

PREVALENCE OF COMPLICATIONS OF SIMPLE TOOTH EXTRACTIONS AND ITS COMPARISON BETWEEN A TERTIARY CENTER AND PERIPHERAL CENTERS: A STUDY CONDUCTED OVER 8,455 TOOTH EXTRACTIONS

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ABSTRACT

This study was conducted to investigate and compare the prevalence of complications of simple tooth extractions in a tertiary centre (BP Koirala Institute of Health Sciences, Dharan) and the peripheral centers (Mechi and Koshi zonal hospitals). This is a prospective descriptive study.

Tooth extractions were carried out under local anesthesia in the tertiary and the peripheral centers during one year period (March 15th 2004 to March 15th 2005). Intraoperative and postoperative complications were recorded and analyzed.

Out of 8,455 tooth extractions in 6,639 [male-2,465 (37.12%) and females - 4,174 (62.88%)] patients aged between 5yrs- 65 yrs, 7,152 extractions were done in tertiary center and 1,393 extractions were done in peripheral centers. 90 complications (1.06%) were observed. 53(58.89%) complications were intraoperative and 37(41.12%) complications were postoperative. 60(0.84%) complications were observed in the tertiary center and 30 (2.3%) complications were observed in the peripheral centers and the difference was highly significant ($P<0.000001$). The most frequent complication in the tertiary centre was fracture of tuberosity (0.15%) and in the peripheral centers it was 'roots left' (0.77%). Prevalence of 'roots left', injury to adjacent tooth and postoperative hemorrhage was significantly high ($P<0.05$) in peripheral centers.

The higher prevalence rate of complications of tooth extractions in the peripheral centers should not be overlooked and well equipped and organized extraction procedure with qualified dental practitioner is strongly suggested to minimize the complications.

Key Words: Complications; intraoperative; postoperative; tooth extraction.

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INTRODUCTION

Tooth extraction is often considered as a minor and unimportant operation by many dentists. Attempting difficult cases without proper training may result in complications and serious infections which may require specialist help. Since earliest period of history the extraction of a tooth has been considered very formidable procedure by layman, even today the removal of a tooth is dreaded by the patient almost more than any other surgical procedure.¹ Simple extractions of teeth can become complicated when teeth are fractured. Adequate lighting, accessibility, visibility and surgical techniques are considered to be important in a tooth extraction procedure. Radiographs before tooth extraction and also during procedure are of great value to assist with tooth extractions.²

Many serious complications may occur during or after tooth extraction. Aspiration of a tooth is one of the serious complications especially in children and necessitates prompt recognition and early management to minimize the major and sometimes even fatal consequences.³ Patients requiring dental extraction who are debilitated by systemic diseases are of great concern. A bleeding tooth socket has been reported as the initial sign and presentation of chronic disseminated intravascular coagulopathy.⁴

In dentistry complications are unwanted consequences experienced during oral health care delivery.⁵ Complications either intra operative or postoperative are frustrating and daunting experiences to both patients and doctors. Upcoming advances in science and technology in medical and dental fields are aimed at quality care and treatment. In developing countries like Nepal we are working with limited resources and poor level of patient awareness regarding dental health. Data vis-a-vis complications of tooth extractions are lacking in our country. We set out to determine the prevalence of complications of simple tooth extractions and the study was conducted within one year of time period extending from 15th March 2004 to 14th March 2005. Aims of this study were to find out the prevalence of complications of tooth extractions in tertiary centre (BP Koirala Institute of Health Sciences hospital, Dharan) and in peripheral centers (Mechi and Koshi zonal

hospitals), to observe and compare the complications of tooth extractions with tertiary centre to the peripheral centers and to investigate the types and magnitudes of the intra operative and postoperative complications.

