

Review Article

Surgical Tooth Extraction Competence Among Dental Postgraduates and General Practitioners

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ABSTRACT

Bony or soft tissue injuries, such as tooth root fractures, maxillary tuberosity fractures, or root displacement into anatomical spaces, can occur during both complex and simple extraction procedures. A competent professional who is more at ease handling these surgical difficulties can handle them. The objectives include assessing the quality of care in universities, government-owned hospitals, and private facilities, evaluating the competency of dental postgraduates and general practitioners, and listing the most frequent complications, their causes, and the part that a practitioner's experience plays in averting complications. The sample size for this cross-sectional observational study was 313 graduate and general dentists. The participants were given a Google Form to complete to apply the results to the comparison tables. Each participant responded to a complete and verified questionnaire. Dental postgraduates and general practitioners who are currently working throughout Saudi Arabia are eligible to apply. SPSS version 2020, regression, one-way analysis, and descriptive data (mean and standard deviation) were used to analyze the collected data. The majority of participants (61%) were from the academic setting, and the response rate was 100%. When it came to performing the basic extractions, practitioners were more confident (89.8%). Responders with less trust in their ability to perform surgical extractions were more prevalent (52.1%). Among postgraduate and general practitioner dentists, there was a strong relationship between the practitioner's degree of confidence and the lower number of procedural difficulties during surgical tooth extraction.

Keywords: Confidence level, General practitioner, Postgraduate, Surgical extraction

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Introduction

During both surgical and non-surgical tooth extractions, exodontia has numerous consequences that

are now widespread among dental students, general practitioners, post-graduate students, and even oral surgeons. It has been reported by government, academic, and private clinics and hospitals. Soft tissue,

bone, and nerve injuries can cause serious harm. Fractures of the maxillary tuberosity, displacement of the mandibular teeth in the submandibular space and the maxillary roots or teeth into the maxillary sinus, mobility of the neighboring teeth, and in rare instances, extraction of the incorrect tooth are examples of minor injuries [1-5]. Both general dentists and post-graduate students experience these issues at different rates, and they differ in scope and intensity. Several factors, such as the dentist's expertise or even desire to perform these surgical procedures, influence their confidence and performance when performing surgical tooth extractions in their day-to-day practice. While their didactic education is founded on their learned knowledge and cognitive abilities, clinical elements include their exposure to a wide range of cases as well as the caliber and duration of their received training. We hope to draw attention to the most frequent issues that general dentists and postgraduate students encounter when extracting teeth, how frequently these issues occur, how they handle them, and what they do right away. We also hope to identify the factors that contribute to patients' lack of confidence when performing and overseeing specific surgical extraction procedures.

Literature review

To gain a better understanding of general dentists' and postgraduates' confidence in performing dental extraction and surgical procedures, as well as their ability to handle any complications that may arise and how they communicated with their patients regarding the circumstances they faced during the provided service, we reviewed the literature. The information we gathered gave us a key map that helped us move forward with this study.

A self-administrated survey questionnaire was used by Al-Dajani [6] at the Aljouf University School of Dentistry in Saudi Arabia to gauge the confidence of fourth and fifth-year undergraduate dental students in carrying out oral surgical procedures about the number of teeth they extracted during their practice. According to their study, thirty-two dental students spent an average of four to seven hours a week reading up on oral and maxillofacial surgery. A total of 25.3 teeth were extracted by the pupils. 25% of the students became proficient in treating dry sockets, and 75% of the students employed sutures after tooth extraction. Furthermore, 56.3% of respondents acknowledged that their initial extraction was difficult, and 40.6% of students stated that their lower first molar was the first tooth to be taken. No one considered the initial extraction procedure to be "very tough". They found that by combining fundamental science with a solid

dentistry foundation, they could apply their knowledge to pertinent clinical situations, which made learning more effective. Additionally, they found that students who performed exodontia more often were more confident while using tools. In contrast, students were less confident executing surgical exodontia than performing basic exodontia [6].

