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Original Research

Addition of Demineralized Freeze-Dried BoneGraft toPlatelet-Rich Fibrinis Superior to Platelet-Rich Fibrin Alone for Ameliorationof Osseous Defect Following Impacted Mandibular Third Molar Removal: A Randomized Controlled Trial

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ABSTRACT

Aim
To identify most challenging aspects of endodontic treatment experienced by dental students in Riyadh Elm University during their dental education program.

Methods
This cross-sectional survey was conducted among dental students using questionnaires. The questionnaire included close-ended questions investigating the confidence level of undergraduate students, the specific tasks that they find most challenging. All undergraduate dental students from the levels 8-12 from Riyadh Elm University were included in the study. Data were analyzed using SPSS Version 21.

Results
Of the total 200 respondents, the majority (81%) were females. Over half the participants indicated that the most prominent difficulty while administering anesthesia is related to the inferior alveolar nerve block and while performing the clamp adaptation technique when it comes to placing rubber dam. Two-third reported cavity access to be most difficult when treating posterior teeth. An overwhelming 70% of respondents listed lateral condensation as the most difficult step during root canal filing. The majority reported wanting more information and training related to endodontic treatment.

Conclusion
This study clearly shows that there are obstacles facing students while performing endodontic treatment. It is worth stressing that majority of the surveyed group indicated needing more training to improve their abilities and increase their confidence when performing endodontic treatment.

INTRODUCTION

The field of dentistry has become an essential part of medicine. Maintaining the essential place of dentistry requires providing effective training for dentistry students. This necessitates identifying the most prominent challenges faced by new students. Dental students face several challenges that can complicate their journeys towards becoming professional dentists. One of these challenges arises when students start undergoing practical training to gain dental experience. More

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specifically, endodontic treatment seems to be representing a challenge to students.[1]

Endodontic treatment is a field with many tasks that have the potential to present difficulties. For example, some students report that administering anesthesia can present a challenge. In addition, rubber dam use can cause difficulties that start to disappear as students gain more experience. Furthermore, radiographic examinations and intracanal medication were found to be especially challenging in one study.[1]

In a survey, the most prominent challenges were endodontic radiology, evaluation of root canal obturation, and determining the correct recall period.[2]. Another survey at the University of Bristol in the United Kingdom investigated RCTs among dental students at years 3-5. As expected, students with more clinical experience reported a higher level of confidence. In addition, students reported being more confident while performing completing anterior RCTs as opposed to posterior RCTs. The study concludes that increasing experience can improve students' performance.[3]

A study was conducted to investigate root canal treatments at an academic hospital in Pretoria, South Africa. The study revealed that root canal treatments (RCTs) completed by students suffered from insufficiencies. In fact, 42.73% of RCTs performed by students were incomplete.[4] Furthermore, another study aimed at evaluating the frequency of intern's procedural errors while performing root canal treatments. The evaluation was done by two experienced endodontists and revealed that around 39% of cases experienced procedural errors, which is a high percentage.[5]

A similar conclusion was reached by a study performed at Taibah University, Saudi Arabia. Retrospective chart review of previous endodontic procedures showed that in 31.1% of cases experienced procedural errors. The most common errors were underfilling, overfilling, and voids.[6]

Haug et al. (2018) studied the performance of 4th year undergraduate students in an undergraduate students' clinic in Norway. An investigation of treatment results showed that 31.1% of procedures contained errors, 82.5% of which were related to hand files.[7]

In many instances, endodontic treatment presents difficulties to professional dentists, not only students. A study performed in Riyadh, Saudi Arabia, used a survey to investigate the problem of separated endodontic files (SEF). This occurs when a separation of endodontic instruments takes place within the root canal. The study showed that about 57.6% of dentists faced this problem when performing root canal preparations.[8]

With endodontic treatment presenting a challenging field to dentists and dental students, conducting a study that can identify its most challenging aspects in Riyadh Elm University can be of great benefit. Identifying those challenges can help make informed decisions that can facilitate improving the students' performance and the quality of care offered by the university. Studies show that there is a certain level of difficulty experienced by undergraduate students when performing endodontic treatment. Therefore, conducting a study investigating these challenges can positively impact students' performance and the care offered by the clinic.

