

2023-09-12

Perceived confidence of dental students and new graduates in performing tooth extractions

An exploratory study

Gaballah, K

<https://pearl.plymouth.ac.uk/handle/10026.1/21749>


10.1111/eje.12936

European Journal of Dental Education

Wiley

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Please cite only the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

Perceived confidence of dental students and new graduates in performing tooth extractions—An exploratory study

Kamis Gaballah¹ | Kamran Ali² | Daniel Zahra³  | Ensanya Abou Neel⁴ | Eteman Ibrahim⁵

¹Department of Oral and Craniofacial Sciences, College of Dental Medicine, University of Sharjah, Sharjah, United Arab Emirates

²QU Health College of Dental Medicine, Qatar University, Doha, Qatar

³School of Psychology, Plymouth University, Plymouth, UK

⁴Department of Preventive and Restorative Dentistry, College of Dental Medicine, University of Sharjah, Sharjah, United Arab Emirates

⁵Quality Assurance Officer, University Dental Hospital Sharjah, Sharjah, United Arab Emirates

Abstract

Introduction: The ability to perform uncomplicated tooth extractions is a core clinical skill in undergraduate dental education. The aim of this study was to evaluate pre-extraction assessment skills of dental students and interns and explore their self-perceived confidence in performing these tooth extractions.

Materials and Methods: A cross-sectional survey investigated the self-perceived confidence to perform the extraction for a set of eight expert-rated cases. The participants were dental students at three different stages, that is, in Years 4 and 5 of the Bachelor of Dental Surgery (BDS) programme and interns. The participants were asked to rate the difficulty level of each of the eight tooth extraction cases. The self-perceived confidence of the participants to perform extraction of each was also explored. Finally, the participants were asked to identify the main reason for the perceived lack of confidence.

Results: A total of 199 responded to the survey, yielding a response rate of 94.7%. The effect of grade of extraction (the expert rating of cases) and stage of education on difficulty ratings was assessed using a mixed three stage of education \times 4-grade ANOVA, with response (Difficult=1, Easy=0) as the dependent variable. The results showed that there was a correlation between the stage of education and grade of extraction and affected the self-perceived confidence of the participants. Gender showed a significant impact with females categorizing significantly more cases as difficult. A three-way contingency table (counts of each confidence-level response by stage of education by expert rating of cases) suggests a statistically significant association between the three factors. Most participants identified limited clinical exposure as the main reason for their perceived lack of confidence.

Conclusion: The findings of this study show that a majority of the participants were able to recognize tooth extraction cases which were beyond the scope of their training stage with females reporting a lower confidence. Increased clinical exposure to a wider range of tooth extraction cases with varying levels of difficulty may contribute to improving the self-confidence of undergraduate dental students and interns.

KEYWORDS

competence, confidence, dental students, tooth extraction, undergraduate

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *European Journal of Dental Education* published by John Wiley & Sons Ltd.

1 | INTRODUCTION

The goal of undergraduate dental programmes is to prepare the students for independent dental practice and equip them with underpinning scientific knowledge, clinical skills and behavioural attributes required to serve the community in a safe and effective manner.¹ Dental students are expected to demonstrate competence and confidence in range of clinical operative procedures as well as skills in communication, team-working, management, leadership and professionalism.²

Competence of a new dental graduate may be viewed as the ability to perform a clinical procedure independently in a safe and effective manner. The ability to perform uncomplicated tooth extractions is a core clinical skill in undergraduate dental education globally.³⁻⁶ Dental schools provide clinical training in tooth extractions through structured exposure of students to appropriate patients allowing them repeated opportunities to consolidate their clinical skills under supervision of clinical faculty. However, considerable global variations in the teaching and training of undergraduate dental students in oral surgery.⁶⁻⁸ A key variation relates to the number of tooth extractions which dental students are required to perform at a satisfactory level prior to graduation.

Given that most contemporary dental curricula are based on a competency-based framework, numerical targets may not be the most critical factor in assessing performance of students. It has also been reported that the relationship between the total number of tooth extractions and the successful completion of the final assessment does not always follow a linear relationship and it is also important to evaluate the confidence of students in performing the core clinical procedures.^{3,7,9} Nevertheless, minimal targets are still prescribed widely in undergraduate dental curricula.

There are remarkable variations in the difficulty level of tooth extractions encountered in clinical practice, more so than many other clinical procedures and may be related to both local factors as well as patient-related systemic factors.¹⁰ Local factors which may complicate tooth extractions include but not limited to: mouth opening and access; position and orientation of the tooth; residual crown structure; bone thickness; root morphology especially if showing dilaceration, hypercementosis, ankylosis or accessory roots, concrescence, etc. Patient-related factors which may complicate tooth extractions include medical conditions and drugs associated with increased risk of bleeding and delayed healing.

Given the variations in the difficulty-level of tooth extractions, it is important for the students to develop pre-extraction assessment skills to identify cases suitable for their stage of education and the "grain-size" of their abilities.⁹ This is important not only to minimize the risk of complications but also to ensure that students have a positive learning experience, and their confidence is not impacted by repeated unsuccessful attempts at tooth extractions and/or negative feedback from their clinical supervisors.

The conceptual framework of this study was underpinned by the theory of situated learning which views learning as a transformative process linked closely to the context, and social interactions in a learning environment.¹¹ Dental students begin their professional journey through legitimate peripheral participation first by

observing and then performing basic tasks. Participation and professional interactions in the learning environment enable the novice students to demonstrate responsibility and allow them to take a more active role in the community of practice. Clinical training in tooth extractions allows students to observe, assist and eventually perform straightforward tooth extractions on real patients. The dental school environment offers a safe space for the beginners under close supervision of experienced clinical faculty with options to seek verbal and/or practical support as and when required. During their clinical training, dental students are expected to consolidate their clinical skills in tooth extractions and develop into competent and confident clinicians. Dental students should be able to perform routine tooth extractions independently by the time they graduate from the dental school.

The aim of this study was to evaluate the pre-extraction assessment skills of undergraduate dental students and rate their self-perceived confidence in undertaking tooth extractions with a range of difficulty.

2 | METHODS

2.1 | Ethical considerations

Ethical approval was obtained from the University of Sharjah Research Ethics Committee (approval number REC-21-10-17-1). Participation in the survey was voluntary, and individuals could not be identified using the obtained. No personal information was requested except for gender, and stage of education. The potential candidates gave their consent to participate in the study after reading written information on the aims and methods of the study data. Neither participation nor questionnaire findings affected academic progress. Student perceptions of confidence were not linked to grades or academic performance. All research data were processed and stored according to the university's data protection regulations.

