and referral of them to the other dentists by specialists.

A significant relationship was observed between "Do you agree with the referral system" and with an increase age ( $P = 0.040$ ), years elapsed since graduation ( $P = 0.030$ ) and years in practice ( $P = 0.010$ ); so they showed more positive attitude toward referral. There was also a significant

relationship between years elapsed since graduation ( $P = 0.020$ ) and years since office establishment ( $P = 0.030$ ) and the referral during the past 6 months. Also, In relation to the question "Do you think that proximity to specialists affects your referral?" a significant relationship wasn't observed between the answers to this question and age ( $P = 0.214$ ), years elapsed since graduation ( $P = 0.080$ ), sex ( $P = 0.133$ ) and years in practice ( $P = 0.050$ ). Also, There wasn't a significant relationship between sex ( $P = 0.107$ ), age ( $P = 0.412$ ), years elapsed since graduation ( $P = 0.090$ ) and years since office establishment ( $P = 0.121$ ) and the referral during the past 6 months.

Regarding the frequency of the referrals to endodontists, the majority of the respondents (55.0%) referred 1-5 cases per month. Five percent of the respondents never referred a case, and 10.0% respondents referred 15 cases per month.

In reply to the question "In case of need for a referral, where do you prefer to refer the patient to?" none of the subjects chose another general dentist or other clinics, but they referred patients to a dental school (24.0%), an endodontist (68.0%), and dental specialist clinic (4.0%). A small minority (4.0%) did not feel the need to refer a patient to an endodontist.

Table 2 presents the frequency of certain factors which the respondents considered to influence their decision-making process. As it is seen, most of the referrals included canal

obstruction (e.g. calcified canal, broken instrument) which was the most frequently factor to be important (35.0%) or very important (60.0%) in making a decision to refer.

This research showed that female GDPs referred more patients compared to males ( $P = 0.040$ ), and the relationship between gender and referral was significant ( $P = 0.040$ ). There was a significant relationship between age and referral of patients.

## Discussion

All the dental community effort is directed towards bringing health to patients as much as possible. This can be happened only by correct and timely diagnosis and delivery of appropriate treatment.<sup>22</sup> The quality and balance of an appropriate treatment can be affected by referral pattern. If the referral system uses correctly, the correct diagnosis, fast and correct treatment of diseases will be achieved. Besides, not referring or incorrect referral might lead to unwanted effects and delay in diagnosis and treatment.<sup>23</sup>

It is revealed from several studies that there is a substantial need for RCT in the population. Also, it is found that a considerable amount of this need is in the form of retreatment.<sup>5-7,17</sup> Furthermore, there are several longitudinal studies in which it is concluded that RCT has a high success rate up to 96.0% for periapical health.<sup>1,23,24</sup> However, in many of these research works, the RCTs carried out in Specialty clinics or in dental schools have been evaluated.

**Table 1.** GDPs' (general dental practitioners) answers to the general questions by sex

Question	Male		Female		Total	
	Yes	No	Yes	No	Yes	No
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Do you agree with the referral system?	330 (94.3)	20 (5.7)	260 (96.3)	10 (3.7)	590 (95.2)	30 (4.3)
Have you referred a patient during the past 6 months?	200 (57.1)	150 (42.9)	100 (37.1)	170 (62.9)	300 (43.4)	320 (56.4)
Do you think that proximity to specialists' effects on your referral?	100 (28.4)	250 (71.4)	230 (85.2)	40 (14.8)	330 (53.2)	290 (46.8)
Do you think that the type of treatment you perform is important in referral?	300 (85.7)	50 (14.3)	245 (90.7)	25 (9.3)	545 (87.9)	75 (12.1)

