

# Standardizing Wound Tissue Type Assessment: Evaluating Reliability Using an AI-Based System Among Clinicians with Different Experience Levels: A Cross-Sectional Study

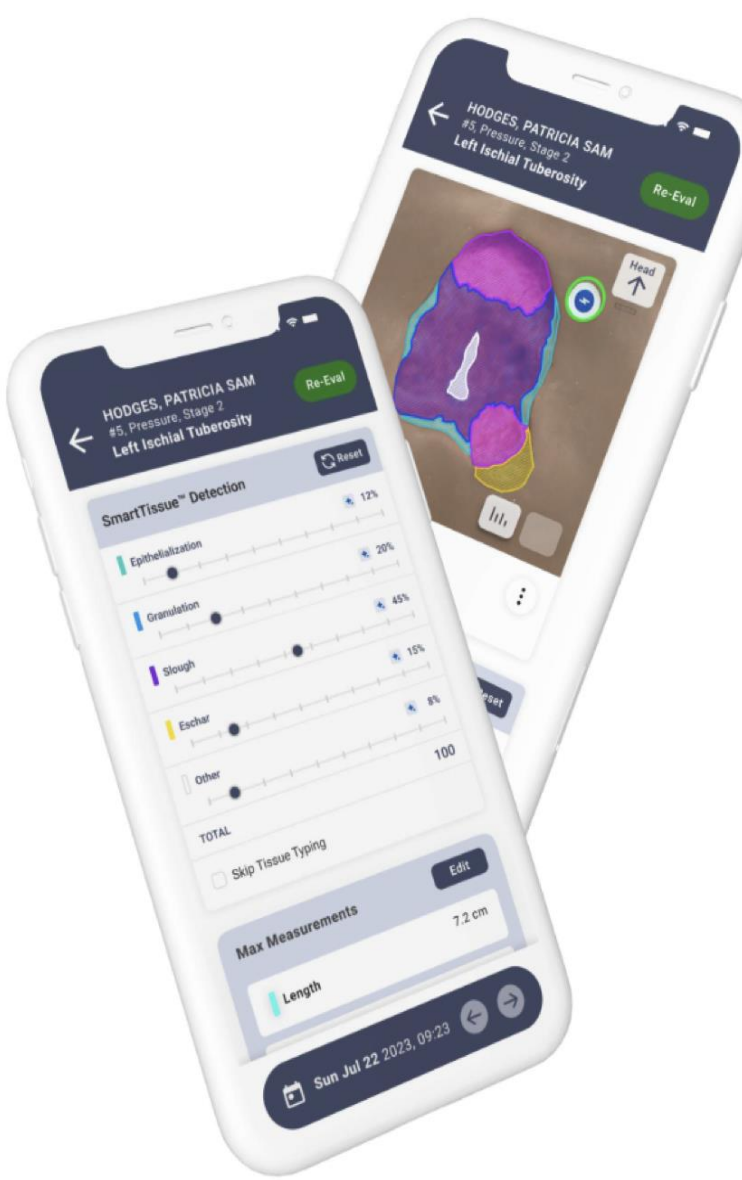


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## Introduction

- Accurate wound assessment is essential for effective management, especially for complex and treatment-resistant wounds.<sup>1</sup>
- Wound care relies on evaluating tissue types as each indicate a different stage of the healing process, yet assessments vary among clinicians.<sup>2</sup>
- Subjectivity in manual wound evaluation can impact treatment decisions and healing outcomes.<sup>3</sup>
- AI-driven wound care technologies (AI-WCT) have emerged as promising tools to standardize assessments improve measurement precision, and enhance reliability across clinicians with various experience levels.<sup>4</sup>
- This study applies cutting edge computing AI—previously validated and trained using thousands of images.<sup>5</sup>



## Objective

- This study assesses inter- and intra-rater reliability of AI-WCT in wound tissue classification across clinicians with varying experience levels.

## Methodology

- Study Design:** Cross-sectional reliability study conducted during a single clinic visit.
- Intra-rater Reliability (Tissue Types):**
  - Two raters—a wound care physician and a nurse —independently assessed 20 wound cases twice using AI-WCT to classify and quantify wound tissue types (granulation tissue, slough and eschar).
- Inter-rater Reliability (Tissue Types):**
  - Three raters— a wound care physician, a nurse and a medical resident— assessed 17 wound cases for consistency
  - Raters used AI-WCT to independently classify wound tissue types and quantify the tissue composition.
- AI-WCT process:**
  - The AI-tool provided an automated wound edge tracing. Clinicians had the ability to manually adjust the wound margins as needed
  - Raters did not communicate during assessments.

