

Evaluation of the Reasons for Tooth Extraction Amongst Patient Referred to Tabriz School of Dentistry, Iran

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Abstract: Damage to the tooth and its supporting structure is one of the commonest problems amongst patients. Tooth extraction is always the last choice in dentistry. This study aimed to determine the causes of tooth extraction in patients referred to the surgical ward of Tabriz Dentistry School. This analytical descriptive cross-sectional study was performed on 200 patients from September 2014 until August 2015. General information of the patient, site and causes of tooth extraction after clinical examination were recorded in a questionnaire. Data was recorded in SPSS software version 16 and was analyzed by using descriptive statistics (frequency, percentage) and analysis χ^2 and $p < 0.05$ was considered significant. In this study, 200 patients were studied (66 men and 134 women). The most common causes of tooth extraction were irreparable dental caries (74.5%), misplaced teeth (29.5%) and complete denture therapy (3.5%). Complete denture therapy was seen more at the ages of 50 (61.4%) and with less frequency at the age groups 10-20 and 21-30 years old. Dental caries is still the main reason of tooth extraction without considering the age and sex. Other than dental caries, misplaced teeth were also a common cause for extraction.

Key words: Tooth extraction, dental caries, periodontal disease, clinical examination, misplaced teeth

INTRODUCTION

Today with significant advances in dentistry as well as considering the vital role of tooth in individual's health, beauty and chewing, protecting teeth is necessary until the old ages. Tooth extraction is allowed only with the scientific evidence and as the last way for dental treatment. However, in poor and developing countries, high rates of tooth extraction is regrettable and controversial (Peterson *et al.*, 2003; Yazdani *et al.*, 2008; Danielson *et al.*, 2011; Aliabadi *et al.*, 2014). Now a days, the dentistry science generally emphasizes on maintenance of teeth for keeping their possible function.

Teeth have important role in chewing, esthetics and phonation, hence maintaining them can not only guarantee a good oral health but also general health of an individual while teeth loss can have negative effects on quality of life in terms of biological, psychological and social aspects. Therefore, permanent teeth extraction as a part of the treatment plan should be avoided as much as possible (Peterson *et al.*, 2003; Daameh, 2006; Aliabadi *et al.*, 2014).

Various studies have been carried out in the world to determine the tooth extraction reasons (McCaul *et al.*, 2001; Eskandarizadeh *et al.*, 2002; Alesia and Khalil, 2013). In most studies, dental caries has been the most common

cause of tooth extraction before age 40 and periodontal among over 40 years has been one of the most important factors. In addition, gender and dental treatments as well as regular dental visit could be involved in this matter. Other teeth extraction causes are extraction of impacted teeth for orthodontic treatments, dental implants, impacted tooth and Pericoronitis (McCaul *et al.*, 2001; Daameh, 2006; Aida *et al.*, 2009).

Being aware of the major causes of tooth extraction, proper prevention and training methods can be designed and implemented to reduce teeth extraction significantly and also by comparing the results of this study with similar studies in later years, Preventive methods can be designed.

Reasons for tooth extraction in various countries and even the results of studies in developed countries are different, conducting a study in Iran seems necessary (Ong *et al.*, 1996; Jovino-Silveira *et al.*, 2005; Medina-Solis *et al.*, 2012). However, there is not enough information in Iran which requires further study with regard to the cultural, social and economic differences of Iran with other countries in order to implement the programs of tooth extraction prevention and improving the oral health in our country. Therefore, the study was implemented to determine the tooth extraction reasons among patients referred to the Surgery Ward of Dentistry Faculty of Tabriz.

MATERIALS AND METHODS

Questionnaire was used to collect and record data from September 2014 until August 2015. In the first part of the questionnaire the demographic data of samples including gender, age, education level and occupation was recorded. In the second part, the type of tooth and reason for its extraction was recorded. Tooth extraction reasons of patients were categorized in 8 groups that respectively were as follows:

- Severe and incurable caries
- Incurable periodontal disease
- Impacted tooth
- Orthodontic treatment
- Economic considerations
- Misplaced teeth
- Complete denture therapy

Other reasons including:

- Pericoronitis
- Endodontic treatment failure
- Supernumerary tooth
- Teeth engaged with jaw fractures
- Tooth extractions due to the systemic disease
- Traumatic fractures of tooth and tooth with pathological lesions
- Cracked tooth and treatment before radiotherapy (Peterson *et al.*, 2003)

Sampling was done in sequential way, so that all patients respectively responded to the questions of researcher during the examination and before tooth extraction. The data was collected through interviews, observation and examination then was recorded on data forms.

