



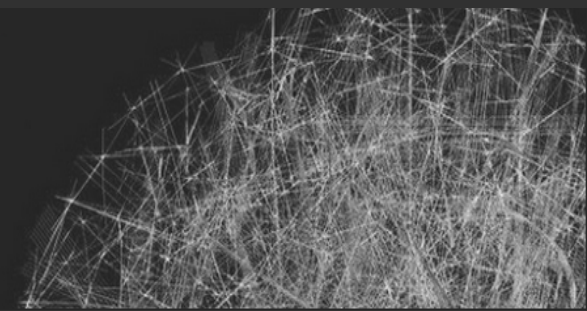
Núcleo de Pesquisa em
Neurociência e Reabilitação

CORTICAL CHANGES IN BRACHIAL PLEXUS INJURY PATIENTS WITH CHRONIC PAIN

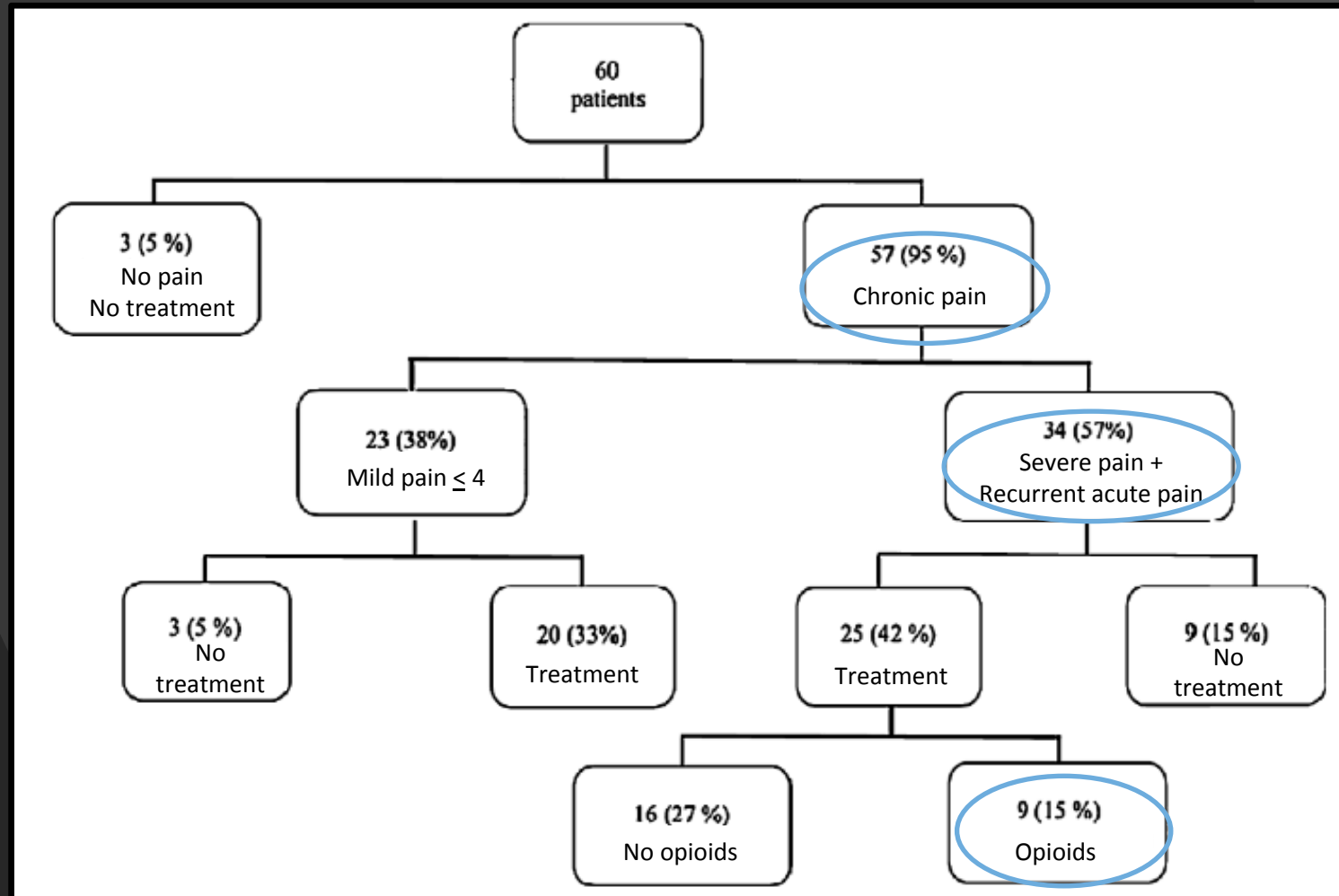
Fernanda de Figueiredo Torres

Novembro/2016

