SUMMARY AND CRITICAL APPRAISAL

Akif Demirel, Nur Sena Önder, Merve
Alkış, Şaziye Sarı. Smear layer removal efficacy of irrigating
solutions applied distinct needle designs: a scanning electron
microscopy study. Journal of Clinical Pediatric Dentistry. 2023;47(1): 58-66. doi: 10.22514/jocpd.2022.016.

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OUTLINE

- SUMMARY

    1. INTRODUCTION
    2. METHODOLOGY
    3. RESULTS
    4. DISCUSSION
    5. CONCLUSION

- CRITICAL APPRAISAL
- GENERAL COMMENTS
- REFERENCES

SUMMARY

INTRODUCTION

- The introduction gave a good overview of the different tools and techniques required for the experiment, although it did not state the reason for the experiment as clearly.
- In summary it states that the article examines and compares the use of two irrigation needle types ; the double side-vented(DSVN) and open ended(OEN) needles, and their efficacy with regards to smear layer removal (SLR) when used with either NaOCl, Citric Acid or EDTA.`
- The results were gotten by examining the inner root surfaces with scanning elecrtron microscopy.

SUMMARY

METHODOLOGY

- The method was in line with randomized control experiments and it was very clear in its presentation, although the choice of an in-vitro experiment for determining the success of pulpectomy seemed very limited. In summary there were 5 groups and 3 scores as follows:
- Group 1 (5% EDTA + OEN),
- Group 2 (6% CA + OEN),
- Group 3 (5% EDTA + DSVN),
- Group 4 (6% CA + DSVN)
- and control Group 5 (1% NaOCl + OEN)

SUMMARY

METHODLOGY II

- Score 0: Most of the dentin tubules were open and no SL was observed.
- Score 1: Most of the dentin tubules were partially obliterated or partially visible and moderate SL was observed.
- Score 2: Most of the dentin tubules were completely obliterated and SL was observed in abundance.

SUMMARY

RESULTS.

- The article clearly examines the results of the different techniques and irrigants based on their effects on the coronal, middle and apical thirds of the root, which was in keeping with the aim of the experiment.
- In the coronal third, all the experimental groups showed superior SLR results to the control group
- In the middle third, EDTA with DSVN , CA with DSVN and CA with OEN (excluding EDTA with OEN) achieved effective SL removal with a statistically significant margin over the control group.
- In the apical third, only DSVN groups achieved effective SL removal with a statistically significant margin over the control group.
- Erosive changes were detected in all but apical third while EDTA was used with either needle type.

SUMMARY

DISCUSSION

- The discussion examined the effects of the two needle types on the different surfaces of the root canal. It examines how OENs produce higher apical pressure and cause more irrigation solution to access the periapical tissues while SVN tips allow irrigants to contact the root canal walls rather than the periapical area. SVNs also prevent the extrusion of irrigation solutions and debris into the periapical area, thus it was detremined that the efficacy of irrigation procedures in the apical region increases with the use of SVNs.
- The efficacy of the three irrigants used in the experiment were also compared and a combination of NaOCl for its antibacterial activity with either EDTA or CA for their ability to dissolve inorganic tissue was the prefered choice. .

SUMMARY

DISCUSSION II

- Another result of this study was that the removal level of the SL was significantly lower in the apical third in comparison to the coronal third in all the experimental groups.
- The findings of this study mostly complied with previous studies when compared.
- Limitations: as this study was conducted under in-vitro conditions, the irrigation procedures especially in the apical third could not be simulated like in-vivo environment.
- Needle diameters in this study could not be standardized due to the lack of commercial availability.

SUMMARY

CONCLUSION

- Regardless of irrigation materials, it was concluded that the smear layer removal efficacy of both needle types was similar.
- Citric Acid was recommended over EDTA solely because there was no associated erosive damage.

CRITICAL APPRAISAL

- This critical appraisal will be done using the critical appraisal skills programme (CASP) Randomised Controlled Trial Standard Checklist

- **1. Did the study address a clearly focused research question**:

- **YES :**
  - beacuse it was able to assess the outcomes of pulpectomy using the stated techniques.

CRITICAL APPRAISAL

- **2. Was the assignment of participants to interventions randomised?**

- **YES:**
  - because the samples were taken from 30 participants and distributed at random into 5 groups without bias because the selection was done in the absence of the subjects.

CRITICAL APPRAISAL

- **3. Were all participants who entered the study accounted for at its conclusion?**

- **YES:**
  - because there were no losses to follow-up and exclusions after randomisation because it was an in-vitro study.

CRITICAL APPRAISAL

- **4. Were the investigators ‘blind’ to the intervention they were giving to participants?**

YES:

because the scoring investigator was blinded to the sample origin and blindly scored the SEM photographs at weekly intervals.

CRITICAL APPRAISAL

- **5. Were the study groups similar at the start of the randomised controlled trial?**

- **YES:**
  - because all participants were in the same age bracket and the same inclusion and exclusion criteria were applied to them.

CRITICAL APPRAISAL

- **6. Apart from the experimental intervention, did each study group receive the same level of care (that is, were they treated equally)?**

- **YES:**
  - because the same follow up intervals and interventions were applied to all samples throughout the duration of the research.

CRITICAL APPRAISAL

- **7. Were the effects of intervention reported comprehensively?**

- **YES:**
  - because the results were reported for each outcome in each study group at each follow-up interval , power calculation was done, limitations were clearly stated , p values were reported amongst others.

CRITICAL APPRAISAL

- **8. Was the precision of the estimate of the intervention or treatment effect reported?**

- **NO:**
  - because confidence intervals were not reported.

CRITICAL APPRAISAL

- **9. Do the benefits of the experimental intervention outweigh the harms and costs?**

- **NO:**
  - because the experiment was not cost effective due to the use of SEM and the results didnt show any significant deviation from previous works.

CRITICAL APPRAISAL

- **10. Can the results be applied to your local population/in your context?**

- **YES:**
  - because it focuses on the techniques of SLR in pulpectomy which is a paediatric procedure and thus fits with the demography of patients in our clinic.

CRITICAL APPRAISAL

- **11. Would the experimental intervention provide greater value to the people in your care than any of the existing interventions?**

- **YES:**

  because it highlights the fact that CA is preferrable as an inorganic solvent as compared to NaOCl or EDTA which is readily available. It also highlights the advantage of DSVN over OEM as it concerns protection of the succedaneous tooth.

GENERAL COMMENTS

- The title of the article was explanatory enough as to the design of the research but left out details of the actual aim and type of study.

- The introduction was able to break down the research process and rationale.
- Ethical approval and consent were gotten and mentioned.

- The materials and methods were properly stated and put down, the power calculation to determine the adequate sample size necessary was also documented, but there was inedaquate information on follow up procedures and outcome.

- Data analyses were specified and results were properly interpreted.

- The findings were adequately discussed and compared with previous works, but they do not really offer much in terms of changing the pulpectomy procedure in our environment.

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THANK YOU