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Study Patterns of Referring to Root Canal Treatment Professionals by General Dental Practitioners

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ABSTRACT

General dental practitioners act as gatekeepers for specialist dental care because they generally decide whether, when, and where to refer patients for specialist care. As such, they play a central role in the referral process. The aim of this study was to evaluate the referral patterns of general dentists to endodontics in Dezful city. Materials and Methods: This descriptive epidemiologic study was performed on all general dentists in Dezful city. The questionnaire was designed by the researcher and based on previous studies. The questionnaire consisted of two sections: demographic information (age, sex, and work history) and 32 questions about the conditions under which general dentists refer patients to an endodontics. The data were analyzed by SPSS software after collecting questionnaires. Descriptive statistics, Chi-square, Fisher test and Pearson correlation coefficient were used for data analysis. The significance level was considered to be P <0.05. Results: The mean (SD) age of dentists in this study was 34.96 (5.782) years with a minimum of 26 and a maximum of 52 years. In the present study, 30.1% dentists were female and 69.9% were male. The mean (SD) of the working experience of dentists in this study was 7.61 (4.917) years, with a minimum of 1 and a maximum of 22 years. The most frequent referrals were as follows: apical surgery for mandibular anterior teeth 49.5%, apical surgery of maxillary anterior teeth 47%, and root canal treatment of premolar or corneal molars with cruve angle of 20-40, 32%. Female dentists referred more cases to endodontists than male dentists (P<0.05). With increasing age and work experience, dentists participating in the study are more likely to do so than referral (P<0.05). Conclusion: The result of this study showed that referral system is not well-managed, and most 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: Referral, General Dentists, Endodontics

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INTRODUCTION

General physicians are first providers of care giving in health centers and they are not supposed to act as a professional who is able to diagnose and treat complicated disorders. In dentistry case it is getting even more critical [1]. General dentists are acting as a guard for professional dentistry treatments because they decide where and when a patient need to refer to a professional. So, they play main role in referring phase [2]. Until 2013, only 13% Iranian dentists were professional

so that patients had more simple access to a general one [3]. However, in most cases recognizing nature of treatments is difficult. For example, for a patient with toothache is very difficult to decide about appropriate treatment such as simple filling, root canal treatment, gum operation and withdrawal. In addition, many patients who need health care refer to general dentist for advice [1, 3].

Many studies indicated that in most cases, professional treatments by general dentist caused dentistry errors. Studies illustrated that considerable numbers of root canal treatment by general dentists need retreatment by a professional dentist [1, 3]. many studies in different countries showed that there is high prevalence of Apical Periodontitis relevant to filling root canal (24-61%) but also many imperfect filling has been reported (38-81%). These studies indicated that only 60-75% general dentists were successful at root canal treatment while rate of success in professional infirmaries and dentistry universities was about 96% [4].

Studies reported female dentists refer patients to the endodontists better than male dentists. Obturaion canal is the most common factor of referring patients to the professionals and then perforation, complicated trauma, need to retreatment and core and pore mixed with crawn or beidge are the factors of deciding to refer [3]. Another study illustrated that consistent pain is the most common cause of referring and then gingival swelling, sinus tract, apical radioluency are other causes. Referring due to endo problems such as canal calcification, broken tools, post, perforation, and resorption were at least cause around less than 0.5% [4]. Broken tools, dental trauma, problems in diagnosis and then persistent symptoms were other causes of referring based on other studies [4].

Since there is no system supervising general dentists referral [1] and besides there is a few papers in subject of referring to professional dentists [3,12-5], in order to improve root canal treatment quality by general dentists it is important to clear main reasons of referring to professionals. As evidence shows that there is no a comprehensive research about this subject, this study aimed at studying patterns of referring to treatment professionals by Dezful dentists.

MATERIALS AND METHODS

This descriptive epidemiologic study was performed on all general dentists in Dezful (n=103). Samples were collected by census. Criteria of attendees were: general dentistry certification, not attending to similar study and inclination to participate, being occupied in Dezful. Criteria of excluding from the study were incomplete questionnaire and no willing to participate.