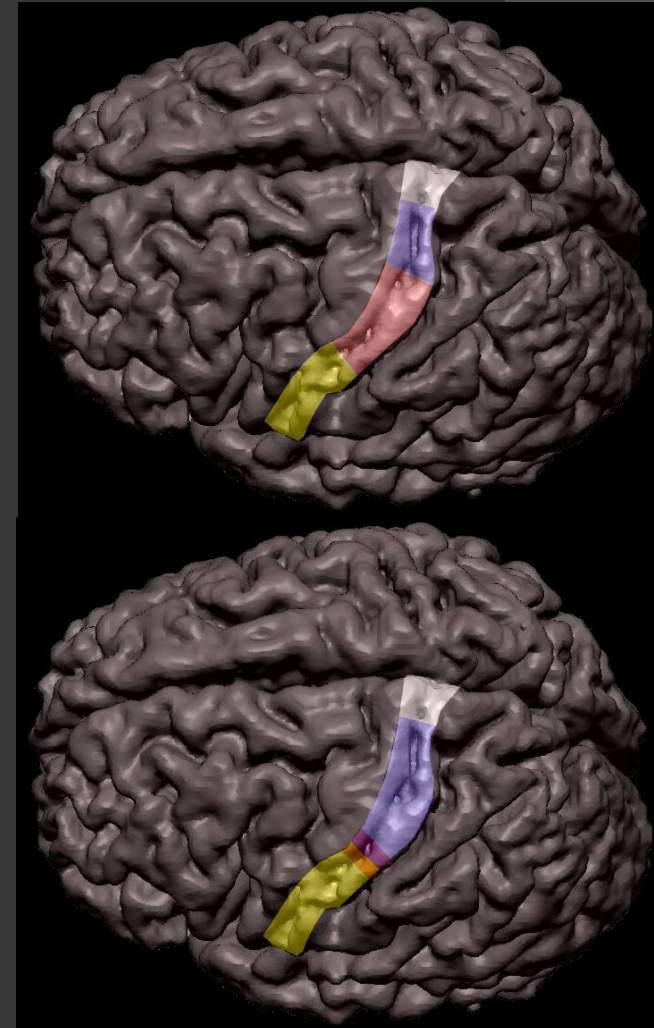
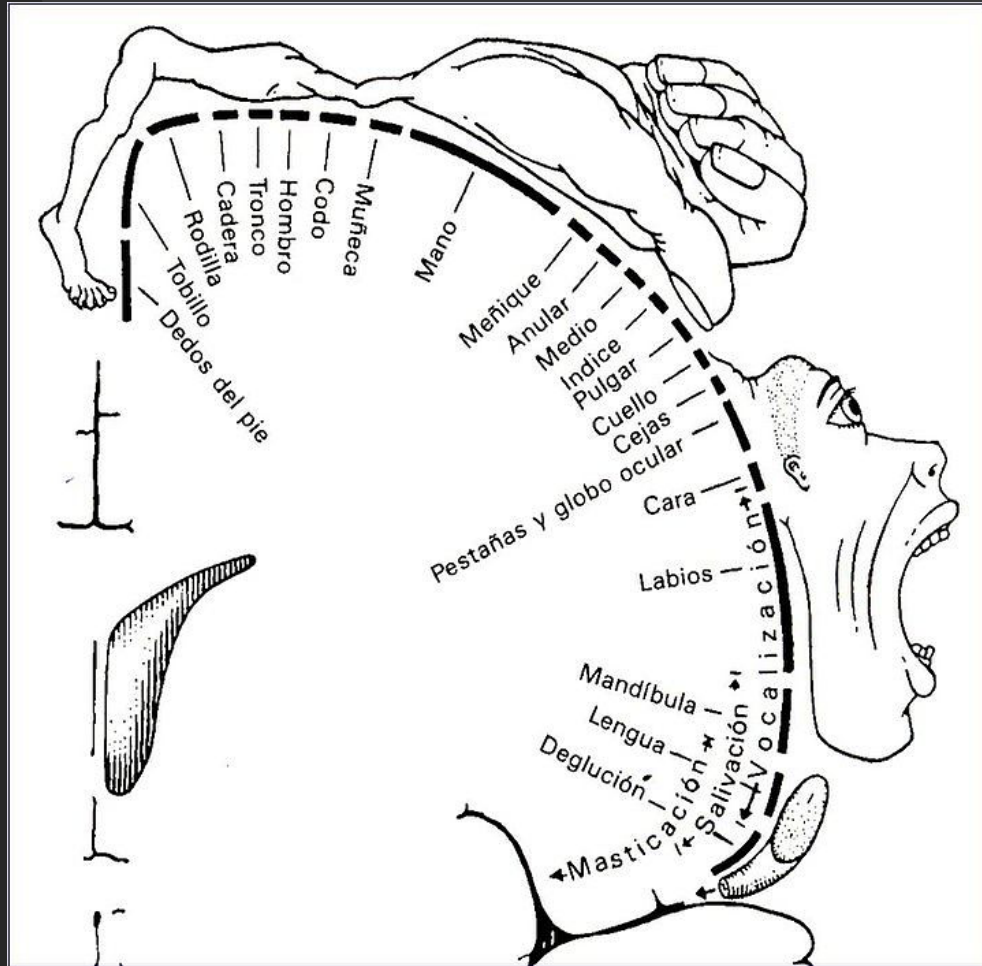
NeuroMat



Pain after Brachial Plexus Injury



Brain Plasticity after Peripheral Injuries



Normal

Amputee

Cohen et al., 1991; PascualLeone et al., 1996;
Flor et al., 1995; Ojemann & Silbergeld, 1995