In addition to identifying the reasons behind the general dentist's lack of confidence in certain extraction techniques, this study attempts to identify a remedy that might boost the confidence of the next generation of general dentists. In a different study, Bahammam and Linjawi [7] focused on the knowledge, attitudes, and barriers to using evidence-based practice (EBP) among aspiring Saudi dentists. Health organizations developed a key indicator or competency standard for evaluating high-quality patient-centered clinical care solutions as part of the EBP. Clinical governance was the name given to it as part of the auditing process. No testing or treatments were ordered for the students in this EBP trial. This may help to explain why they don't see the benefits of using EBP in their therapeutic procedures. Therefore, a lack of knowledge of the concept was the biggest obstacle to the application of EBP. Lack of time for their studies was ranked as the second most serious issue, while their restricted access to EBP resources was regarded as the most serious issue. According to present studies, integrating EBP competencies into the medical sector's expectations and activities may enhance healthcare quality, consistency, and reliability while also lowering costs. However, the results are uncertain and typically not worth the effort without a well-designed strategy for integrating EBP into any therapeutic context. The EBP required a transformation in culture and heightened awareness at all levels, in addition to a professional approach and a set of abilities, knowledge, and clinical experience. EBP integration should be well-structured as a major proficiency level in graduate curricula, according to this research, which is crucial in Saudi contexts and programs to allow them to develop [7].

Honey *et al.* evaluated the self-confidence of senior dental students at Cardiff University and Cork University [8]. Sixty-one and thirty-four final-year students in Cardiff and Cork, respectively, were given a questionnaire that measured their degree of confidence in carrying out procedures, which are frequently done in primary dental care clinics. The questionnaire used a five-point rating system, with 1 representing the lowest level of confidence and 5 representing the highest. Their findings demonstrated that the response rate was 74% (n = 70) and that dental students' self-confidence was best when doing scaling

and polishing (4.61) as opposed to just (2.26) when performing surgical tooth extraction. Regarding the straightforward tooth extraction process, Cardiff students showed a little more confidence than Cork students, as seen by their scores of 4.31 out of 5 and 3.76 out of 5, respectively. Additionally, Cardiff students scored 2.61 out of 5 on the confidence scale for performing surgical tooth extraction, compared to 1.88 out of 5 for Cork University students [8].

Shah *et al.* [9], conducted a study, where they assessed the senior undergraduate students' confidence and experience in oral surgery procedures, by responding to a survey. They discovered that a higher percentage of individuals were referred to secondary care facilities as a result of low confidence levels following graduation. From the perspective of the patients, this increased their annoyance but also was thought to place a financial strain on the NHS nationwide. One month before their graduation in 2015, 150 senior dental students at King's College were required to complete a survey. On the oral surgery quota, their degree of confidence was evaluated using scenario-based questions. In contrast, a mucoperiosteal flap was raised first, then the tooth was surgically sectioned, and finally, the suture was applied. 84% of students had conducted between 50 and 79 extractions during their undergraduate studies, 47% had performed between 10 and 19 surgical extractions, and the response rate was 71% (107/150).

75% of the students felt they had adequate knowledge and clinical competency as an undergraduate performing oral surgery, no variables between the gender of the students and their confidence level were noted.

A cross-sectional study was conducted at Kuwait University to assess undergraduate students' confidence in the field of oral and maxillofacial surgery. By improving the instructional programs and choosing the necessary supplies and equipment, this assessment sought to equip students to handle surgical issues [10]. They used a validated, well-structured questionnaire created by the Association of British Academic Oral and Maxillofacial Surgeons to compare 39 students in total between the sixth year ($n = 20$) and seventh year ($n = 19$). It comprised 17 questions that evaluated the OMFS curriculum of the undergraduates. They discovered that while 61% of the students reported feeling sufficiently confident performing basic dentoalveolar procedures and handling basic surgical complications such as pericoronitis and bleeding from a tooth socket, they expressed less confidence in performing advanced surgical procedures and surgical extractions. They concluded

that pupils prefer using lifts and basic extraction forceps.

Research question

To assess the level of confidence of dental postgraduate and general dental practitioners in performing uncomplicated and complicated dental extractions.

Research hypothesis

- The level of confidence among postgraduates is higher than among general practitioners.
- The level of education and training influences the level of confidence.

Rationale

To provide quality patient care, steer clear of potential issues and needless expenses.