Data were collected from a researcher-made questionnaire which involved two parts: demographic information such as age, gender and years of job experience and 32 questions about what cases are referred by them including: second and third maxillary molars and mandible molars, retreatment of 1-5 maxillary and mandible teeth, root canal treatment of anterior teeth, premolars, crowned molar, root canal treatment of abutment teeth in maxillary and mandible, vital pulp therapy in anterior and posterior teeth, apexification of anterior and posterior teeth, root canal treatment of anterior, premolar, maxilla molar and mandible molars which are calcific, root canal treatment in traumatized teeth, root canal treatment of tooth with lesion from 2*2 mm or higher than 2*2 mm, root canal treatment of teeth with fistula, root canal treatment of teeth with cellulite, epico surgery of anterior mandible and maxillary teeth, Root canal treatment of premolar and anterior curved teeth with 0-20 or 20-40 curve angle.

These questions are related to conditions that made general dentist to refer the patient to a root canal treatment professional. This questionnaire was based on other studies [2, 5, 8, 10, 11].

This questionnaire is validated by professional of root canal treatment in Ahavaz University. After visiting dentists, first questionnaire was explained then their consent was attained and finally the questionnaire was distributed. At last questionnaire was collected at the end of the da. Data were analyzed by 20th version of SPSS software. In order to analyzed data we used descriptive statistic such as frequency distribution table, percentage, mean, standard deviation, Chi square tests, Fisher test, and Spearman correlation test. Level of significant of the test was $p<0.05$.

RESULTS

Out of 130 participators in this study, 30.1% (31 dentists) were female and 69.9% (72dentists) were male. Average of job experience was 7.61 (4.917) years with minimum 1 year of experience and maximum of 22. Results of table 1 indicates that maximum reference is related to: 1- 51epico surgery of anterior mandible teeth (49.5%), 2- 47 epico surgery of anterior maxillary teeth (47%) and 3- root canal treatment of premolar or corowned molar teeth with 20-40 angle (32%). Root canal treatment of premolar or curved teeth with 0-20 curve angle was 32%.

Prevalence of prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful based on their gender is indicated in table 2. Female dentists are referring patients to professionals more than male dentists ($p<0.05$).

Prevalence of prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful based on their age is indicated in table 3. Based on Spearman correlation test, when dentist is getting older they are more willing to perform root canal treatment and not referring them to professionals ($p<0.05$).

Prevalence of prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful based on their job experience is indicated in table 4. Based on Spearman correlation test, when dentist is getting more experienced they are more willing to perform root canal treatment and not referring them to endodontists ($p<0.05$).

