

RESEARCH ARTICLE

Dental students' perceptions of undergraduate clinical training in oral and maxillofacial surgery in an integrated curriculum in Saudi Arabia

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Abstract

Purpose: The aim was to understand dental students' experiences with oral and maxillofacial surgery (OMS) teaching, their confidence levels in performing routine dento-alveolar operations, and the relationship between the students' confidence level and the number of teeth extracted during the clinical practice. **Methods:** The survey questionnaire was distributed to 32 students at Aljouf University College of Dentistry, Saudi Arabia during their fourth and fifth year in 2015. Respondents were asked to rate 19 items, which represent a student's confidence in performing routine surgical interventions, using a four-point Likert scale (1 = very little confidence, 4 = very confident). A multivariate regression was computed between average confidence and the variables: weekly hours devoted to studying oral and maxillofacial surgery, college grade point average, and the total number of teeth extracted. **Results:** The response rate was 100%. Students revealed the highest level of confidence in giving local anesthesia (96.9%), understanding extraction indications (93.8%), and performing simple extractions (90.6%). Less confidence was shown with handling difficult extractions (50.0%), extracting molars with separation (50.0%) or extracting third molars (56.3%). The average confidence in performing surgical procedures was 2.88 (SD = 0.55), ranging from 1.79 to 3.89. A given student's confidence increased with an increase in the total number of teeth extracted ($P = 0.003$). **Conclusion:** It reveals a significant impact of undergraduate clinical training on students' confidence in performing oral and maxillofacial surgery clinical procedures: The more clinical experience the students had, the more confidence they reported.

Key Words: *Clinical competence; Clinical training; Dental education; Integrated curriculum; Oral and maxillofacial surgery*

INTRODUCTION

Undergraduate teaching in the academic field of oral and maxillofacial surgery (OMS) emphasizes preparing competent general dentists who can examine, diagnose, surgically treat, and manage diseases and disorders in the oral and maxillofacial region of the human body [1,2]. Comprehensive patient care is the backbone of clinical training at College of Dentist-

ry, Aljouf University, Saudi Arabia, where the fourth and fifth year undergraduate students treat patients who have diverse needs. This comprehensive care model is boosted with an integrated dental curriculum, in which the curriculum is divided into a number of interdisciplinary blocks instead of being delivered in discrete discipline-based courses. While few studies have been conducted to evaluate the confidence of undergraduate dental students around the time of their graduation [3,4], none of these studies specifically measured students' confidence with their OMS training. This study aimed to evaluate students' perceptions, experiences, and confidence levels with OMS tasks at the Aljouf University College of Dentistry, Saudi Arabia.

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METHODS

Participants, place of study, and year of study

This study included undergraduate students in either of the last two years of the dental program at the College of Dentistry, Aljouf University, Saudi Arabia in 2015. Our study has been approved by the Research Ethics Board at Aljouf University, and has been conducted in full accordance with the World Medical Association Declaration of Helsinki.

Study design

This investigation is a cross-sectional observational study.

Survey tool

A self-administered survey questionnaire was distributed to 32 fourth- and fifth-year students who are expected to complete their studies this year or next. A cover letter accompanied the survey providing a brief description about the study. All participants were 18 years of age and over. The data were anonymized and unidentifiable prior to analysis. Three professors pre-tested the survey to assure that questions were well written and captured the information we intended to collect. Moreover, the survey was pilot-tested on five randomly selected fourth- and fifth-year students to assess the whole questionnaire under actual survey conditions. Since the targeted population was small (N = 32), all current fourth- and fifth-year students were surveyed.