Aims & objectives

- To evaluate the competency of the dental postgraduate and general practitioner.
- To assess the quality of treatment in universities, government-owned hospitals, and private hospitals/centers.
- The role of practitioner's experience in preventing complications.

Significance of the study

- Compared to general practitioners, we anticipate that postgraduates' degree of confidence will influence their decision-making while handling surgical extractions and related complications, improving the postoperative result.
- The study will increase confidence in patient management, prevent some potential consequences, and promote effective patient care.

Materials and Methods

This is a survey-based study. The scope of the study is based on evaluating the young dentists' level of confidence in performing dental extraction and dealing with related complications, through evaluating their knowledge, attitude, and limitations. This will serve to determine their level of confidence while dealing with different kinds of extraction complications. A validated survey by a Biostatistician and two professors in the Oral and Maxillofacial Surgery department at King Abdulaziz University Dental Hospital in Jeddah was sent to the participants in a Google form to complete the questionnaire. Participants were all general practitioners including postgraduate students, who are currently working in the governmental or private sectors. The selection of the participants was based on inclusion and exclusion criteria.

Inclusion criteria

Any dental postgraduate and general practitioner, who is currently practicing dentistry, in KSA.

Exclusion criteria

Pre-clinical dental students

Study design and area

A cross-sectional, observational study, in Jeddah, SA.

Study subject

The study included dental universities, government-owned, and private hospitals/centers. Postgraduate and general practitioners who are now practicing dentistry and performing tooth extractions.

Instruments & interventions

All of the participants completed a fully validated questionnaire that probed them about their confidence in executing the extraction procedure, their attitude toward dealing with difficulties, their methods of prevention of potential complications, and their readiness to deal with those complications.

Statistical analysis

Collected data were analyzed using SPSS® version 25, for Windows statistical software. Descriptive statistics (mean and standard deviation), regression, and one-way ANOVA tests were used.

Budget

No external funding was needed during this observational study.

Results and Discussion

Over eight months, from August 10, 2021, to March 31, 2022, 313 participants participated in our survey; they were split into two groups: 102 (32.6%) males ($n = 102$) and 67.4% females ($n = 211$). The majority of the participants were under 30 years old (20–25 years (68.1%) and 26–30 years (29.4%)), and over half of the study population (55%) had graduated within the last four years, from 2016–2020. Three groups—

government hospitals, private clinics, and university settings—were given different results.

At the time of data collection, around two-thirds of the participants (191) were employed at a university hospital. The remaining 62 and 60 were split equally between public and private institutions.

Following a descriptive analysis of the data gathered and a one-way ANOVA, we discovered a significant relationship between age and dental practice at the university hospital. This was demonstrated by the fact that over 90% of the participants were between the ages of 20 and 25, with a highly significant P-value of 0.000 (**Table 1**).

In comparison to their counterparts in government and commercial centers, university practitioners had statistically considerably fewer years of experience doing dental extractions.

Additionally, it was discovered that the majority of University hospital practitioners—who make up the majority of professionals across all healthcare sectors—graduated from King Abdulaziz University (82%).

In terms of the weekly number of surgical tooth extractions, over 50% of the participants conducted 1–5 extractions. Remarkably, the majority of those professionals were employed by a university hospital. This demonstrated that, in contrast to dentists working in the commercial and other governmental sectors, those employed in university hospitals demonstrated higher practice levels. Nevertheless, at a rate of 6% and 10%, respectively, the public and private sectors reported six to ten surgical tooth extractions each week. The number of participants doing one to five extractions per week increased from 50% to 85% when the same test was conducted on basic tooth extractions. There was a strong link between working in a university hospital and having a higher rate of simple tooth extractions, as the majority of individuals performing these procedures were from university hospitals.

The majority of participants ($n = 266$ (85%)) in the nonsurgical tooth extraction procedure extracted one to five teeth every week, followed by six to ten teeth (6.1%), eleven to fifteen teeth (2.2%), and more than fifteen teeth (1.9%). Conversely, 4.8% did not do dental extractions every week.