**Table 2.** Factors considered being of influence on the decision to refer

Factors	Very important	Important	Neutral	Fairly unimportant	Not at all important
	n (%)	n (%)	n (%)	n (%)	n (%)
Difficult diagnostic problem	82 (13)	106 (18)	150 (24)	224 (36)	58 (9)
Difficult diagnostic cause of pain	220 (36)	182 (29)	56 (8)	85 (14)	77 (12)
Pulpal or periapical disease untreatable	290 (47)	170 (27)	50 (7)	65 (11)	45 (7)
Internal and external resorption	300 (48)	150 (24)	30 (5)	90 (15)	50 (8)
Root canal therapy of molars	150 (24)	150 (24)	80 (13)	85 (14)	155 (25)
Patients are very nervous or worried	225 (37)	195 (31)	75 (12)	80 (13)	45 (8)
Persistent signs and/or symptoms (pain, swelling, sinus tract, etc.)	220 (36)	248 (40)	70 (11)	75 (12)	7 (1)
Tooth type (anatomy, canal curvatures, position in dental arch)	240 (38)	245 (39)	50 (7)	78 (13)	7 (1)
Obstruction in canals (obliteration, calcification, broken instruments)	372 (60)	217 (35)	17 (2)	7 (1)	7 (1)
Presence of a post and core in combination with a crown or bridge	217 (35)	186 (30)	100 (14)	60 (10)	57 (9)
Retreatment	186 (30)	248 (40)	106 (17)	40 (6)	40 (6)
Perforation	186 (30)	279 (45)	55 (9)	60 (10)	40 (6)
Open apex	300 (48)	145 (23)	87 (15)	70 (10)	18 (3)
Complicated trauma (luxations, avulsions, root fractures)	217 (35)	279 (45)	80 (13)	24 (4)	20 (3)
Size of the radiolucency	80 (13)	85 (14)	200 (28)	150 (24)	105 (17)
Insufficient time to perform treatment	50 (7)	70 (10)	240 (40)	100 (14)	160 (26)
Low payment for treatment	60 (10)	60 (10)	200 (28)	190 (31)	110 (18)
Apicoectomy	150 (24)	255 (41)	140 (23)	65 (9)	10 (2)
Horizontal root fracture	250 (40)	170 (27)	120 (19)	60 (10)	20 (3)
Vertical root fracture	280 (45)	170 (27)	50 (7)	80 (13)	40 (6)

In the present study, 620 Iranian GDPs were evaluated regarding the referral system of patients to endodontists. The majority of dentists referred patients to endodontists (68.0%) and dental schools. A small minority (4.0%) did not feel the need to refer. In addition, females referred more patients than males. This study showed that with an increase in age, years elapsed since graduation and years elapsed since office establishment, the participants showed more positive attitude toward referral. Clark showed that 90.0% of dentists believe that referral system is necessary and 82.0% referred medically compromised patients,<sup>11</sup> which is in agree with those found by Cottrell et al.,<sup>1</sup> Abbott et al.<sup>25</sup> and Ree et al.<sup>4</sup>

In the study by Abbott<sup>26</sup> it was revealed that 94.0% of GDPs had positive attitudes toward refer the patient to endodontists, but they only referred 46.0% of patients requiring RCT. The perception that endodontists are

partners in patient care. Like this research, some showed that female GDPs, old dentists had more referred patterns.<sup>8,14,17,27</sup>

Some studies<sup>9,28</sup> showed that most of the patients are referred to specialized hospitals, and a minority is referred to the specialist's office. In our study, most of the patients are referred to endodontists and dental schools. This difference might be attributed to the educational programs, skills, and social differences. In addition, it should be pointed out that the referred to dental schools might be due to the fact that there are currently amount of 325 endodontists in Iran,<sup>29</sup> who had the long waiting list of patients.

In the present study, most of the referrals were due to canal obstruction, followed by the presence of a perforation, complicated trauma, need for retreatment and the presence of a post-and-core in combination with a crown or bridge. Based on our research, it is found that the presence of an

obstruction is a major reason to refer (95.0% of respondents), which is in agree with these obtained by Caplan et al.<sup>21</sup> who showed that 75.0% of GDPs tended to refer teeth with separated instruments or ledged canals.