METHODS

The cross-sectional survey was conducted using a questionnaire. The questionnaire included close-ended questions investigating the confidence level of undergraduate students, the specific tasks that they find most challenging, and so on. Before the study was conducted, the Institutional Review Board (IRB) approval was obtained. The sample was comprised of students of the following levels:

- Level 8: Single root canal treatment.
- Level 9: Single and two root canal treatment.
- Level 10: All of the above in addition to single and two root canal retreatment.
- Levels 11 & 12: All of the above in addition to three root canal retreatment.
- It is worth mentioning that rotary instruments are not used.

All undergraduate dental students from the levels mentioned above at Riyadh Elm University at Riyadh city are included in the sample. Data were analyzed using SPSS Version 21. A p value of ≤ 0.05 was considered as statistically significant.

RESULTS

The results show that 81% of participants were female and 19% were male as shown in figure 1. The results also show that around 36% of participants were level 10 – 11 students. More than 50% of the survey participants indicated that the most prominent difficulty while administering anesthesia is related to the inferior alveolar nerve block. Around 41% of participants indicated that intra-pulpal technique is the most difficult. When it comes to placing rubber dam, more than 50% of participants indicated facing difficulties while performing the clamp adaptation technique. Clamp choice was the least difficult with around 17%.

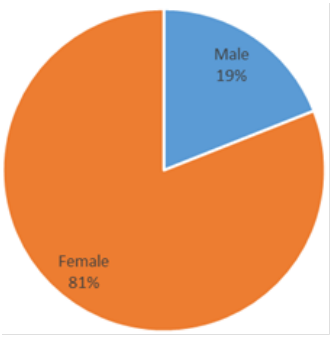

Fig 1: Gender distribution of survey participants

As expected according to literature, students reported that they found cavity access to be most difficult when treating posterior teeth with around 66% agreeing with this finding. On the other hand, around 25% found treating anterior teeth to be more difficult. When it comes to working length determination, the most reported difficulty (42% of participants) pertains to root length. Reference point accounted for 25% of responses and other difficulties accounted for the remaining 33%. The results of difficulties incurred during root canal instrumentation were not as definitive.

A small majority reported finding difficulties during step-back technique. The remaining results can be found in figure 7. The vast majority of surveyed students indicated that they use calcium hydroxide as the intracanal medication in their clinics (Figure 8). An overwhelming 70% of respondents listed lateral condensation as the most difficult step during root canal filing. The remaining results can be found in figure 9. In the last question asked, more than 90% of respondents reported wanting more information and training related to endodontic treatment.