Statistical analysis

Univariate descriptive statistics were used to describe and summarize the characteristics of participants, and included calculating means, percentages and their corresponding standard deviations/confidence intervals as indicated. The average confidence in performing surgical procedures was computed from the 19 variables, which represented a student's confidence in performing routine surgical interventions. Levels of confidence were ranked using a four-point Likert scale (i.e., very little confidence, little confidence, confident, very confident), and assigned the numeric values: 1, 2, 3, and 4, respectively. In bivariate analysis, a chi-squared test (χ^2) was used to evaluate the statistical differences between the number of teeth extracted and confidence levels in performing surgical procedures. A Pearson product-moment correlation coefficient was calculated to assess the relationship between the total number of teeth extracted and the average confidence in performing surgical procedures. A multivariate linear regression model was computed between the average confidence (dependent variable) and the following variables: weekly hours devoted to study of OMS, college grade point average (GPA), as well as the total number of teeth extracted by the student. Data were analysed

using the Statistical Package for the Social Sciences (SPSS) version 21.0.

Ethical approval

A statement was added to the survey informing the participant that completion and return of the survey was considered implied consent. This method of consent was approved by the Research Ethics Board at Aljouf University. Participation in this study was voluntary. Students were allowed to decline or withdraw from participation at any time without any negative consequences. As per privacy and confidentiality, no identifiable data were collected (i.e., participants' name, full address, or postal code).

RESULTS

Participants' characteristics

Thirty-two dental students reported devoting an average of 4.7 hours every week studying material related to the discipline of oral and maxillofacial surgery. The mean for the total number of teeth extracted by the students was 25.3 teeth (SD = 12.15) ranging from 9 to 65 teeth. 75% of the students placed suture(s) after extracting teeth, while 25% had the experience of treating a dry socket (alveolar osteitis) whenever indicated during their undergraduate clinical training. Interestingly, none of the students mentioned that they would not be referring extractions to oral and maxillofacial surgeon. Table 1 illustrates the characteristics of surveyed students and the routine surgical procedures they performed in the dental school clinics.

First oral and maxillofacial surgery experience for undergraduate students

Fig. 1 illustrates the distribution of first extraction procedures performed by the 32 students according to the type of tooth extracted and the self-reported degree of extraction difficulty. 40.6% of students perceived having the lower first molar as their first tooth to extract. 56.3% perceived that their first extraction procedure was difficult. No one rated the first extraction procedure "very difficult".

Confidence levels in performing oral and maxillofacial surgery procedures

As shown in Fig. 2, students in both years revealed the highest level of confidence in giving local anesthesia (96.9%), understanding extraction indications (93.8%), and performing simple extractions (90.6%); whereas the lowest level of confidence was perceived while taking a biopsy of an intra-oral lesion (46.9%) or a lesion on the skin (37.5%). Compared to their confidence in performing simple extractions, they reported relatively less confidence whenever the surgical inter-

Table 1. Characteristics of surveyed dental students and main surgical interventions practiced of 32 dental students, Aljouf University, Saudi Arabia

		n	%	Mean	Standard deviation
Year of study	Fourth year	16	50.0	-	-
	Fifth year	16	50.0	-	-
Weekly hours devoted to studying OMS	< 2.5	8	25.0	2.0	0.00
	2.5- < 5	7	21.9	3.7	0.49
	5- < 7.5	15	46.9	5.9	0.88
	≥ 7.5	2	6.3	9.0	1.41
	Total	32	100.0	4.7	2.12
Total number of teeth extracted in dental school clinics	< 10	2	6.3	9.0	0.00
	10- < 15	8	25.0	14.4	3.66
	15- < 20	12	37.5	23.3	1.86
	20- < 25	7	21.9	35.1	2.91
	≥ 25	3	9.4	50.0	13.23
Total	32	100.0	25.3	12.15	
Total number of cases where suturing were indicated and completed	0	8	25.0	0.0	0.00
	1- < 3	11	34.4	1.3	0.47
	3- < 6	9	28.1	4.3	0.87
	≥ 6	4	12.5	7.5	1.91
Total	32	100.0	2.6	2.64	
Total number of dry socket cases treated	0	24	75.0	-	-
	1	7	21.9	-	-
	2	1	3.1	-	-
	Total	32	100.0	-	-
Self-reported referral strategy of extractions to an OMS specialist	Refer all extractions	5	15.6	-	-
	Refer difficult extractions	27	84.4	-	-
	No referral	0	0.0	-	-
	Total	32	100.0	-	-