Table 1: Prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful

Row	Question	I refer		I perform	
		numbers	percent	numbers	Percent
1	Second maxillary molar teeth	9	8.7	94	91.3
2	Second mandibular molar teeth	9	8.7	94	91.3
3	Third maxillary molar teeth	13	12.6	90	87.4
4	Third mandibular molar teeth	10	9.7	93	90.3
5	Retreatment of 1 to 5th maxillary teeth	8	7.8	95	92.2
6	Retreatment of 1 to 5th mandibular teeth	9	8.7	94	91.3
7	Retreatment of maxillary molar	23	22.3	80	77.7
8	Retreatment of mandibular molar	23	22.3	80	77.7
9	Root cacnal treatment of anterior crowned teeth	5	4.9	97	95.1
10	Root cacnal treatment of premolar crowned teeth	6	5.8	97	94.2
11	Root cacnal treatment of molar crowned teeth	5	4.9	98	95.1
12	Root canal treatment of abutment teeth in maxilla	1	1	102	99
13	Root canal treatment of abutment teeth in mandible	1	1	102	99
14	Vital pulp therapy in anterior teeth	0	0	103	100
15	Vital pulp therapy in posterior teeth	4	3.9	99	96.1
16	Apexification of anterior teeth	27	26.2	76	73.8
17	Apexification of posterior teeth	26	25.2	77	74.8
18	Root canal treatment of anterior maxilla molars which are calcific	3	2.9	100	97.1
19	Root canal treatment of anterior molar and mandible molars which are calcific	2	1.9	101	98.1
20	Root canal treatment of anterior, premolar, maxilla molar molars which are calcific	3	2.9	99	97.1
21	Root canal treatment of anterior, premolar and mandible molars which are calcific	4	3.9	99	96.1
22	Root canal treatment in traumatized teeth	3	2.9	99	96.1
23	Root canal treatment of tooth with lesion that occupies 2*2 mm of tooth	4	3.9	98	96.1
24	Root canal treatment of tooth with lesion that occupies higher 2*2 mm of tooth	6	5.9	96	94.1
25	Root canal treatment of teeth with fistula	13	12.7	89	87.3
26	Root canal treatment of teeth with cellulite	31	30.4	71	69.6
27	Epico surgery of anterior maxillary teeth	47	47	53	53
28	Epico surgery of anterior mandible teeth	51	49.5	49	47.6
29	Root canal treatment of anterior curved teeth with 0-20 curve angle	16	16	84	84
30	Root canal treatment of anterior curved teeth with 20-40 curve angle	29	28.7	72	71.3
31	Root canal treatment of premolar or molar curved teeth with 0-20 curve angle	19	19	81	78.6
32	Root canal treatment of premolar or molar curved teeth with 20-40 curve angle	32	32	68	68

Table 2: Prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful based on their gender

