

Sixth International Congress of Electromyography

Edited by A. Persson

SYPOSIA

**Invited contributions to
the 6th International Congress
of Electromyography
in Stockholm, Sweden,
June 17—20, 1979.**

**Edited by A. Persson, Dept of Clinical Neurophysiology,
Huddinge University Hospital, S-141 86 Huddinge, Sweden.**

内 部 交 流

P 114/30

第 6 届国际肌动电流描记
法会议文集
(英 2-8/7111-6)

A 00350

SYMPOSIA

Invited contributions to
the 6th International Congress
of Electromyography
in Stockholm, Sweden,
June 17-20, 1979.

• **Role of the blood and plasma proteins in the course of development of the neuromuscular system in the first year of life.** The role of the blood and plasma proteins in the course of development of the neuromuscular system in the first year of life will be discussed. The main emphasis will be given to the changes in the composition of the blood and plasma proteins during the first year of life, and the changes in the properties of the blood and plasma proteins during the first year of life. The changes in the properties of the blood and plasma proteins during the first year of life will be discussed. The main emphasis will be given to the changes in the composition of the blood and plasma proteins during the first year of life, and the changes in the properties of the blood and plasma proteins during the first year of life.

• **Blood vessels in children under one year old and their role in the development of the neuromuscular system.** The role of the blood vessels in the development of the neuromuscular system will be discussed. The main emphasis will be given to the changes in the composition of the blood vessels during the first year of life, and the changes in the properties of the blood vessels during the first year of life.

• **Development of the neuromuscular system in children under one year old.**

• **Development of the neuromuscular system in children under one year old.**

In choosing the topics for the Symposia to be held at the 6th International EMG Congress, our main aim was to select some fields illustrating the multidirectional development of Electromyography and Clinical Neurophysiology. With more refined recording techniques and methods of analysis now available, Electromyography and Neurography are growing in strength both as basic research tools and as diagnostic clinical procedures. We are widening the scope of our discipline by utilizing these techniques to investigate not only peripheral but also central nervous functions and disorders. By devoting our attention also to fields of growing interest, such as restorative neuromuscular surgery and occupational medicine, and to problems related to environmental and toxic hazards of everyday life, we can make further medically important contributions.

The participants of the Symposia were invited to prepare short papers to be available in a booklet at the time of the Congress. Most of the speakers responded positively to this. In order to have as complete covering as possible of the Symposia, abstracts have been included when manuscripts were not submitted. The papers are printed by direct offset from the authors' original manuscripts.

We want to thank all the contributors to the Symposia for their willingness to participate.

The Organizing Committee

Additional copies can be ordered from Dr. A. Persson,
Dept. of Clin. Neurophys., Huddinge Univ. Hospital,
S-141 86 Huddinge, Sweden.

TABLE OF CONTENTS	PAGE
<u>SYMPOSIUM 1:</u> In situ recording from single nerve and muscle cells in man...	9
K.E. Hagbarth, Uppsala, Sweden: Microneurography technique.....	11
Å.B. Vallbo, Umeå, Sweden: Skin mechanoreception.....	14
E. Torebjörk, Uppsala, Sweden: Skin thermo- and nociception.....	20
D. Burke, Sydney, Australia: Muscle spindle activity in man.....	25
B.G. Wallin, Uppsala, Sweden: Sympathetic activity in man.....	30
E. Stålberg, Uppsala, Sweden: Single fibre EMG. Technique and findings in neuromuscular disorders.....	36
J. Trontelj, Ljubljana, Yugoslavia: Single fibre EMG in the study of reflexes.....	41
<u>SYMPOSIUM 2:</u> Central motor control in man and clinical applications.....	47
P.L. Strick, Syracuse, N.Y., USA: Motor preparation: influence on peripheral afferent input to motor cortex and cerebellum.....	49
J.E. Desmedt and E. Godeaux, Brussels, Belgium: The patterning of voluntary commands as revealed by single motor unit studies in man.....	55
M. DeLong, Baltimore, Md, USA: Subcortical mechanism in voluntary motor control.....	61
R.J. Grimm, Portland, Or, USA: Platform studies of movement.....	67
R.G. Lee, Calgary, Canada: Long latency EMG responses to load perturbations in patients with abnormalities of central motor control mechanisms.....	72
C.D. Marsden, P.A. Merton and H.B. Morton, London and Cambridge, United Kingdom: The postural function of long latency motor responses to local disturbances in man.....	73
R.R. Young, Boston, Mass, USA: An overview of the pathophysiology of various tremors.....	74
A. Struppner, München, Germany FR: Investigations concerning motor control in man with unilateral lesions of neuronal circuits.....	80
M. Hallet, Boston, Mass, USA: Surface EMG analysis of abnormal voluntary and involuntary movements.....	81
H. Narabayashi, Tokyo, Japan: Influence of co-existing cerebellar pathology on involuntary movements.....	82