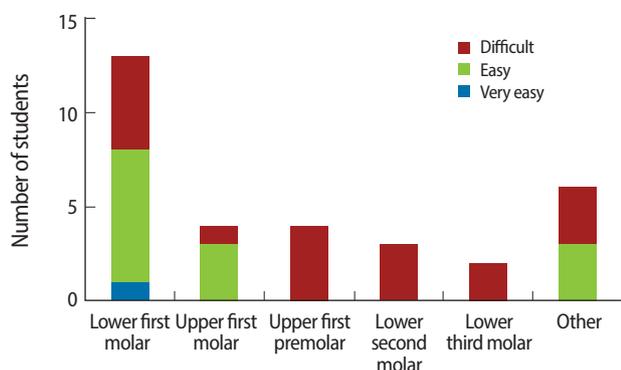


Fig. 1. First tooth extracted by a student in the faculty clinic and self-reported degree of this extraction difficulty of 32 dental students, Aljouf University, Saudi Arabia.

vention involved handling of difficult extractions (50.0%), extracting molars with separation (50.0%), or extracting third molars (56.3%). Fig. 3 demonstrates differences in confidence scores between fourth- and fifth-year students. Compared to their counterpart in the fourth-year, fifth-year students displayed significantly higher confidence in the following: understanding extraction indications ($P = 0.012$); administering an topical anesthetic injection to your patient ($P = 0.005$); us-

ing elevators to luxate teeth ($P = 0.040$); using forceps to extract teeth ($P = 0.031$); performing a difficult extraction ($P = 0.032$); extracting molars with separation ($P = 0.019$); treating swelling after extraction ($P = 0.032$); and surgical placement of implants ($P = 0.011$). Nevertheless, fourth- and fifth-year students showed no statistically significant difference in the following: performing simple extraction ($P = 0.330$); extracting third molars ($P = 0.357$); treating pericoronitis in the third molar area ($P = 0.497$); treating a dry socket ($P = 0.519$); placing sutures after tooth extraction ($P = 0.613$); treating bleeding after extraction ($P = 0.141$); treating pain after extraction ($\nu = 0.686$); incision and drainage of vestibular abscess ($P = 0.654$); performing alveoloplasty ($P = 0.273$); taking a biopsy for an intraoral lesion ($P = 0.241$); and taking a biopsy for a lesion on the skin ($\nu = 0.478$).

Degree of confidence and the number of teeth extracted

With the increase in the total number of extractions completed, the student's confidence level increased significantly with regard to the following: using elevators to luxate teeth (χ^2 ; $P = 0.013$); using forceps to extract teeth (χ^2 ; $P = 0.013$); performing a difficult extraction (χ^2 ; $P = 0.042$); and treating bleeding after dental extraction (χ^2 ; $P = 0.041$). The average confidence in performing surgical procedures was 2.88 (SD = 0.55),

