

Tongue movement and speech after lateral glossectomy: Results from 2D and 3D ultrasound imaging

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The research results from two studies are presented. In the first study, B-mode ultrasound was used to track the midsagittal tongue movement of 10 lateral partial glossectomy patients during a standardized reading passage before and after surgery. Six normal adults served as control speakers. The main outcome measure was the tongue velocity during speech. The technique of defect reconstruction (local vs. flap) was included as a co-variate in the analysis. Following the surgery, all patients significantly increased the velocity of the midsagittal tongue movements during the reading passage. The results demonstrated that the partial glossectomy patients compensated for the lateral tongue resections by increasing the velocity of the residual tongue during speech. In the second study, the tongue shapes of 12 patients with lateral tumours of the tongue were recorded with 3D ultrasound before their surgery and 2 months after. Twelve normal participants served as controls. Speech acceptability was also assessed. Principal component analyses demonstrated that the flap reconstructions lead to a stiffening of the operated side of the tongue. A concavity index and an asymmetry index demonstrated that the glossectomy patients exhibited decreased midsagittal grooving and increased lingual asymmetry. The change in midsagittal grooving correlated moderately with a decrease in speech acceptability. The implications of these findings for speech therapy are discussed.