2.2 | Study design

This was a cross-sectional analytical study and reported in accordance with STROBE guidelines.

2.3 | Settings

The study was conducted at the college of dental medicine at the University of Sharjah, United Arab Emirates.

2.4 | Participants

A purposive sampling technique was used to target undergraduate dental students in the BDS years 4 and 5, and also new graduates doing their dental internship.

2.5 | Research instrument

The data collection instrument was based on an electronic questionnaire. The first part of the questionnaire included eight clinical cases of tooth extractions with high-resolution radiographic images (Appendix 1). The eight cases of tooth extractions were allocated random numbers from 1 to 8. The difficulty-level of each case was rated by four senior oral surgery faculty instructors to determine the suitability for students and interns at various stages of training and were rated into four grades (with an increasing difficulty level). The difficulty-level of eight cases, as determined by the experts, along with relevant case numbers are summarized below.

Grade I Suitable for BDS4, BDS5 and interns (Case nos.1 and 3).

Grade II Suitable for BDS5 and interns (Case nos. 2 and 4).

Grade III Suitable for interns only (Case nos. 6 and 7).

Grade IV Complicated, beyond the scope of students and interns (Case nos. 5 and 8).

The inter-examiner agreement was evaluated via the Kappa test with a value of 0.86. Subsequently, the participants were asked to rate the difficulty-level of each tooth extraction case. The second part of the questionnaire explored self-perceived confidence of the participants to perform extraction of each case on a three-point scale ranging from "able to perform independently", "perform with help", and "unable to perform". Finally, the participants were asked to identify the main reason for their perceived inability to perform tooth extraction on one or more cases.

2.6 | Data collection

The questionnaire was administered face-to-face using electronic tablets during the second semester of the academic year (November 2021 to March 2022). Data collection was overseen by administrative staff who were not involved in student assessments. The participants were asked to review the cases and provide their responses independently. The participants were allowed up to 30 minutes to submit their responses.

2.7 | Data analysis

The analyses reported here were conducted using the R statistical environment (R Core Team 2020). Ratings of case difficulty were recorded to allow a comparison, using a mixed analysis of variance, of the proportions of students within each stage who identified each grade of extraction (expert rating) as difficult, and how these factors interacted. The same analysis was repeated with the inclusion of gender as a factor to investigate differences in difficulty ratings between male and female participants.

Ratings of whether students would feel confident performing the extractions independently, with help, or not at all, were collated into a three-way contingency table and analysed to assess any

association between stage of education, grade of extraction and self-perceived confidence. Follow-up analyses using two-way contingency tables and chi-Squared test of association explored these relationships between each combination of factors, as well as considering gender differences. Descriptive summaries were analysed for sample composition and reasons given for reluctance to perform the extractions.

3 | RESULTS

3.1 | Sample

The total number of students and interns at the institution was 210. Of this number, 199 responded to the survey, with an overall response rate of 94.7%. Mean age and number of respondents by stage of education and gender are shown in Table 1.

3.2 | Difficulty ratings of tooth extraction cases

The percentage of each group reporting the extraction in each case as easy or difficult, are shown in Table 2.

The effect of grade of extraction (the expert rating of cases) and stage of education on difficulty ratings was assessed using a mixed 3 stage (BDS 4, BDS 5, intern) × 4 (grades I-IV) ANOVA, with response (Easy=0, Difficult=1) as the dependent variable. The resultant mean for each cell of the design represents the percentage of respondents who perceived the cases as difficult in that category, and the ANOVA compares the differences in these means between groups.

The results showed that there was a main effect of stage of education ($F_{2,196}=4.31$, $p=.015$, $\eta_g^2=.015$), a main effect of grade of extraction ($F_{2,72,533.84}=115.57$, $p<.001$, $\eta_g^2=.279$) and a significant interaction between the two ($F_{5,45,533.84}=4.76$, $p<.001$, $\eta_g^2=.031$); as depicted in Figure 1.

Pairwise comparisons (Tukey HSD) showed that Grade 1 extractions, only the BDS 4 and intern years differ significantly ($p=.030$); for Grade II extractions, only the BDS 4 and intern years differ significantly ($p=.004$) and on Grade III and IV extractions, no differences were seen by stage.

TABLE 1 Respondents and mean age by stage and gender.

| Stage | Number (N) | Gender | Mean age (Years) |
|------------|------------|--------|------------------|
| BDS Year 4 | 54 | Female | 22 |
| | 25 | Male | 22 |
| BDS Year 5 | 51 | Female | 23 |
| | 17 | Male | 23 |
| Intern | 40 | Female | 24 |
| | 12 | Male | 24 |

TABLE 2 Percentage of ratings of each case by stage.

| Case | Grade of extraction | BDS 4 | | BDS 5 | | Interns | |
|--------|---------------------|----------|---------------|----------|---------------|----------|---------------|
| | | Easy (%) | Difficult (%) | Easy (%) | Difficult (%) | Easy (%) | Difficult (%) |
| Case 1 | I | 79.75 | 20.25 | 91.18 | 8.82 | 96.15 | 3.85 |
| Case 2 | II | 58.23 | 41.77 | 83.82 | 16.18 | 92.31 | 7.69 |
| Case 3 | I | 30.38 | 69.62 | 26.47 | 73.53 | 50.00 | 50.00 |
| Case 4 | II | 44.30 | 55.70 | 58.82 | 41.18 | 63.46 | 36.54 |
| Case 5 | IV | 5.06 | 94.94 | 2.94 | 97.06 | 5.77 | 94.23 |
| Case 6 | III | 45.57 | 54.43 | 39.71 | 60.29 | 50.00 | 50.00 |
| Case 7 | III | 50.63 | 49.37 | 42.65 | 57.35 | 51.92 | 48.08 |
| Case 8 | IV | 29.11 | 70.89 | 19.12 | 80.88 | 15.38 | 84.62 |