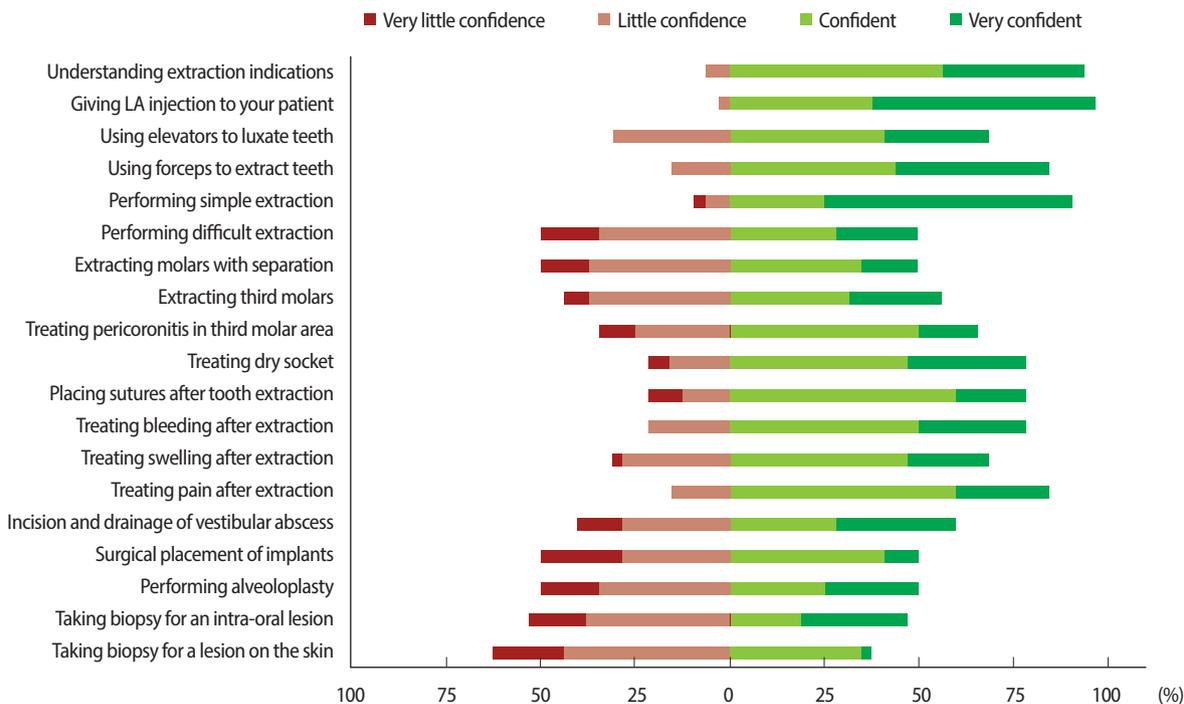


Fig. 2. Level of confidence among undergraduate dental students in performing 19 routine surgical interventions of 32 dental students, Aljouf University, Saudi Arabia.

ranging from 1.79 to 3.89. Overall, there was a moderately positive significant correlation between the total number of teeth extracted and the average confidence in performing surgical procedures ($r = 0.449$, $n = 32$, $P = 0.01$). A scatterplot summarizes the results of Pearson product-moment correlation coefficient analysis (Fig. 4). As per the multivariate linear regression analysis, a student's confidence increased when the total number of teeth extracted increased ($P = 0.003$) (Table 2).

DISCUSSION

The integrated dental curriculum at the Aljouf University College of Dentistry is educationally beneficial to its dental students, enhancing their acquisition of an increasingly large body of dental information in a more effective and efficient way through the integration of basic science and dental information and placing both in relevant clinical contexts. The OMS teaching is designed to meet the certification requirements of the Saudi Commission for Health Specialties, Ministry of Health, Saudi Arabia, and includes integrated didactic and clinical instruction in dento-alveolar surgery, anatomy, pathology, management of medically compromised patients, and local anesthesia and pain control. The OMS teaching provides students with clinical training in local anesthetic techniques, dental extractions, and minor oral surgeries in order to enhance

the skills acquired during undergraduate education. We believe that current OMS teaching, as an essential part of an integrated dental curriculum, encourages students not only to think about dental care issues more comprehensively, but also to build treatment plans and make decisions based on both fundamental basic science and evidence-based clinical principles.

