Introduction

Figure 1. Representative clinical images highlighting the presence of tunnels in HS (black oval).

- **Hidradenitis Suppurativa (HS) is a** chronic inflammatory condition characterized by nodules, abscesses, and tunnels.
- HS tunnels act as “infected wounds” inside the dermis and produce significant pain, malodorous drainage, and scarring.
- Tunnels contribute to the tremendous psychosocial burden of HS and demonstrate high levels of resistance and recurrence even with biologic therapy. Surgical excision is often the only effective option.
- These tunnels require aggressive wound care even as a routine measure; and additional wound care is needed if these lesions are excised.
- Extensive wound care increases the burden to patients, caregivers, and their families and of course increases financial burdens.
- Our overarching goal is to optimize wound care for patients living with HS by reducing healing times and preventing the recurrence of tunnels.

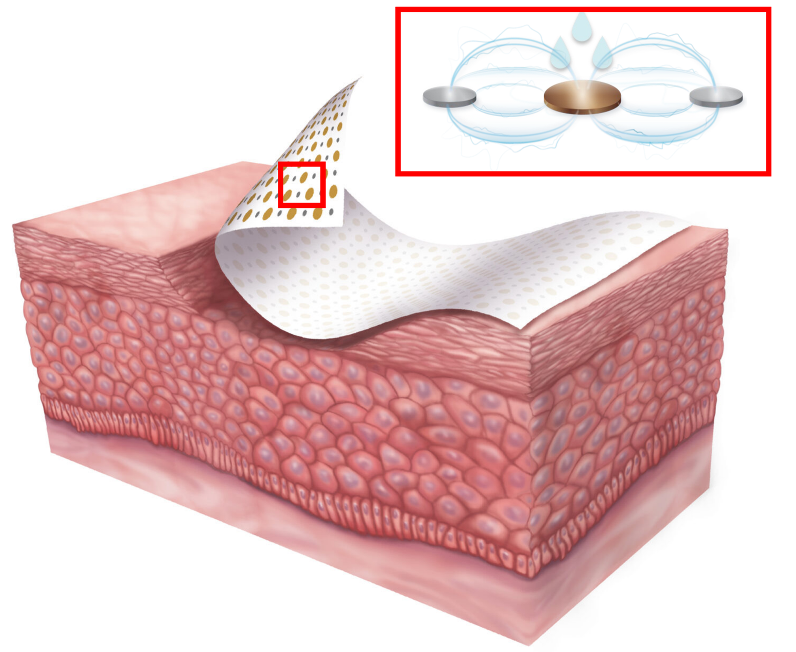
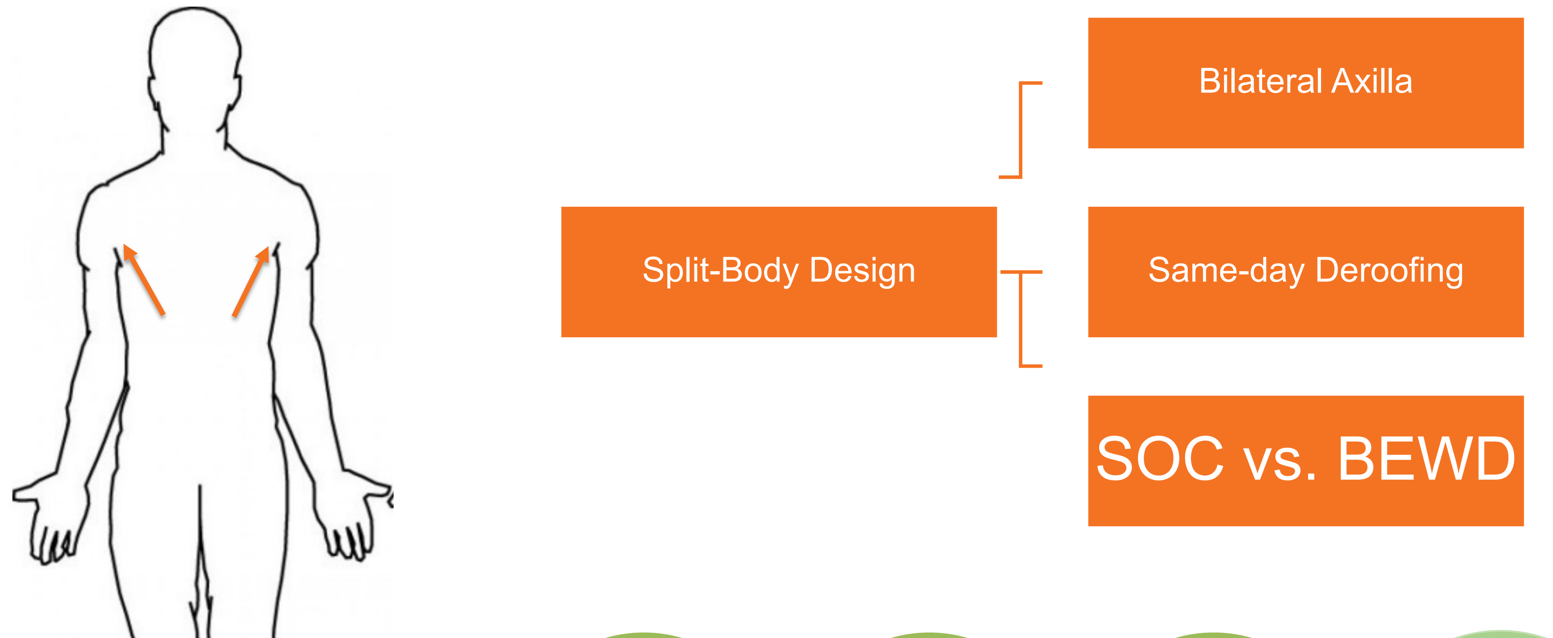


