# Microbial Evaluation of Disposable Prophy Angles

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## Purpose:

The purpose of this study was to investigate the presence of microbial contaminants on non-sterilized, pre-packaged disposable prophy angles as compared to pre-sterilized disposable prophy angles.

## Materials and Methods:

10 new, pre-packaged disposable prophy angles from each manufacturer (Table 1), total 40 angles, were individually placed in disposable plastic centrifuge tubes containing 20 ml sterile tryptic soy broth. 10 Tubes with 20 ml sterile tryptic soy broth only were used as negative controls (Blank). Each centrifuge tube was agitated by Vortex for 20 seconds and then incubated on a shaker for 18 h (220 RPM, 37 °C). After incubation, aliquots (0.5 ml) from each centrifuge tube were transferred to a blood agar plate. All plates were aerobically cultured at 37 °C for 48 hours.
The bacteria growth was assessed visually by colony counting and bacterial morphology. Positive samples were selected and bacteria Gram stain was performed. The morphology of bacteria was observed and captured by a Nikon E200 microscope system.

**Table 1. Sample information for the experiment**

| Brand Name |
|---|
| (Blank) |
| Major Brand-1 |
| Major Brand-2 |
| Major Brand-3 |
| Sterile MINI ERGO |

## Results:

Microbial positive plates for samples from each brand were counted and recorded. The result is shown in Table 2. There was microbial contamination found in all disposable prophy angle groups except the Sterile MINI ERGO (Pac-Dent) group. The ratios for microbial positive plates in each group were between 10% to 60%.

**Table 2. Result of plates counting after microbial culture with blood agar plates**

| Group Name | A | B | C | D | E |
|---|---|---|---|---|---|
| Sample Brand Name | Blank | Major Brand-1 | Major Brand-2 | Major Brand-3 | Sterile MINI ERGO (Pac-Dent ) |
| Microbial Positive Plates Number | 0 | 1 | 2 | 6 | 0 |
| Total Tested Plates Number | 10 | 10 | 10 | 10 | 10 |
| Ratio of Positive Plates | 0% | 10% | 20% | 60% | 0% |

Microbial cultures on blood agar plates were analyzed. Pictures of bacterial positive plates are shown in Figure 1. Both bacterial morphology and quantity were accessed. There was no visible microbial growth in Blank (1A). There was high concentration of bacteria in samples of (1B) and (1C). Bacterial positive plates were fully covered with bacteria film. Compare to group (1B) or (1C), the bacteria concentration in (1D) sample was low, yellow round colonies were identified, which indicated bacteria of (1D) sample was quite different from bacteria of (1B) or (1C) samples. There was no visible microbial growth in Sterile MINI ERGO (Pac-Dent, 1E) plates.

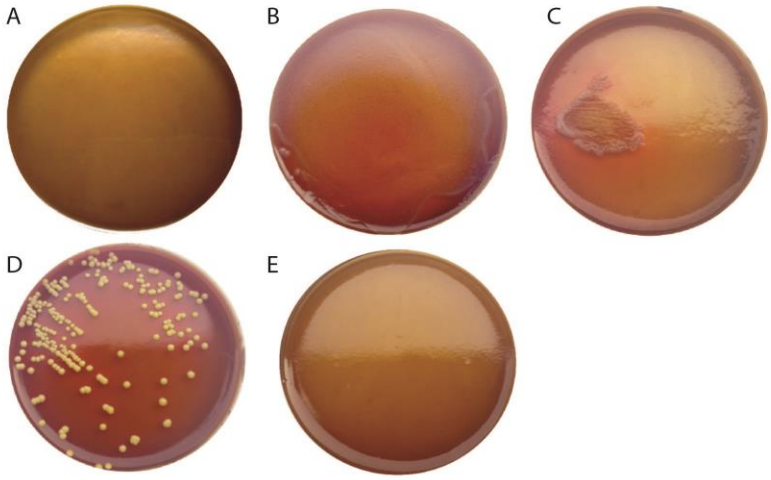


**Figure 1. Pictures of microbial culture in blood agar plates**
A, Blank; B, Major Brand-1; C, Major Brand-2; D, Major Brand-3; E, Sterile MINI ERGO (Pac-Dent)

More detailed bacterial morphology analysis was carried out by Gram bacteria stain method (Figure 2). The bacteria that retain the purple stain from the crystal violet were gram-positive, and those that take on the pink (brown) stain from the safranin were gram-negative. Bacteria with diverse morphology was observed. For bacteria of group D sample, most bacteria was Gram-negative bacteria (pink/brown color) with irregular shape. For bacterial of group B and group C samples, both Gram-negative bacteria and rod-like Gram-positive bacteria (purple/blue color) was observed. The Gram stain results were consistent with bacterial morphology analysis from blood agar plates.

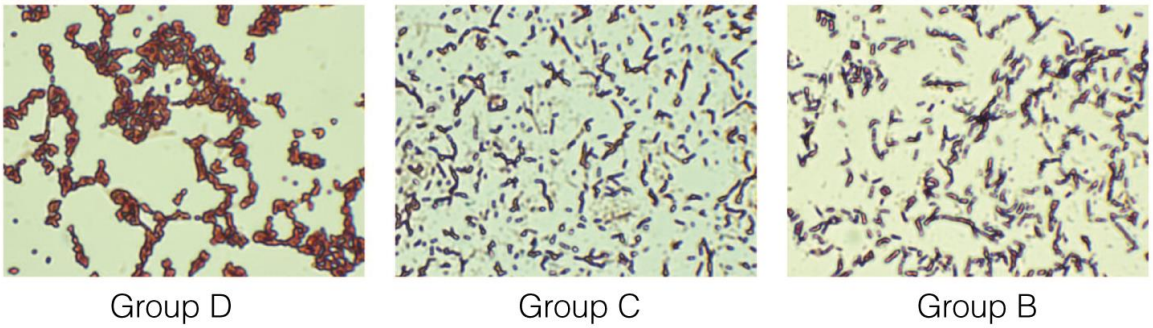


**Figure 2. Photos of Gram stain from microbial positive culture samples**

## Conclusion:

Both Gram-positive bacteria and Gram-negative bacteria can cause many types of human infections. In this investigation, the data showed that compare to normal disposable prophy angles, sterile disposable prophy angles can dramatically reduce the possibility from microbial contamination.

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