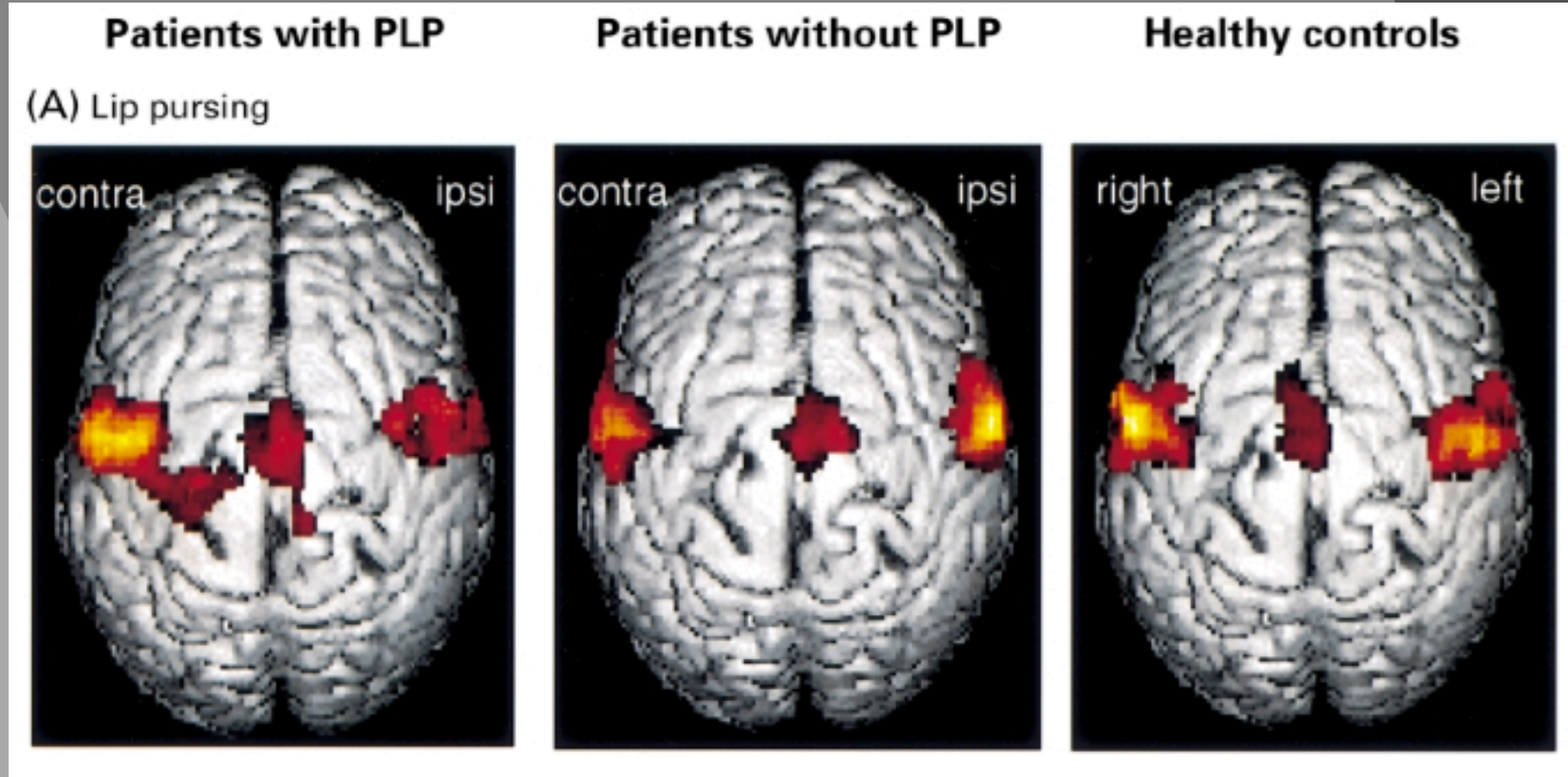
Brain Plasticity in Chronic Pain

Brain (2001), 124, 2268–2277

Phantom movements and pain An fMRI study in upper limb amputees

Martin Lotze,¹ Herta Flor,³ Wolfgang Grodd,² Wolfgang Larbig¹ and Niels Birbaumer^{1,4}