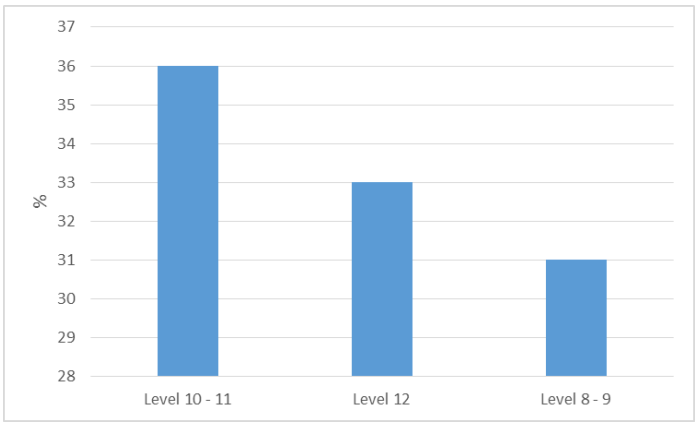

Fig 2: Survey participants' distribution based on student levels

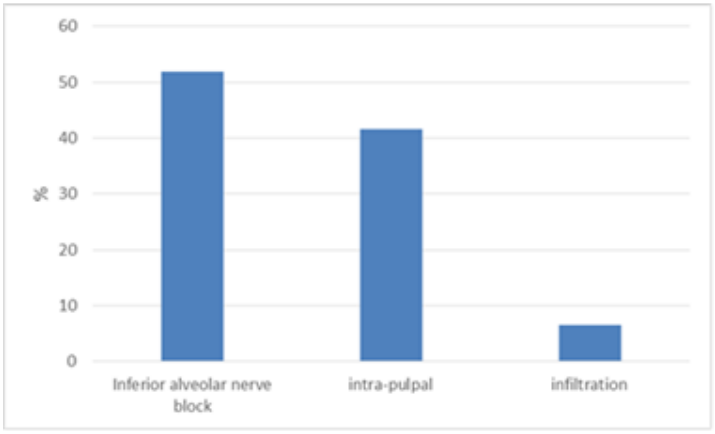

Fig 3: The most difficult anesthesia techniques according to participants

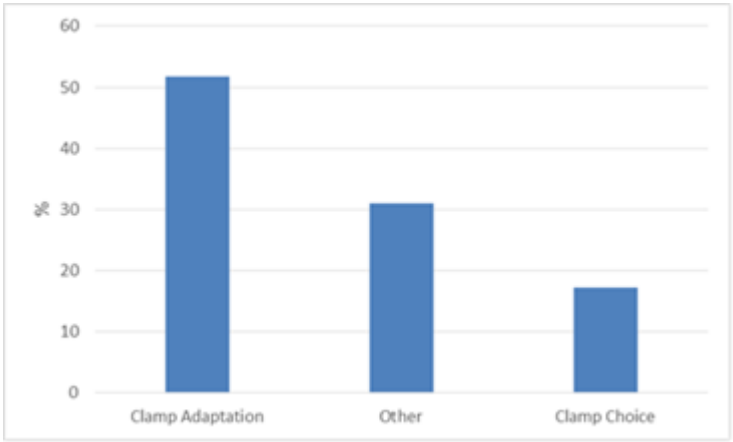

Fig 4: Difficulties when placing rubber dam as reported by participants

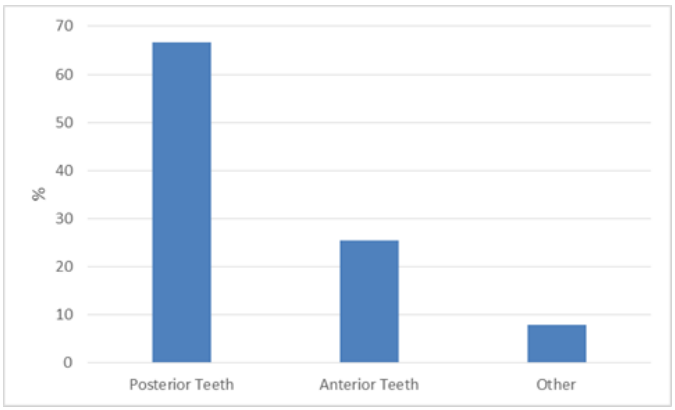

Fig 5: A comparison in cavity access between posterior and anterior teeth

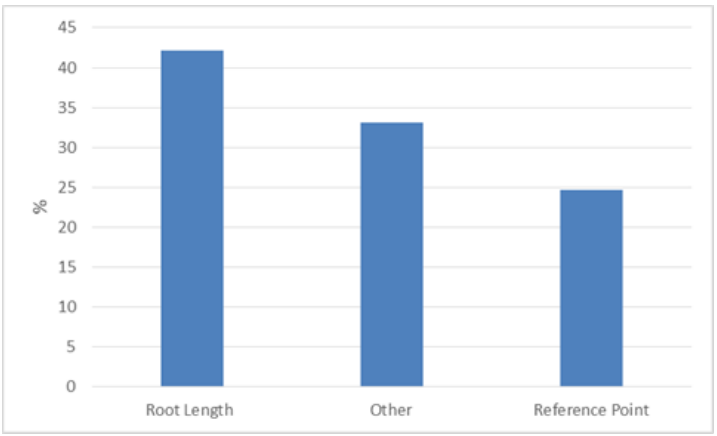

Fig 6: Difficulties related to working length determination

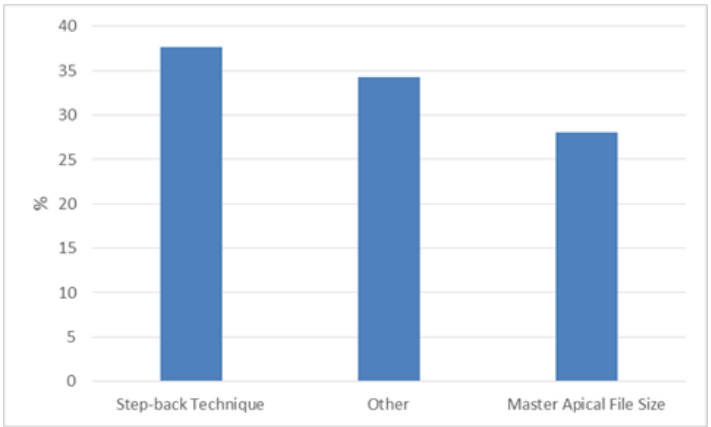

Fig 7: Difficulties related to root canal instrumentation

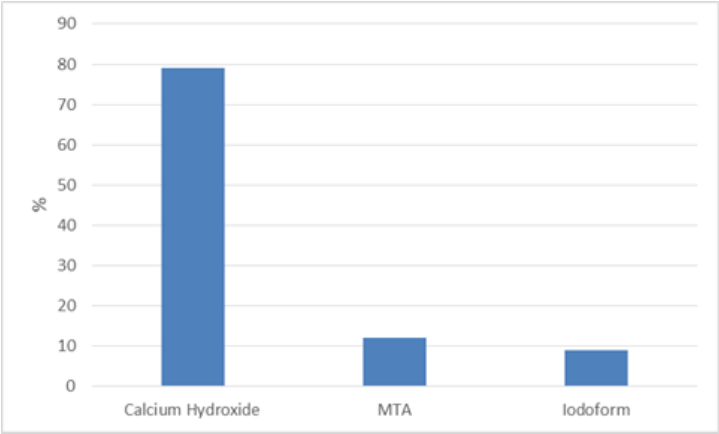

Fig 8: The mostly used intracanal medications

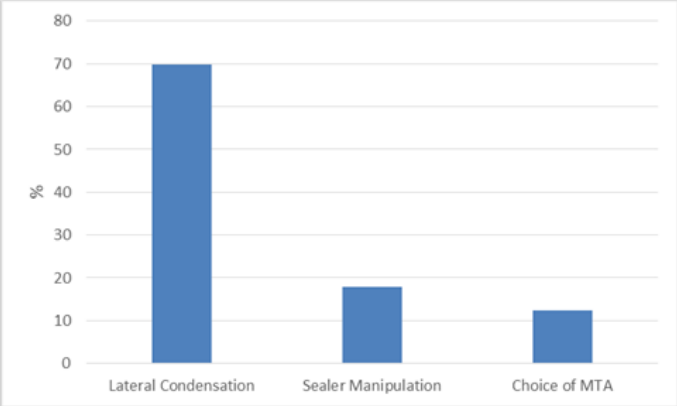

Fig 9: Difficulties facing respondents in root canal filing

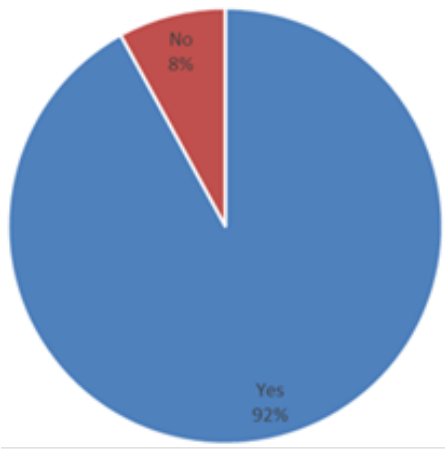

Fig 10: Participants' response regarding needing more information and training

DISCUSSION

Of the total 200 participants in this study, 81% of which were female, and 19% were male. This is due to the fact that more of the interactions made by the researchers were with female students. The literature shows that although administering anesthesia is not a significant problem, it still exists.[1-2] For one of the surveyed groups, this percentage reached more than 30%, which can be considered a bit high.[1] However, this research goes a step further by determining which particular situations cause the difficulty. The questionnaire of this survey showed that 51.87% of interviewees indicated having a difficulty when performing inferior alveolar nerve block. This difficulty may arise due to the required precision with which a doctor should administer anesthesia. The anatomy of the patient could play a crucial role in mitigating or aggravating this difficulty.

