

# A Feasible Solution to High Frequency Loss Based on Transposing Fundamental Frequency

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Hearing impairment and loss are common problems among the aged. Traditional hearing aids, which amplify the volume of sound, are not effective in solving high frequency loss. There are frequency compensation hearing aids (roughly 30 thousand yuan) and electronic cochlea operation (roughly 100 thousand yuan) currently in market. But these are not affordable for majority of people in developing countries. So we want to develop a device that can treat hearing loss of high frequency loss with low costs. In our experiment, we experiment with syllable "Ah" and "Oh" and words "Nihao" and "Sunday", We utilize the software Matlab to transform them to frequency spectrum. Then we switch the fundamental frequency to 50 Hertz and compute the position of each harmonic by adjusting horizontal axis. We transform these two syllables back to time-domain, and output the sound, and collect data about the number of normal people and patients who can recognize the syllable. The data show 80% of normal people can recognize the transformed syllables and "Sunday", and 70% normal can recognize "nihao". We write a program within the Matlab platform to realize the real-time transformation. Now, this program can be applied to any sentences or paragraphs with all languages. Our data show that transposing fundamental frequency is a feasible way to help high frequency loss patients. We plan to compile this program to chip and then manufacture the real device, and conduct with experiment with more patients in Eye & ENT Hospitable.

## Awards Won:

Acoustical Society of America: Second Award of \$1,500