Computer-Aided Oral Cancer Diagnosis

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Currently, oral cancer patients visit a pathologist in order to determine the severity of their oral cancer. The pathologist then takes a biopsy of the oral tissue, which undergoes a chemical staining procedure, and is finally examined by the pathologist to determine whether it is a noncancerous, precancerous, or cancerous tissue sample. Since the pathologist, based on his knowledge and experience, is the only one who diagnoses the patient, there are disparities between the diagnoses of different pathologists. Having a program that can effectively diagnose the tissue sample as noncancerous, precancerous, or cancerous using non-invasive scans, not only increases the accuracy of the diagnoses, but also saves money and time. Using the auto-fluorescence oral tissue scans and the application MATLAB, a program was created that inputted the oral tissue scans and diagnosed them as noncancerous, precancerous, or cancerous. A set of 50 noncancerous, precancerous, and cancerous scans was used to train the program to detect cancerous tissue based on the cell area, nuclei area, and cell eccentricity. These values compared to those of the noncancerous tissue scans were used to diagnose three sets of 50 random scans as noncancerous, or cancerous. Out of the 3 sets of 50 scans used as the data sample, 43 scans in each set were correctly diagnosed with an accuracy of 86%. In conclusion, the results indicate that this program used to diagnose oral tissue cancer can be implemented and used alongside current diagnosis methods.