Table 1. Descriptive statistics illustrated

Descriptive statistics					
Variable		Frequency	Percent	Mean	SD
Gender	Male	102	32.6	1.67	.469
	Female	211	67.4		
Age (years)		20-25	68.1	1.36	.583

	26-30	92	29.4		
	31-35	5	1.6		
	36-40	2	0.6		
	41-45	1	0.3		
In what year did you graduate? if you are still a student type in "NA"	1990-1995	2	0.6		
	2006-2010	4	1.3		
	2011-2015	10	3.2	--	--
	2016-2020	172	55		
	2021-2022	8	2.6		
	NA	117	37.4		
How many years have you been doing dental extraction?	1-5	287	91.7		
	6-10	24	7.7	1.09	.307
	11-15	2	.6		
Graduation school	National	293	93.6	1.06	.245
	International	20	6.4		
University name	King Abdulaziz University	257	82.1	1.18	.384
	Other	56	17.9		
Where are you practicing dentistry?	Government-owned center	62	19.8		
	Private center	60	19.2	2.41	.800
	University hospital	191	61		
Are you confident in performing a surgical tooth extraction?	Yes	150	47.9	2.52	.500
	No	163	52.1		
What is easier for you to extract?	Single rooted teeth	281	89.8	1.10	.303
	Multi rooted teeth	32	10.2		
How many teeth surgical extractions do you do per week?	0	141	45.0		
	1-5	157	50.2	.61	.631
	6-10	10	3.2		
	10 >	5	1.6		
How many teeth simple extractions do you do per week?	0	15	4.8		
	1-5	266	85.0		
	6-10	19	6.1	1.12	.599
	11-15	7	2.2		
	15 >	6	1.9		

Six questions were given to the participants in this study, which produced significant results. The answers to questions one, three, five, eight, nine, and thirteen are shown in the following tables.

Q1: Did you face a root fracture complication during a procedure?

Root fractures during extraction were the most frequent complication, occurring in 190 of the participants

($p=0.00$). These instances were more common in governmental settings, where 156 cases were addressed right away and 34 cases were referred ($P = 0.000$). Only 33 practitioners ($P = 0.001$) told their patients about the complication, whereas 123 practitioners did not notify their patients at all (**Table 2**).

Table 2. Root fracture complication

		Government	Private	University	P-value
Root Fracture Complication	N = 190 (60.7 %)	54	45	91	0.00
	Referred (34)	14	8	12	0.000
	Managed (156)	40	37	79	

Didn't inform (123)	8	15	100	0.001
Informed (33)	10	12	11	

Q2: During surgery, did you experience a luxation problem or damage to nearby teeth?

Of the 45 dentists who responded positively, the majority worked in academic institutions, with the remaining dentists being evenly distributed ($P =$

0.003). The case was handled by 38 dentists, with the remaining dentists referring their patients ($P = 0.017$). While the remaining dentists notified the patient of the complication ($P = 0.003$), the majority of the dentists ($n = 37$) did not (**Table 3**).

Table 3. Luxation or injury to adjacent teeth complication

	Government	Private	University	P-value
N = 45 (14.4 %)	14 (22.6%)	14 (23.3%)	17 (8.9%)	0.003
Luxation or injury to neighboring teeth				
Referred (7)	2	2	3	0.017
Managed (38)	12	12	14	
Didn't inform (37)	9	11	17	0.003
Informed (1)	1	0	0	

Q3: Did you face a complication of an alveolar bone fracture during a procedure?

A total of 34 respondents admitted they faced alveolar bone fractures, with the least among them being in

private clinics ($P = 0.006$). 29 managed the case while the rest referred their patients ($P = 0.037$). 28 dentists informed their patients about the complications, while the remaining dentists did not ($P = 0.006$) (**Table 4**).

Table 4. Alveolar bone fracture complication

	Government	Private	University	P-value
N = 34 (10.9%)	13	8	13	0.006
Alveolar bone fracture complication				
Referred (5)	2	1	2	0.037
Managed (29)	11	7	11	
Didn't inform (28)	10	7	11	0.006
Informed (1)	1	0	0	

Q4: Did you face a complication of dislocating the mandible during a procedure?

A total of 19 participants confirmed the occurrence of this complication ($P = 0.0000$), most of them referred

to the case ($n = 16$), and only three managed the case, which was practiced in the university ($P = 0.000$). **Table 5** shows that only three physicians told their patients about their complications ($P = 0.000$).

