Medical > In Vivo > Other material

115

Noninvasive imaging of human oral mucosa in vivo by confocal reflectance microscopy.

ABSTRACT

OBJECTIVES/HYPOTHESIS: To study the microscopic anatomy of normal oral tissues in vivo using confocal reflectance microscopy (CRM). This novel and noninvasive imaging modality can define and characterize healthy oral mucosa and thus this work serves as the foundation for studying oral diseases in vivo.

STUDY DESIGN: This was a pilot observational cohort study comparing noninvasive CRM images with histology.

MATERIALS AND METHODS: Lip and tongue mucosa were imaged by CRM in six healthy human subjects. In CRM living tissue is illuminated by a laser source and backscattered (or reflected) light is collected by a detector. Image contrast is determined by natural differences in refractive indices of organelles and other subcellular structures within the tissues. Gray-scale images were displayed in real-time on a video monitor and represented horizontal (en face) optical sections through the tissue. Motion of the oral tissue relative to the objective lens was minimized with a tissue stabilizer. After imaging, biopsies were taken from the same site of lip mucosa to correlate noninvasive confocal images with conventional histology.

RESULTS: Confocal images correlated well with conventional histology, both qualitatively (visual analysis) and quantitatively (stereology). Imaging was possible up to depths of 490 and 250 microm in the lip and tongue, respectively. Cells and organelles including nuclei, circulating blood cells, and extracellular matrix were clearly observed.

CONCLUSION: CRM provides details of normal human oral mucosa at the cellular level without the artifacts of histological processing, and thus has the potential for further development and use in clinical practice as a diagnostic tool for the early detection of oral cancer and precancer.