Frictional Fabric-Based Tissue Biopsy Sampling for Wound Organism Analysis

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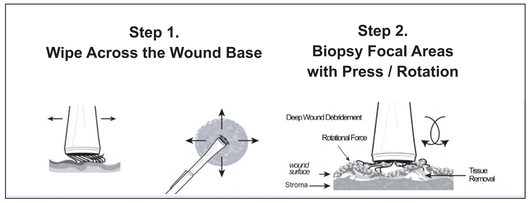
SoftBiopsy®

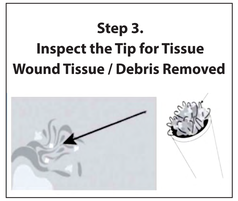
Introduction:

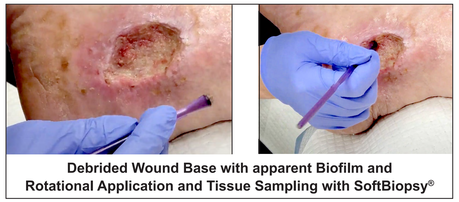
Evaluation of chronic non-healing wounds for the presence of planktonic and non-planktonic organisms is of paramount importance in both efforts to debride and diagnostically sample wounds. Because traditional full thickness biopsy has been considered traumatic and aggressive, traditional Z-Swab samples of tissue fluids hasaided in removing sample fluid and cytology for anatomic, microbiologic, or molecular testing. This abstract introduces a new technology designed to be minimally invasive yet remove histologic biopsy samples suitable for analysis, which has been proven over 1.5 million clinical cases of cervical biopsies to gently remove trans-epithelial biopsies from intact lesion-bearing mucosal tissues.

Methods:

After informed consent, the FDA compliant frictional fabric-based biopsy device SoftBiopsy® was used in post-debridement cases to sample the wound base and evaluated microscopically for evidence of intact tissue suitable for molecular, culture, or anatomic pathology testing. The method was to gently sweep the hooked fabric bristles across the entire wound surface, and secondarily focus on areas of apparent infection or possible biofilm, pressing and twisting the fabric as to frictionally abrade and capture curetting type fragments of tissue and trap them into the hook array. The hooked fabric tip is then detached from the handle and sent to the lab for analysis.

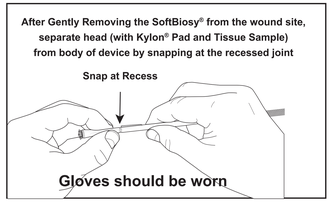


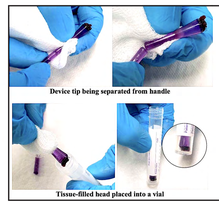




Debrided Wound Base with apparent Biofilm and
Rotational Application and Tissue Sampling with SoftBiopsy®

Inspect the Kylon® fabric for tissue after sampling

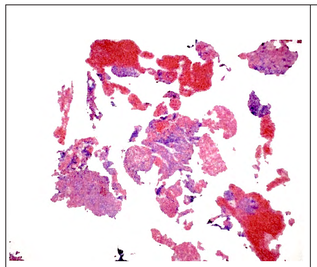




For evaluation of wound organisms, use sterile technique to detach the sample from the handle and place into the vial for transport to the lab.

Results:

Photomicrographic evidence of tissue samples used for testing of the presence of organisms and their potential antibiotic sensitivity using microbiologic or genomic testing is presented. The acquisition of tissue curettage samples was perceived as minimally invasive by both the patient and clinician evaluating the patient during the tissue sampling.



Histopathologic evidence of tangential (curettage) biopsy results from SoftBiopsy® sampling of the debrided wound base.

Wound Pathogen Panel

RESULTS SUMMARY

Organism Classification	Genus Species	Result	Microbial Load
AEROBIC BACTERIA: GRAM NEGATIVE	Klebsiella pneumoniae	DETECTED(+)	HIGH
AEROBIC BACTERIA: GRAM POSITIVE	Staphylococcus aureus	DETECTED(+)	HIGH
AEROBIC BACTERIA: GRAM POSITIVE	Enterococcus faecalis	DETECTED(+)	MEDIUM
AEROBIC BACTERIA: GRAM NEGATIVE	Pseudomonas aeruginosa	DETECTED(+)	LOW
AEROBIC BACTERIA: GRAM POSITIVE	Corynebacterium jeikeium	DETECTED(+)	LOW
FUNGI	Candida parapsilosis	DETECTED(+)	LOW

Resistance Gene Classification	Resistance Gene	Result
Extended Spectrum ß-lactamase	SHV	DETECTED(+)
Extended Spectrum ß-lactamase	TEM	DETECTED(+)
MRSA / MRSE potential	MecA	DETECTED(+)
Macrolide-Lincosamide-Streptogram B	ErmA	DETECTED(+)
Macrolide-Lincosamide-Streptogram B	ErmC	DETECTED(+)
Tetracycline	TetM	DETECTED(+)

Wound pathogen report example without patient identifiers
from SoftBiopsy® wound base evaluation for Biofilm

Discussion:

Excavating areas suspect of biofilm in wounds using biopsy rather than traditional swabbing has been shown to present a robust sample for testing of organisms and antibiotic sensitivity. Frictional abrasion as a means for biopsy collection has been shown in mucosal tissue to be immune stimulatory. More research needs to be done in chronic wounds to evaluate this effect on ameliorating biofilm and enhancing wound repair.

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