Tracing tremor: Neural correlates of essential tremor and its treatment
Buijink, A.W.G.
TRACING TREMOR

Neural correlates of essential tremor and its treatment

Arthur W.G. Buijink
Tracing tremor

*Neural correlates of essential tremor and its treatment*

Arthur W.G. Buijink
This thesis was prepared at the Department of Neurology and Clinical Neurophysiology, Academic Medical Center, University of Amsterdam, Amsterdam, the Netherlands.

Work for chapters 3, 4, 5, 6 and 8 was supported by grants from the Prinses Beatrix Fonds (W.OR10-01) and the Hersenstichting Nederland (2012(1)-91). Work for chapter 9 was performed using the e-bioinfra platform developed at the e-bioscience group of the Bioinformatics Laboratory of the AMC, using resources of the Dutch e-Science Grid, BiGGrid project, which is financially supported by the Netherlands Organisation for Scientific Research (NWO).

The authors report no conflicts of interest.

Printing of this thesis was financially supported by the AMC Graduate School, the Department of Neurology of the AMC, Stichting Wetenschapsfonds Dystonie and the Benelux Neuromodulation Society.

Printed by Ipskamp Drukkers, Enschede, the Netherlands
Cover design and illustration by Tessa de Römph and Arthur Buijink

Copyright 2015 Arthur W.G. Buijink, Amsterdam. No parts of this thesis may be reproduced, stored or transmitted in any form or by any means without the prior permission of the author or publishers of the included scientific papers.
Tracing tremor

Neural correlates of essential tremor and its treatment

ACADEMISCH PROEFSCHRIFT
ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. D.C. van den Boom
ten overstaan van een door het College voor Promoties ingestelde commissie,
in het openbaar te verdedigen in de Agnietenkapel

op vrijdag 29 januari 2016, te 14.00 uur

door Arthur Willem Gerard Buijink
geboren te Amsterdam
Promotiecommissie

Promotor: prof. dr. I.N. van Schaik
Copromotor: dr. A.F. van Rootselaar

Universiteit van Amsterdam
Vrije Universiteit
Universiteit van Amsterdam
Erasmus Universiteit Rotterdam
Universiteit van Amsterdam
Universiteit van Amsterdam

Faculteit der Geneeskunde
Contents

1. General introduction and aims................................................................. 9

2. How to tackle tremor – systematic review of the literature and
diagnostic work-up.................................................................................. 23


Part I: neural correlates of essential tremor

3. Bilateral cerebellar activation in unilaterally challenged essential
tremor...................................................................................................... 47

4. Motor network disruption in essential tremor, a functional and
effective connectivity study.................................................................. 67


5. Rhythmic finger tapping reveals cerebellar dysfunction in essential
tremor.................................................................................................... 101


6. Cerebellar atrophy in cortical myoclonic tremor and not in hereditary
   essential tremor – a voxel-based morphometry study......................... 119

7. Decreased cerebellar fiber density in cortical myoclonic tremor but
   not in essential tremor....................................................................... 137


Part II: neural correlates of treatment of essential tremor

8. Propranolol in essential tremor affects motor control in a pattern
   fitting increased Renshaw inhibition.................................................. 149

9. Structural changes in cerebellar outflow tracts after thalamotomy in
   essential tremor.................................................................................. 169


10. Summary and discussion................................................................. 183