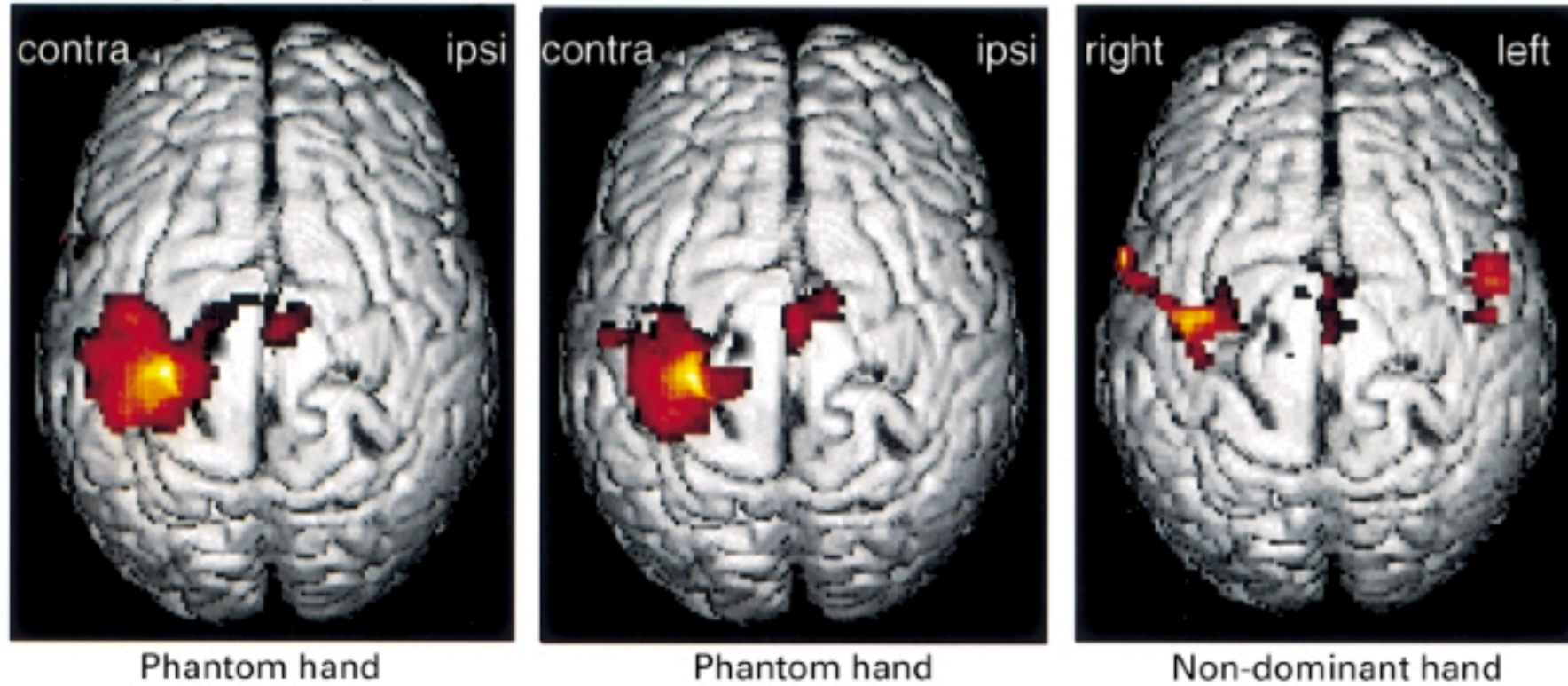
Brain Plasticity in Chronic Pain



Lotze et al., 2001

Brain Plasticity in Chronic Pain

(C) Making a fist-imagination



Brain Plasticity in Chronic Pain



Buttler & Moseley, 2013

Brain Plasticity after BPI

Cortical Excitability of the Biceps Muscle after Intercostal-to-Musculocutaneous Nerve Transfer

Malessy, Martijn J.A. MD; van der Kamp, Wim MD; Thomeer, Ralph T.W.M. MD, PhD; van Dijk, J. Gert MD, PhD

Neurosurgery

Issue: Volume 42(4), April 1998, pp 787-794

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Keywords: Central adaptation, Cortical magnetic stimulation, Excitability, Nerve transfer, Neural plasticity, Peripheral nerve

J Neurosurg 98:261–268, 2003

Functional magnetic resonance imaging and control over the biceps muscle after intercostal–musculocutaneous nerve transfer