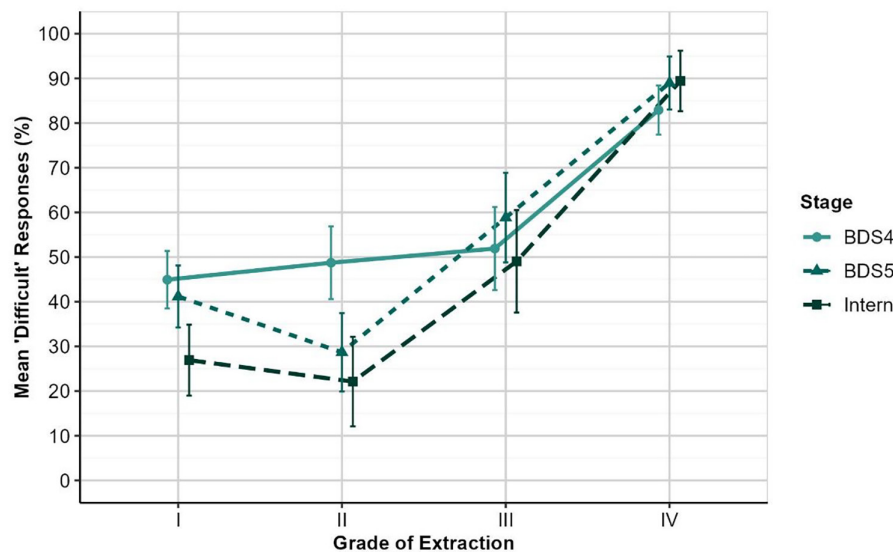


FIGURE 1 Mean cases rated by participants as "difficult" (%) by grade of extraction and stage.

BDS Year 4 respondents rated Grade I, II and III extractions as being of comparable difficulty, but they judged Grade IV extractions to be more difficult than all other grades.

BDS Year 5 respondents also rated Grade IV extractions more difficult than grades I, II and III. Unlike BDS Year 4 respondents, however, they did not rate grades I, II and III comparably. Instead, BDS Year 5 respondents rated grades I and II and grades I and III as being of similar difficulty but rated Grade III extractions as more difficult than Grade II extractions.

Intern respondents' judgements show the same pattern as BDS 5 respondents; judgements of the difficulty of Grade I, II and III extractions are all significantly lower than their judgements of Grade IV cases; and in addition, Grade III extractions were seen as more difficult than Grade II extractions.

These patterns are found across both male and female respondents. Side-by-side plots are shown in Figure 2. Statistically, the ANOVA described above, with gender factored in, showed a significant main effect of gender ($F_{1,193} = 4.08, p = .045, \eta_g^2 = .007$), with females categorizing significantly more cases (54.60%) as difficult on average than Males (48.00%), but no significant interaction effects

with either stage ($p = .601$), difficulty level ($p = .065$), or the two in combination ($p = .186$), that is, the patterns shown in Figure 1 and both of those shown in Figure 2 are statistically comparable.

3.3 | Self-reported confidence ratings

The percentage of each group reporting the perceived confidence for performing each extraction, by stage of education, are depicted graphically in Figure 3.

Correspondence analysis of a three-way contingency table (counts of each confidence-level response by stage of education by expert rating of cases) suggests a statistically significant association between the three factors ($\chi^2 df = 28 = 853.725, p < .001$). Chi-Squared tests of association between stage of education and response are significant for Grade I ($\chi^2 df = 4 = 17.497, p = .002$), Grade II ($\chi^2 df = 4 = 16.517, p = .002$), Grade III ($\chi^2 df = 4 = 14.916, p = .005$) and Grade IV ($\chi^2 df = 4 = 22.703, p < .001$) extractions.

Similarly, collapsing across stage of education and testing for associations between responses and expert rating of cases showed a

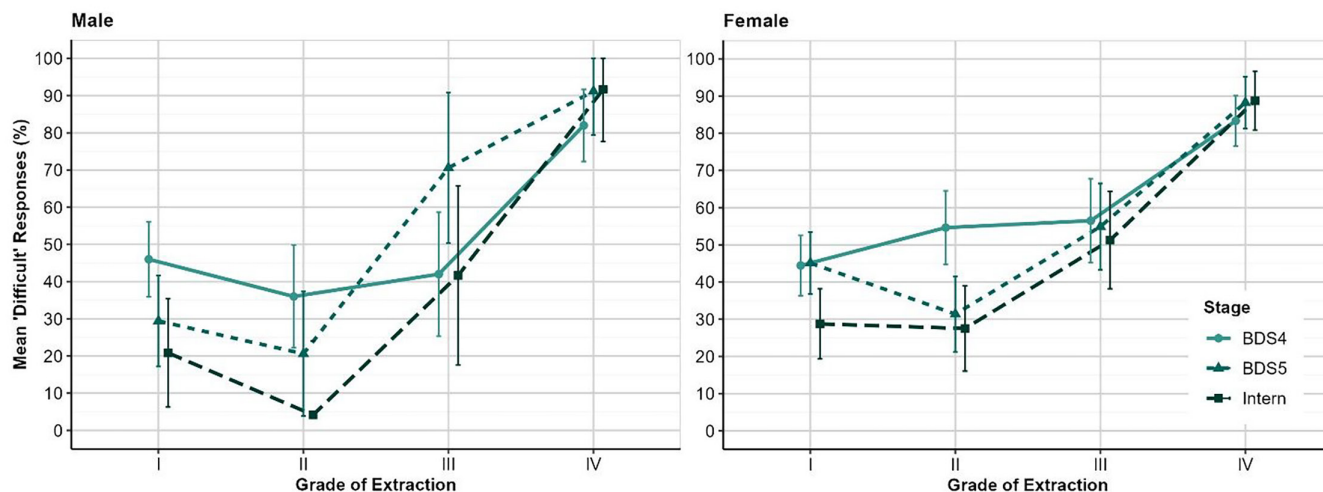


FIGURE 2 Mean cases rated by participants as “difficult” (%) by grade of extraction and gender.