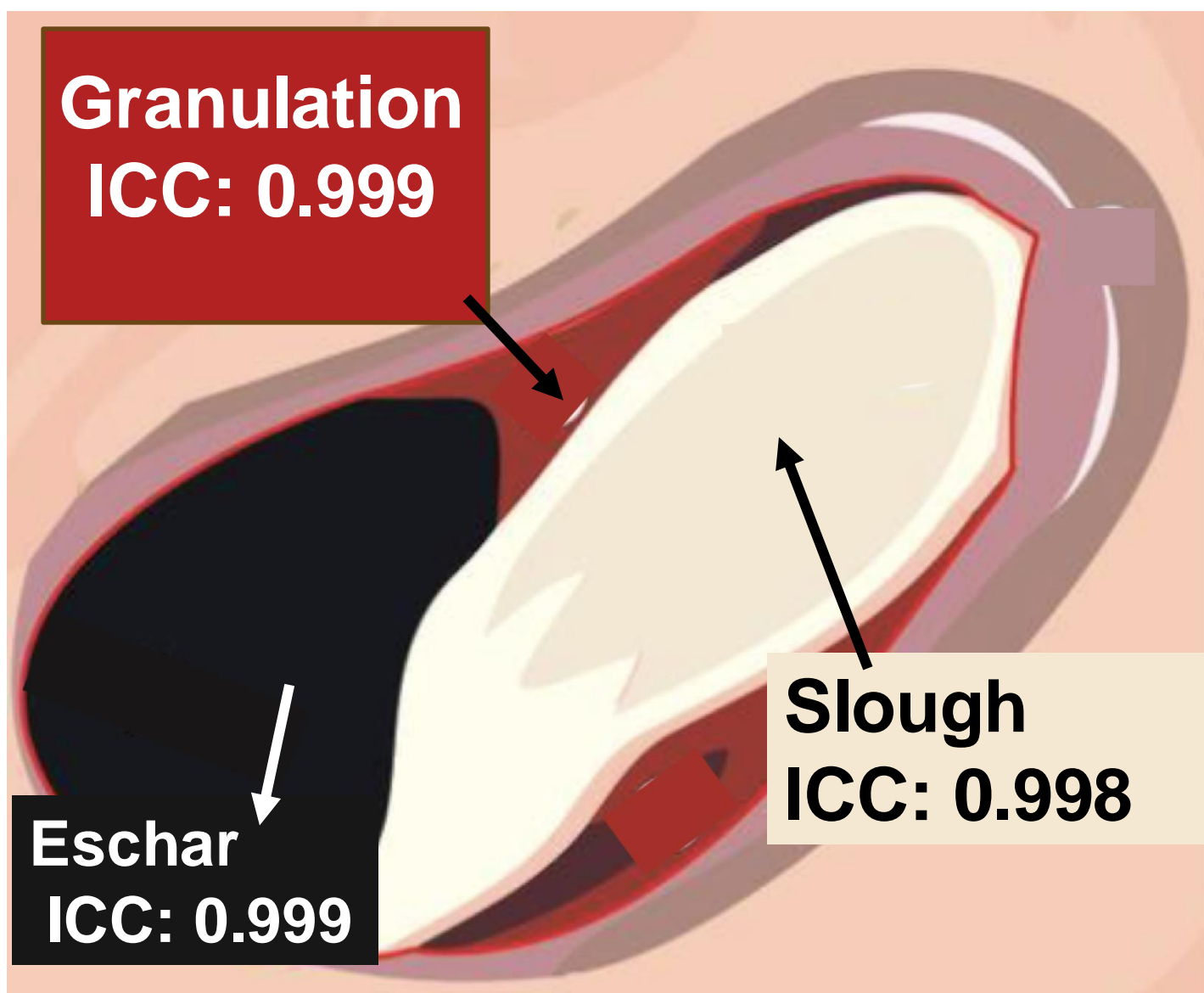


- Analysis:** Intraclass Correlation Coefficient (ICC) was used to assess consistency in classification and quantification of tissue types.

## Results

### Intra-Rater Reliability in Tissue Type Assessment

20 unique wounds from 19 patients were assessed, with 70% male. The most common wound type was venous ulcers (55%), followed by pressure injuries (30%), abrasion, arterial ulcers and skin tears each accounted for 5%.



Excellent  
Intra-rater  
Agreement

Demonstrated a near-perfect consistency in repeated measures.