Row	Question	I refer		I perfrom		P Value
		Female	Male	Female	Male	
		Number (percentage)	Number (percentage)	Number (percentage)	Number (percentage)	
1	Second maxillary molar teeth	(44.4%) 4	(55.6%) 5	(28.7%) 27	(71.3%) 67	0.326*
2	Second mandibular molar teeth	(44.4%) 4	(55.6%) 5	(28.7%) 27	(71.3%) 67	0.326*
3	Third maxillary molar teeth	(53.8%) 7	(46.2%%) 6	(26.7%) 24	(73.3%) 66	0.046*
4	Third mandibular molar teeth	(50%) 5	(50%) 5	(28%) 26	(72%) 67	0.149*
5	Retreatment of 1 to 5th maxillary teeth	(87.5%) 7	(12.5%) 1	(25.3%) 23	(74.7%) 71	0.000*
6	Retreatment of 1 to 5th mandibular teeth	(77.8%) 7	(22.2%) 2	(25.5%) 24	(74.5%) 70	0.001*
7	Retreatment of maxillary molar	(52.2%) 12	(47.8%) 11	(23.8%) 19	(76.2%) 61	0.009*
8	Retreatment of mandibular molar	(56.5%) 13	(43.5%) 10	(22.5%) 18	(77.5%) 62	0.002*
9	Root cacnal treatment of anterior crowned teeth	(80%) 4	(20%) 1	(26.8%) 26	(73.2%) 71	0.02**
10	Root cacnal treatment of premolar crowned teeth	(83.3%) 5	(16.7%) 1	(26.8%) 26	(73.2%) 71	0.003**
11	Root cacnal treatment of molar crowned teeth	(100%) 5	(0.0%) 0	(26.5%) 26	(73.5%) 72	0.000**
12	Root canal treatment of abutment teeth in maxilla	(0.0%) 0	(100%) 1	(30.4%) 31	(69.6%) 71	0.510**
13	Root canal treatment of abutment teeth in madible	(0.0%) 0	(100%) 1	(30.4%) 31	(69.6%) 71	0.510**
14	vital pulp therapy in anterior teeth	-	-	(30.1%) 31	(69.9%) 72	-
15	vital pulp therapy in posterior teeth	(50%) 2	(50%) 2	(29.3%) 29	(70.7%) 70	0.582**
16	apexification of anterior teeth	(40.7%) 11	(59.3%) 16	(26.3%) 20	(73.7%) 56	0.180*
17	apexification of posterior teeth	(42.3%) 11	(57.7%) 15	(26%) 20	(74%) 57	0.116*
18	root canal treatment of anterior maxilla molar which are calcific	(66.7%) 2	(33.3%) 1	(29%) 29	(71%) 71	0.218**
19	root canal treatment of anterior mandible molar which are calcific	(100%) 2	(0.0%) 0	(28.7%) 29	(71.3%) 72	0.089**
20	root canal treatment of premolar and maxilla molars which are calcific	(100%) 3	(0.0%) 0	(27.3%) 27	(72.7%) 72	0.02**
21	root canal treatment of premolar and mandible molars which are calcific	(100%) 4	(0.0%) 0	(27.3%) 27	(72.7%) 72	0.007**
22	root canal treatment in traumatized teeth	(100%) 3	(0.0%) 0	(28.3%) 28	(% 71.7) 71	0.02**
23	Root canal treatment of tooth with lesion that occupies 2*2 mm of tooth	(100%) 4	(0.0%) 0	(27.6%) 27	(72.4%) 71	0.007**
24	Root canal treatment of tooth with lesion that occupies above 2*2 mm of tooth	(83.3%) 5	(16.7%) 1	(27.1%) 26	(72.9%) 70	0.01**
25	root canal treatment of teeth with fistula	(53.8%) 7	(46.2%) 6	(27%) 24	(73%) 65	0.06**
26	root canal treatment of teeth with cellulite	(41.9%) 13	(58.1%) 18	(25.4%) 18	(74.6%) 53	0.09*
27	epico surgery of anterior maxillary teeth	(40.4%) 19	(59.6%) 28	(20.8%) 11	(79.2%) 42	0.03*
28	epico surgery of anterior mandible teeth	(41.2%) 21	(58.8%) 30	(18.4%) 9	(81.6%) 40	0.01*
29	Root canal treatment of anterior curved teeth with 0-20 curve angle	(37.5%) 6	(62.5%) 10	(29.8%) 25	(70.2%) 59	0.564**
30	Root canal treatment of anterior curved teeth with 20-40 curve angle	(51.7%) 15	(48.3%) 14	(22.2%) 16	(77.8%) 56	0.004*
31	Root canal treatment of premolar or molar curved teeth with 0-20 curve angle	(47.4%) 9	(52.6%) 10	(25.9%) 21	(74.1%) 60	0.06*
32	Root canal treatment of premolar or molar curved teeth with 20-40 curve angle	(53.1%) 17	(46.9%) 15	(19.1%) 13	(80.9%) 55	0.001*

Table 3: Prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful based on their age

Row	Question	Number	Correlation Coefficient	P Value
1	Second maxillary molar teeth	103	0.390	0.000
2	Second mandibular molar teeth	103	0.390	0.000
3	Third maxillary molar teeth	103	0.411	0.000
4	Third mandibular molar teeth	103	0.396	0.000
5	Retreatment of 1 to 5th maxillary teeth	103	0.405	0.000
6	Retreatment of 1 to 5th mandibular teeth	103	0.418	0.000
7	Retreatment of maxillary molar	103	0.441	0.000
8	Retreatment of mandibular molar	103	0.429	0.000
9	Root cacnal treatment of anterior crowned teeth	102	0.229	0.021
10	Root cacnal treatment of premolar crowned teeth	103	0.152	0.125
11	Root cacnal treatment of molar crowned teeth	103	0.183	0.064
12	Root canal treatment of abutment teeth in maxilla	103	-0.038	0.700
13	Root canal treatment of abutment teeth in mandible	103	-0.038	0.700
14	vital pulp therapy in anterior teeth	103	-	-
15	vital pulp therapy in posterior teeth	103	0.196	0.047
16	apexification of anterior teeth	103	0.273	0.005
17	apexification of posterior teeth	103	0.292	0.003
18	root canal treatment anterior maxillary teeth molars which are calcific	103	0.209	0.034
19	root canal treatment anterior mandibular teeth which are calcific	103	0.135	0.173
20	root canal treatment of premolar and maxilla molars which are calcific	102	0.174	0.081
21	root canal treatment of premolar and mandible molars which are calcific	103	0.220	0.025
22	root canal treatment in *traumatized teeth*	102	0.259	0.009
23	*Root canal treatment of tooth with lesion that occupies 2*2 mm of tooth*	102	0.251	0.011
24	*Root canal treatment of tooth with lesion that occupies above 2*2 mm of tooth*	102	0.196	0.049
25	*root canal treatment of teeth with fistula*	102	0.400	0.000
26	*root canal treatment of teeth with* cellulite	102	0.432	0.000
27	epico surgery of anterior maxillary teeth	100	0.512	0.000
28	epico surgery of anterior mandible teeth	100	0.551	0.000
29	Root canal treatment of anterior curved teeth with 0-20 curve angle	100	0.376	0.000
30	Root canal treatment of anterior curved teeth with 20-40 curve angle	101	0.432	0.000
31	Root canal treatment of premolar or molar curved teeth with 0-20 curve angle	100	0.348	0.000
32	Root canal treatment of premolar or molar curved teeth with 20-40 curve angle	100	0.439	0.000

