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Diffusive Optical Imaging of Arteries and Lesions in the Mouth for Assisting Oral Surgery

Optical imaging technology precisely locates and maps submerged arteries and lesions in the mouth, enabling the creation of custom surgical tools and guides to minimize damage during oral surgery.

The greater palatine artery (GPA) is an anatomical landmark for oral surgery. Currently, a surgeon must rely on prior knowledge of the GPA location to avoid damaging it or surrounding nerves. Unfortunately, studies suggest that there can be a discrepancy of up to 4 mm and this uncertainty can cause a variety of surgical complications and injuries.

Researchers at Purdue University have developed a method to image arteries and lesions in the roof of the mouth. The technology described uses the contrast in optical properties between the arteries or lesions and the surrounding tissue to locate the GPA and lesions that are not visible to the naked eye. This allows for their exact location and depth to be computationally identified. In addition, researchers can print images of the artery on a surface mask that covers only the regions of tissue above the artery, providing surgeons a guide to areas of the mouth to avoid. Custom surgical tools of limited length that could not damage the artery can be printed.

Advantages:

-Reduces likelihood of artery and nerve damage

-Computationally identifies the exact location and depth of the GPA

Potential Applications:

-Custom surgical tools

-Oral surgery

TRL: 3

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