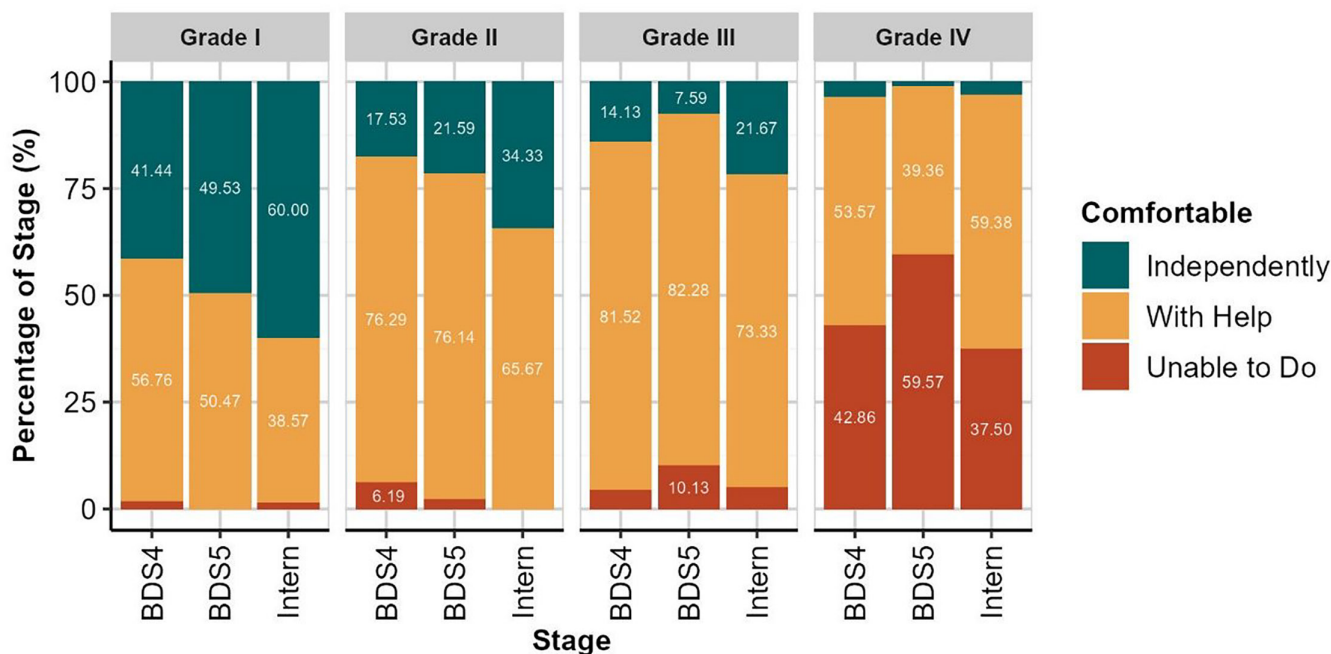


FIGURE 3 Self-perceived confidence of participants by grade of extraction and stage of education. Labels for values of <5% omitted.

significant relationship between the two (χ^2 $df=6=761.33, p < .001$), and these are found within all permutations of the contingency tables, for example, whether comparing responses between Grade I and Grade II extractions, Grade II and Grade III extractions, Grade I and Grade IV extractions, etc. All of these relationships hold across male and female respondents; a summary of responses for each are shown in Figure 4.

3.4 | Factors underlying lack of confidence

Table 3 shows the percentage by responses to why students were reluctant to perform the extractions.

4 | DISCUSSION

Clinical dentistry requires several years of experience which extend beyond the temporal confines of a university environment.¹² Given that dental students get limited clinical exposure during their undergraduate education, stakeholders need to moderate their expectations regarding the “grain-size” of skills that may be achieved realistically by new dental graduates.^{9,13-15} Although dental schools mandate the undergraduate students to achieve clinical targets for various procedures, evidence from the literature suggests that numbers alone are not a reliable predictor of competency.^{16,17} In addition to numerical targets, dental educators need to consider the context and complexity of clinical tasks, evaluate students' confidence and

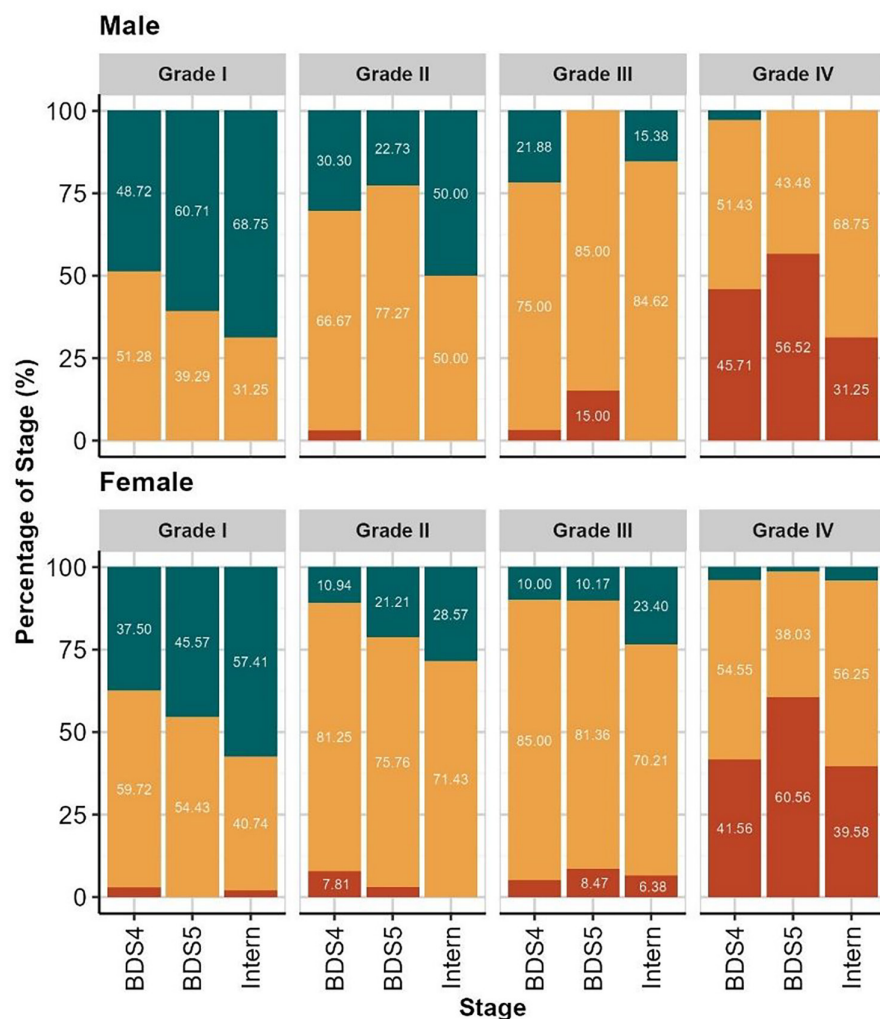


FIGURE 4 Self-perceived confidence of participants by grade of extraction, stage of education and gender. Labels for values of <5% omitted.

TABLE 3 Reasons for lack of confidence: percentage of participants in each stage of education by gender.

| Reason | Males | | | Females | | |
|--------------------------------|----------|----------|------------|----------|----------|------------|
| | BDS4 (%) | BDS5 (%) | Intern (%) | BDS4 (%) | BDS5 (%) | Intern (%) |
| Always nervous or anxious | 4.00 | 0.00 | 8.33 | 7.41 | 1.96 | 2.50 |
| Fear of complications | 16.00 | 11.76 | 0.00 | 11.11 | 11.76 | 15.00 |
| Limited exposure to such cases | 20.00 | 23.53 | 33.33 | 48.15 | 33.33 | 35.00 |
| No exposure to such cases | 32.00 | 47.06 | 58.33 | 24.07 | 29.41 | 35.00 |
| Feel underprepared | 28.00 | 17.65 | 0.00 | 9.26 | 23.53 | 12.50 |

monitor student performance longitudinally for a more comprehensive evaluation of students.