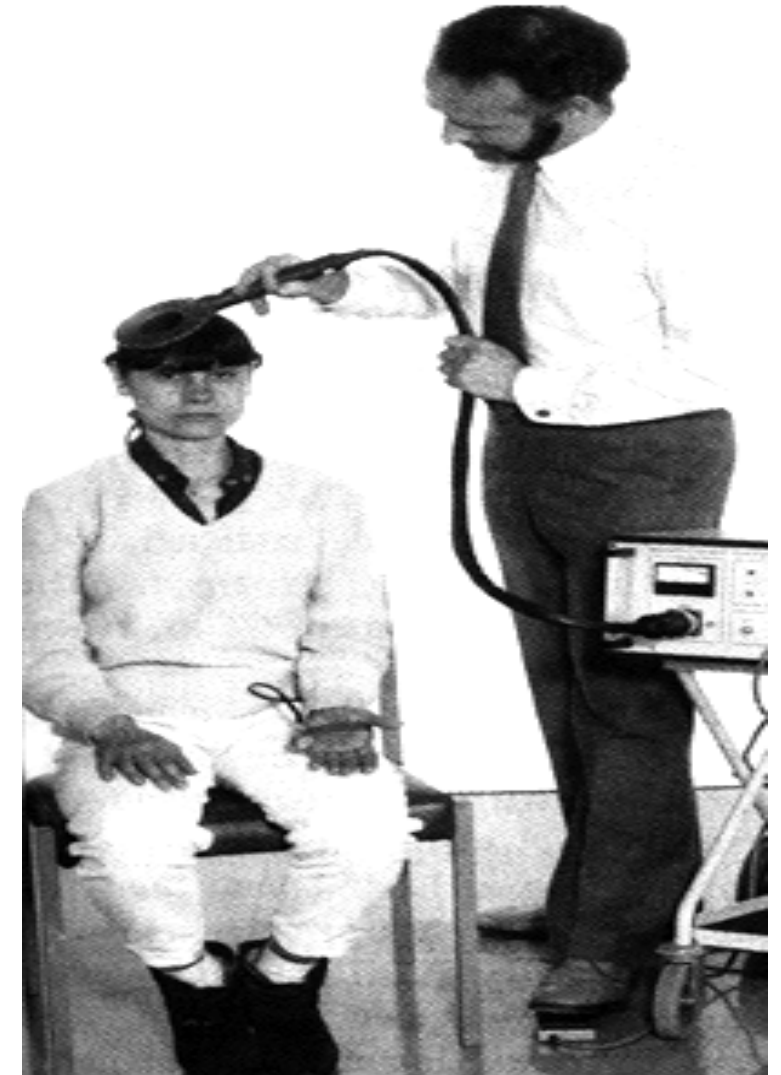
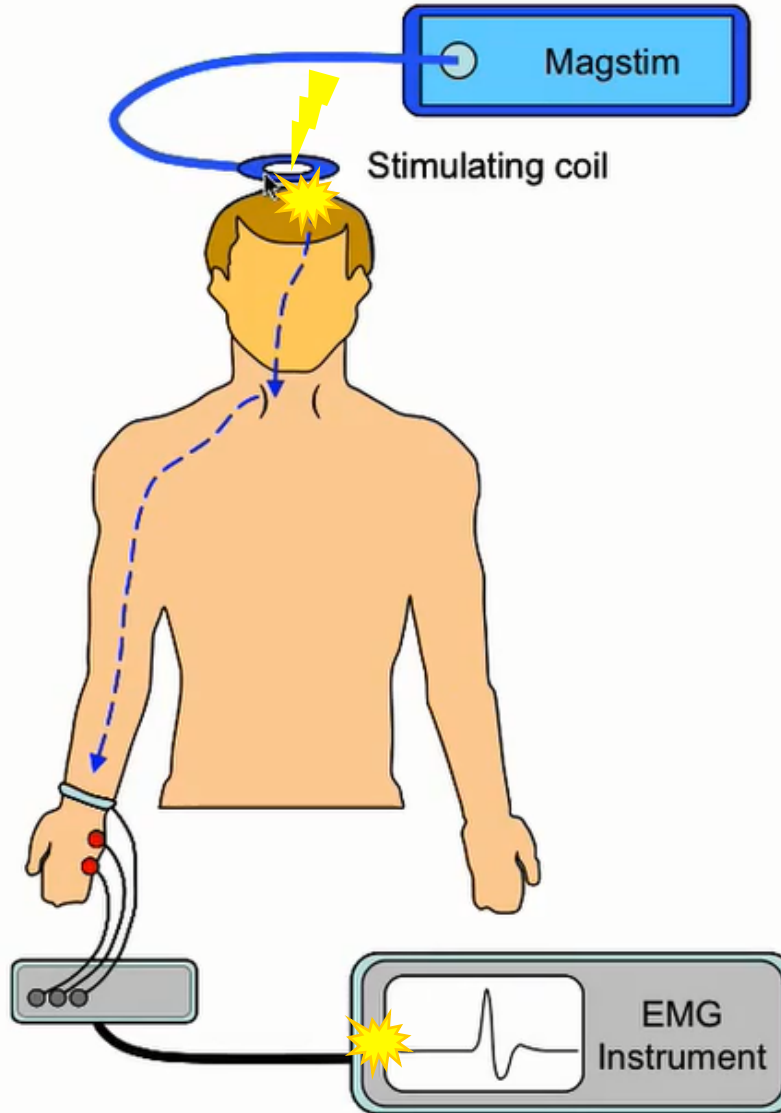
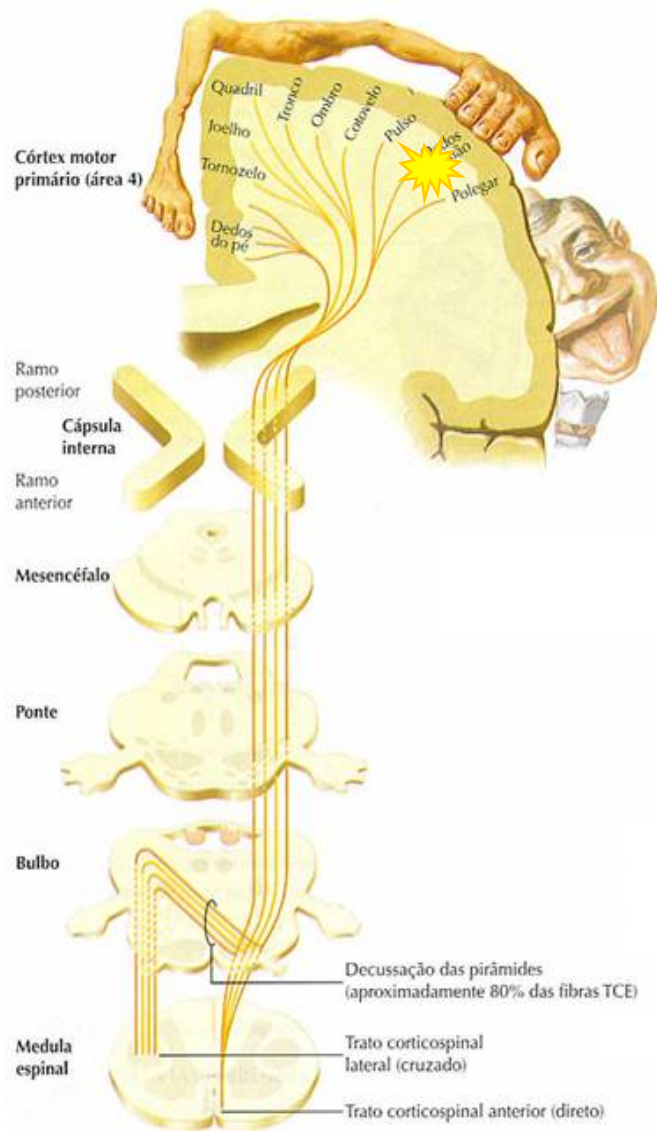
MARTIJN J. A. MALESSY, M.D., PH.D., DICK BAKKER, M.D., AD J. DEKKER, PH.D., J. GERT VAN DIJK, M.D., PH.D., AND RALPH T. W. M. THOMEER, M.D., PH.D.

Departments of Neurosurgery, Radiology and Neurology, and Clinical Neurophysiology, Leiden University Medical Center, Leiden, The Netherlands

General Objective

To investigate pain influence over cortical representations in brachial plexus injury patients using transcranial magnetic stimulation.

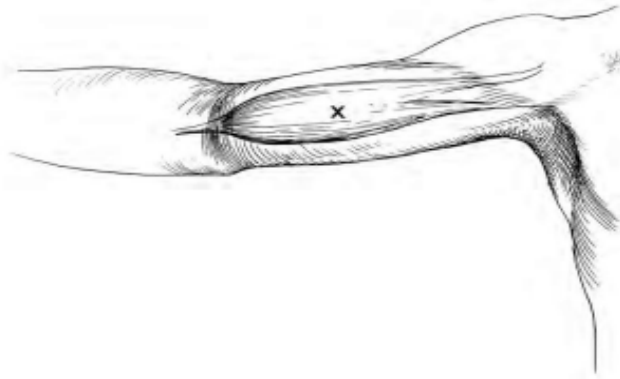
Transcranial Magnetic Stimulation



Methods

1. Identification of intact cortical motor connections after injury of different brachial plexus trunks through the presence of motor evoked potentials.