After examination and analyzing available radiographs the exact etiology of tooth extraction was recorded for each patient. The examination stages and teeth extraction were done under the supervision of oral and maxillofacial surgery expert and data was recorded. Decision for tooth extraction was proposed by professor of surgery section but sometimes for the economic consideration when tooth was extracted upon patients request on basis of financial constraints. Full explanation of the ways to keep the tooth was described to patients as well as the problems caused by tooth loss and then they were introduced to different parts of the school. Extraction was carried out for the patients who opted for that modality of treatment despite being introduced to different conservation treatment modalities. The misplaced teeth refer to teeth that traumatize the soft tissue and could not be aligned by orthodontic treatment. In incurable caries, the tooth restoration is impossible.

The periodontal diseases are problems in which the tooth becomes loose due to the reasons such as bone resorption or deep plaques, so it should be extracted. Impacted tooth refers to tooth that fails to erupt into the dental arch within the expected developmental window. Orthodontic reason refers to extraction of a tooth or teeth for creating space so as to align the remaining teeth. Patients who did not wish to participate in this study or had incompletely filled files were excluded from this study.

Data analysis: Patient data was recorded in SPSS software version 16 and was analyzed by using descriptive statistics (frequency, percentage) and analysis (χ^2) and $p < 0.05$ was considered significant.

Ethical considerations: After giving explanation and purpose of the study, consent was sought from the patients or their caretakers. Every interviewed patient or caretaker was assured of the confidentiality of the information. Written consent was obtained from all patients. This study was approved by the Ethics Committee in Human of Tabriz University Dental School.

RESULTS

In this study, 200 patients who were referred to the Oral and Maxillofacial Surgery ward of Dentistry Faculty of Tabriz university of Medical Sciences for tooth extractions were evaluated. Of which 134(67%) were female and 66(33%) were male. According to Table 1, the lowest age group that was referred for tooth extraction was between 10-20 years old that constituted the 22 patients (11%) while age group 21-30 years old had most patients (65 patients 32.5%). The tooth extraction had a direct relationship with age for patients above 31 years old ($p < 0.001$; 480 teeth (64%).

Table 2 presents data of the patient in respect to their employment status. Frequency distribution of educational level of patients revealed that 9 patients (4.5%) no formal education 76 patients (38%) had diploma (high school diploma) and 53 patients (26.5%) had university degree. In this study, 193 patients (96.5%) who were referred for tooth extraction lived in urban areas and 7 patients (3.5 %) lived in rural areas.

Distribution of reasons for tooth extraction among patients in Table 3. There was a significant relationship between tooth extraction reasons and gender of patients ($p < 0.001$). Although, tooth extraction due to dental caries was distributed near equally among males (79.5%) and females (60.4) but also misplaced teeth (26.7%) more common in woman than men (10.06%).

The relationship between the causes of tooth extractions and age are demonstrated in Fig. 1. Complete denture therapy was seen more at the ages of 50(61.4%)

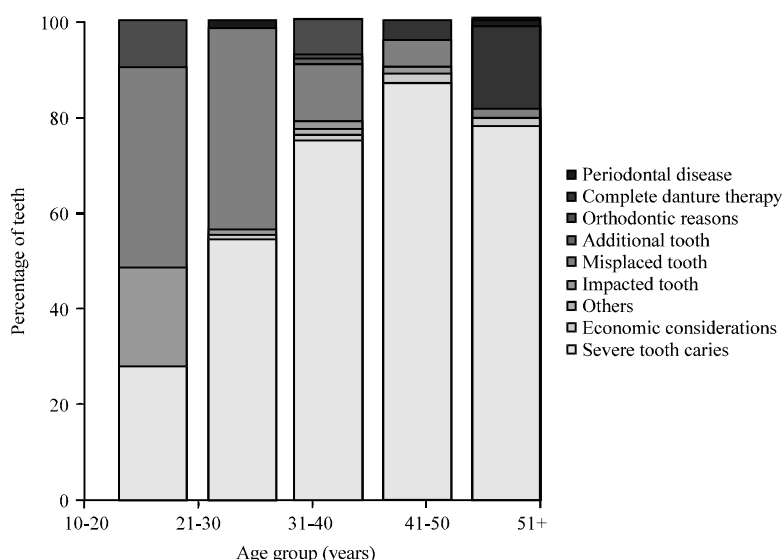


Fig. 1: The relationship between the causes of tooth extractions and age

Table 1: Frequency distribution of patient's age

Patient age (Years)	Number of patient		Tooth	
	Number	Percentage	Number	Percentage
10-20	22	11.0	60	8.0
30-21	65	32.5	210	28.0
40-31	47	23.5	168	22.4
50-41	38	19.0	158	21.1
Over 51	28	14.0	154	20.5
Total	200	100.0	750	100.0

