

### How Do I find clues about where myoclonus is originating?

Anna Latorre, MD, PhD<sup>1</sup>, Blake Hale, MSc<sup>1,2</sup>, Lorenzo Rocchi MD, PhD<sup>3</sup>

<sup>1</sup>Department of Clinical and Movement Neurosciences, UCL Queen Square Institute of Neurology,  
University College London, London, UK

<sup>2</sup>Department of Clinical Neurophysiology, National Hospital for Neurology and Neurosurgery,  
London, UK

<sup>3</sup>Department of Medical Sciences and Public Health, University of Cagliari, Cagliari, Italy

#### Corresponding Author:

Anna Latorre

Department of Clinical and Movement Neurosciences

UCL Queen Square Institute of Neurology,

University College London, London, UK

[a.latorre@ucl.ac.uk](mailto:a.latorre@ucl.ac.uk)

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#### Abstract

Myoclonus is defined as a brief and jerky shock-like involuntary movement caused by abrupt muscle contraction or sudden cessation of ongoing muscular activity. Myoclonus can be generated by abnormal activity in different parts of the nervous system, both peripheral and central, including cortical and subcortical structures. According to the presumed neural generator, myoclonus is classified as cortical, subcortical (including myoclonus-dystonia and brainstem/reticular myoclonus), spinal (including segmental spinal and propriospinal myoclonus) and peripheral. The identification of myoclonus subtype, and therefore its potential source, is clinically important as it can guide diagnosis and treatment.

In this video lecture we reviewed how to determine myoclonus origin. We first reviewed the clinical features typical of each myoclonus subtype. We then explored the electrophysiological techniques that can aid in the differential diagnosis of myoclonus, based on its origin. In conclusion, we provided a clinical and electrophysiological overview on how to find clues about neural generators of myoclonus.

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- 3) Manuscript: A. Writing of the first draft, B. Review and Critique.

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The authors confirm that the approval of an institutional review board was not required for this work. Patients have signed consent for video acquisition and publication. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

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## References:

1. Shibasaki H, Hallett M. Electrophysiological studies of myoclonus. *Muscle & nerve* 2005;31(2):157-174.
2. Zutt R, Elting JW, van Zijl JC, et al. Electrophysiologic testing aids diagnosis and subtyping of myoclonus. *Neurology* 2018;90(8):e647-e657.
3. Latorre A, Rocchi L, Berardelli A, Rothwell JC, Bhatia KP, Cordivari C. Reappraisal of cortical myoclonus: A retrospective study of clinical neurophysiology. *Movement disorders : official journal of the Movement Disorder Society* 2018;33(2):339-341.
4. Hallett M, Chadwick D, Adam J, Marsden CD. Reticular reflex myoclonus: a physiological type of human post-hypoxic myoclonus. *Journal of neurology, neurosurgery, and psychiatry* 1977;40(3):253-264.
5. Kojovic M, Cordivari C, Bhatia K. Myoclonic disorders: a practical approach for diagnosis and treatment. *Therapeutic advances in neurological disorders* 2011;4(1):47-62.
6. Merchant SHI, Vial-Undurraga F, Leodori G, van Gerpen JA, Hallett M. Myoclonus: An Electrophysiological Diagnosis. *Movement disorders clinical practice* 2020;7(5):489-499.
7. Beudel M, Elting JWJ, Uyttenboogaart M, van den Broek MWC, Tijssen MAJ. Reticular Myoclonus: It Really Comes From the Brainstem! *Movement disorders clinical practice* 2014;1(3):258-260.
8. Brown P, Farmer SF, Halliday DM, Marsden J, Rosenberg JR. Coherent cortical and muscle discharge in cortical myoclonus. *Brain : a journal of neurology* 1999;122 ( Pt 3):461-472.

9. Rocchi, L., Latorre, A., Ibanez Pereda, J., Spampinato, D., Brown, K.E., Rothwell, J. and Bhatia, K. (2019), A case of congenital hypoplasia of the left cerebellar hemisphere and ipsilateral cortical myoclonus. *Mov Disord*, 34: 1745-1747.