



# **Tremor: From Pathogenesis to Treatment (Synthesis Lectures on Biomedical Engineering)**

*Mario Manto*

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# Tremor: From Pathogenesis to Treatment (Synthesis Lectures on Biomedical Engineering)

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Tremor represents one of the most common movement disorders worldwide. It affects both sexes and may occur at any age. In most cases, tremor is disabling and causes social difficulties, resulting in poorer quality of life. Tremor is now recognized as a public health issue given the aging of the population. Tremor is a complex phenomenon that has attracted the attention of scientists from various disciplines. Tremor results from dynamic interactions between multiple synaptically coupled neuronal systems and the biomechanical, physical, and electrical properties of the external effectors. There have been major advances in our understanding of tremor pathogenesis these last three decades, thanks to new imaging techniques and genetic discoveries. Moreover, significant progress in computer technologies, developments of reliable and unobtrusive wearable sensors, improvements in miniaturization, and advances in signal processing have opened new perspectives for the accurate characterization and daily monitoring of tremor. New therapies are emerging. In this book, we provide an overview of tremor from pathogenesis to therapeutic aspects. We review the definitions, the classification of the varieties of tremor, and the contribution of central versus peripheral mechanisms. Neuroanatomical, neurophysiological, neurochemical, and pharmacological topics related to tremor are pointed out. Our goals are to explain the fundamental basis of tremor generation, to show the recent technological developments, especially in instrumentation, which are reshaping research and clinical practice, and to provide up-to-date information related to emerging therapies. The integrative transdisciplinary approach has been used, combining engineering and physiological principles to diagnose, monitor, and treat tremor. Guidelines for evaluation of tremor are explained. This book has been written for biomedical engineering students, engineers, researchers, medical students, biologists, neurologists, and biomedical professionals of any discipline looking for an updated and multidisciplinary overview of tremor. It can be used for biomedical courses. Table of Contents: Introduction / Anatomical Overview of the Central and Peripheral Nervous System / Physiology of the Nervous System / Characterization of Tremor / Principal Disorders Associated with Tremor / Quantification of Tremor / Mechanisms of Tremor / Treatments

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