The participants in this study received didactic teaching on tooth extractions and clinical training in tooth extractions from the start of Year 4 with one weekly clinical session. On average, the participants performed 20 tooth extractions per academic year. At the time data collection, Year 4 students practised extraction for one semester; Year 5 students three semesters while the interns completed 2 years as students and one semester as interns. In Year 4, students receive help from supervisors which gradually reduces with time to reach the lowest level during the second semester in Year 5. The interns

work independently and seek help less frequently. Nevertheless, the internship year for the participants in this study represented a period of supervised education and training. The data collection was from November 2021 to March 2022. Although the COVID-19 pandemic had largely subsided during the data collection period, it is possible that reduction in face-to-face learning activities in the period preceding the study might have had a knock-on effect and impacted on the confidence of students. The COVID-19 pandemic has had an adverse impact on student experience and confidence on an unprecedented scale.¹⁸ It would be important to monitor future cohorts of students to identify any differences in students' confidence.

The results of this study show that increased clinical exposure improves the confidence of students and new graduates in dealing with increasingly complex cases of tooth extractions. These findings are consistent with a recent study on foundation dentists in the United Kingdom.¹⁹ However, the confidence tends to plateau indicating that further experience as an independent practitioner is required to deal with complicated cases. These observations are in accord with the theoretical framework of this study. Dental students begin their professional journey as novice learners and through legitimate peripheral participation, progress through the stages of advanced beginners, aiming to be clinically competent by the time they graduate from the university. Further professional development and experience facilitate transformation of dental graduates into skilled, and ultimately an expert professional.

Accurate assessment of the difficulty level of tooth extraction also requires accurate interpretation of pre-operative radiographs. Undergraduate training in radiography varies considerably in dental schools and evidence from the literature suggests that undergraduate dental students in some countries may not be confident in their radiology skills.^{4,9,20} Common anatomical variations which can be missed on casual radiographic evaluation include accessory roots, dilaceration in the apical third of the root, concrescence, and close association with local nerves and maxillary antrum.¹⁰ Inaccurate radiographic assessment may lead to underestimation of the difficulty and consequently lead to a higher risk of tooth fracture and a variety of other intra-operative and postoperative complications. Underperformance of dental students on tooth extractions is often attributed to lack of competence in extraction technique. However, it may in fact reflect poor pre-operative assessment. Similarly, inadequate radiographic assessment may reflect gaps in radiology education rather than deficiencies in surgical skills. Therefore, structured training in evaluation and interpretation of pre-operative radiographs of patients requiring tooth extractions should be considered an integral part of teaching in oral surgery. Accurate radiographic assessment is likely to enhance the confidence of undergraduate students when performing tooth extractions.

Some inconsistencies in the assessment of difficulty level of tooth extractions cases were noted among a small percentage of participants in each of the three groups. Some Year 4 students rated a higher proportion of Grade II extraction (Case No. 2) as easy compared to Grade I (Case No. 3). Such inconsistencies in self-perceived confidence may reflect gaps in radiographic assessment of cases and/or lack of experience of Year 4 participants. While overestimation of difficulty level of tooth extractions is not ideal, it primarily reflects limited confidence but does not pose risks to patients as such. A small percentage of participants appeared to be over-confident in their abilities to extract teeth which were over and above the difficulty level appropriate to their stage of education. This reflects “unconscious incompetence” and is certainly a source of concern. It is widely accepted that one of the key attributes of dental graduates is their ability to recognize their own limitations and refer complex cases appropriately.²¹ In addition, the challenges of managing patient anxiety and achieving

adequate pain control when undertaking tooth extractions under local anaesthesia may impact student confidence adversely. The findings of this study reiterate the need to improve the training of dental students and new graduates to improve their confidence in tooth extractions.^{19,22}

The findings of this study reiterate that dental educators must ensure that students get appropriate experience in performing tooth extractions of single and multi-rooted teeth in both arches with a range of difficulty level so that they are proficient in dealing with variations in clinical practice. Extraction of periodontally involved teeth and mobile, retained roots localized to the soft tissues may fulfil the numerical requirements but such experience does not provide adequate evidence of skills in tooth extractions.²⁰ Therefore, decisions regarding signing off the students for their finals must not rest purely on numbers.

The high proportion of female participants in this study reflects the demographics of the institution as females outnumber males in all years of the dental programme. High number of females in undergraduate dental education is not exclusive to this sample and mirrors the gender trends reported from other institutions.^{18,23,24} Overall, the female participants in this study were less confident compared to their male peers. While it is possible that it may reflect a more cautious approach by females or conscious incompetence, underlying factors for these observations may require further exploration preferably using qualitative methods to gain a deeper understanding.

Dental educators must support the students and trainees to reflect on their skill-set and prioritize patients' interests and safety at all times. Individualized and immediate feedback on student performance in simulated and clinical settings was identified as a key factor in enhancing student competence in tooth extractions and this was endorsed by all participants uniformly as reported previously.²⁵ Feedback should not be restricted to assessments and ideally should follow all patient encounters involving invasive and irreversible clinical procedures including tooth extractions. A log of students' performance during patient encounters can help populate sufficient data points required for longitudinal monitoring of student performance. Although more challenging, dental educators must also try to prioritize providing timely support to underperforming students and offer appropriate remediation to ensure continuity in their clinical training.²⁶ While it is often easy to dismiss the student as being “incapable”, structured remediation, constructive feedback and close support by supervisors can go a long way in enhancing student confidence and can translate into improved student performance.

The learning experiences of dental students in tooth extractions may be enhanced by providing structured training in a simulated dental learning environment using tooth extraction models on mannequins. While training in simulated settings is well established in developed countries, this may not be the case in some developing countries primarily due to resource constraints.²⁰ Simulated settings offer a non-threatening learning space where novice students can consolidate core skills required to perform tooth extractions safely.

Many dental schools also require dental students to pass a competency in pre-clinical settings before they are allowed to perform tooth extractions on real patients in clinical settings.²⁷ This is an appropriate strategy to ensure dental students are safe to perform tooth extractions on patients and is essential to enhance public confidence when receiving dental treatment provided by undergraduate students.

