

MRI technique appears feasible to help identify involvement of jawbone by oral cancer

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A preliminary study suggests that a magnetic resonance imaging (MRI) technique called SWIFT (sweep imaging with Fourier transform) appears feasible to help provide a three-dimensional assessment that may aid in detecting involvement of the jawbone by oral cancer, according to a report in the September issue of *Archives of Otolaryngology–Head and Neck Surgery*.

Advanced squamous cell carcinoma that arises in the oral cavity frequently invades the mandible ([jawbone](#)), according to background information in the article. Treatment may or may not necessitate removal of the mandible. "Unfortunately, detecting bone invasion prior to surgery is often difficult using currently available imaging techniques," write the authors. Determining mandibular invasion with a high degree of accuracy before surgery might allow the surgeon to contain the cancerous cells, prevent unnecessary mandible removal and aid in planning for reconstruction.

Although multiple imaging techniques, most commonly computed tomography and MRI, have been used preoperatively to assess mandibular invasion in oral carcinoma, these techniques may not always provide a clear and accurate assessment of tumor infiltration into the mandible. The authors investigated the SWIFT method of MRI for mandibular invasion by squamous cell carcinoma. The method offers delineated assessment of cortical (compact bone which forms the outer

shell of some structures) and medullary (inner cavity where marrow is stored) bone, "which is not possible with conventional imaging techniques," the researchers write.

Ayşe Tuba Karagülle Kendi, M.D., and colleagues from the University of Minnesota, Minneapolis, designed a descriptive case study. Participants were patients with oral carcinoma who underwent segmental mandibulectomy at a tertiary academic institution. The researchers used a 9.4-T Varian MRI system to examine two specimens from each patient for cortical and medullary invasion by cancer cells. Histologic sections (specimens examined with a microscope) were compared with the images obtained by the SWIFT technique.

Images produced by the SWIFT technique with in vitro specimens were of sufficient resolution (156 to 273 micrometers) to accurately depict tumor invasion of cortical and medullary bone. Evidence of mandibular invasion with tumor was found in both specimens by histopathology. Researchers found a high degree of correlation between magnetic resonance images and histopathologic findings.

"This preliminary report demonstrates that the SWIFT imaging technique has the capacity to show fine details of intramandibular anatomy," conclude the authors. "Furthermore, the correlations between the histologic and MR [magnetic resonance] images of these two specimens clearly show malignant invasion that has not been previously demonstrated with MR techniques. The data described in this report suggest that MRI has a great deal of potential in accurately determining bone [invasion](#) preoperatively."

More information: Arch Otolaryngol Head Neck Surg. 2011;137[9]:916-919.

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