

THE VERBO-TONAL METHOD FOR REHABILITATION PEOPLE WITH COMMUNICATION PROBLEMS

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The Verbo-tonal method of rehabilitation for people who have severe communication problems was developed in the 1950s by Professor Petar GUBERINA, a linguist who was particularly interested in speech perception.

Underlying the method is the conviction that language evolved from spoken language and that speech (which is used interchangeably with spoken language) is a social event. We speak (i.e., we use spoken language) when we want to express something or when we react to an event. In this sense, the " meaning " of speech is transmitted not only by linguistic elements but also by the auditory and visual information present in the rhythm, the intonation, the loudness, the tempo, the pauses, the tension, and the gestures of the speaker. Thus the individual speaker is both a producer and a perceiver of speech. Most important, the auditory and visual information in his production reflects how he perceives speech. If his perception changes, his speech will also change. If we have corrected his speech, we have corrected his perception.

The verbo-tonal procedures follow the pattern of language development observed in babies who have normal hearing. Before a baby learns to speak, he cries, babbles, and coos – he produces sound. His whole body participates in producing and receiving sounds. This vocal activity is not a response to his sense of hearing ; rather, it is a response to his proprioceptive sense.

As the baby matures, his vocal play becomes more sophisticated. During this time, rhythm and intonation patterns and rhythmic motor activities, as well as his vestibular, tactile and proprioceptive senses, contribute to his speech / language development. By the time he utters his first meaningful word at 9 to 12 months of age, he has already learned how to manipulate rhythm and intonation to assign different meanings to the word. For example, when he says " mama " he may mean " mama, come here " or " mama, I'm getting impatient if you don't hurry with my food, I'm going to scream ". And Mama learns quickly to understand these patterns.

Rhythm and intonation transmit meaning not only in infant speech but in adult spoken language as well. If we say " Mary came home yesterday ", and emphasize the first word, no more words are needed to convey the meaning that Mary came, as opposed to anyone else. If we emphasize the last word, we mean that she came yesterday and not on another day.

As early as 1938 GUBERINA stressed the importance of rhythm and intonation in producing and perceiving speech ; moreover, as a result of his research and experience, he proposed that the low frequencies transmit the rhythm and intonation patterns of language. In the early 1950s he began to apply these two principles to the habilitation of deaf children who have hearing only in the low frequencies (GUBERINA 1954). He reasoned that the brain would function best if it were to receive the auditory stimuli for which the ear is most sensitive ; moreover, it would be enriched (in Piaget's terms) by these optimal stimuli ; and with time and training, it would be prepared to respond to more difficult tasks, i.e., less favorable stimuli.

It wasn't until the late 1950s and early 60s that other researchers began to use low-frequency amplification with deaf children. Henk, Huizing and Taselaar (1958) concluded that the main contribution to intelligibility is given by that part of the " tone scale " where the hearing is most sensitive. Later they said : " These results correspond closely to the experiments of GUBERINA " (Huizing & Taselaar 1959).

In North America, Daniel Ling (1963, 64, 65) was one of the early advocates of using the child's residual hearing in the low frequencies. After he visited the Center for the Verbo-Tonal Method in Marseilles in 1960, he reported that deaf children had excellent speech because the Verbo-Tonal instruments transmitted the low frequencies without distortion.

As a result of Ling's research, Zenith developed the first commercial hearing aid that had an extended low-frequency response. Since that time many other manufacturers have developed similar hearing aids. Despite the wide availability of low-frequency and/or " high gain " hearing aids, the goal of intelligible rhythmical, spoken language for most deaf children has not been realized.

Amplification alone will not guarantee good speech. Amplification must be accompanied by " appropriate auditory training " (Rosenthal, Lang & Levitt 1975). During Verbo-Tonal training, deaf children are taught to speak and to perceive speech simultaneously. The speech stimulation procedures follow the developmental patterns which have been observed in normal-hearing children. The hearing-impaired children receive speech through vibrators that stimulate their vestibular, tactile and proprioceptive senses and through headphones. The children learn to produce normal rhythm and intonation patterns (suprasegmentals) and normal voice quality by imitating bodily movements and rhythmic patterns. They learn to develop meaningful speech by participating in simulated communication situations.

Our goals are to help them develop good communication skills and to integrate them into a normal educational system. Thus the Verbo-Tonal method stresses the importance of simultaneously developing all the senses ; it does not advocate isolating any sense, exaggerating any stimuli, or substituting an alternative linguistic code. In short, it is not a " Total Communication " approach to rehabilitating hearing impaired individuals ; if it is anything, it is a " unified sensory " approach which emphasizes the importance of spoken language.

Although we receive information from the low frequencies, we must also discriminate speech sound. Normal listeners can discriminate low-pitched words and sounds through a low-frequency band, but they do not comprehend high-pitched words. They can comprehend high-pitched phonemes (e.g./i/), however, if we pass one low-frequency band (0,5 Hz to 300, 600 or 1000 Hz) and one high band (3200 to 6400 Hz). The intensity level for the low band can be at the person's threshold level or slightly above (0 to 20 dB S.L.), while the high band need be only near the person's threshold level. This GUBERINA calls " discontinuous hearing ".

Others researchers have confirmed that we can perceive speech through discontinuous frequency bands. Palva's results (1965) show that listeners comprehend 18 % of the words when speech is passed through 480-660 Hz ; they comprehend 25 % when it is passed through 1800-2400 Hz ; but when sound is passed through both bands simultaneously, they comprehend 70 % of the words. For other results see Matzker (1956), Linden (1964), Ticinovic & Sonic (1971).

When Rosenthal, Lang and Levitt (1975) discussed the importance of low frequencies for hearing-impaired individuals, they also mentioned that the addition of one band of high frequencies improves comprehension significantly. Barbara Franklin's results (1969, 1973, 1975, 1979) confirmed that both normal and hearing-impaired listeners comprehend speech better through discontinuous transmission than through a broad frequency band. Furthermore, the previous studies support our own investigations and observations that speech discrimination percentages are greater during discontinuous transmission than the sum of the percentages for the individual bands.

Thus far we have discussed the significance of speech production, of the low frequencies, and of discontinuous frequency-band transmission in speech perception. The hearing-impaired individual has yet another perceptual process which helps him discriminate and acquire speech. When he is given the opportunity to practice listening through his most perceptive frequency bands (his optimal field of hearing), he perceptually discovers in the speech signal the clues he needs to distinguish one sound from another. In other words, when he receives speech through his optimal field of hearing, he can learn to discriminate all speech sounds even though some acoustic information is diminished.

The central nervous system receives information from all the senses. It is responsible for organizing this information by eliminating those stimuli which create cybernetic noise (von Bekesy's sensory inhibition 1967) and by selecting those stimuli which are optimal for it to function. According to Verbo-Tonal theory, sensory information is subordinate to the function of language. The brain can be taught to structure the information through functional rehabilitation.

For hearing-impaired children and adults, the goal of Verbo-Tonal therapy is to help them develop good oral communication skills which allow them to freely interact with normal-hearing people. Young hearing-impaired children should be integrated into regular classrooms as soon as possible. In this chapter, we will attempt to assess how Verbo-Tonal Centers in North America and in Europe achieve this goal by reviewing the evaluations of their patients' communication skills and integration rates.

The University of Tennessee Verbo-Tonal program provides regular training for young hearing-impaired children. Evaluators of this program have reported that the children showed significant improvement in oral communication skills as a function of therapy (Asp 1969, Bradbury 1970, Asp French & Lawson 1970, Asp 1973a, Asp, Archer & Kline 1979, Asp 1981). Pre-school children who had the most therapy talked more frequently with normal-hearing pre-schoolers than those who had less V-T therapy (Shirley 1972).

When the Verbo-Tonal program was compared to other programs, our children had better listening and speaking skills than those who were enrolled in a comparable oral day program (Woodfin 1971, Woodfin & Asp 1971) and they had better articulation and oral reading skills than children who were in a signed English (Total Communication) program at a residential school for the deaf (Duncan 1976).

Between 1972 and 1978, 53 % of the hearing-impaired children at the University (average loss 90 dB in the better ear) were integrated into public school classrooms (Asp, Archer & Kline 1979). For the years 1976 to 1978, the percentages were 60, 62 and 71 % respectively. More of these children could have been integrated if they could have continued in therapy beyond six years of age (Asp, Archer & Kline 1979).

If the frequency response for the auditory training and the hearing aid is carefully chosen, the rehabilitation time for adults and children who developed hearing losses after they had developed language will be shorter than for young congenitally deaf children (Asp & Berry 1975c). To ensure that the test scores agree with the patient's personal evaluation of his "handicap", it is necessary to include a noise and reverberation background with the speech stimulus (Mason 1977). When tested appropriately, most patients show a 20 % improvement in discrimination within 3 months of regular training (Asp & Berry 1975c). Some patients improve their speech reception thresholds even though pure-tone thresholds remain the same (Vertes et al. 1972). Generally, Verbo-Tonal training helps the patients adjust to amplification and it improves their communication ability in everyday listening situations.

The New York League for the Hard-of-Hearing provides aural rehabilitation for hearing-impaired adults and some children. Santore reported that the Verbo-Tonal method satisfied the diagnostic and therapeutic needs of the hearing-impaired population better than other auditory training programs previously used at the League. The procedures identified auditory functions that are not ordinarily diagnosed with standard audiometric procedures. Therefore, the therapy was particularly beneficial for people who did not function well in daily situations even though they had good speech discrimination scores or for people who were not able to adjust to amplification. In a five-year study of 80 adults, 71 % of the patients had a significant improvement in auditory perception (Santore 1978b).

Eisenberg & Santore (1976) presented a case study of a 12-year-old child who had a congenital, profound bilateral sensori-neural hearing loss. Despite substantial auditory training, he was unable to comprehend any speech material through his binaural amplification or through the audiometer prior to Verbo-Tonal therapy. Following two and one-half years of V-T therapy, he was able to use his residual hearing to perceive speech. His aided speech discrimination scores improved from 0 % (prior to therapy) to 56 %. The authors suggested that this method should be tried with other children who have not benefitted from standard procedures.

The Western Pennsylvania School for the Deaf, a residential school, has adopted the Verbo-Tonal Method for all grades. All of the children, from those in the nursery school to those in the upper school, improved in receptive and expressive communication skills. The professionals have developed an interesting integration program in which the deaf children and normal-hearing children are brought together either in the regular public school classroom or at the residential school. Generally, the results have been positive; however, the investigators have cautioned that such a program must be carefully organized and frequently reviewed if it is to be successful (Craig, Douglas &

Burke 1979).

Over the years a number of other programs in North America have reported results. Investigators who evaluated the program at the Alexander Graham Bell School for the Deaf in Columbus, Ohio, reported that the method had advantages that traditional systems lacked (Black 1971). The children improved their speech intelligibility and their rhythm and intonation patterns (Card, Jones, Prillerman 1972). The Metropolitan School for the Deaf in Toronto, Ontario, reported that the deaf children in all the Verbo-Tonal classes progressed at least as much as the children in the regular program, and in some cases their progress was exceptional (Roberts 1969).

Through two independent fellowships from the World Rehabilitation Fund, Santore (1980) and Asp (1981) were able to observe and evaluate major Verbo-Tonal Centers in Europe where the method is used in different languages and cultures. In the following review, we will combine information from the fellowship reports with results of studies which were completed at the various centers.

The SUVAG Center in Zagreb, Yugoslavia, has grown over the past 25 years, and currently is the most comprehensive Verbo-Tonal Center in the world. It provides services for people who have many kinds of communication problems. In an early study sponsored by the United States Government, the SUVAG Center evaluated the progress of 100 hearing-impaired children over a five-year period (GUBERINA et al. 1972). The results showed that 44 % of the children were integrated into regular public school classrooms, where they performed at the appropriate gradelevel. (The number increased after the reporting period, December 1966, because some of the children were still in training at that time). Thirty percent of the children improved significantly in speech discrimination ; 97 % improved when speech was presented through their optimal field of hearing ; 92 % improved in their ability to understand speech in a free field presentation ; and 23 % achieve 100 % intelligibility through a hearing aid at a distance of ten feet. More recent statistics showed that 75 to 90 % of the hearing-impaired children from this center are integrated (Asp 1981).

Santore (1980) reported that the Zagreb pre-school children who had moderate-to-severe hearing losses had uniformly excellent speech, language, auditory skills, voice qualities, rhythm and intonation patterns. She attributed this result to the fact that they used body movement activities and musical rhythm exercises to develop the auditory system for speech and language acquisition. The children who had profound hearing losses had good voice quality, rhythm and speech patterns, and they were able to communicate orally. In general, she was impressed with the speech intelligibility and the spontaneous language skills of these children. Most deaf children can develop good oral communication skills and they can enter a " hearing society " ...[

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