Another fundamental strategy to ensure patient safety during invasive procedures such as tooth extraction is to use surgical safety checklist to prevent wrong tooth extraction.²⁸ While dental schools can develop their own surgical safety checklists and standard operating procedures, surgical safety checklist developed by the world health organization (WHO) is available online and can be used for this purpose. It is important that students familiarize themselves with the surgical safety checklist early so that they can use it effectively. Extraction of a wrong tooth is considered as a clinical incident and clinicians must do everything to avoid such an occurrence as there can be significant medico-legal implications. Wrong tooth extraction can also impact adversely on student confidence and subsequent clinical performance.

Other measures which may minimize such clinical incidents is to use an appropriate student to supervisor ratio to allow for close supervision. In particular, students should be observed directly by a clinical supervisor on a one-to-one basis from the point of application of forceps and/ or elevator until the delivery of the tooth. Also, the clinical assistant of the student (nurse or a fellow student) must remain vigilant to alert the student performing the tooth extraction promptly, should they attempt to place their forceps on the wrong tooth. It is also important for dental schools to regularly undertake clinical audits on wrong tooth extractions on student clinics and take appropriate steps to reduce such occurrence through student remediation and staff training.

Some limitations of this study need to be mentioned. First, this study was done at a single institution which limits the generalizability of these findings. Second, the results are based on a questionnaire and further engagement with the participants using qualitative methods could have allowed a deeper insight into the factors which impact on the learning experiences of the students and new graduates in oral surgery. Finally, it might be helpful to follow the participants longitudinally to evaluate how further experience contributes to shaping their confidence in tooth extractions.

5 | CONCLUSIONS

The findings of this study show that a majority of the participants were able to recognize tooth extraction cases which were beyond the scope of their training stage with females reporting lower confidence.

ACKNOWLEDGEMENTS

The authors would like to thank the dental students and interns who participated in this study.

FUNDING INFORMATION

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors. Open access funding was provided by the Qatar National Library.

CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests for this review.

DATA AVAILABILITY STATEMENT

Detailed survey data are available from the corresponding author upon request.

ORCID

Daniel Zahra  <https://orcid.org/0000-0001-6534-6916>

REFERENCES

- Innes N, Hurst D. *GDC Learning Outcomes for the Undergraduate Dental Curriculum*. Vol 13. Evid Based Dent; 2012:2-3.
- Ali K, Slade A, Kay EJ, Zahra D, Chatterjee A, Tredwin C. Application of Rasch analysis in the development and psychometric evaluation of dental undergraduates preparedness assessment scale. *Eur J Dent Educ*. 2017;21(4):e135-e141.
- Ali K, Qazi HS, Siddiqi K, Glanville R. Assessment of undergraduate students in tooth extraction competence—a cohort study. *Eur J Dent Educ*. 2021;25(3):607-613.
- Qazi HS, Ali K, Cockerill J, Zahra D, Raja UB, Ataulloh K. Self-perceived competence of new dental graduates in Pakistan – a multiinstitution study. *Pak Armed Forces Med J*. 2021;71(3):739-743.
- MacLuskey M, Durham J. Oral surgery undergraduate teaching and experience in the United Kingdom: a national survey. *Eur J Dent Educ*. 2009;13(1):52-57.
- Brand HS, van der Cammen CCJ, Roorda SME, Baart JA. Tooth extraction education at dental schools across Europe. *BDJ Open*. 2015;1(1):15002.
- Durham JA, Moore UJ, Corbett IP, Thomson PJ. Assessing competency in Dentoalveolar surgery: a 3-year study of cumulative experience in the undergraduate curriculum. *Eur J Dent Educ*. 2007;11(4):200-207.
- Stelzle F, Farhoumand D, Neukam FW, Nkenke E. Implementation and validation of an extraction course using mannequin models for undergraduate dental students. *Acta Odontol Scand*. 2011;69(2):80-87.
- Ali K, Cockerill J, Zahra D, Qazi HS, Raja U, Ataulloh K. Self-perceived preparedness of final year dental students in a developing country—a multi-institution study. *Eur J Dent Educ*. 2018;22(4):e745-e750.
- Hupp J, Tucket M, Ellis E. *Contemporary oral and maxillofacial surgery*. Mosby; 2019.
- Lave J, Wenger E. *Situated Cognition: Legitimate Peripheral Participation*. Cam-bridge University Press; 1991.
- Chambers D, Gerrow J. Manual for developing and formatting competency statements. *J Dent Educ*. 1994;58(5):361-366.
- Ali K, Slade A, Kay E, Zahra D, Tredwin C. Preparedness of undergraduate dental students in the United Kingdom: a national study. *Br Dent J*. 2017;222(6):472-477.
- Ali K, Tredwin C, Kay E, Slade A. Transition of new dental graduates into practice: a qualitative study. *Eur J Dent Educ*. 2016;20(2):65-72.
- Mat Yudin Z, Ali K, Wan Ahmad WMA, et al. Self-perceived preparedness of undergraduate dental students in dental public universities in Malaysia: a national study. *Eur J Dent Educ*. 2020;24(1):163-168.

16. Dawson LJ, Mason BG, Bissell V, Youngson C. What is professional competence? *Eur J Dent Educ.* 2016;21(3):130-135.
17. Dawson LJ, Mason BG, Bissell V, Youngson C. Calling for a re-evaluation of the data required to credibly demonstrate a dental student is safe and ready to practice. *Eur J Dent Educ.* 2017;21:130-135.
18. Ali K, Alhajja ESA, Raja M, et al. Blended learning in undergraduate dental education: a global pilot study. *Med Educ.* 2023;28(1):2171700.
19. Brown J, Baker R, Moore R. An investigation into the oral surgery curriculum and undergraduate experience in a sample of DFT's in the UK. *Eur J Dent Educ.* 2021;25(3):421-434.
20. Ali K, Siddiqi KM, Qazi HS. Developing competence in tooth extractions during undergraduate dental education – a qualitative study. *South-east Asian J Med Educ.* 2021;15(2):27-33.
21. Ali K, Tredwin C, Kay EJ, Slade A, Pooler J. Preparedness of dental graduates for foundation training: a qualitative study. *Br Dent J.* 2014;217(3):145-149.
22. Macluskey M, Durham J, Bell A, et al. A national survey of UK final year students' opinion of undergraduate oral surgery teaching. *Eur J Dent Educ.* 2012;16(1):e205-e212.
23. Ali K, Raja M, Watson G, Coombes L, Heffernan E. The dental school learning milieu: Students' perceptions at five academic dental institutions in Pakistan. *J Dent Educ.* 2012;76(4):487-494.
24. Ali K, Zahra D, Coelho C, Jones G, Tredwin C. Academic performance of undergraduate dental students with learning disabilities. *Br Dent J.* 2017;222(3):205-208.
25. Seifert LB, Herrera-Vizcaino C, Herguth P, Sterz J, Sader R. Comparison of different feedback modalities for the training of procedural skills in Oral and maxillofacial surgery: a blinded, randomized and controlled study. *BMC Med Educ.* 2020;20(1):330.
26. Cleland J, Cilliers F, van Schalkwyk S. The learning environment in remediation: a review. *Clin Teach.* 2018;15:13-18.
27. Ali K, Mccarthy A, Robbins J, Heffernan E, Coombes L. Management of impacted wisdom teeth: teaching of undergraduate students in UK dental schools. *Eur J Dent Educ.* 2014;18(3):135-141.
28. Dargue A, Fyfe E, French K, et al. The impact of wrong-site surgery on dental undergraduate teaching: a survey of UK dental schools. *Eur J Dent Educ.* 2021;25(4):670-678.