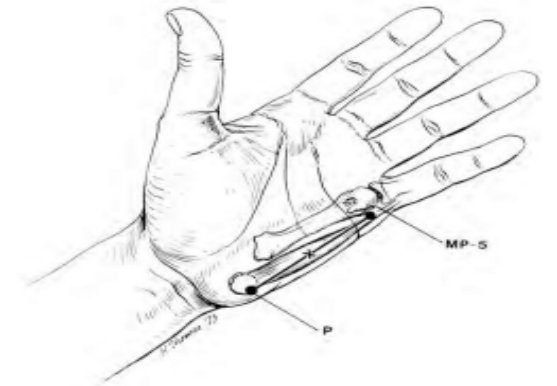
Superior Trunk
Biceps Brachii



Superior and Middle Trunks
Extensor Carpi Radialis

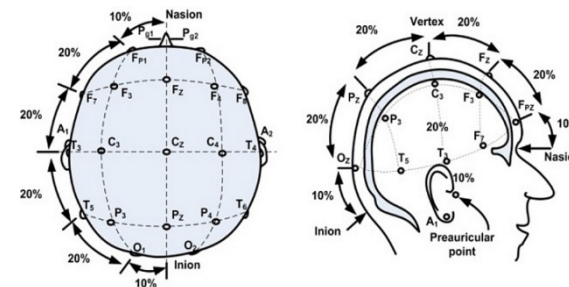
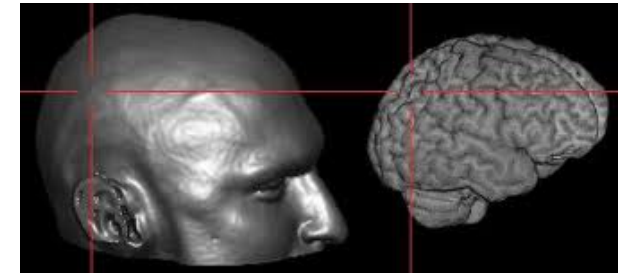
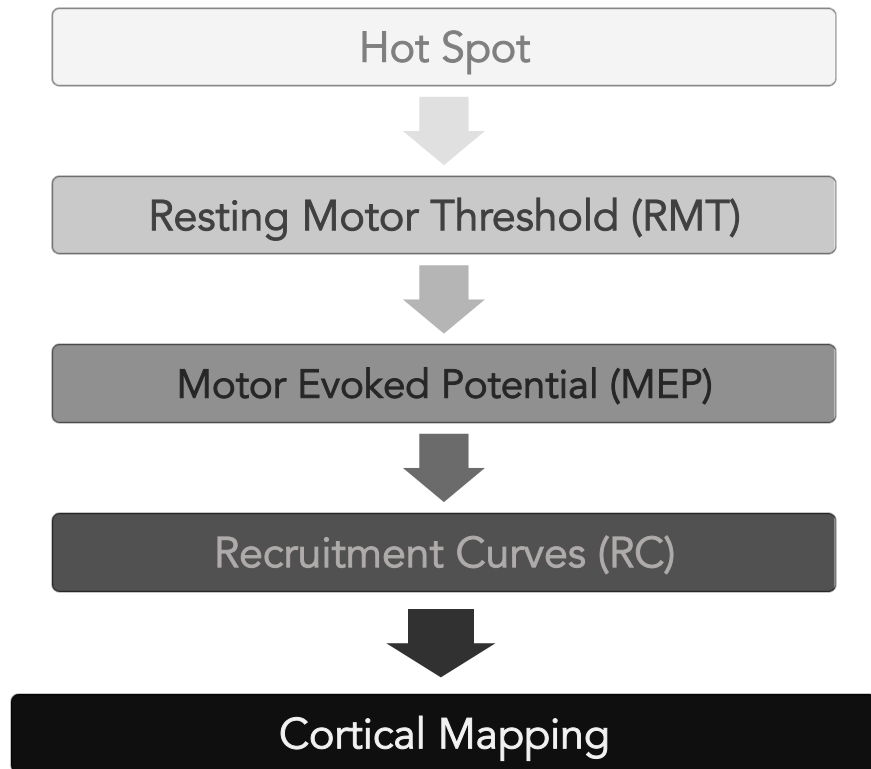