Based on a survey in England,<sup>30</sup> the main reason for referral to endodontists was retreatment (20.0% of patients), followed by inability to control pain and/or swelling (14.0%), and inability to diagnose the cause of the endodontic problem (13.0%). In a similar research which was done in Western Australia,<sup>26</sup> it was found that the main reason of referral is the pain diagnosis and management (24.0% of patients), followed by calcified canals (18.0%), endodontic retreatment (15.0%), trauma (13.0%), surgery (7.0%), and perforations (6.0%). Caplan et al.<sup>21</sup> and Zokaie and Manzari<sup>30</sup> found that, in many cases GDPs recommend the treatment of apicoectomy/retrofilling for a referral.

Ree et al.<sup>4</sup> showed that the presence of an obstruction in the canal, a perforation or resorption and persistent signs and/or symptoms, are the major factors to referring. In agree with present findings, Peculiene et al.<sup>6</sup> showed that perforation (87.1%), need for retreatment (76.0%) and the history of repeated abscesses (66.5%), can be considered as important factors to referring. In a study by Abbott<sup>26</sup> reasons for referral to a single Australian endodontic practice were analyzed by reviewing 2000 patient records. In 24.0% of patients; the pain management was the main reason for referral. In another similar<sup>31</sup> with recording information patient referred for treatment over a 3 weeks period, it was concluded that the dentist was unable to control pain/swelling or diagnose the

endodontic problem in 4 and 13% patients respectively.

In the present study, it is found that in 76.0% of the respondents, the presence of pain and/or swelling can be considered as an important/very important referral factor. This result is in agree with the findings by Ree et al.<sup>4</sup> that the rapid resolution of pain and swelling is the major objective of referral, that on an emergency basis. Consequently, the management of endodontic practice should consider logistic support to providing this type of treatment.

### Conclusion

This survey showed that a minor group of GDPs in Iran has a positive attitude toward the referral system. Although in some cases, this system is not managed correctly, and dentists prefer to perform specialized treatment procedures by themselves. Therefore, the education of GDPs about the importance of referral seems to be a useful way. In addition, it is found that an obstruction in the canals, a perforation and retreatment in descending order, are three main factors in making a decision for a referral. It's recommended to do some similar studies in the other populated cities.

### Conflict of Interests

Authors have no conflict of interest.

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### References

1. Cottrell DA, Reebye UN, Blyer SM, Hunter MJ, Mehta N. Referral patterns of general dental practitioners for oral surgical procedures. *J Oral Maxillofac Surg* 2007; 65(4): 686-90.
2. Harris RV, Pender SM, Merry A, Leo A. Unravelling referral paths relating to the dental care of children: a study in Liverpool. *Prim Dent Care* 2008; 15(2): 45-52.
3. Shayan S. Statistics Iranian dentists [Online]. [cited 2013]; Available from: URL: <http://irden.ir/amoozesh/nd/162439/> [In Persian].
4. Ree MH, Timmerman MF, Wesselink PR. Factors influencing referral for specialist endodontic treatment amongst a