METHODS

Tooth extractions were carried out under local anesthesia, 2% lignocaine with 1:80,000 adrenaline and post extraction instructions were given to each patient. Teeth were extracted by dental surgeons and dental interns in peripheral centers (Mechi and Koshi zonal hospitals) during their compulsory community oriented rotational residential internship program; and by dental surgeons, dental interns, and dental students (4th year and 5th year) under the supervision of faculty members in tertiary center (BPKIHS hospital). In the tertiary center, consultants intervened the procedure only in case the students faced problems with simple tooth extractions. Complications were observed and compared in between the tertiary centre and the peripheral centers. As extraction of impacted tooth was not carried out as a routine procedure in peripheral centers due to lack of proper instrument till this study was conducted, it was not considered in this study. Patients were asked to report to the hospital if there was any problem and patients who presented with complications were recorded. Complications were recorded in accordance with their presentation either intra operative or postoperative and also in accordance with their occurrence whether in tertiary centre or in peripheral centers. Data are compared and analyzed by using Chi Square test, Chi Square test with Yates correction and Fisher exact Test using Epi- Info Version 6.0. Level of significance was set up at 5% and P value < 0.05 was considered to be statistically significant.

RESULTS

Eight thousand four hundred fifty five tooth extractions were carried out in 6,639 patients including 2,465 males (37.12%) and 4,174 females (62.88%, P<0.001) aged between 5 years to 65 years (table I). Out of 8, 4557 tooth extractions, 7152 tooth extractions were carried out in tertiary center and 1,303 tooth extractions were carried out in peripheral centers. 90 complications were

observed, and out of these complications 60 complications were in tertiary center and 30 complications were in peripheral centers (P<0.000002) (table III). Intraoperative complications in tertiary center and peripheral centers were 36 and 17 respectively (P=0.001). Similarly, postoperative complications in tertiary center and peripheral centers were 34 and 13 respectively (P=0.002), (table II).

Table I: Sexwise Distribution of Patients

Centre	Male	Female	Total	P value
Tertiary	1,913	3,478	5,391	<0.0001*
Peripheral	552	194	746	
Total	2,465	4,174	6,639	

* Statistically significant

Table II: Intraoperative and Postoperative complications in Tertiary Center and Peripheral Centers

Complications	Tertiary Center N=7,152	Peripheral Centers N=1,303	P value
Intra-Operative	36	17	0.001*
Post-operative	34	13	0.002*

* Statistically significant

Table III: Types and magnitude of complications in Tertiary center and Peripheral centers

Complications	Total N=8455	Tertiary Center N=7,152	Qbf Complications	Peripheral Centers N=1,303	Qbf Complications	P value
Pain felt	21	11	0.15	10	0.27	0.0015**
Postoperative bleeding	19	10	0.147	9	0.69	0.0039**
Fracture of alveolar bone	16	16	0.22	Nil	Nil	0.173†
Dry socket	11	7	0.092	4	0.31	0.13†
Retention of foreign body	5	3	0.042	2	0.15	0.17†
Injury to adjacent teeth	4	1	0.014	3	0.23	0.0129**
Overcrowd	3	3	0.042	Nil	Nil	NA
Overcrowd of adjacent teeth	2	2	0.028	Nil	Nil	NA
Fracture of root	2	1	0.014	1	0.07	NA
Fracture of crown	1	1	0.014	Nil	Nil	NA
Submandibular swelling	1	Nil	Nil	1	0.07	NA
Concussion of adjacent teeth	1	1	0.014	Nil	Nil	NA
Submandibular swelling of adjacent teeth	1	1	0.014	Nil	Nil	NA
Submandibular swelling of teeth	1	1	0.014	Nil	Nil	NA
Swallowing of teeth	1	1	0.014	Nil	Nil	NA
Total	90	60	0.84	30	2.3	0.000002

* Yates corrected chi square value

** Fisher exact test

Statistically significant, Nil - no complications observed

NA - not applicable

Complications with significant difference in between tertiary center and peripheral centers were; roots left ($P=0.0015$), postoperative hemorrhage ($P=0.0039$) and injury to adjacent tooth ($P=0.012$) (table III). In tertiary center the frequency of complications was in the order of; fracture of tuberosity (16), roots left (11), postoperative hemorrhage (10), dry socket (7), removal of wrong tooth (3), oroantral communication (3), osteomyelitis (2), injury to adjacent tooth (1), hematoma (1), facial nerve anesthesia (1), canine space infection (1), buccal space infection (1), submasseteric space infection (1), foreign body granuloma (1) and swallowing of tooth (1), and in the peripheral centers the order of frequency was; roots left (10), postoperative hemorrhage (9), dry socket (4), injury to adjacent tooth (3), removal of wrong tooth (2), hematoma (1), subcutaneous cervicofacial emphysema (1).

