

Hurdles of Care Utilization Systems: Point-Of-Care Ultrasound in Dentistry. A Pilot Study

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Introduction

- Recommended appropriateness criteria for imaging and treatment decisions of facial swellings of odontogenic origin (FSOO) do not exist
- Computed tomography (CT) is commonly utilized in medical settings to diagnose and plan the appropriate course-of-care for a FSOO but exposes the patient to a moderate level of ionizing radiation.
- Point-of-care ultrasound (POCUS) has been utilized in emergency medical settings to differentiate abscess and cellulitis in skin and soft tissue infections. Due to their similar clinical phenotypic presentations, POCUS could also be an adjunctive diagnostic instrument utilized by healthcare providers to identify a concern of fluid presence in FSOO.
- This may aid treatment planning decisions while maintaining ionizing radiation exposure as low as reasonably achievable (ALARA) in the pediatric patient.

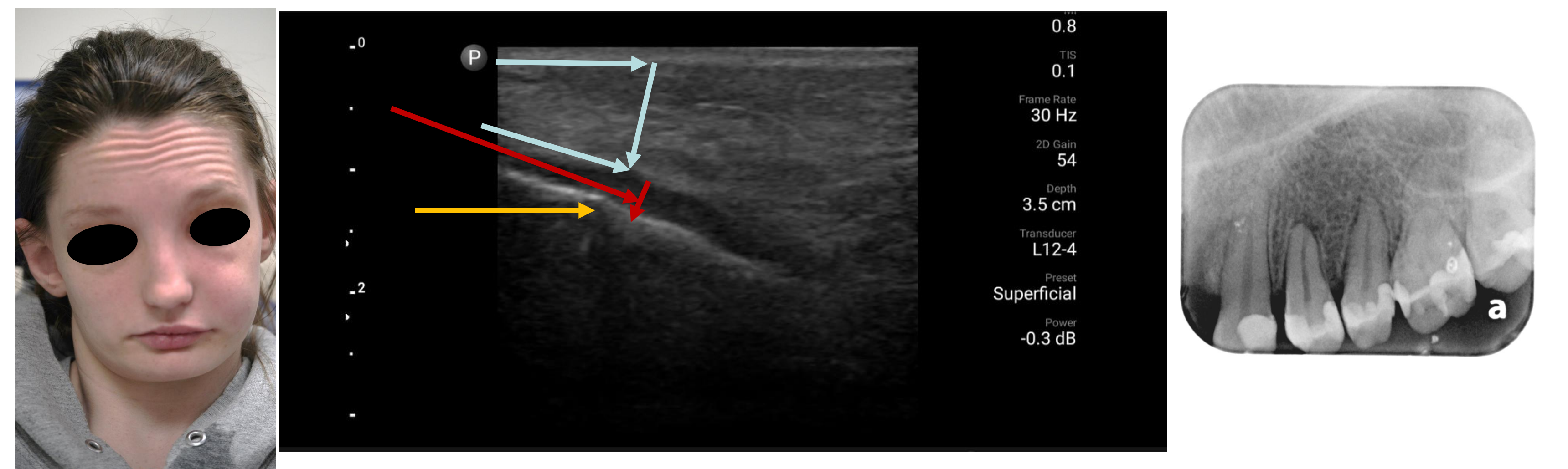
Objectives

- The objective of this prospective observational study is to evaluate if POCUS can be used as an adjunct diagnostic instrument by pediatric dentists in the role of a novice POCUS user in the differentiation of cellulitis or abscess in facial swellings of odontogenic origin when compared to a gold standard expert.
- A secondary objective would be to see how POCUS affects any hurdles of care utilization systems in a dental clinic hospital setting.

