Malignant lesions in the oral mucosa often go undetected by current techniques; white light inspection and biopsy of the suspicious regions, which are conventionally graded by histopathological staining. This method is considered invasive and requires a large sampling size. An ideal method would be one that reduces the sampling size and is non-invasive. Multiphoton Autofluorescence Microscopy (MPAM) and Second Harmonic Generation Microscopy (SHGM) is a non-invasive imaging technique that can display depth resolved morphological and spectroscopic features, and has been used in cancer diagnostics. However, MPAM and SHGM have a minimum field of view. On the other hand, Wide-Field Fluorescence Imaging provides autofluorescence information at a wider field of view that has been studied in the past to identify tissue abnormalities. We used Wide-Field Fluorescence Imaging on our hamster oral cancer models to screen for abnormalities, followed by MPAM and SHGM of the suspicious sites. Our results presented an increase in red fluorescence intensity as a suspected lesion and MPAM and SHGM supported this indication; however, there were some inconsistencies. We envision this non-invasive multimodal imaging technique as a step forward in diagnosing lesions in the oral mucosa.

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