

# Oral microbiome ecology changes as an approach of postmortem interval estimation

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## ABSTRACT

Oral cavity harbours one of the most diverse microbiomes in the human body, it has been shown to be the second most complex in the body after the gastro-intestinal tract. Upon death, the indigenous microorganisms lead the decomposition of the carcass. So that, oral cavity and gastro-intestinal tract microbiomes, play a key role in human decomposition. The aim of the present study is to monitor both quantitatively and qualitatively the decay of signature bacterial species in order to use that information as a postmortem interval estimator.

Three donated individuals (one male and two females) to the University of Tennessee Forensic Anthropology Center for the W. M. Bass Donated Skeletal Collection were studied. Oral swab samples were daily taken throughout the different stages of cadaveric putrefaction. DNA was extracted and analyzed by next generation sequencing techniques.

The three cadavers showed similar overall successional changes along decomposition process. *Firmicutes* and *Actinobacteria* are the predominant phyla in the fresh stage. *Tenericutes* presence corresponds to bloat stage. *Firmicutes* is the predominant phyla in advanced decay, being that *Firmicutes* community a different one from the predominant *Firmicutes* of the fresh stage.

This study depicts the thanatomicrobiome successional changes in the oral cavity, and highlights its potential use in forensic cases as a quantitative and objective approach to estimate PMI, from an ecological rationale.