

Essential Electromyography

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John A. Jarratt

Emeritus of Sheffield Teaching Hospitals NHS Foundation Trust

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 John A. Jarratt
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Shaftesbury Road, Cambridge CB2 8EA, United Kingdom
 One Liberty Plaza, 20th Floor, New York, NY 10006, USA
 477 Williamstown Road, Port Melbourne, VIC 3207, Australia
 314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India
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To
Indy, Scarlett, Theo and Zachary
In the forlorn hope that they might be impressed.

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Preface

The clinic where I first trained was called the Department of Applied Electrophysiology. No doubt the menace this implied of some junta-like operative extracting a diagnosis by whatever means necessary prompted a re-branding exercise. Departments of Clinical Neurophysiology sprang up, which seemed to place them within their natural neurological habitat and at the same time distinguishing them from the scientific hothouses of academic neurophysiology. There now seems to be a backward trend to label the specialty Electrodiagnosis or, consonant with the zeitgeist of social media, EDX.

This leads us to the difficulty in creating a title for this book. The name of the specialty would be an obvious choice but this cult of increasing concision is offset by its diminished allure. I hope that *Essential Electromyography* captures the aim of providing a brief account of the principles underlying the techniques involved in electromyography and nerve conduction studies rather than detailed descriptions of the techniques themselves. Changing fashions in nomenclature and even technique should not invalidate these principles.

An additional aim of the book is to introduce to a variety of readers what a professor of medicine once pejoratively if not condescendingly described to the author as the arcane world of clinical neurophysiology. This underlined what most practitioners of the specialty already know; namely, that many of their colleagues find the jargon as impenetrable as the basic principles underlying its exercise. With this in mind, an attempt has been made to describe or define technical terms when they are first encountered. A glossary is also provided.

The findings in commonly occurring conditions and how they are related to the underlying pathology are explained. The techniques involved are mentioned only where necessary and then briefly. In this way I hope the book will appeal not only to junior trainees in the subject but also to a wide range of clinicians such as neurologists, orthopaedic surgeons, general physicians, rheumatologists and endocrinologists who refer patients for investigation. This short summary should aid their selection of patients for referral and their appreciation of the implications of the results. Experience suggests that lawyers involved in medico-legal cases might also be interested.

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Abbreviations

| | |
|---------------------------------------|--|
| m/s | Metres per second. |
| ms Milliseconds | Also sometimes called msec. Thousandths of a second. |
| mV Millivolts | Thousandths of a volt. |
| µV Microvolts | Millionths of a volt. |
| ACh Acetylcholine | A chemical involved in transmitting impulses between nerves, and between a nerve and the muscle it supplies. |
| CMAP Compound muscle action potential | The potential recorded from a muscle after stimulating its nerve supply; representing the sum of all the individual muscle action potentials generated. |
| CNE Concentric needle electrode | A recording electrode produced by passing an insulated wire down the cannula of a hollow needle. |
| CV | Conduction velocity. |
| EPZ End-plate zone | The point at which a motor nerve connects to its muscle. See also NMJ, neuromuscular junction. |
| F-wave | A late and small compound muscle potential generated by antidromic stimulation of a motor nerve and subsequent firing of the anterior horn cell. |
| H-reflex | A late and small compound muscle action potential generated by orthodromic stimulation of muscle spindle afferents which connect monosynaptically to the anterior horn cell. Similar to a tendon reflex. |
| MAP Muscle action potential | The propagated potential generated by an active single muscle fibre. |
| MCV | Motor conduction velocity. |
| MNAP Mixed nerve action potential | The potential recorded from a mixed nerve representing the sum of the action potentials generated by individual active sensory and motor fibres. |
| MUAP Motor unit action potential | The potential generated by an active motor unit, representing the sum of all the individual muscle action potentials within that unit. |
| MUP | Same as MUAP. |
| M-wave | Same as CMAP. |
| NMJ Neuromuscular junction | The point at which a motor nerve connects to its muscle. See also EPZ, end-plate zone. |
| NMT Neuromuscular transmission time | The time taken for a nerve impulse arriving at the end-plate zone to generate a muscle action potential. |
| SAP Sensory action potential | Same as SNAP. |
| SCV | Sensory conduction velocity. |
| SNAP Sensory nerve action potential | The potential recorded from a sensory nerve representing the sum of the action potentials generated by individual active fibres. |