Above finding reveals that the more extractions the students completed, the more confidence they gained in handling extraction instruments—mainly elevators and forceps, managing difficult extractions, and treating post-extraction hemorrhage. On the other hand, both college GPA and weekly hours devoted to study did not seem to contribute to students' confidence. While the increase in the time devoted to study might reinforce a student's ability to memorize taught material, this added time may not significantly increase students' clinical confidence. The non-significant effect of GPA renews the argument over the sufficiency of GPA in evaluating dental student progress mainly in clinical settings [5].

The students displayed high confidence in performing simple clinical procedures, while they were less confident in performing complex procedures. A good example is the high confidence among students when performing simple extractions, while difficult surgical extractions were accompanied with less confidence. Nevertheless, our study demonstrates that the more teeth the students extracted, the more clinical confidence

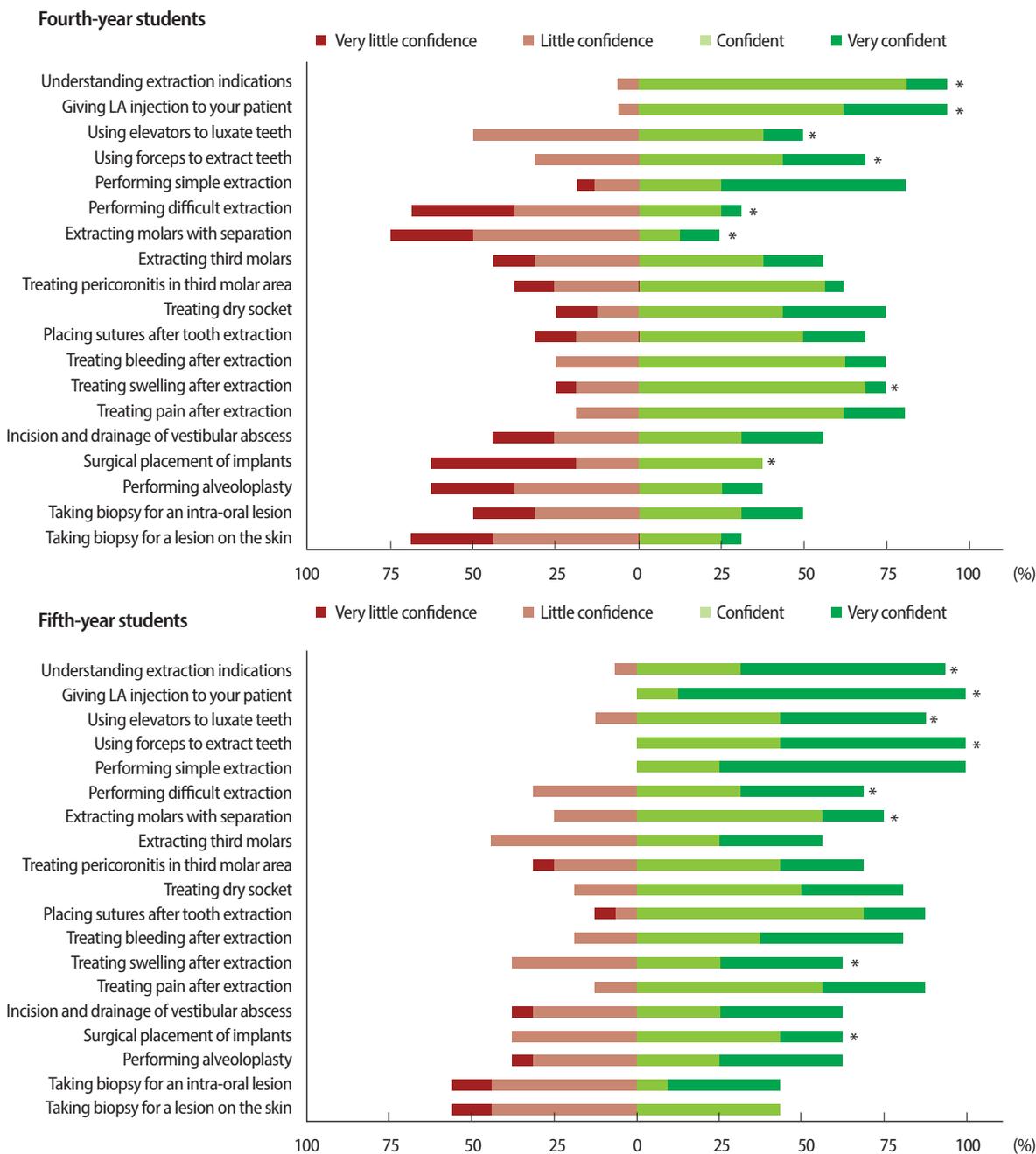


Fig. 3. Level of confidence among fourth- and fifth-year students in performing 19 routine surgical interventions of 32 dental students, Aljouf University, Saudi Arabia. *The difference between the fourth- and fifth-year students is statistically significant (χ^2 , $P < 0.05$).

they displayed. This significant improvement in students' confidence can be related to their live interaction with patients combined with direct supervision by knowledgeable faculty members [6].

Future research directions should investigate the possible role of internships as well as dental outreach training in primary care settings in improving students' confidence in han-

dling clinical interventions in general, and OMS procedures in particular. There is a need for multi-school studies that examine the differences between traditional curriculum and integrated curriculum mainly with regard to students' cognition, confidence, and acquisition.