The issue of rubber dam use is similar to anesthesia in its significance as a difficulty. Alrahabi (2017) found it to be a problem, although not significant.[2] Tavaers et al. (2018) reached a similar conclusion with one of the surveyed groups reporting that 32% of its participants lacked confidence on rubber dam use.[1] Our research attempts to investigate this problem more specifically by examining specific situations. Our survey revealed that 51.72% of participants faced problems related to clamp adaptation. The reason for this difficulty can be related to the variety of sizes needed for different patients. The survey showed that the majority of participants (66.67%) lacked confidence and faced difficulty when trying to access cavity while treating posterior teeth. This is consistent with the findings of a previous study where in all surveyed groups, more than 80% of participants indicated facing this particular difficulty.[1] This may be due to the existence of many canals as opposed to anterior teeth.

When it comes to working length determination, previous articles show that this is not a significant issue for dental students.[1-4] However, difficulties still exist. Tavares found that the main difficulty pertains to determination of root length, which is consistent with 42.13% of responses of our research. This is also consistent with the findings of Haug et al. (2018) which revealed that loss of working length was the most common mishap in their study.[7] The difficulty here is obvious. The working length should be determined very accurately with a small margin of error. Therefore, any mistake in determining the working length will be difficult to rectify.

Literature shows that difficulties exist with root canal instrumentation. However, those difficulties are not significant. This can be seen in several sources.[1, 4, 6-7] Also, these articles do not specify the difficulty facing practitioners. This problem is the focus of one of the reviewed articles. Pedir et al. (2016) found the problem of separated files to be significant and most of those separations occurred in the apical third.[8] Our research tries to specifically investigate the causes of difficulty associated with root canal instrumentation. The survey showed most respondents (37.64%) struggled with the step back technique. The step back technique requires considerable time and effort to perform, which might be the source of the difficulties.

