

Principles and Practices of  
**LARYNGEAL  
ELECTROMYOGRAPHY**

WEN XU



WILEY



# Principles and Practices of Laryngeal Electromyography

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# Preface

Laryngeal electromyography (LEMG) is an important method that detects the status of electrophysiological activity of the laryngeal muscles during various physiological activities such as phonation, breathing, and swallowing, studying the electrical activity of the laryngeal nerve and its innervated muscles. It provides a scientific basis for the diagnosis, treatment, and prognosis of laryngeal immobility such as organic (neuromuscular paralysis or cricoarytenoid joint abnormalities), swallowing disorders, spasmodic dysphonia, and other laryngeal neuromuscular pathologies. Due to the difficulties of clinical application of LEMG, such as the need for a certain electrophysiological basis for its operation and diagnosis, and the need for neurologist assistance, this technique has not yet been widely used in clinical practice. Therefore, otolaryngologists urgently need to master standardized examination and diagnostic interpretation methods to improve the level of diagnosis and treatment of laryngeal neuromuscular dysfunction.

As an original monograph on LEMG, it contains over 36,000 words and 167 original clinical pictures, including a large number of electromyogram and stroboscopic laryngoscopy photos, which are illustrated in detail. Besides, it is supplemented by 18 selected interesting clinical cases, demonstrating the fundamentals of LEMG and its clinical experience thoroughly. It mainly involves two parts: (a) basis of LEMG; (b) abnormal LEMG characteristics and case studies.

- **Basis of laryngeal electromyography:** It includes applied anatomy and physiology of the larynx, electromyographic recorders and electrodes, introduction to needle-electrode electromyography and the parameters of its evaluation, basic principles and basic operations of LEMG, examination of laryngeal nerve conduction function, other electrophysiological tests (including repetitive nerve stimulation and single-fiber electromyography), as well as the principles and precautions of electromyography.
- **Abnormal laryngeal electromyographic manifestation and case study:** It may help you to grasp LEMG vividly and three-dimensionally in vocal fold paralysis, vocal fold paralysis combined with lower cranial nerve injuries, mechanical movement disorders of the vocal folds, laryngeal myopathy, myasthenia gravis, spasmodic dysphonia, and functional dysphonia, from the dimensions of both clinical features and case studies.

This book is clinically instructive, combining electrophysiological theories and techniques with clinical practice for the majority of otolaryngological specialists, physicians, primary care physicians, postgraduate students, and other related electrophysiologic professionals with a concise and clear text. It provides a concise and practical reference book for clinical LEMG.

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# Basis of Laryngeal Electromyography

Due to the deep location and complex physiological functions of the larynx and pharynx, it is necessary to choose some special methods to evaluate their functional changes in structure and physiology. Before the examination of the laryngopharynx, the medical history of the patient should be obtained in detail, then the symptoms should be analyzed, and the general condition should be paid more attention to as well. Laryngoscopy is the basis for making a diagnosis of laryngopharyngeal diseases, including indirect laryngoscopy, flexible laryngoscopy, electrolaryngoscopy, strobolaryngoscopy, narrow-band imaging endoscopy, and direct laryngoscopy. Clinical evaluation of vocal function mainly includes subjective and objective assessment and measurement of voice quality, voice-related quality of life, assessment of the vocal fold vibration, laryngeal electromyography, aerodynamic assessment, laryngopharyngeal reflux (pH monitoring), etc.

Laryngeal electromyography (LEMG) objectively detects the bioelectrical activity of laryngeal muscles during different physiological activities, such as phonation, respiration, and swallowing. LEMG determines the function of laryngeal nerves and muscles so as to provide the basis for the diagnosis, treatment, and prognosis of laryngeal neuromuscular disorders. This part begins with a brief introduction of laryngeal anatomy and physiology, and then the essential knowledge of electromyography and characteristics of LEMG are further elaborated.