This study has the following limitations: The study evaluated OMS training depending on the level of confidence per-

Table 2. Multivariate linear regression results for the average confidence levels of 32 dental students in performing clinical surgical procedures among dental students of Aljouf University, Saudi Arabia

	Coefficient (B)	95% Confidence interval	Standard error	P-value
(Constant)	1.874	(0.992-2.756)	0.431	0.000
Weekly hours devoted to study OMS	0.024	(-0.167-0.215)	0.093	0.796
GPA by group	0.054	(-0.224-0.332)	0.136	0.694
The total number of teeth extracted by the student	0.274	(0.105-0.442)	0.082	0.003
R-squared	0.303			
No. observations	32			

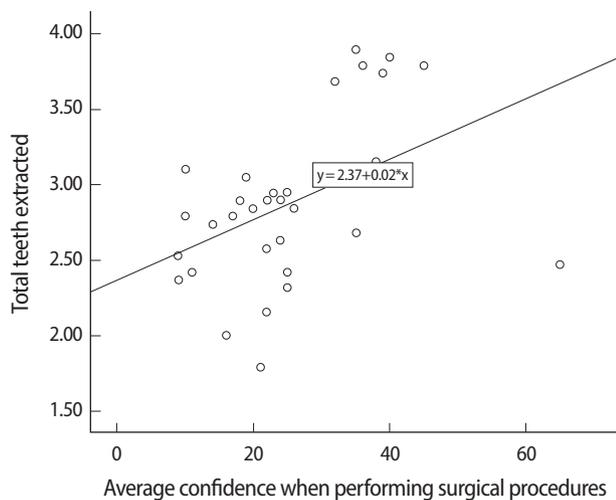


Fig. 4. A moderate positive significant correlation was discovered between the total number of teeth extracted and the average students' confidence in performing surgical procedures of 32 dental students, Aljouf University, Saudi Arabia.

ceived by students. We need to keep in mind that confidence level is a subjective indicator, so confidence level cannot totally replace an assessment of the true ability or skill of a student to perform the real surgical procedure. In addition, these data represent a single dental school. Future studies should include studies of larger sample size including several dental schools from different countries.

In conclusion, this study revealed a significant impact for undergraduate clinical training on students' confidence in performing OMS clinical procedures: Students at the College of Dentistry, Aljouf University were more confident in performing simple surgical procedures, while they were less confident in performing complex procedures. Under the umbrella of an integrated curriculum, the more clinical experience the students have, the more confidence they will display.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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SUPPLEMENTARY MATERIAL

Audio recording of the abstract.

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