Table 2: Frequency distribution of patient's employment status

Employment status of patients	Patient		Tooth	
	Number	Percentage	Number	Percentage
Self employed	34	17.0	223	29.7
Employed	25	12.5	72	9.6
Housewife	100	50.0	320	42.7
Unemployed	8	4.0	33	4.4
Others	33	16.5	102	13.6
Total	200	100.0	750	100.0

Table 3: Frequency distribution of reasons for tooth extraction among patients

Reasons for tooth extraction	Patient		Tooth		F/M
	Number	Percentage	Number	Percentage	
Severe dental caries	149	74.5	516	68.8	255/261
Misplaced tooth	59	29.5	146	19.5	113/33
Complete denture therapy	7	3.5	44	5.9	30/14
Impacted tooth	6	3.0	17	2.3	7/10
Economic considerations	6	3.0	8	1.1	4/4
Periodontal disease	4	2.0	6	0.8	4/2
Orthodontic reasons	3	1.5	7	0.9	5/2
Additional tooth	2	1.0	3	0.4	3/0
Pulp necrosis	1	0.5	1	0.1	0/1
Cracked tooth	1	0.5	1	0.1	1/0
Teeth with pathologic lesions	1	0.5	1	0.1	0/1
Treatment before radiotherapy	0	0.0	0	0	0
Total	239	100.0	750	100	-

and with less frequency at the age groups 10-20 and 21-30 years old. Supernumerary tooth was expressed more at the ages of 31-40 (66.7%) as the reason for tooth extraction (Fig. 1).

The most frequently extracted teeth were the maxillary right and left third molars (23%), followed by mandibular third molars (12%).

Orthodontic reasons and misplaced teeth were observed more at the ages of 10-20 and less at age groups over 50 years old (0.0%).

Reasons such as pulp necrosis, cracked tooth and tooth with pathological lesions were more common among the age group 31-40 (66.7%).

"Periodontal disease", "severe dental caries", "complete denture therapy" and "economic

considerations" were seen more in patients with elementary education level and less frequent in those with lower education level (0.0%).

"Orthodontic reasons" (71.4%) and "Supernumerary tooth" (66.7%), "impacted tooth" were seen more in patients with secondary education level and less frequency with no formal education level.

Tooth extraction due to the "misplaced tooth" was observed more in patients with undergraduate education (54.1%) and lower with no formal education level (0.0%).

The misplaced tooth was observed less in unemployment (6.2%). The economic considerations are more in housekeeping employment status (50.0%) and less in clerk employment (0.0%).

Most of the people who were admitted for tooth extraction had expressed their monthly income between 150-300 US dollars. The study reveals that 96.5% of subjects were living in the city.

DISCUSSION

Protection of the teeth and their supporting tissue until old age indicates good hygiene practices and healthy eating behavior of an individual and on the other hand it shows the efficiency of health system of a given society. One of the problems in patient's mouth and tooth refers to destruction of tooth or its supporting tissues in which the consequence of such destruction, regardless of the high costs to get health care that the vast majority of society are unable to pay has a great impact on the social health, beauty and the appearance of all individuals in a society. In the current study, it was found that female patients had higher frequency of tooth loss when compared to their male counterpart, the similar findings were observed in studies in Tabriz (Yazdani *et al.*, 2008), Scotland (McCaul *et al.*, 2001), Japan (Aida *et al.*, 2009), Greece (Chrysanthakopoulos, 2011), Saudi Arabia (Alesia and Khalil, 2013) and while contrary to our findings, a study in Brazil found male predominance (Montandon *et al.*, 2012; Aliabadi *et al.*, 2014). This observed difference between male and female can be attributed to women pay more attention to their beauty or health and also they have more free time to go to for dental treatment (Eskandarizadeh *et al.*, 2002; Alesia and Khalil, 2013).