- group of Dutch general practitioners. *Int Endod J* 2003; 36(2): 129-34.
5. Boucher Y, Matossian L, Rilliard F, Machtou P. Radiographic evaluation of the prevalence and technical quality of root canal treatment in a French subpopulation. *Int Endod J* 2002; 35(3): 229-38.
  6. Peciuliene V, Rimkuvienė J, Maneliene R, Drukteinis S. The need and reasons for referrals to specialists among Lithuanian general dentists. *Medicina (Kaunas)* 2010; 46(9): 611-5.
  7. Hommez GM, Coppens CR, De Moor RJ. Periapical health related to the quality of coronal restorations and root fillings. *Int Endod J* 2002; 35(8): 680-9.
  8. Cobb CM, Carrara A, El-Annan E, Youngblood LA, Becker BE, Becker W, et al. Periodontal referral patterns, 1980 versus 2000: a preliminary study. *J Periodontol* 2003; 74(10): 1470-4.
  9. Coulthard P, Kazakou I, Koron R, Worthington HV. Referral patterns and the referral system for oral surgery care. Part 1: General dental practitioner referral patterns. *Br Dent J* 2000; 188(3): 142-5.
  10. Sharpe G, Durham JA, Preshaw PM. Attitudes regarding specialist referrals in periodontics. *Br Dent J* 2007; 202(4): E11-E19.
  11. Clark S. Professional attitudes to specialisation and minor oral surgery in general dental practice. *Br Dent J* 1995; 179(6): 209-13.
  12. Wu MK, Wessellink PR. Endodontic leakage studies reconsidered. Part I. Methodology, application and relevance. *Int Endod J* 1993; 26(1): 37-43.
  13. Gillen BM, Looney SW, Gu LS, Loushine BA, Weller RN, Loushine RJ, et al. Impact of the quality of coronal restoration versus the quality of root canal fillings on success of root canal treatment: a systematic review and meta-analysis. *J Endod* 2011; 37(7): 895-902.
  14. Asgary S, Shadman B, Ghalamkarpour Z, Shahravan A, Ghodousi J, Bagherpour A, et al. Periapical status and quality of root canal fillings and coronal restorations in Iranian population. *Iran Endod J* 2010; 5(2): 74-82.
  15. Hogg W, Baskerville N, Lemelin J. Cost savings associated with improving appropriate and reducing inappropriate preventive care: cost-consequences analysis. *BMC Health Serv Res* 2005; 5(1): 20.
  16. Zemanovich MR, Bogacki RE, Abbott DM, Maynard JG, Jr., Lanning SK. Demographic variables affecting patient referrals from general practice dentists to periodontists. *J Periodontol* 2006; 77(3): 341-9.
  17. de Moor RJ, Hommez GM, de Boever JG, Delme KI, Martens GE. Periapical health related to the quality of root canal treatment in a Belgian population. *Int Endod J* 2000; 33(2): 113-20.
  18. McAndrew R, Potts AJ, McAndrew M, Adam S. Opinions of dental consultants on the standard of referral letters in dentistry. *Br Dent J* 1997; 182(1): 22-5.
  19. Kourkouta S, Darbar UR. An audit of the quality and content of periodontal referrals and the effect of implementing referral criteria. *Prim Dent Care* 2006; 13(3): 99-106.
  20. Barnes JJ, Patel S, Mannocci F. Why do general dental practitioners refer to a specific specialist endodontist in practice? *Int Endod J* 2011; 44(1): 21-32.
  21. Caplan DJ, Reams G, Weintraub JA. Recommendations for endodontic referral among practitioners in a dental HMO. *J Endod* 1999; 25(5): 369-75.
  22. Williams LE, Nettifee-Osborne JA, Johnson JL. A model for improving student confidence and experience in diagnostic sample collection and interpretation. *J Vet Med Educ* 2006; 33(1): 132-9.
  23. JOE Editorial Board. Success and failure in endodontics: an online study guide. *J Endod* 2008; 34(5 Suppl): e1-e6.
  24. Peters OA. Current challenges and concepts in the preparation of root canal systems: a review. *J Endod* 2004; 30(8): 559-67.
  25. Abbott JA, Wolcott JF, Gordon G, Terlap HT. Survey of general dentists to identify characteristics associated with increased referrals to endodontists. *J Endod* 2011; 37(9): 1191-6.
  26. Abbott PV. Analysis of a referral-based endodontic practice: Part 1. Demographic data and reasons for referral. *J Endod* 1994; 20(2): 93-6.
  27. Sweeting LA, Davis K, Cobb CM. Periodontal Treatment Protocol (PTP) for the general dental practice. *J Dent Hyg* 2008; 82(Suppl 3): 16-26.
  28. Absi EG, Satterthwaite J, Shepherd JP, Thomas DW. The appropriateness of referral of medically compromised dental patients to hospital. *Br J Oral Maxillofac Surg* 1997; 35(2): 133-6.
  29. Hosseinpour R, Safari HR. Review of statistics and information department of Dentistry. Tehran, Iran: Iranian Dental Association; 2013. [In Persian].
  30. Zokaie S, Manzari M. The need and reasons for referrals to endodontists among Kerman general dentists [Thesis]. Kermn, Iran: School of Dental, Kerman University of Medical Sciences; 2004.
  31. Harty FJ. A survey of endodontic procedures performed by practitioners in limited practice. *Int Endod J* 1992; 25(1): 25-8.