Table 5. Dislocation of the mandible complication

	Government	Private	University	P-value
N = 19 (6.1 %)	11	3	5	0.000
Dislocating the mandible complication				
Referred (16)	10	4	2	0.000
Managed (3)	0	0	3	
Didn't inform (0)	-	-	-	0.000
Informed (3)	1	2	0	

Q5: Did you face a complication of fracturing the maxillary tuberosity during a procedure?

38 participants all responded in the affirmative to this question, with the governmental group having the highest response rate ($P = 0.001$). The remaining

individuals referred their patients, whereas 29 handled the case ($P = 0.002$). Only two dentists ($P = 0.000$) told their patients of the problem, while 27 dentists failed to do so (**Table 6**).

Table 6. Fracturing the maxillary tuberosity complication

	Government	Private	University	P-value
N = 38 (12.1 %)	16	7	15	0.001
Maxillary tuberosity fracture complication				

Referred (9)	5	0	4	0.002
Managed (29)	11	7	11	
Didn't inform (27)	11	5	11	0.000
Informed (2)	0	2	0	

Q6: Did you face a complication of disturbing artificial restorations during a procedure?

Just six individuals (two from the university group and four from the governmental group) answered “yes” to this question ($P = 0.013$). One suggested his patient,

and five handled the matter within the same visit ($P = 0.047$). The remaining dentists told their patients about the complication, while three did not ($P = 0.002$) (Table 7).

Table 7. Disturbing artificial restorations complication

	Government	Private	University	P-value
N = 6 (1.9 %)	4	0	2	0.013
Disturbing artificial restorations complication				
Referred (1)	1	0	0	0.047
Managed (5)	3	0	2	
Didn't inform (3)	3	0	0	0.002
Informed (2)	0	0	2	

Every dental graduate must be able to conduct an extraction with confidence and competence, handling any problems that may arise following their undergraduate instruction. However, it is getting more difficult to evaluate undergraduate students' educational experiences consistently due to the growing number of dental schools, each with its own set of prerequisites, teaching standards, and number of qualified faculty members.

In dentistry, performing surgical operations can be more closely related to skillful execution than merely following a set of instructions. The majority of situations can be handled simply, however some complex procedures may require the assistance of an expert. Untrained general dentists are more likely to experience surgical extraction difficulties in these circumstances. Additionally, dentists' confidence levels can have a significant impact on their ability to avoid these issues and deal with any difficulties that may arise during the surgical operation.

Future studies should examine the function of dental outreach training and internships in dentistry, claims Aldajani [6]. As they performed more extractions, the practitioners were more accustomed to using extraction tools, mostly forceps, and elevators, handling challenging extraction cases, and managing post-extraction bleeding. However, there was no correlation found between increasing students' confidence and either the GPA or the weekly clinical exposure hours. It is unlikely that increased study time will significantly increase students' clinical confidence, even though it may increase their ability to recall material.

The argument is rekindled by the fact that GPA is not a reliable indicator of dentistry students' progress,

especially in clinical settings. Students were more confident while doing simple clinical procedures than sophisticated ones.

However, our results demonstrated that the number of teeth the students extracted was proportionately associated with increased clinical confidence. Direct supervision by certified teaching staff and in-person interactions with patients are responsible for the increase in student confidence. In primary care settings, students now feel more confident when they face clinical interventions in both general and OMS procedures. Studies involving many schools are required to investigate the distinctions between integrated and standard curricula, especially concerning students' learning, confidence, and cognitive abilities.

According to this study, undergraduate students' confidence in carrying out OMS procedures is significantly impacted by their clinical training. Students at the College of Dentistry at Aljouf University were shown to be less confident when doing sophisticated surgical operations but more confident when performing simple ones. According to the current findings, students will exhibit greater confidence the more clinical experience they have under the auspices of an integrated curriculum.

Handling the extraction instruments and devices comfortably, such as forceps and elevators is directly linked to the level of clinical training experience.