In the current study, it was found that most patients' age group those admitted for tooth extraction was between 21-30 (32.5%) and follow by 31-40 (23.5%) years old. The similar findings were observed in studies in Tehran (Jafarian and Etebarian, 2012) and Scotland (McCaul *et al.*, 2001) while contrary to our findings, a study in Tabriz by Yazdani *et al.* (2008) most patients' age group was between 40-49.

The third molar was the most often extracted tooth. Overall, caries was found to be the principal reason for loss of all tooth types apart from lower incisors which were extracted mainly for periodontal reasons. However, below 21 years, 68% of premolar extractions were performed for orthodontic purposes. In the current study, education level of most of the patient was high school graduates ($n = 53$, 26.5%), unlike study by Yazdani which reported high number of patient had informal education and a study in Tehran which reported most of the patients were high school drop-outs.

In this study majority of women were housewives (50%) which were similar to the study of Jafarian and Etebarian (2012). This issue indicate that high prevalence

of tooth extraction can be attributed to the awareness rate of this group of society. Most of the people who were referred for tooth extraction, expressed that, their monthly income was between 150-300 US dollars that encompasses the lower middle class which was again similar to the study of Tabriz and Afghanistan (Daameh, 2006; Yazdani *et al.*, 2008). Epidemiological studies have shown that subjects of low income and education are more likely to be edentulous than their complements of higher income and education (Barker *et al.*, 2009).

In this study, the presence of dental caries was the most common reason for tooth extraction (74.5%). A significant difference ($p = 0.00$) was observed between the sexes of patients in the various reasons for tooth extraction.

Both caries and misplaced teeth were found to be the main reasons for tooth extractions in both sexes but more females than males had extractions as part of a complete denture therapy. This is in agreement with other studies but it is not in agreement with the Scottish survey of 2001 (Reich and Hiller, 1993; McCaul *et al.*, 2001; Yazdani *et al.*, 2008).

It is clear that the presence of dental caries is the most prevalent reason for tooth extraction in Iranian patients. Similar percentages were shown in previous studies by Yazdani *et al.* (2008) in Iran, Oginni (2005) in Nigeria, MacCaul *et al.* (2001) in Scotland and Angelillo *et al.* (1996) in Italy. This is most likely due to the patient's lack of knowledge about oral health, lack of dental health maintenance and poor nutrition. Also, the lack of financial ability to pay for the treatment of dental disease impacts the willingness of patients to get a tooth extraction (Lee *et al.*, 2015).

In this study, the presence of dental caries was the reason cited for extractions in 74.5% of the patients. Studies of extractions due to the presence of caries in Nigeria (Oginni, 2005), the UK (Lesolang *et al.*, 2009), Italy (Angelillo *et al.*, 1996) and Bangladesh (Akhter *et al.*, 2008) reported 56.4, 37, 34.4, 67.5%, respectively.

In this study, a poorly positioned tooth was cited as the second most common reason for extractions in 59 patients (29.5%) and of a total of 146 teeth (19.5%). Periodontal disease was cited as the reason for extractions in only 4 patients (2%). According to Alesia's study in Saudi Arabia, dental caries factors associated with orthodontic problems have been reported as the more prevalent reasons for tooth extraction (Alesia and Khalil 2013). Periodontal disease as a reason for extraction was observed in studies in German and Asian populations and were reported at 20.7 and 35.8%, respectively (Hull *et al.*, 1997; Akhter *et al.*, 2008).

This difference may be due to the heterogeneity of the population sampling used. The development of dental

caries and periodontal diseases in recent decades, treatment with various diagnostic and therapeutic methods, oral health of the studied population, financial considerations and the number of follow-up dentistry visits for patients can all affect the results.

In a study conducted in Rafsanjan, Iran in 2009, the most common cause of tooth extraction was the patient's request and healthy teeth were extracted with the patients' willingness (Aliabadi *et al.*, 2014). This may be due to the patients' lack of awareness about the disadvantages of prosthesis usage, low level of oral hygiene and lack of attention to dental maintenance (Chestnutt *et al.*, 2000). In our study, tooth extraction due to the patients' willingness was seen in only 8 patients (4%) and it was due to additional reasons in the case of other patients. These patients were less educated than others in the study. Reasons for extractions may have changed in this region over recent years due to advance in preventive measures and an increased awareness of the importance of regular dental checkups.

In this study, tooth extraction had a direct relationship to age. This is similar to results from studies conducted in Japan and other countries (Kabat, 2007; Aida *et al.*, 2009).