How to cite this article: Gaballah K, Ali K, Zahra D, Abou Neel E, Ibrahim E. Perceived confidence of dental students and new graduates in performing tooth extractions—An exploratory study. *Eur J Dent Educ.* 2023;00:1-15.
doi:[10.1111/eje.12936](https://doi.org/10.1111/eje.12936)

APPENDIX

Perceived confidence of dental students and interns in tooth extractions

Section I.

Participant information.

Age (Years).

Gender

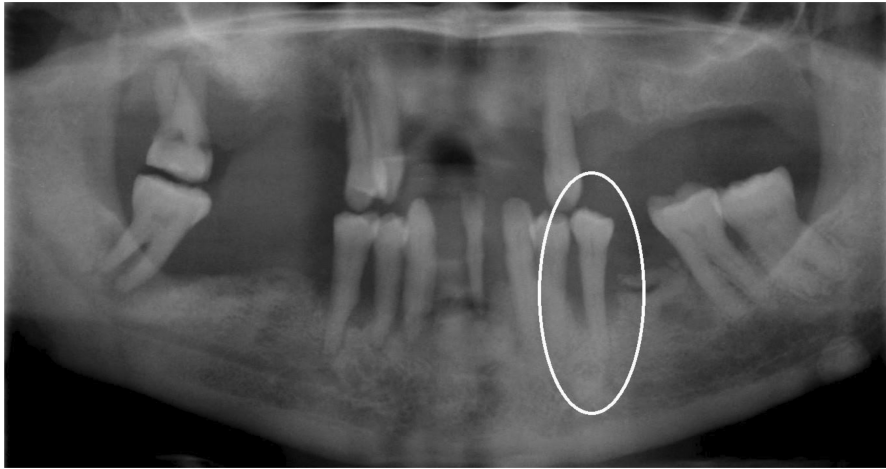
- Male
- Female
- Prefer not to say

Stage of Education

- BDS Year 4
- BDS Year 5
- Internship year

Section II.

CASE 1.



Please evaluate the radiograph shown above and answer the following questions.

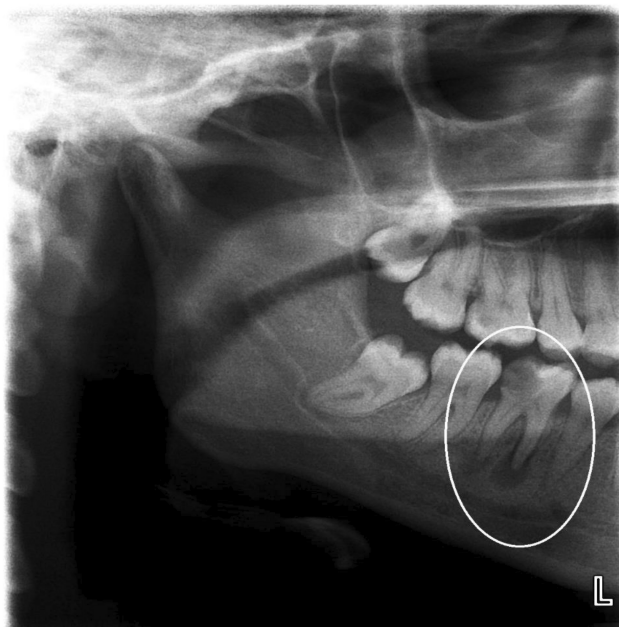
A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?

- i Very easy
- ii Easy
- iii Moderately difficult
- iv Very difficult
- v Complicated

B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?

- i. Independently
- ii With help
- iii Unable to perform

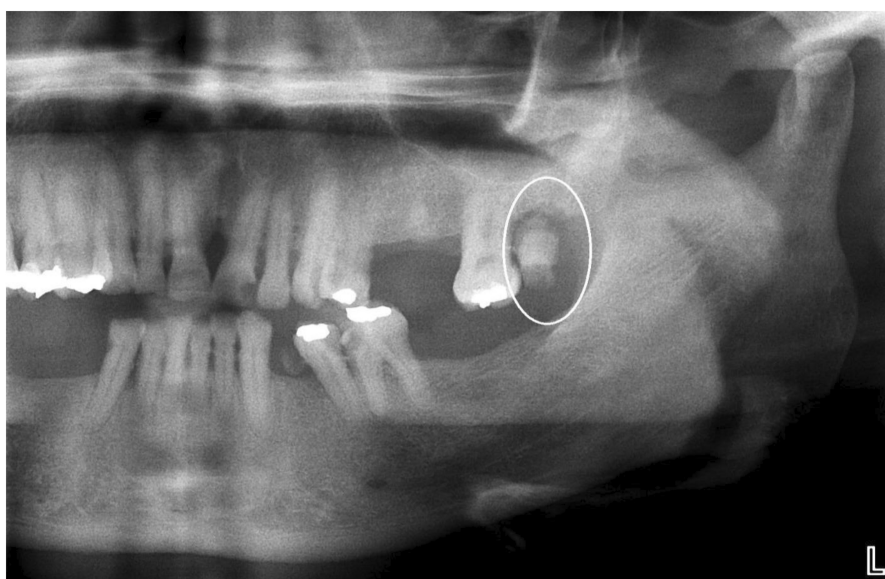
CASE 2.



Please evaluate the radiograph shown above and answer the following questions.