### Case study: Intra-rater Reliability

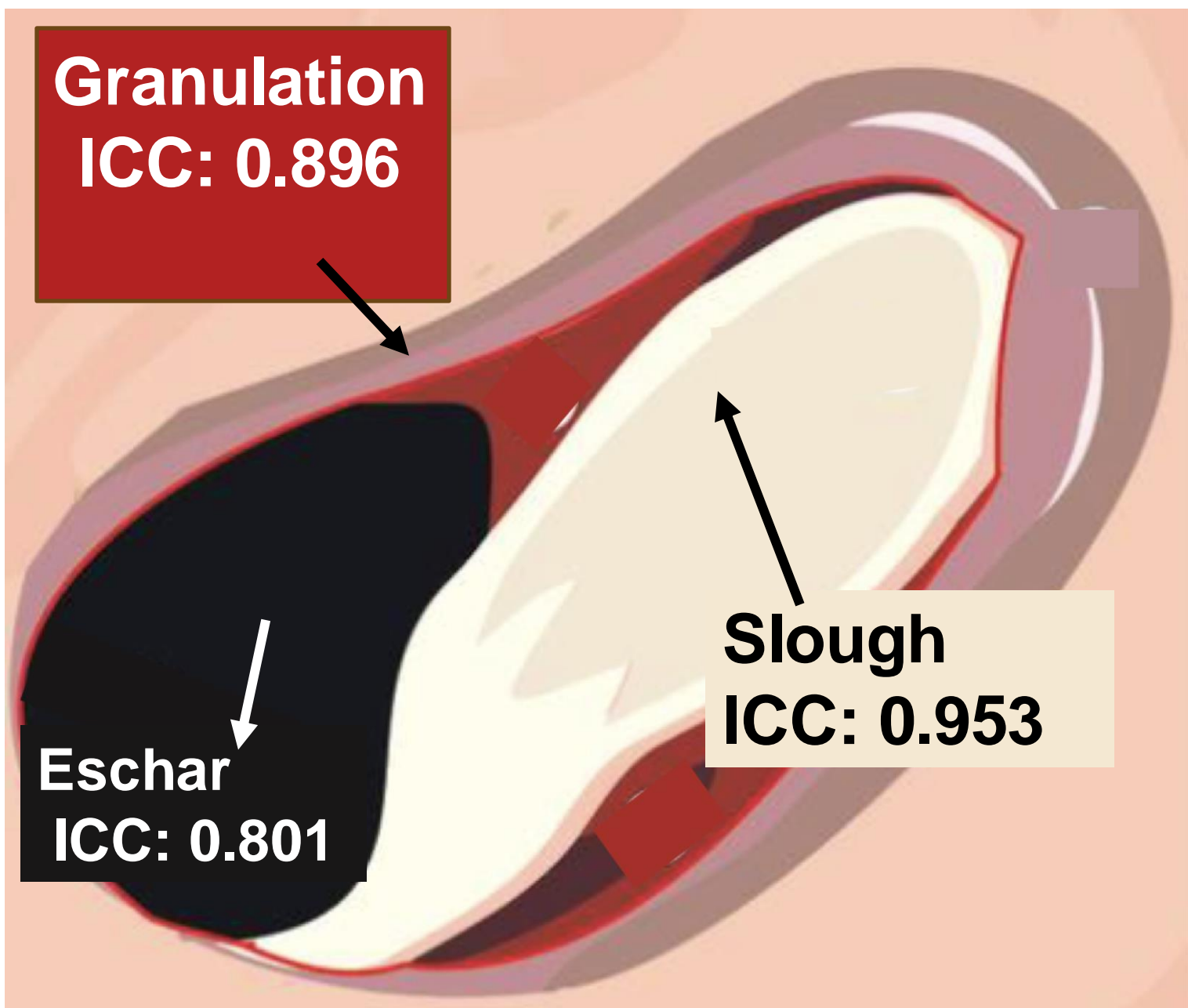


#### Case Details:

- Patient:** 96-year-old male
- Wound Type:** Venous ulcer on the left medial malleolus
- Tissue Composition:**
  - 50% granulation tissue and 10% slough
- Assessment Consistency:** Clinicians quantified tissue types identically with repeated assessments, indicating high intra-rater agreement.

### Inter-Rater Reliability in Tissue Type Assessment

17 unique wounds from 16 patients were assessed, with 68.8% male and mean age of 67 years old.



Excellent  
Agreement for  
slough

Good  
Agreement for  
granulation &  
eschar



AI-WCT supports consistent and reliable measurements across different raters, irrespective of their experience level in wound assessment.

### Case study: Inter-rater Reliability



#### Case Details:

- Patient:** 73-year-old female
- Wound Type:** Venous ulcer on the left medial malleolus
- Tissue Composition:**
  - Rater 1: 40% granulation and 50% slough
  - Rater 2: 40% granulation and 50% slough
  - Rater 3: 30% granulation and 50% slough
- Assessment Consistency:** Clinicians showed identical quantification of slough, and minor variability for granulation, suggesting strong reliability

## Discussion

- The near perfect intra-rater agreement suggests a high precision and minimal variability for the same rater in identifying and quantifying wound tissue types with repeated measures.
- Similarly, the strong inter-rater observed suggest that the AI-WCT supports reliable measurements across different raters, ensuring highly reproducible results. AI can reduce human variability in quantifying tissue types, thus, standardizing tissue classification among different users.
- Improving objectivity and reproducibility in practice are essential for tracking wound progress and making treatment decisions.
- Because of the high agreement, AI-assisted wound assessment tools could be instrumental in multi-clinician settings, enhancing the quality of documentation and ensuring consistent evaluations across providers for better wound progress tracking.

## References

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