Figure 2. Bioelectric Wound Dressing Technology

- Bioelectric wound dressings (BEWDs) utilize embedded copper and zinc particles to catalyze redox reactions in the presence of fluids.
- Wireless bioelectric wound dressings offer benefits such as reducing pro-inflammatory cytokines, providing antimicrobial and antibiofilm effects, and promoting keratinocyte migration.
- **We hypothesize that bioelectric wound dressings (BEWD) modulate the skin microbiome in HS**

Methods



Results

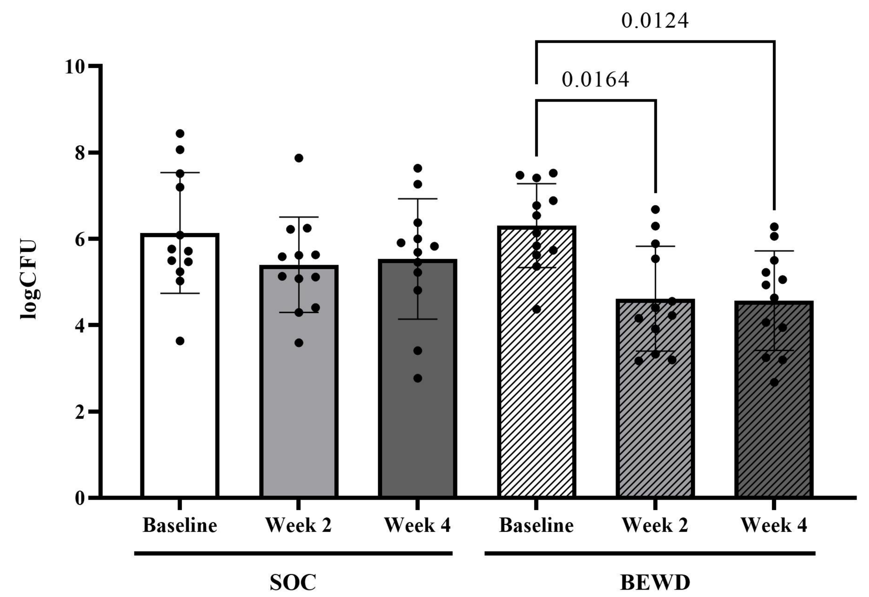


Figure 3. Average LogCFU (A) (n=12) were calculated at Week 0, Week 2, and Week 4 in both axillae and repeated measures-ANOVA was used to compare timepoints within the treatment. There were no significant differences in bacterial load at each timepoint in the group treated with SOC (p=0.89, p=0.97). A statistically significant reduction in bacterial load was noted between week 0 and week 2 (p=0.0164) and between week 0 and week 4 (p=0.0124) in the group treated with BEWD.