Table 4: Prevalence of general dentist patterns of referring to root canal treatment professionals in Dezful based on their job experience

Row	Question	Number	Correlation Coefficient	P Value
1	Second maxillary molar teeth	102	0.403	0.000
2	Second mandibular molar teeth	102	0.403	0.000
3	Third maxillary molar teeth	102	0.384	0.000
4	Third mandibular molar teeth	102	0.398	0.000
5	Retreatment of 1-5 maxillary molar	102	0.378	0.000
6	Retreatment of 1-5 mandibular molar	102	0.407	0.000
7	Retreatment of maxillary molar	102	0.448	0.000
8	Retreatment of mandibular molar	102	0.432	0.000
9	Root cacnal treatment of anterior crowned teeth	101	0.220	0.027
10	Root cacnal treatment of premolar crowned teeth	102	0.165	0.098
11	Root cacnal treatment of molar crowned teeth	102	0.179	0.071
12	Root canal treatment of abutment teeth in maxilla	102	0.000	1.000
13	Root canal treatment of abutment teeth in mandible	102	0.000	1.000
14	vital pulp therapy in anterior teeth	102	-	-
15	vital pulp therapy in posterior teeth	102	0.206	0.038
16	apexification of anterior teeth	102	0.377	0.000
17	apexification of posterior teeth	102	0.383	0.000
18	Root canal treatment anterior maxillary teeth molars which are calcific	102	0.218	0.027
19	Root canal treatment anterior mandibular teeth which are calcific	102	0.149	0.134
20	Root canal treatment of premolar and maxilla molars which are calcific	101	0.134	0.180
21	Root canal treatment of premolar and mandible molars which are calcific	102	0.185	0.063
22	root canal treatment in *traumatized teeth*	101	0.259	0.009
23	*Root canal treatment of tooth with lesion that occupies 2*2 mm of tooth*	101	0.259	0.009
24	*Root canal treatment of tooth with lesion that occupies above 2*2 mm of tooth*	101	0.180	0.072
25	*root canal treatment of teeth with fistula*	101	0.432	0.000
26	*root canal treatment of teeth with* cellulite	101	0.487	0.000
27	epico surgery of anterior maxillary teeth	99	0.579	0.000
28	epico surgery of anterior mandible teeth	99	0.603	0.000
29	Root canal treatment of anterior curved teeth with 20-40 curve angle	99	0.418	0.000
30	Root canal treatment of anteriorcurved teeth with 20-40 curve angle	100	0.452	0.000
31	Root canal treatment of premolar or molar curved teeth with 0-20 curve angle	99	0.390	0.000
32	Root canal treatment of premolar or molar curved teeth with 20-40 curve angle	99	0.470	0.000