<u>SYMPOSIUM 3: Neurophysiological Assessment of Entrapped, Resutured and Grafted Nerves and Transplanted Muscles in Humans.....</u>	83
P.J. Dyck, Rochester, Minn, USA: Neurophysiologic Evaluation of Restorative Surgery of Nerve and Muscle.....	85
R.P. Bunge, St. Louis, Mo, USA: Cytological aspects of peripheral nerve repair.....	87
P.J. Dyck, Rochester, Minn, USA: Clinical and pathological studies of nerve regrowth.....	93
H. Millesi, Vienna, Austria: Methods and results of upper limb nerve repair.....	102
D.G. Kline, New Orleans, La, USA: Methods and results of lower limb nerve repair.....	110
W. Brown, London, Ontario, Canada: Electrophysiological methods in the evaluation of nerve regeneration following repair.....	121
M. Jesel and F. Isch, Strasbourg, France: Nerve injuries - regeneration after repair.....	127
V.K. Nielsen, Copenhagen, Denmark: Interfascicular neurolysis in ulnar nerve entrapment.....	131
G. Rushworth, R.A. Dickson, J. O'Hara and J. Tricker, Oxford, United Kingdom: Nerve gap repair and the quality of regeneration.....	137
L. Hakelius, Uppsala, Sweden: Reinnervation of free muscle transplants.....	143
<u>SYMPOSIUM 4: Muscle fatigue.....</u>	149
I. Petersén, Göteborg, Sweden: Introduction.....	151
B. Pernow, Stockholm, Sweden: Muscle metabolism.....	155
W. Laurig, Dortmund, Germany FR: Muscle fatigue and adaptation to work as important sources of variance of the electrical activity.....	159
L. Lindström, Göteborg, Sweden: Fatigue-induced myoelectric changes from a signal theory point of view.....	166
R. Örtengren, Göteborg, Sweden: Electromyographic evaluation of localized muscle fatigue during static and dynamic loading.....	172
G. Andersson, Göteborg, Sweden: Localized muscle fatigue in posterior back muscles.....	177
A. Grassino, Montreal, Canada: Fatigue of the respiratory muscles.....	182
R. Kadefors and I. Petersén, Göteborg, Sweden: Industrial work and localized muscle fatigue.....	188

<u>SYMPOSIUM 5:</u> Environmental and Toxic Hazards. Neurophysiological methods for the early detection of neuromyopathies.....	195
H.H. Schaumburg, Bronx, N.Y., USA: Neurology of toxic neuropathies.....	197
A.K. Asbury, Philadelphia, Pa, USA: Pathology of industrial toxic neuropathies.....	198
P.M. LeQuesne, London, United Kingdom: Electrophysiological investigation of toxic neuropathies in man.....	202
A.J. Sumner, Philadelphia, Pa, USA: Pathophysiological studies of toxic neuropathies.....	206
F. Buchtal and F. Behse, Copenhagen, Denmark: Nerve conduction, nerve biopsy and electromyography in men with increased blood levels.....	210
R.G. Feldman, D.S. Sax, Z.L. Kovacs and T.L. Johnson, Boston, Mass, USA: Field studies of toxic neuropathies.....	215
G. Caruso, L. Santoro, A. Perretti, L. Serlenga and L. Rossi, Naples, Italy: Electrophysiological findings in the poly-neuropathy of leather cementing workers.....	219
A. Sebille, Paris, France: Prevalence of latent perhexiline neuropathy detected by means of electrophysiological procedures.....	224
U. Lindblom and J.M. Goldberg, Huddinge, Sweden: Screening for neurological symptoms and signs after exposure to jet fuel.....	227

SYMPOSIA

Invited contributions to
the 6th International Congress
of Electromyography
in Stockholm, Sweden,
June 17-20, 1979.

In choosing the topics for the Symposia to be held at the 6th International EMG Congress, our main aim was to select some fields illustrating the multidirectional development of Electromyography and Clinical Neurophysiology. With more refined recording techniques and methods of analysis now available, Electromyography and Neurography are growing in strength both as basic research tools and as diagnostic clinical procedures. We are widening the scope of our discipline by utilizing these techniques to investigate not only peripheral but also central nervous functions and disorders. By devoting our attention also to fields of growing interest, such as restorative neuromuscular surgery and occupational medicine, and to problems related to environmental and toxic hazards of everyday life, we can make further medically important contributions.

The participants of the Symposia were invited to prepare short papers to be available in a booklet at the time of the Congress. Most of the speakers responded positively to this. In order to have as complete covering as possible of the Symposia, abstracts have been included when manuscripts were not submitted. The papers are printed by direct offset from the authors' original manuscripts.