Inferior Trunk
Abductor Digiti Minimi



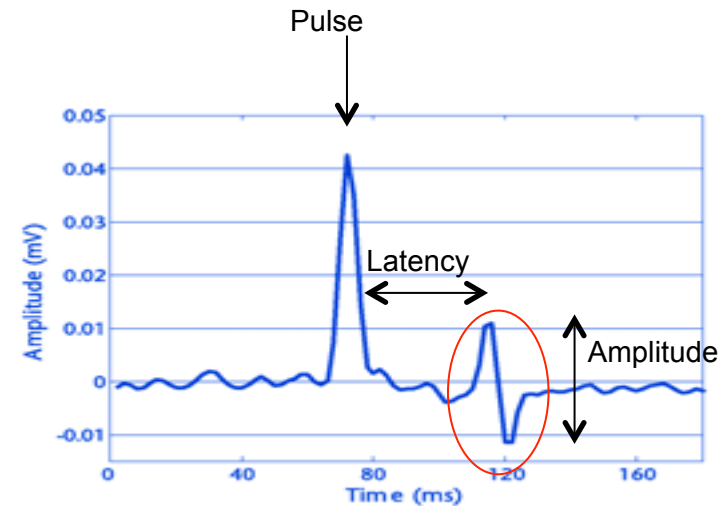
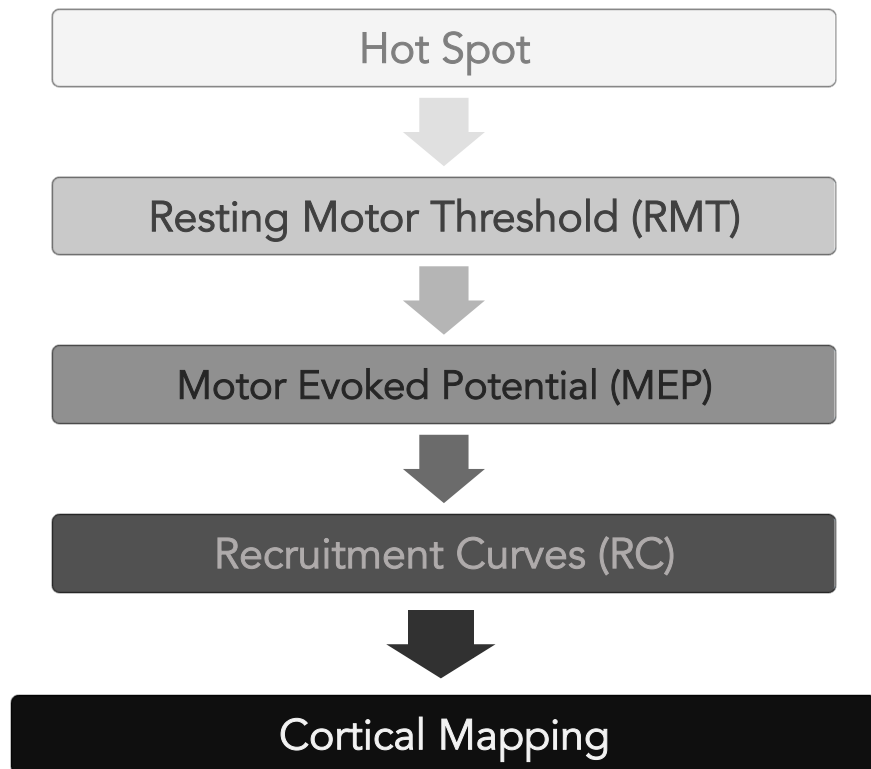
Methods

2. To assess cortical plasticity on the muscle groups of interest representation areas (changes in resting motor threshold and in MEP amplitude).



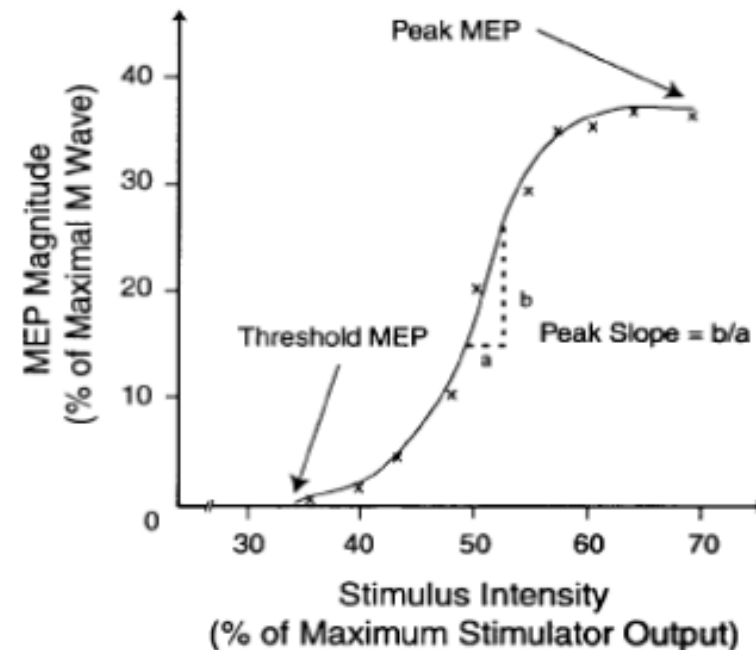
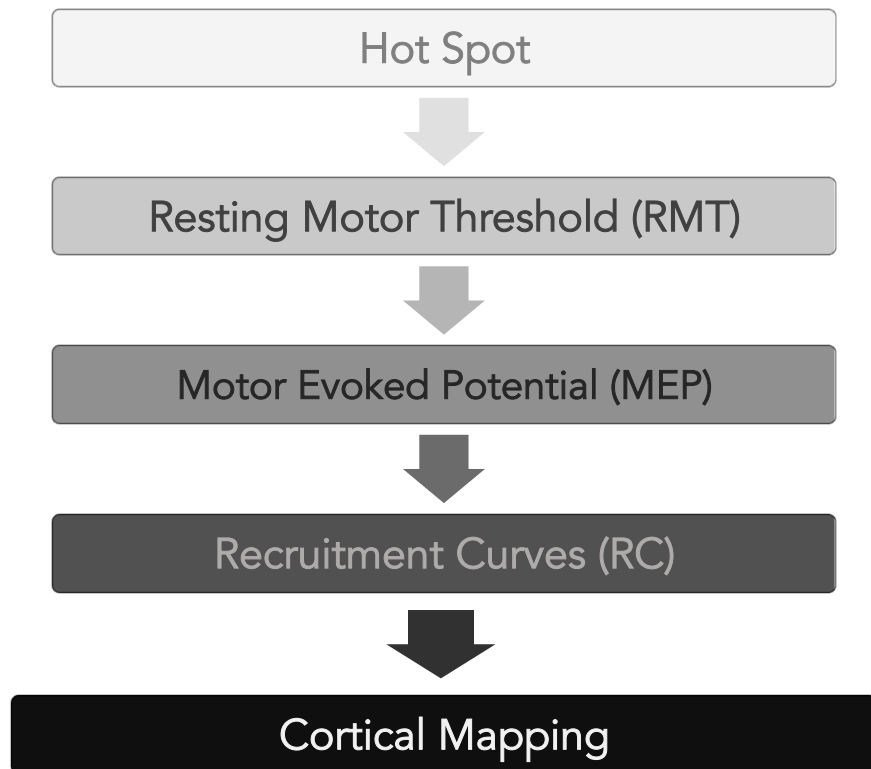
Methods