This study showed that with increasing age, the presence of dental caries was the main reason for tooth extraction and this is similar to the study conducted in Scotland (McCaul *et al.*, 2001). Improving hygiene and oral care is important in retaining permanent teeth until old age. Studies in many countries and on several continents indicate that the decision to extract a tooth is based on several factors related to both the patient and the dentist (Chestnutt *et al.*, 2000; Peimani and Bakhshi, 2011). These factors can be affected by the experience of the dentist, aesthetics, prosthetic considerations and the economic status of the patient.

In this study as in Chestnut *et al.* (2000) and Peymani and Bakhshi (2011), most patients were between 20-30 years of age. In our study, 20% of the patients were under 20 years of age and orthodontic treatment was the less prevalent condition for tooth extraction in this age group (1.5%). Some studies, like the Scottish survey showed that orthodontic treatment in the age 20 and under age group and the presence of dental caries in the age 20 and above group were the most common reasons for tooth extraction (McCaul *et al.*, 2001). This was in contrast to other studies conducted in 2000 also in Scotland, where the presence of dental caries and periodontal disease in Both groups were equal causes of tooth extraction (Kay and Blinkhorn, 1986). Our study confirmed periodontal disease was a

frequent reason for tooth extraction with increasing age. Based on these aspects, an effective case-finding approach is mandatory and the targeted population approach for people of more than middle age might be required.

When patients were examined in terms of economic status, the largest number of tooth extractions was seen in people with a monthly income of 150 USD; complete denture application and the presence of dental caries were the main reasons. This shows the importance of finances and lack of insurance coverage in this group which unfortunately is consistent with Kabat's statistics (Kabat, 2007). These results indicate that more teeth were extracted because of the presence of caries and this highlights the need to increase prevention programs and promote periodic examinations using audio-visual media and other forms of advertising to encourage preventative measures (Adegoroye *et al.*, 2010). Although, this study showed that it is possible to obtain information on oral health issues from patients presenting to the outpatient facilities of hospitals and dental health centers in the dentistry university the findings may not be representative of Iran as a whole. Also, it should be noted that his study sample was biased because the visits by individuals attending these clinics were problem-based. Given the limited infrastructure of oral health services in Tabriz city, the prevalence rates of the conditions reported here are unlikely to be overestimated. In summary, it is important to consider the social aspects of oral health such as management-seeking behaviors, hygiene practices and opinions about the association between teeth and the health of the entire body.

CONCLUSION

The findings of this survey indicated that, the presence of caries was the principal reason for tooth extraction in Tabriz, Iran. It seems that lack of awareness, illiteracy, economic problems of patients, high cost of dental treatment, lack of insurance coverage for conservative dental treatment and the society's trend toward using artificial teeth at older ages discourage patients from caring for their teeth. This study can be followed up by informing insurance officials of the findings and by continuing to raise awareness about dental health through the media.