DISCUSSION

Studies showed that high percentages of medical career are physicians and general dentsits as providers of first care giving. In contrast to many physicianary career, dentistry professionals are very rare rather than general one and it is around 20% professionals and 80% general dental practitioners which makes nature of dentistry more complicated [1,13]. All attempts of physiciance is leading patients to have healthy life. Quality and balance of a treatment can be affected by a good reference pattern. If reference system is used appropriately, diagnosis and treating disease becomes more simple and successful. In addition, inappropriate ference has some negative effects and delay in diagnosis and treatment [3]. General dental practitioners act as gatekeepers for specialist dental care because they generally decide whether, when, and where to refer patients for specialist care [2]. The aim of this study was to evaluate the referral patterns of general dentists to endodontics in Dezful city.

Results of the study show that most cases of refereeing are epico surgery of anterior mandible teeth (49.5%), epico surgery of anterior maxillary teeth (47%) and root canal treatment of premolar teeth or curved molars with 20-40 angle (32%).

In Peciuliene *et al* research (2010) broken tools, dental trauma, problems in diagnosis and then persistent symptoms were the main causes of professional reference [4]. In Caplan *et al* study (1999) showed that 75% general dentists refered patients due to broken tools or ledged canals [12].
In Lin et al study (2007) performed in Tiwan most common cause of reference was calcific canals, retreatment of root canal, persistent symptoms or long term ones [10]. In Neatherland, Ree *et al* (2003) the most common of reference was obliteration of canal, perforation, resorption, and persistent symptoms [11].

According to the study in England main reason of referring to endodontiss was retreatment (20%), controlling pain of inflammation (14%), not able to diagnosis of endodontic disease cause (13%) [3]. In Abbot study (1994) main reason of referring was diagnosis and treatment of the pain (24%), calcific canals (18%), trauma (13%), operation (7%) and perforation (6%) [14].
Studies reported female dentists refer patients to the endodontists better than male dentists, because it seems they are more prudent than male dentists. In Tavakolinejad *et al*., study (2015) it was illusterated that ale dentists refer patients to the endodontists better than male dentists.

Average age of dentists (Standard deviation) was 34.96 (5.782) in which minimum age was 26 and maximum age was 52. In this study 30.1% were female dentists and 69.9% were male. Average of job experience was 7.61 (4.917) years with minimum 1 year of experience and maximum of 22. By increase of age and experience participators were getting more eager to perform treatment by their own ($p<0.05$). These finding indicates that reference system is not controlled appropriately and most dentist are willing to carry out treatment by themselves. In contrast to this study, Tavakolinejad *et al* (2015) had more positive view toward reference by getting older and more experienced [3]. In Clark et al study 90% dentist believed that reference system is necessary and 82% patients needed complicated clinical care so they need to be referred [15]. In Ree *et al* study (2003) most dentist (83%) had more than 10 years of experience so their study cleared that job experience has no effect on reference and most dentist (87%) preferred to refer patients to the endodontist [11]. In Caplan *et al* study dentists had10 years of experience and more and by having more experience their willingness to reference had been increased which is not compatible with our results [12].

In Abbot et al study (2011) 94% general dentists had positive view towards reference ot endodontists byt only 46% patients who needed root canal treatment were referred to professionals [8]. In Peciuliene *et al*., (2010), 72.1% Litwanian dentists carried out complicated root canal treatment and only 19% refreed the to endodontists [4]. In Berlin *et al*., study (2015) only 40% of complicated root canal treatment s was performed by general dentists [6].

Difference of these researches with our study is due to dentistry training courses, attaining required skills and social differences. In addition, one of the other reasons is lacking a good pattern or not mentioning to importance of this subject and also it is due to laco of good relationship between general dentist and endodontist or misunderstandings between them.

CONCLUSION

Results of the study show that most cases of refereeing are epico surgery of anterior mandible teeth (49.5%), epico surgery of anterior maxillary teeth (47%) and root canal treatment of premolar teeth or curved molars with 20-40 angle (32%). female dentists refer patients to the endodontists better than male dentists. By getting older and having more experience, dentists prefere to perform root canal treatment by their own ($P<0.05$).

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