The most commonly used intracanal medication and revealed that more than 79% of respondents used calcium hydroxide, which is the same medication used in a past study.[1] The research also investigates where difficulties most occur when performing root canal fillings (RCTs). The majority of participants (69.83%) indicated that they face difficulties while performing the lateral condensation technique. This finding is consistent with the findings of Tavares et al. (2018).[1] In that study,

a considerable percentage of participants in the surveyed groups indicated having problems with lateral condensation.

When performing lateral condensation, removing the spreader might sometimes cause the unintended removal of the gutta percha. The other reviewed articles indicate that inadequacies in RCTs are very common. However, no specific technique is indicated as the most common cause of inadequacies. Lastly, the survey shows that 92% of participants in our questionnaire need more training and information for endodontic treatment. This is essentially consistent with all reviewed articles where participants indicate their need of more training to boost their confidence in the field of endodontics.

CONCLUSION

This study clearly shows that there are obstacles facing students while performing endodontic treatment. This is consistent with other studies reviewed prior to conducting this research. An enormous majority of participants indicated their need for more training. The responses showed several interesting facts:

- Administering anesthesia when performing inferior alveolar nerve block turned out to be a difficulty faced by more than half of the participants.
- Similarly, clamp adaptation turned out to be a difficulty faced by more than 50% of participants.
- Around 66% face difficulties when treating posterior teeth.
- For working length determination, root length turned out to be the main obstacle.
- Lateral condensation turned out to be a problem when performing RCTs.

It is worth stressing that majority of the surveyed group indicated needing more training to improve their abilities and increase their confidence when performing endodontic treatment.

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