However, the student's confidence was negatively impacted by both their overall GPA and their weekly allotment of study hours, and the increase in study hours strengthened their knowledge-based skills rather than their clinical confidence. The argument about

GPA's lack of value in gauging dentistry students' growth, especially in clinical settings, is rekindled by the need to memorize taught material. While the students were less confident when doing difficult clinical procedures, they had a high level of confidence when conducting simple ones. For instance, students exhibited a high level of confidence when conducting easy extractions, whereas they showed a lower level of confidence when executing complicated surgical extractions. However, our research showed that students' clinical confidence increased with the number of teeth they pulled. Students' confidence has significantly increased as a result of their in-person interactions with patients and close supervision from experienced faculty members.

Of the 95 final-year students in survey research conducted by Honey *et al.* 36 were from Cardiff University and 34 were from University College Cork [8]. According to their findings, final-year dental students' confidence levels during clinical operations at Cardiff and Cork Dental Schools were consistent with those of other published studies. It was discovered that the areas in which Cardiff and Cork's students felt most confident were basic dental operations like scaling and polishing, history and examination, caries diagnosis, simple fillings, and pediatric dentistry. In line with our research, complex procedures like veneer preparation, orthodontic emergencies, molar endodontics, surgical extraction, and traditional bridgework showed the lowest confidence, with 52.1% of participants responding "no" when asked if they were confident performing surgical tooth extraction.

There were not many discernible differences in the confidence levels of pupils in Cardiff and Cork. Compared to Cork students, Cardiff students demonstrated more confidence in oral surgery for all three operations (basic extractions, surgical extractions, and handling dental emergencies). When it came to surgical tooth extractions, pupils at Cardiff were more confident than those at both schools. Cardiff students were more comfortable with dental emergencies and basic extractions than their Cork counterparts. The teaching philosophies at both institutions, the availability of eligible patients with more extractions performed at Cardiff, and the disparities in access to and provision of dental services between Cork and Cardiff are likely the causes of this. Insufficient clinical exposure in the undergraduate curriculum has been identified as one of the barriers to gaining confidence in performing clinical procedures. Nevertheless, clinical exposure is constrained by several factors, including the availability of suitable patients, the physical space in dental schools, the

amount of time available in an already overly hectic dental curriculum, and the lack of clinical staff with the necessary training to provide instruction.

Because they received the same clinical instruction and experience, there were no discernible differences in the confidence levels of the male and female participants in this research.

Using a validated questionnaire by ABAOMS, Kamal [10] conducted a cross-sectional survey of all sixth and seventh-year dentistry students in the Kuwait University Faculty of Dentistry, with a total of 39 participants from both sixth and seventh-year students. The research evaluated the undergraduate students' confidence in oral and maxillofacial surgery as well as their capacity to perform minor oral surgery. The majority of participants 89.8% found it easier to extract single-rooted teeth than multiple-rooted teeth, and they also concluded that both the sixth and seventh-year student groups showed a lower level of self-confidence in performing more invasive procedures like the raising of a flap. These findings are consistent with the sixth and seventh-year students' confidence in extracting an upper single-rooted tooth with an intact crown (94.7 and 90% respectively), sectioning of teeth, removal of bone, and suturing of wounds, all of which are consistent with our study because 52.1% of participants ($n = 163$) said they were not confident in their ability to perform a surgical tooth extraction, and 45% of our study sample ($n = 141$) do not perform surgical tooth extraction every week. This highlights the need for more practical instruction and training for students in surgical tooth extraction so they can handle such cases in their future practice.

Impact of the study

Decrease the possibility of post-surgical procedure complications.

All results will be sent to the centers involved in this study and assess the need for more training, with experts' recommendations.

Future work: compare the western and the Eastern regions in KSA; to assess any deficiencies and exchange experience between them.

Limitations of the study

Due to multicenter involvement, this study had certain limitations, including poor standardization in the surgical setting during surgical operations, including the availability of adequate instruments and materials. Not all of the surveys addressed the patient's level of cooperation during the operations, which might be a modifying factor in a stressful setting for the clinician, resulting in accidents and poor choices.

Recommendations

To see how well the doctor handles surgical procedures and the way they handle problems, more research is needed.

The general dentist must be aware of his or her limitations to avoid complications in advanced surgical situations and to try to send the case right away if it is beyond his or her scope of practice.

Conclusion

In conclusion, among postgraduate and general practitioner dentists, there was a strong association between the practitioner's level of confidence and the fewer procedural difficulties that occurred during surgical tooth extraction.

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