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REFERENCES

- Adegoroye, B.S., U. Omolara and G.B. Eweniyi, 2010. Some Nigerian dentists and oral health workers assessment of the dental health care needs of their nation's primary school-age-children. *Int. J. Trop. Med.*, 5: 10-15.
- Aida, J., M. Morita, R. Akhter, H. Aoyama and M. Masui *et al.*, 2009. Relationships between patient characteristics and reasons for tooth extraction in Japan. *Community Dent. Health*, 26: 104-109.
- Akhter, R., N.M.M. Hassan, J. Aida, K.U. Zaman and M. Morita, 2008. Risk indicators for tooth loss due to caries and periodontal disease in recipients of free dental treatment in an adult population in Bangladesh. *Oral Health Prev. Dent.*, 6: 199-207.
- Alesia, K., H.S. Khalil, 2013. Reasons for and patterns relating to the extraction of permanent teeth in a subset of the Saudi population. *Clin. Cosmet. Investig. Dent.*, 5: 51-56.
- Aliabadi, E., E. Moayedie and J. Jamali, 2014. Study of reasons for extraction of permanent teeth in Shiraz 2012-2013. *J. Neyshabur Univ. Med. Sci.*, 2: 51-55.
- Angelillo, I.F., C.G. Nobile and M. Pavia, 1996. Survey of reasons for extraction of permanent teeth in Italy. *Commun. Dent. Oral Epidemiol.*, 24: 336-340.
- Barker, L., D.M. Malvitz and K.R. Phipps, 2009. Development and status of the national oral health surveillance system. *Prev. Chronic Dis.*, 6: 1-7.
- Chestnutt, I.G., V.I. Binnie and M.M. Taylor, 2000. Reasons for tooth extraction in Scotland. *J. Dent.*, 28: 295-297.
- Daameh, D., 2006. Reasons for permanent tooth extraction in the North of Afghanistan. *J. Dent.*, 34: 48-51.
- Danielson, O.E., A.C. Chinedu, E.A. Oluyemisi, B.O. Bashiru and O.O. Ndubuisi, 2011. Frequency, causes and pattern of adult tooth extraction in a Nigerian rural health facility. *Odontostomatol. Trop. Dent. J.*, 34: 5-10.
- Eskandarizadeh, A., B. Tajadod and S. Adhami, 2002. Indications for permanent tooth extraction in patients referred to kerman dental school 1999. *J. Dent. Sch.*, 20: 143-154.
- Hull, P.S., H.V. Worthington, V. Clerehugh, R. Tsirba and R.M. Davies *et al.*, 1997. The reasons for tooth extractions in adults and their validation. *J. Dent.*, 25: 233-237.
- Jafarian, M. and A. Etebarian, 2012. Reasons for extraction of permanent teeth in general dental practices in Tehran, Iran. *Med. Princ. Pract.*, 22: 239-244.
- Kabat, W.O.J.C.I.E.C.H., 2007. The reasons of tooth extraction taking into consideration the socio economical status during changes in the public health service in the west-pomeranian voivodeship. *Ann. Acad. Med. Stetin.*, 54: 127-135.
- Kay, E.J. and A.S. Blinkhorn, 1986. The reasons underlying the extraction of teeth in Scotland. *Br. Dent. J.*, 160: 287-290.
- Lee, C.Y., Y.Y. Chang, T.Y. Shieh and C.S. Chang, 2015. Reasons for permanent tooth extractions in Taiwan. *Asia Paci. J. Public Health*, 27: NP2350-NP2357.
- Lesolang, R.R., D.P. Motloba and R. Laloo, 2009. Patterns and reasons for tooth extraction at the Winterveldt Clinic: 1998-2002. *J. South Afr. Dent. Assoc.*, 64: 214-218.
- McCaul, L.K., W.M.M. Jenkins and E.J. Kay, 2001. Public dental health: The reasons for extraction of permanent teeth in Scotland: A 15-year follow-up study. *Br. Dent. J.*, 190: 658-662.
- Montandon, A.A.B., E.P. Zuza and B.E.C.D. Toledo, 2012. Prevalence and reasons for tooth loss in a sample from a dental clinic in Brazil. *Int. J. Dent.*, 20: 719-750.
- Oginni, F.O., 2005. Tooth loss in a sub-urban Nigerian population: Causes and pattern of mortality revisited. *Int. Dent. J.*, 55: 17-23.
- Ong, G., J.F. Yeo and S. Bhole, 1996. A survey of reasons for extraction of permanent teeth in Singapore. *Commun. Dent. Oral Epidemiol.*, 24: 124-127.
- Peimani, A. and H. Bakhshi, 2011. Assessment of the reasons for tooth extraction among patients referred to the Rafsanjan dental school (2008). *J. Rafsanjan Univ. Med. Sci. Health Serv.*, 10: 94-102.
- Peterson, L.J., E. Ellis, J.R. Hupp and M.R. Tucker, 2003. *Contemporary Oral and Maxillofacial Surgery*. 4th Edn., C.V. Mosby Co., St. Louis, ISBN: 0323-01887-4, pp: 18.
- Reich, E. and K.A. Hiller, 1993. Reasons for tooth extraction in the western states of Germany. *Commun. Dent. Oral Epidemiol.*, 21: 379-383.
- Silveira, R.C.J., A.D.F.C. Junior, E.H.A. de Souza and E.S. Gusmao, 2005. Primary reason for tooth extraction in a Brazilian adult population. *Oral Health Prev. Dent.*, 3: 151-157.
- Solis, C.E.M., A.P.P. Loyola, E.P. Campos, H.P. Cruz and R.D.L.R. Santillana *et al.*, 2012. Principal reasons for extraction of permanent tooth in a sample of Mexicans adults. *Rev. Invest. Clin.*, 65: 141-149.
- Yazdani, J., E. Khashabi and M. Ghavimi, 2008. Evaluation of the reasons for the extraction among patients referred to the oral surgery department, faculty of dentistry, Tabriz University of Medical Sciences between June and February 2005. *Med. J. Tabriz Univ. Med. Sci.*, 30: 139-142.