

Homogenization and deep tissue biopsy as an effective pre-analytical approach to performed adequate microbiological diagnosis and antibiotic treatment of wounds. Experience gained in a University Hospital in North Italy – Milan

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Aims

Pre analytical methods used for sample collection influence the quality of microbiological diagnosis. Laboratory automation improves the plating culture standardization and the time of positivity. Most commonly wound sampling techniques include superficial swab as non-invasive procedure, but wound swabs can be contaminated by commensal flora. Although cultures of deep-tissue biopsies are considered the reference standard for microbiological diagnosis, they are not performed in clinical practice frequently and patients receive antibiotics following a positive culture of swabs. To date, the sensitivity of tissue culture was upgraded by the tissue homogenization. Aim of the study was to compare the microbiological results obtained with homogenization pre-treatment of deep tissue biopsy sampling with microbiological results of swabs cultures.

Methods

Superficial ulcer swabs (Eswab Copan Brescia, IT) collected from December 2023 to March 2024 (N=82), were compared to deep tissue biopsy (N= 132) collected from December 2024 to March 2025, and processed with a homogenization protocol, according to the manufacturing instructions (ProbeAX Evolution, Axonlab). Samples were unrolled by Vulnology Clinic at University Sacco Hospital and incubated in a Lab Automated system (WASPLAB Copan Brescia IT) in both the periods.

Results

Microbiological results from 214 patients were obtained as reported in Table 1. Swabs samples show higher frequency of positivity respect of biposies samples (64,6% versus 47,8%). In 2025 the polymicrobial growth results lower (12%) than in 2024 (34%).

Discussion

Bacterial cultures of deep-tissue biopsies are considered the reference standard for a microbiological diagnosis although they are invasive, costly and require well trained operators
A worrisome rate of multi-organisms as aetiological agents of infection reported in 2024 (34%) has decreased in 2025 (12%) when biopsies were performed.
The results of our study suggest that culture of a superficial ulcer swabs is not reliable enough to predict the bacterial aetiology, due to polymicrobial growth. For this reason, patients risk to be overexposed to unnecessary antibiotic treatment with high risk of side effects and emergency of multi drug resistant microorganisms.

	2024 (percentage)	2025 (percentage)
Negative	29 (35.4%)	69 (52.2%)
Positive	53 (64.6%)	63 (47.8%)
Monomicrobial wound	35 (66%)	55 (88%)
Polymicrobial wound	18 (34%)	8 (12%)
Total	82	132

