A dehypernasality trainer

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A dehypernasality trainer that can be used for conditioning speech is described.

This is a brief report of a dehypernasality trainer, 12 of which are now in use on cleft palate children at the Stanford Medical Center. Although developed for such patients, the instrument can be used for the conditioning of speech in psychological research.

The basic speech problem encountered by cleft palate patients is hypernasality. Postoperative success rates are far from perfect (MacCollum, Richardson, & Swanson, 1956; Owsley, Lawson, Miller, & Blackfield, 1966; Trauner & Doubek, 1955) so attempts have been made to train patients to control muscular contractions. It is known that individuals with cleft palate often attempt to compensate for their hypernasality by hypoglossal and superior constrictor muscle movements (Yules & Chase, 1968). Direct electrical stimulation of the posterior pharynx musculature has resulted in a gain of voluntary control of the circumpharyngeal oronasal sphincter for some patients.² It is this muscle contraction and a correlative decrease in nasal air flow, as determined by dynamic respirometry, that we attempted to train with the instrument described herein.

The dehypernasality unit is inexpensive (\$50.00) and can be assembled by a nonelectrician (see Fig. 1). Twin radio earphones (\$2.00) serve as microphones and are suspended from lensless sunglasses; one microphone is set opposite the nose and the other opposite the mouth. Their output is fed into a 14-W Heathkit stereophonic amplifier (\$40.00) and from the amplifier through a rectifier circuit (total \$2.00) as diagrammed in Fig. 2. The rectified output is led to a balance microammeter (\$2.00) that is used to indicate predominance of oral or nasal phonation.

The volume balance control of the amplifier allows the investigator to dictate how much nasality decrease need develop before the meter reads positive for oral speech. Thus, the patient

Fig. 1. Speech conditioner in use. Subject faces small stereo balance meter connected to stereo amplifier by circuit shown in Fig. 2.

Fig. 2. Rectifier circuit interposed between 100- μ A balance meter and Heathkit stereo amplifier.

(S) always has positive feedback. Eventually the meter can be set so that an oral reading is truly nonnasal speech.

We used the trainer daily for a period of 1 month with a total of 23 children and adults whose pretraining speech had been rated hypernasal. The results showed a significant decline in hypernasality.

Preliminary work with the above unit was so successful that a commercial version was developed by the Vega (Fig. 3) Electronics Corporation.³ The Vega Speech-O-Meter employs a dual channel stabilized feedback amplifier acting as a differential comparator. Critical integration of the signals is used to achieve optimum meter damping for this type of speech analysis. The unit is powered by a single 9-V transistor radio battery. Oral-nasal balance is obtained by adjustment of two separate calibrated level controls. An off-test-on switch permits battery testing to be done each time the unit is switched on. Battery life is approximately 100 h of continuous or intermittent use. Two audio jacks on the rear panel permit the output from each microphone to be fed to a conventional two-channel stereo tape recorder.

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NOTES

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Fig. 3. Vega portable Speech-O-Meter with Plantronics microphones (cost: \$300).