

Hiren R. Shah, A study of background noise in transcervical electrolarynx, M. Tech. Thesis, Department of Biomedical Engineering, Indian Institute of Technology Bombay, 1999.

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Abstract – Transcervical electrolarynges make possible adequate communication for people who are not able to use their larynx. The device is held against the neck, and provides pulsatile vibration to the neck tissue, and the vibration gets coupled to the air in the vocal tract. The resulting speech has low intensity, an unnatural quality and is significantly less intelligible than normal speech. Main source of the degradation in quality is the presence of leakage sound. The objective of this project is to study the leakage background noise and methods for its cancellation.

Spectral analysis of alaryngeal speech and leakage sound cancellation system in which the sound is picked up by a microphone and processed for removal of the direct leakage, and the resulting sound is amplified, and output through a speaker. Results of real time implementation of single input adaptive leakage sound canceller using LMS algorithm were not satisfactory due to non-stationary of the leakage sound. Three methods to estimate leakage sound were implemented through off-line processing: LMS adapting, ensemble averaging, and inverse Fourier transform of ensemble averaged spectrum. All the three methods were compared. None of them could finally remove leakage sound because of variation in shape of pulses coming from vibrator. Reason for this variation may be change in application pressure and transducer dynamics.