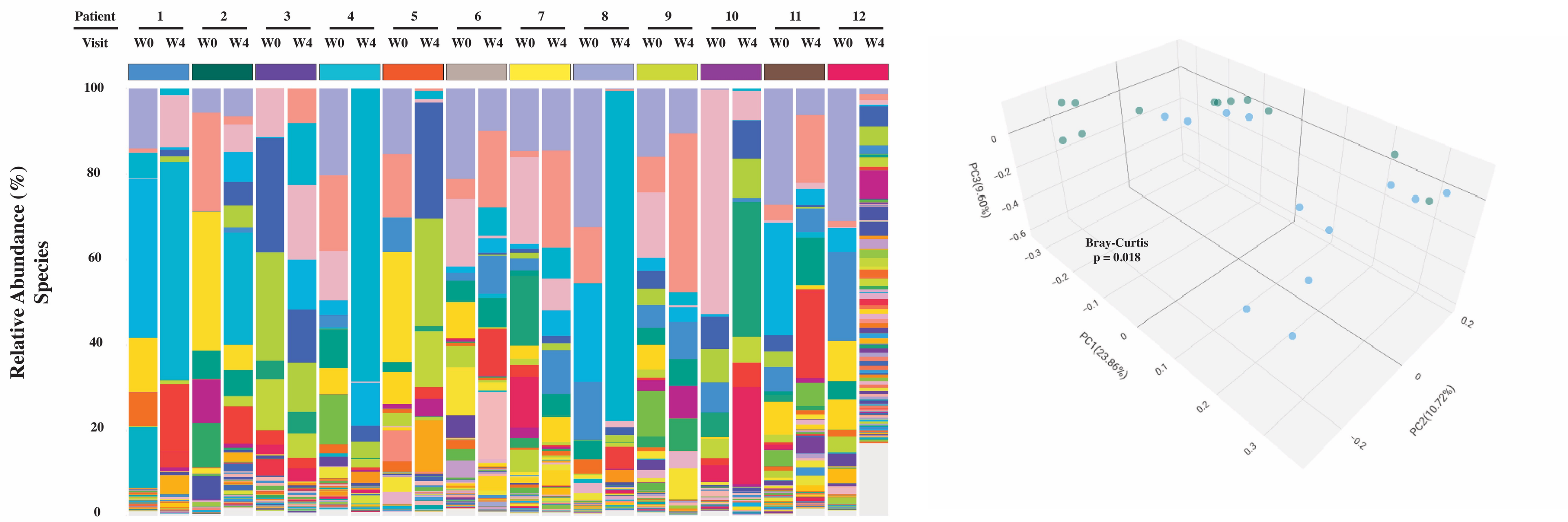


Figure 4. Skin microbiome composition in hidradenitis suppurativa (HS) lesional tissue as compared to post-deroofing excision wound tissue treated with BEWD. Relative abundance (%) of genera (B) and species (C) from BEWD sites before and after treatment with overall most abundant genera displayed. (D) Shannon diversity index did not differ between week 0 and week 4 (not shown, p=0.862); however, (E) beta diversity as measured by Bray-Curtis demonstrated a significant difference between BEWD sites at week 0 and week 4 (p=0.018)