DISCUSSION

BP Koirala Institute of Health Sciences (BPKIHS) hospital is a tertiary center which is well equipped and is provided with specialists as compared to the peripheral centers. Prevalence of complications in the tertiary center was 0.84% where as it was 2.3% in the peripheral centers and the overall prevalence was 1.06%. Our study showed low prevalence in tertiary center and is not in agreement with the values, 1.1%,⁶ 3.4%,⁷ 2-4%⁸ in literature, but the prevalence of complications in the peripheral centers is in agreement with these values in the literature. Similar studies on complications after third molar extraction under local anaesthesia reported 12.6% for lower third molars and 2% for upper third molars and complications after third molar extraction under general anesthesia was 8.2% for lower third molars and 1.5% for upper third molars.⁹ Our study did not involve the extraction of any impacted tooth and for this reason data observed might have been low in our study, but there is significant difference in the complications between tertiary center and peripheral centers. It shows that complications of simple exodontias in peripheral centers are higher (2.3%, $P<0.000002$) than in the tertiary center.

Significant difference was observed between the intraoperative and the postoperative complications ($P<0.05$) (table II) in the tertiary and the peripheral

centers. Most frequent complication in tertiary center was fracture of tuberosity followed by roots left, postoperative hemorrhage, dry socket, removal of wrong tooth. In the peripheral centers the most frequent complication was roots left followed by postoperative hemorrhage, dry socket, injury to adjacent tooth and removal of wrong tooth. According to the data available in the literature, the most frequent complication was dry sockets followed by bleeding sockets and retained roots.⁶ our study showed the prevalence of dry socket 0.098 % in tertiary center and 0.31% in peripheral centers and our data are not in agreement with the values in literature 1-3%,^{10,11} 1-65%.^{12,13} Fracture of tuberosity, secondary infections, oroantral communications, osteomyelitis, facial nerve anaesthesia, foreign body granuloma (occurred due to cotton left in the extraction socket) and swallowing of a tooth were recorded in tertiary center only where as one case of subcutaneous cervicofacial emphysema (occurred due to use of airtor hand piece) was recorded in peripheral centers which is rare and well known complication of dental procedure.¹⁴ In agreement with our study, similar studies have reported the cases of osteomyelitis and secondary infections which required postoperative treatment^{6,7,9,15} and proper evaluation of the clinical state plays major roles in managing the treatment of patients with inflammatory process that involves the oral and para-oral regions.¹⁶ Differences in complications; roots left ($P=0.0015$), injury to adjacent tooth ($P=0.0129$) and postoperative hemorrhage ($p=0.0039$); were significantly higher in peripheral centers than in tertiary center. It may be postulated that high prevalence of tooth extraction complications in the peripheral center may be due to lack of proper instrument set-up and poorly trained practitioners. The cases of post operative hemorrhage were not associated with any underlying systemic condition. This suggests that their problem was related to local factors.¹⁷

Though we did not observe serious complications in our study, there are reports of brain abscess and diffuse cervico-facial cellulitis,¹⁸ laryngeal edema and death from asphyxiation after tooth extraction,¹⁹ and open surgery for a tooth aspirated during dental extraction.³ The reason for our less prevalence of complication without serious complications might be due to either we did not include

complicated exodontias as it was not carried out in peripheral centers or all the patients in our study who faced problem did not report to us or both. Although our study showed the significantly high number of female patients ($p < 0.0001$) who underwent extraction procedure, further study is required to investigate the cause of more number of female patients and other etiological factors associated with tooth extraction complications.

CONCLUSION

The prevalence of complications of tooth extractions was significantly higher in peripheral center than in tertiary center. The overall prevalence of complications was low in the sample which may be due to exclusion of complicated exodontias and poor reporting of the patients. Roots left, injury to adjacent tooth and postoperative hemorrhages without any systemic cause were higher in peripheral centers. In order to minimize these complications proper instrument set-up and well qualified dental practitioners are highly suggestible with well explained post extraction instructions given to the patients. Complications were mostly minor, self limiting and easily treatable. With an organized and systemic approach, the extraction procedure can be minimally traumatic and relatively safe.

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