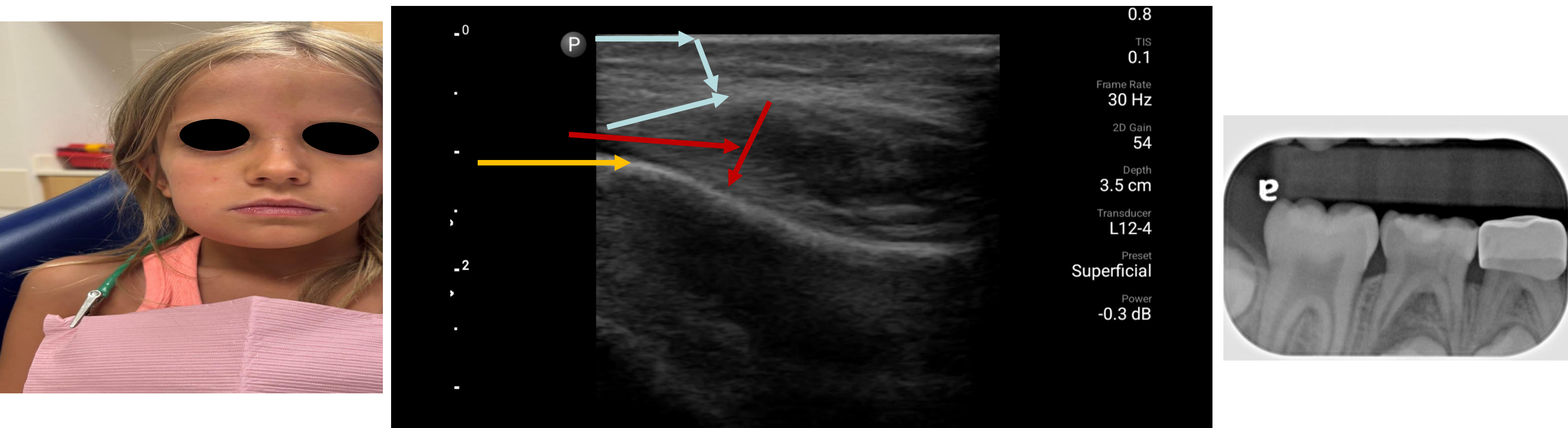
Methods

- IRB-approved (IRB #2024-0073). This prospective observational cohort study evaluated patients aged 0-18 at an outpatient dental clinic who presented with a FSOO. After a clinical and radiographic exam an initial diagnosis, impression and management plan was created.
- POCUS testing performed and a preliminary diagnosis was achieved. Imaging was evaluated by a physician radiologist to compare diagnostic accuracy with the dental team. It was also noted if the POCUS diagnostic findings affected the initial management plan.

Results



- Maxillary Cortical Plate
- Epidermis, Dermis, subcutaneous adipose tissue, subcutaneous connective tissue, muscle
- A hypoechoic area of localized inflammation of soft tissues from the maxillary cortical plate with no appreciable concern for accumulations of fluid, supporting a cellulitis diagnosis



- Mandibular Cortical plate
- Epidermis, Dermis, subcutaneous adipose tissue, subcutaneous connective tissue, muscle
- A Mixed area of echogenicity (hypoechoic and hyperechoic) can signal an abscess on POCUS. An abscess can exhibit an inflammatory process, with areas of both bright (hyperechoic) and dark (hypoechoic) echoes, potentially representing different components like debris, fluid, or gas within the abscess cavity.



- An unaffected control POCUS of the maxilla
- Maxillary cortical plate
- Epidermis, Dermis, subcutaneous adipose tissue, subcutaneous connective tissue, muscle

Results and Discussion

- 19 patients presented to the pediatric dental clinic for urgent / emergent assessment with a FSOO received POCUS.
- At this institution POCUS did not alter course-of-care in patients with FSOO. A reason for this could be that at this institution retrospective data for patients with a FSOO showed a significantly shorter length of stay than previous published data (1.95 +/- 0.99 days), demonstrating strong interdisciplinary course-of-care and source management.
- Consequently, none of the encountered patients required a CT after dental and POCUS evaluation. This is impactful in that dental assessment, minimal dental radiology, and POCUS can prevent the use of medical CT preventing the patient receiving a moderate level of ionizing ration.
- Additionally, POCUS may be useful in isolated healthcare settings where patient admission may require medevac services, especially in rural areas or when ground transport is unsafe or impractical to a higher tier healthcare facility and medical CT may not be readily available.

Conclusion

- POCUS could be an adjust diagnostic instrument in the assessment of potential fluid presence (possible abscess) or lack their off (possible Cellulitis) in patients with FSOO.
- This may prevent the patient from receiving higher levels of ionizing ration like medical CT.
- POCUS could be part of radiogeology appropriateness criteria in maintaining ALARA in patients with FSOO.

References