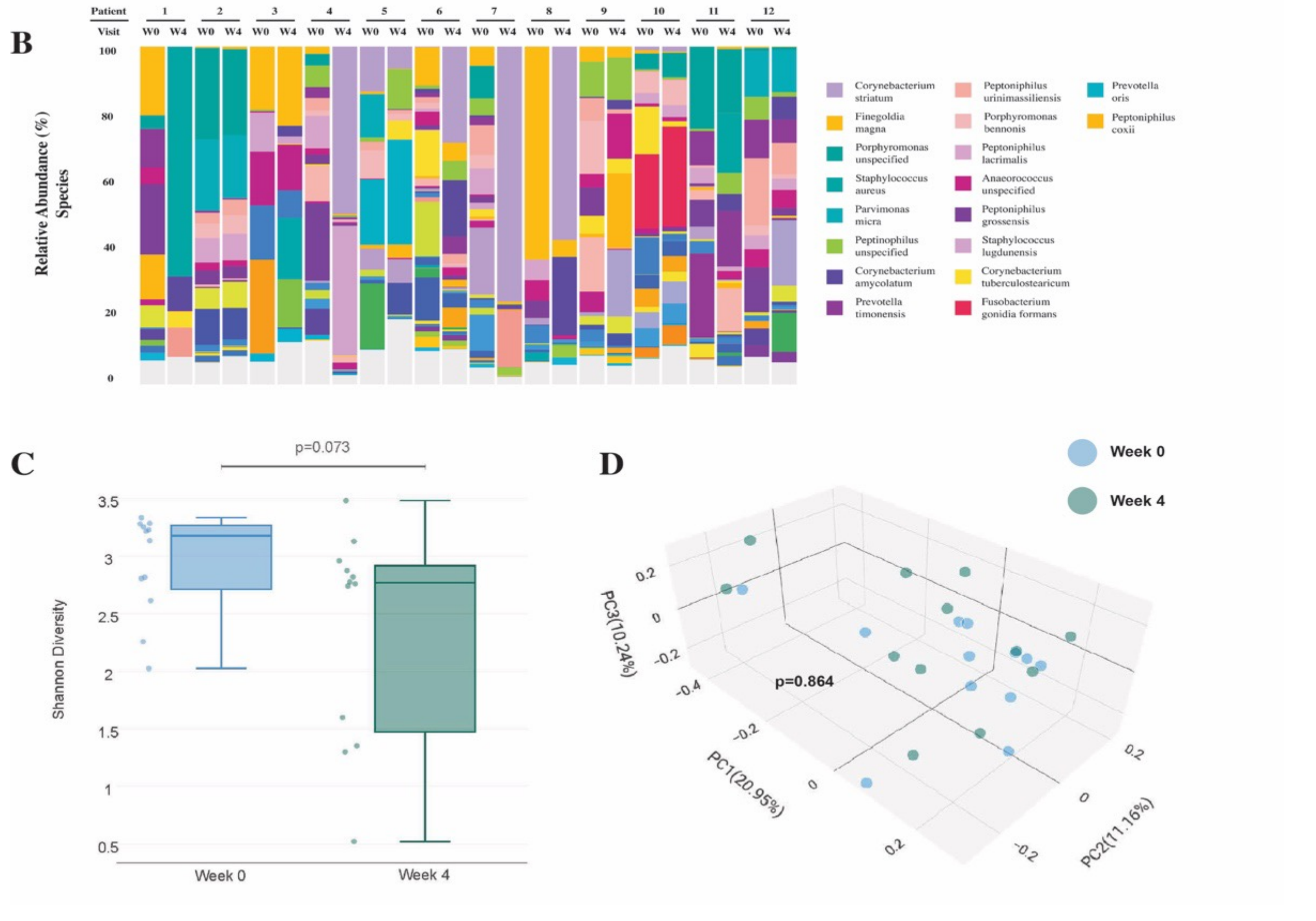


Figure 5. Skin microbiome composition in hidradenitis suppurativa (HS) lesional tissue as compared to post-deroofing excision wound tissue treated in SOC-treated