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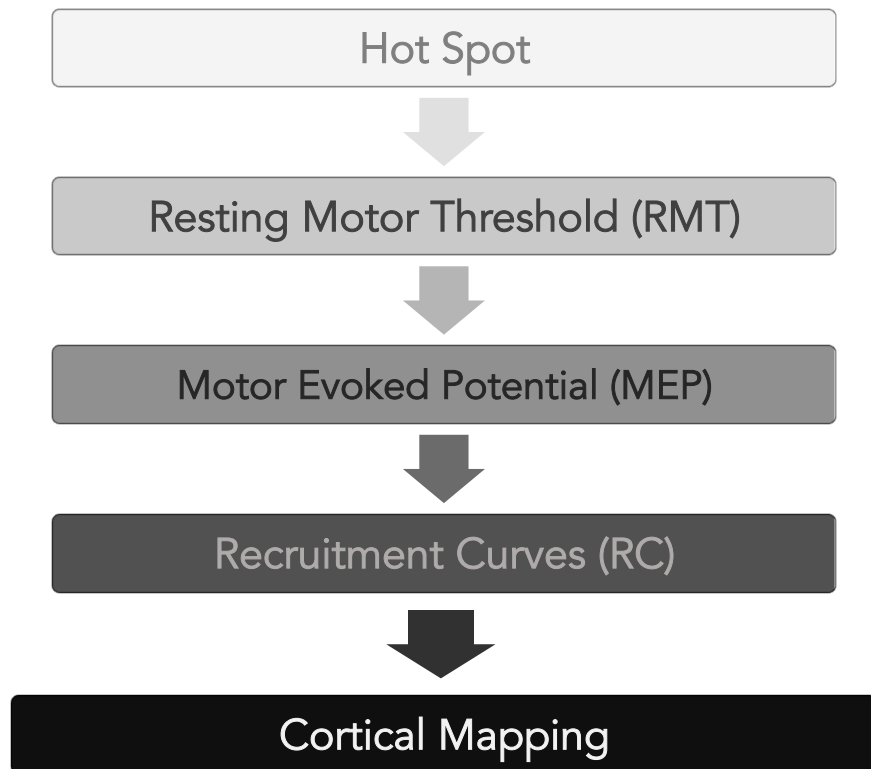
Methods

2. To assess cortical plasticity on the muscle groups of interest representation areas (changes in resting motor threshold and in MEP amplitude).



Methods

2. To assess cortical plasticity on the muscle groups of interest representation areas (changes in resting motor threshold and in MEP amplitude).



Methods

3. To verify any differences between cortical representations in brachial plexus injury patients with or without pain.

Patients WITH PAIN

Any degree, type or time since unilateral traumatic injury

Presence of chronic pain

Age ≥ 18 e ≤ 40

Both genders

Patients WITHOUT PAIN

Any degree, type or time of unilateral traumatic injury

Absence of chronic pain

Age ≥ 18 e ≤ 40

Both genders

Healthy Volunteers

Healthy subjects

Age ≥ 18 e ≤ 40

Both genders

No Nervous System or Motor System disorders

Methods

Exclusion criteria:

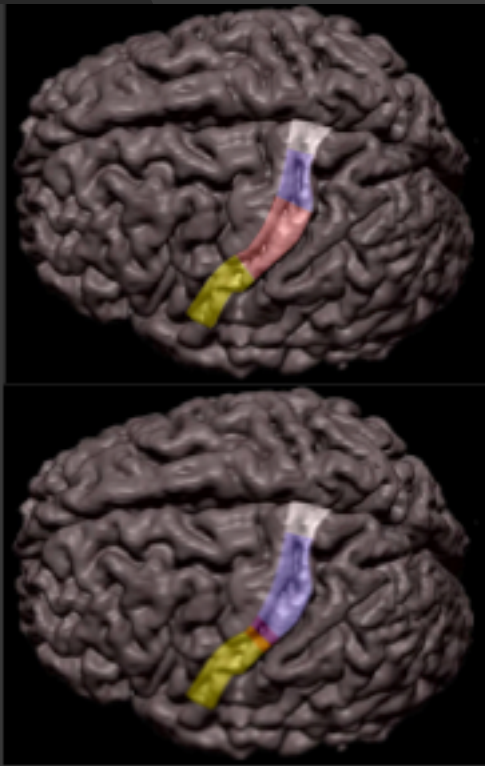
- Cranioencephalic trauma sequelae;
- Cognitive deficits;
- History of CNS and PNS diseases;
- History of chronic pain before injury.

Clinical Evaluation:

- Subjective evaluation;
- Identification of type of injury, complementary exams;
- Objective evaluation (strength, sensibility, ROM);
- Pain evaluation: Map and Intensity, BPI, DN-4, McGill

Approved by the INDC-UFRJ Research Ethics Committee
(CAAE: 21549913.4.0000.5261, report # 642.803)

Expected Results



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Thank you!