- A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?
- i. Very easy
 - ii Easy
 - iii Moderately difficult
 - iv Very difficult
 - v Complicated
- B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?
- i Independently
 - ii With help
 - iii Unable to perform

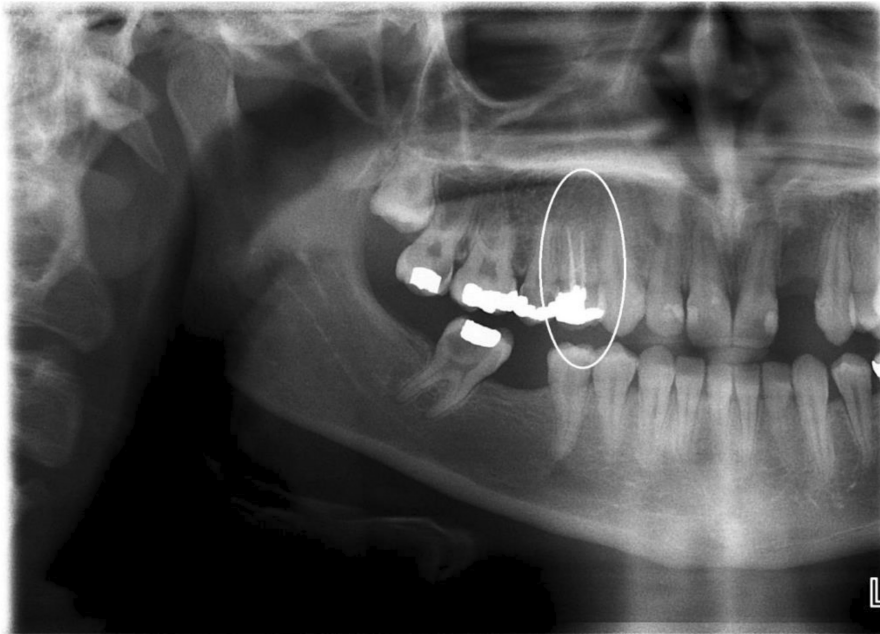
CASE 3.



Please evaluate the radiograph shown above and answer the following questions.

- A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?
- i Very easy
 - ii Easy
 - iii Moderately difficult
 - iv Very difficult
 - v Complicated
- B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?
- i Independently
 - ii With help
 - iii Unable to perform

CASE 4.



Please evaluate the radiograph shown above and answer the following questions.

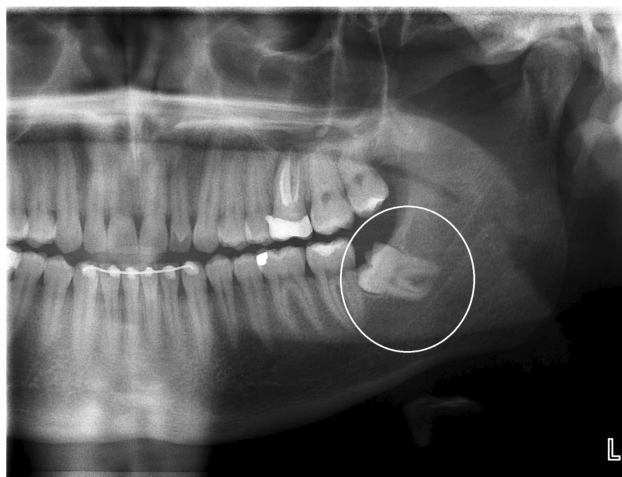
A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?

- i Very easy
- ii Easy
- iii Moderately difficult
- iv Very difficult
- v Complicated

B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?

- i Independently
- ii With help
- iii Unable to perform

CASE 5.



Please evaluate the radiograph shown above and answer the following questions.

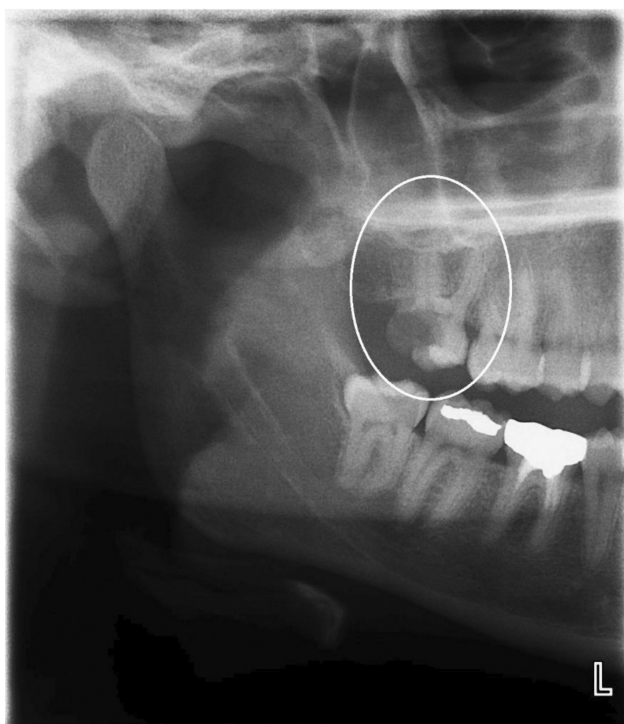
A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?

- i Very easy
- ii Easy
- iii Moderately difficult
- iv Very difficult
- v Complicated

B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?

- i Independently
- ii With help
- iii Unable to perform

CASE 6.



Please evaluate the radiograph shown above and answer the following questions.

A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?

- i Very easy
- ii Easy
- iii Moderately difficult
- iv Very difficult
- v Complicated

B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?

- i Independently
- ii With help
- iii Unable to perform

CASE 7.



Please evaluate the radiograph shown above and answer the following questions.

A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?

- i Very easy
- ii Easy
- iii Moderately difficult
- iv Very difficult
- v Complicated

B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?

- i Independently
- ii With help
- iii Unable to perform

CASE 8.



Please evaluate the radiograph shown above and answer the following questions.

A. How would you rate the difficulty level of extraction of the tooth marked with a white outline?

- i Very easy
- ii Easy
- iii Moderately difficult
- iv Very difficult
- v Complicated

B. Which one of the following options best indicates your confidence level to perform extraction of this tooth?

- i Independently
- ii With help
- iii Unable to perform

Section III.

If you did not feel confident to perform extraction of one or more teeth, which one of the following best indicates the main reason for your lack of confidence?

- No clinical exposure to such cases
- Limited clinical exposure to such cases
- Feel underprepared
- Feel nervous/anxious
- Fear of complications
- Any other – (please provide details)

Thank you for your time and participation.