Results

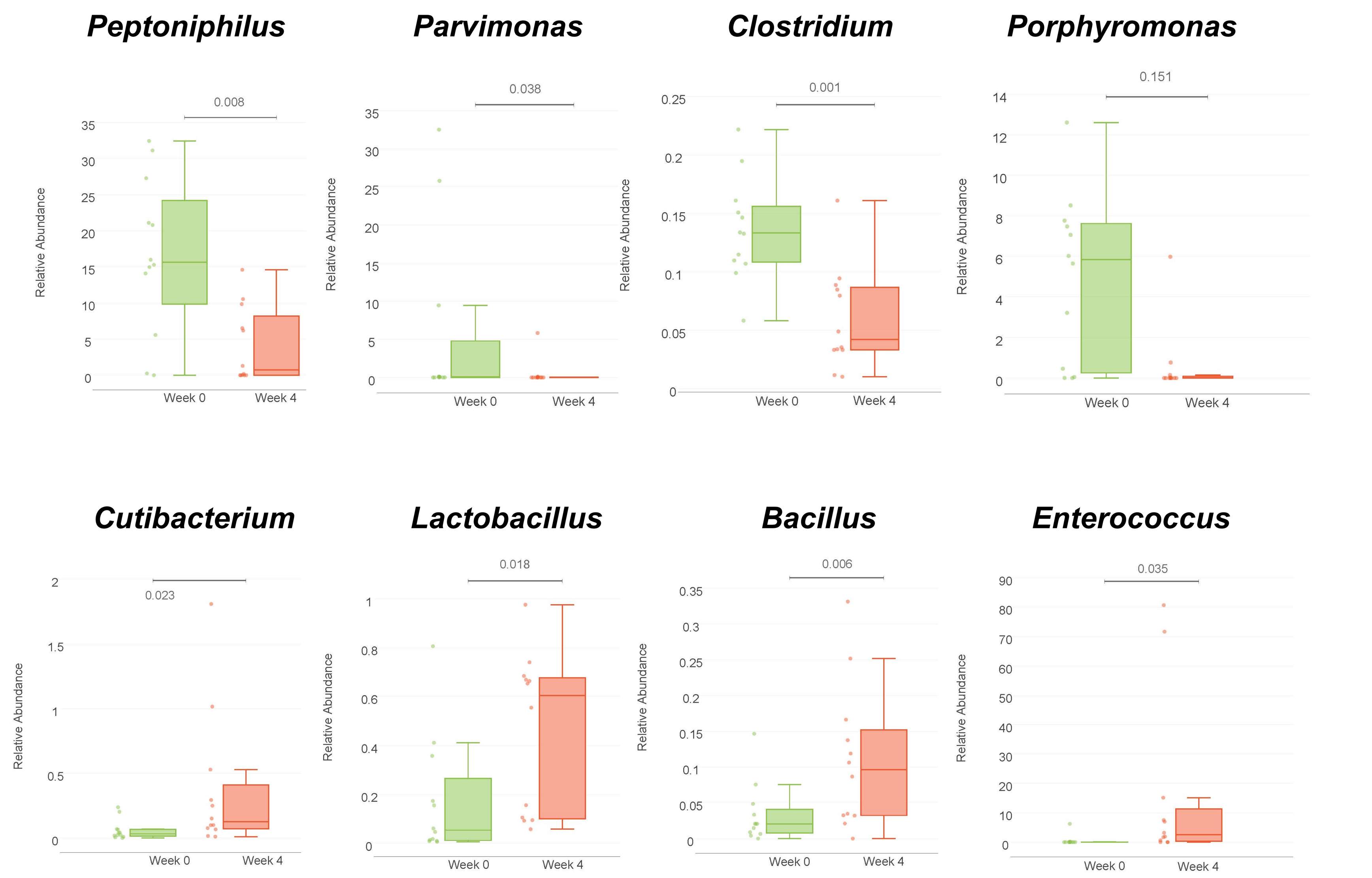


Figure 6. Genera specific changes after BEWD application. Relative abundance (%) of genera from BEWD sites at week 0 and week 4. Multiple genera demonstrated differences between week 0 and week 4. Genera that decreased with BEWD application includes *Peptinophilus* (p=0.008), *Parvimonas* (p=0.038), and *Clostridium* (p=0.001). The genera shown to increase after BEWD application included *Cutibacterium* (p=0.023), *Lactobacillus* (p=0.018), *Bacillus* (p=0.006), and *Enterococcus* (p=0.035).

Conclusion & Ongoing Work

- Patients demonstrated lower recurrence rates with BEWD when compared to standard of care dressing
- Reduction in bacterial load in axillae treated with BEWD, alongside reduced recurrence
- Microbial composition shifts after use of BEWD and is seen as early as week 4
- Changes in microbial diversity or genera-specifc variations are not seen in SOC-treated axillae.
- Inverse relationship between Gram-negative anaerobes and skin commensal species in BEWD-treated axillae
- We highlight a greater need for deeper sequencing of the HS microbiome accompanied by functional analyses and mechanistic studies

Acknowledgements