We want to thank all the contributors to the Symposia for their willingness to participate.

The Organizing Committee

SYPOSIA

Invited contributions to
the 6th International Congress
of Electromyography
in Stockholm, Sweden,
June 17—20, 1979.

Edited by A. Persson, Dept of Clinical Neurophysiology,
Huddinge University Hospital, S-141 86 Huddinge, Sweden.

SYMPÓSIO

International Conference
on Clinical Neurophysiology
and Psychophysiology
in the Treatment of Mental Illness
over 100-110 years.

Additional copies can be ordered from Dr. A. Persson,
Dept. of Clin. Neurophys., Huddinge Univ. Hospital,
S-141 86 Huddinge, Sweden. <http://www.huddinge.se/medicin/neurofysiol>

TABLE OF CONTENTS	PAGE
<u>SYMPOSIUM 1:</u> In situ recording from single nerve and muscle cells in man...	9
K.E. Hagbarth, Uppsala, Sweden: Microneurography technique.....	11
Å.B. Vallbo, Umeå, Sweden: Skin mechanoreception.....	14
E. Torebjörk, Uppsala, Sweden: Skin thermo- and nociception.....	20
D. Burke, Sydney, Australia: Muscle spindle activity in man.....	25
B.G. Wallin, Uppsala, Sweden: Sympathetic activity in man.....	30
E. Stålberg, Uppsala, Sweden: Single fibre EMG. Technique and findings in neuromuscular disorders.....	36
J. Trontelj, Ljubljana, Yugoslavia: Single fibre EMG in the study of reflexes.....	41
<u>SYMPOSIUM 2:</u> Central motor control in man and clinical applications.....	47
P.L. Strick, Syracuse, N.Y., USA: Motor preparation: influence on peripheral afferent input to motor cortex and cerebellum.....	49
J.E. Desmedt and E. Godeaux, Brussels, Belgium: The patterning of voluntary commands as revealed by single motor unit studies in man.....	55
M. DeLong, Baltimore, Md, USA: Subcortical mechanism in voluntary motor control.....	61
R.J. Grimm, Portland, Or, USA: Platform studies of movement.....	67
R.G. Lee, Calgary, Canada: Long latency EMG responses to load perturbations in patients with abnormalities of central motor control mechanisms.....	72
C.D. Marsden, P.A. Merton and H.B. Morton, London and Cambridge, United Kingdom: The postural function of long latency motor responses to local disturbances in man.....	73
R.R. Young, Boston, Mass, USA: An overview of the pathophysiology of various tremors.....	74
A. Struppner, München, Germany FR: Investigations concerning motor control in man with unilateral lesions of neuronal circuits.....	80
M. Hallet, Boston, Mass, USA: Surface EMG analysis of abnormal voluntary and involuntary movements.....	81
H. Narabayashi, Tokyo, Japan: Influence of co-existing cerebellar pathology on involuntary movements.....	82

<u>SYMPORIUM 3: Neurophysiological Assessment of Entrapped, Resutured and Grafted Nerves and Transplanted Muscles in Humans.....</u>	83
P.J. Dyck, Rochester, Minn, USA: Neurophysiologic Evaluation of Restorative Surgery of Nerve and Muscle.....	85
R.P. Bunge, St. Louis, Mo, USA: Cytological aspects of peripheral nerve repair.....	87
P.J. Dyck, Rochester, Minn, USA: Clinical and pathological studies of nerve regrowth.....	93
H. Millesi, Vienna, Austria: Methods and results of upper limb nerve repair.....	102
D.G. Kline, New Orleans, La, USA: Methods and results of lower limb nerve repair.....	110
W. Brown, London, Ontario, Canada: Electrophysiological methods in the evaluation of nerve regeneration following repair.....	121
M. Jesel and F. Isch, Strasbourg, France: Nerve injuries - regeneration after repair.....	127
V.K. Nielsen, Copenhagen, Denmark: Interfascicular neurolysis in ulnar nerve entrapment.....	131
G. Rushworth, R.A. Dickson, J. O'Hara and J. Trickler, Oxford, United Kingdom: Nerve gap repair and the quality of regeneration.....	137
L. Hakelius, Uppsala, Sweden: Reinnervation of free muscle transplants.....	143
<u>SYMPORIUM 4: Muscle fatigue.....</u>	149
I. Petersén, Göteborg, Sweden: Introduction.....	151
B. Pernow, Stockholm, Sweden: Muscle metabolism.....	155
W. Laurig, Dortmund, Germany FR: Muscle fatigue and adaptation to work as important sources of variance of the electrical activity.....	159
L. