AUTOMATIC PHONETOGRAPHIC DATA OF NORMAL VOICE

A Thesis submitted in partial fulfillment of the
requirement for the
Master degree in phoniatrics

Presented by
Amal Hussein Mohammed Kamlo.
King Fahad Hospital, Jeddah

Supervised by
Dr.Mahmoud Yousef Abu El Ella
Prof. Of phoniatrics
Dr.Nasser Hassan Abdel Nasser
Lecturer of phoniatrics

Ain Shams University
Faculty of Medicine
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بسم الله الرحمن الرحيم

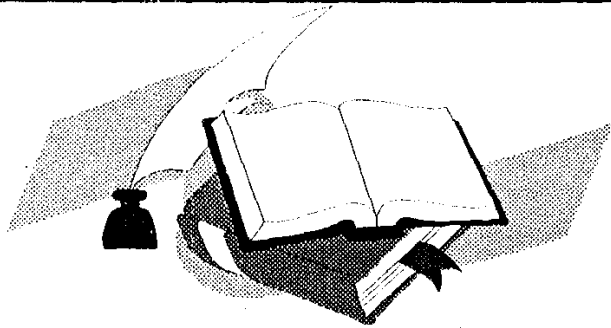*To my parents, husband and children.*

With appreciation

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INTRODUCTION

Phonation or sound- producing vocal fold vibration is a process which the direct current (DC) converts aerodynamic energy to alternating current (AC) or acoustic energy. This takes place when the vocal folds (VFs) are adducted sufficiently to offer an adequate resistance to the DC airflow so that they are set into vibrations. The VF adductor muscles, principally the lateral crico-arytenoids and inter-arytenoids accomplish the task of approximating the arytenoid cartilage, which affects prephonatory VFs closure in the posterior glottis. The degree of resistance offered by the VFs determines how much pressure is required from the airflow to initiate and sustains the vibratory action. That resistance can be altered at the larynx by varying the tension and, or the degree of adduction, including that resulting from supraglottic constrictions. This determines then, how hard the respiratory force must work to sustain phonation. (Murray, et al., 1994).

Other influences over the laryngeal resistance are the intended required loudness, pitch ranges of a speech or singing phrase. Various combinations of intrinsic muscle contractions serve to adjust the tone, length, shape and elasticity of the VFs according to pitch, loudness and quality requirements of the phonatory act. The result of the VFs vibration is a series of pressure pulses, which disturbs air molecules in the vocal tract, so that they oscillate (alternate compression and rarefaction). The oscillating air column forms a sound pressure wave. The shape of the vocal tract resonators determines which components of the glottis source waveform will be enhanced and which will be damped, and thus the nature of sounds will be perceived (Morrison, et al., 1994).

So, the fundamental frequency (Fo) and the sound pressure level (SPL) of any acoustic signal are considered as the most common parameters of speech, singing and voice synthesis (Coleman, 1993).

This relationship between Fo and SPL interested many scientists to record it. Although Wolfe and Stout described results early at 1930's, it was popularized by Damste (1970), and becomes widely used and known as *PHONETOGRAPHY.*