

SENIAM 5

The State of the Art on Sensors and Sensor Placement Procedures for Surface ElectroMyoGraphy: A proposal for sensor placement procedures

Deliverable of the SENIAM project

editors:

Hermie J. Hermens
Bart Freriks

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PREFACE

SENIAM, Surface EMG for the Non-Invasive Assessment of Muscles, is a concerted action, funded by the European Commission as part of the Biomed 2 Research Program. The aim of concerted actions is to facilitate and enhance international co-operation in promising fields of specific interest. The SENIAM project has two objectives: In the first place SENIAM will enable scientists and clinicians working with Surface EMG (SEMG) to exchange knowledge and experience on both basic and applied aspects of SEMG. With respect to this, it is important to notice that the 16 partners originate from many different disciplines, like rehabilitation, orthopaedics, neurology, ergonomics, sports, psychology, all with largely different specific knowledge and experience on SEMG. SENIAM brings together for the first time this variety of knowledge and experience, enabling exchange and discussion and the creation of a European common body of knowledge on SEMG.

The second objective of SENIAM is to develop recommendations for key items in the use of SEMG that presently prevent a useful exchange of data and knowledge and a further maturation of the field. The key items concern: sensors, sensor placement, signal processing and modelling. The development of recommendations is essential to bring SEMG a major step forward as a general tool to be used in many applications focused on the assessment of the functioning and status of the neuromuscular system. The creation of consensus on the key items will enable exchange of information and experience and as such a rapid increase of the common body of knowledge.

The present report is a major achievement in the SENIAM project. It comprises the state of the art on sensors and sensor placement, the obtained consensus about recommendations in order to optimise the sensor configuration as well as a first proposal for the standardisation of the electrode placement on more than 20 muscles. As it is well known, the choice of the sensor configuration as well as the placement on the muscle has a major effect on the SEMG characteristics, so it is felt extremely important that consensus on these items has been obtained. Nevertheless one has to realise that such recommendations will never be finished. The scientific and clinical progress being made in this field will cause that these recommendations have to be updated from time to time. The present results provide a firm basis to start from and in that sense it is something a lot of application focused EMG-users have been waiting for a long time.

Finally I would like to express my sincere thanks to all the experts in the field that have contributed to this report. In addition to this, I would like to thank especially Bart Freriks, Cathy Disselhorst-Klug and Roberto Merletti, who have made a major contribution especially with respect to the inventory on the actual use of the sensors and the guidelines for reporting as well as Bart Freriks for his assistance in compiling all the knowledge into this report.

Dr. ir. H.J. Hermens

Project manager SENIAM project

CONTENTS

Chapter 1

Development of recommendations for sensors and sensor placement procedures, an introduction, *B. Freriks, Enschede (the Netherlands)*

Chapter 2

Sensors and sensor placement procedures used in the European labs, *B. Freriks and H.J. Hermens (the Netherlands), C. Disselhorst and G. Rau (Germany)*

2.1 Introduction

2.2 Methods

2.3 Results

2.3.1 Number of papers scanned and verified by authors

2.3.2 Electrode properties

2.3.3 Electrode placement

2.4 Conclusions

2.5 Consequences for SENIAM

2.6 Literature

2.7 Scanned publications

Chapter 3

The effect of sensor properties and sensor placement procedures on SEMG signal characteristics, *B. Freriks and H.J. Hermens (the Netherlands)*

3.1 Introduction

3.2 The effect of sensor-properties and sensor placement procedures on SEMG characteristics

3.3 Summary of the Enschede workshop

3.3.1 SFAP and MUAP properties

3.3.2 Influence of IED on MUAP and interference pattern characteristics

3.3.3 Influence of electrode surface structure on electrode impedance and contact

3.3.4 Requirements for multi-electrodes

3.3.5 Effect of electrode displacement on SEMG

3.3.6 Crosstalk

3.3.7 Artefacts

3.4 Papers of the Enschede workshop presentations

Transmembrane currents along fast and slow fibers, *W. Wallinga (Enschede, the Netherlands)*

Characterization of motor unit action potentials recorded with surface electrodes, *H. Hermens (Enschede, the Netherlands)*

How inter-electrode distance and motor unit depth influence surface potentials, *K. Roeleveld (Jena, Germany)*

Simulated bipolar SEMG characteristics, *J. Blok (Nijmegen, the Netherlands)*

On an optimal pasteless electrode to skin interface in surface EMG, *J. Blok (Nijmegen, the Netherlands)*

Multielectrode arrays for a more detailed insight into the muscle, *C. Disselhorst-Klug (Aachen, Germany)*

Amplitude aspects and functional considerations on surface electrode displacement with particular emphasis on the upper trapezius muscle, *S. Mathiassen and G. Hägg (Solna, Sweden)*

Surface electromyography (SEMG): a plea to differentiate between crosstalk and co-activation, *Y. Blanc (Geneva, Switzerland)*

Crosstalk in Surface EMG: theoretical predictions and experimental observations, *R. Merletti (Torino, Italy)*

Artefacts in the surface EMG signal, *C. Baten (Enschede, the Netherlands)*

3.5 Conclusions of the Enschede workshop

3.5.1 Effect of electrode properties on SEMG characteristics and side effects

3.5.2 Effect of electrode placement procedure on SEMG characteristics and side effects

3.6 Consequences for SENIAM

Chapter 4

Recommendations for sensor properties and specific sensor placement procedures, *B. Freriks and H.J. Hermens (the Netherlands), C. Disselhorst and G. Rau (Germany)*

- 4.1 Introduction
- 4.2 Description of the SENIAM format
- 4.3 Recommendations for a standardised electrode placement procedure
 - 4.3.1 Selection of the electrodes
 - 4.3.2 Preparation of the skin of the subject
 - 4.3.3 Positioning of the patient/subjects in the desired starting posture
 - 4.3.4 Determination of the electrode location
 - 4.3.5 Placement and fixation of the electrodes
 - 4.3.6 Testing the connection
- 4.4 Recommendations for electrode locations on individual muscles
- 4.5 Literature

Chapter 5

Guidelines for reporting about SEMG, R. Merletti (*Italy*), W. Wallinga, H.J. Hermens and B. Freriks (*the Netherlands*)

Appendix A

Overview of electrode locations found in literature