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EVALUATION OF ULTRASONOGRAPHY AS A DIAGNOSTIC TOOL IN MAXILLOFACIAL SPACE INFECTIONS	KEY WORDS: Ultrasonography, Maxillofacial Space Infections, Abscess, Cellulitis, Diagnostic Imaging.

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ABSTRACT	Background: Maxillofacial space infections are common and potentially life-threatening if not diagnosed early. Differentiating cellulitis from abscess formation is crucial for appropriate management. Aim: To evaluate the diagnostic utility of ultrasonography (USG) in identifying fascial space involvement and differentiating cellulitis from abscess in maxillofacial infections. Methods: A prospective observational study was conducted on 50 patients presenting with maxillofacial space infections over two years (2023–2025). Clinical and radiographic examinations were followed by ultrasonographic evaluation using a 7.5 MHz linear or convex transducer. Findings were correlated with surgical exploration and clinical outcomes. Diagnostic accuracy, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. Results: A total of 114 fascial spaces were involved across 50 patients. Ultrasonography detected 64 abscesses and 50 cellulitis cases. Clinical examination alone demonstrated low sensitivity (48.5%) and specificity (47.1%). USG showed higher sensitivity (81%) and specificity (75%) with statistically significant correlation ($p < 0.05$) between USG and clinical-surgical findings. The submandibular space was the most frequently involved (16%). Conclusion: Ultrasonography is a reliable, non-invasive, and cost-effective modality for differentiating abscess from cellulitis in maxillofacial infections. Routine incorporation of USG in diagnostic protocols can improve decision-making, reduce unnecessary surgical interventions, and enhance patient outcomes.
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INTRODUCTION Maxillofacial infections are commonly encountered in oral and maxillofacial surgical practice. Their rapid spread through fascial planes poses risks of airway compromise and systemic complications. The key clinical challenge is differentiating between cellulitis, which can often be managed with antibiotics, and abscess, which requires timely surgical drainage. Clinical examination alone is often unreliable due to overlapping signs and symptoms. Advanced imaging modalities such as CT and MRI offer excellent diagnostic accuracy but are costly, time-consuming, and may expose patients to radiation or contraindications. Ultrasonography (USG), being non-invasive, radiation-free, portable, and repeatable, offers a potential solution for rapid diagnosis and treatment planning. This study aims to assess the diagnostic accuracy of ultrasonography in maxillofacial space infections and its role in guiding appropriate surgical intervention.	- Detailed history, clinical examination, and radiographic evaluation were performed. - Ultrasonographic scans were obtained using a DS 50 Edan U60 portable ultrasound scanner with 7.5 MHz linear or convex transducer, in longitudinal, transverse, and oblique planes. - Findings were classified as abscess (well-defined hypo/anechoic lesion with posterior enhancement) or cellulitis (ill-defined hyperechoic swelling). - Patients diagnosed with abscess underwent incision and drainage; pus was sent for culture and sensitivity. - Cellulitis cases received parenteral antibiotics and supportive care. - Clinical outcomes were monitored during hospital stay.
MATERIALS AND METHODS Study Design and Setting: Prospective observational study conducted at the Department of Oral Medicine & Radiology, Rajasthan Dental College & Hospital, Jaipur, from 2023 to 2025. Sample: Fifty patients presenting with clinical signs of maxillofacial infections (pain, swelling, trismus, dysphagia) were enrolled. Patients with severe systemic toxicity or airway compromise requiring emergency intervention were excluded. Procedure:	Statistical Analysis Sensitivity, specificity, PPV, NPV were calculated. Chi-square and kappa statistics were applied to assess agreement between clinical and USG findings ($p < 0.05$ considered significant). RESULTS Of the 50 patients (32 males, 18 females; mean age 40 years), 114 fascial spaces were involved. The submandibular space was most commonly affected (16%), followed by buccal, canine, masticator, parapharyngeal, sublingual, and temporal spaces (14% each). USG identified 64 abscesses and 50 cellulitis cases. Clinical examination alone yielded poor diagnostic accuracy (sensitivity 48.5%, specificity 47.1%, PPV 64%, NPV 32%). In contrast, USG demonstrated sensitivity of 81% and specificity

of 75%, with significant agreement between USG and surgical findings ($p < 0.05$).

Key Observations

- Clinical misclassification rate was high, leading to unnecessary or delayed interventions.
- USG-guided diagnosis allowed timely drainage of abscesses and prevented unwarranted surgeries in cellulitis cases.

DISCUSSION

This study demonstrates that ultrasonography significantly improves the accuracy of diagnosing maxillofacial infections compared to clinical examination alone. The high sensitivity of USG ensures early detection of abscesses, while its ability to differentiate cellulitis reduces overtreatment.

Our results corroborate previous findings by Peleg et al. and Al-Belasy, who reported high diagnostic reliability of USG in superficial space infections. The real-time imaging and ability to guide aspiration make USG a valuable adjunct not only diagnostically but also therapeutically.

USG is particularly advantageous in resource-limited settings due to its low cost, portability, and lack of radiation exposure. However, it is operator-dependent and less effective in deeper spaces (e.g., retropharyngeal) where CT or MRI may still be required.

CONCLUSION

Ultrasonography is a safe, effective, and accessible tool for evaluating maxillofacial space infections. Its routine use as part of the diagnostic protocol can optimize clinical decision-making, minimize treatment delays, and improve patient outcomes.

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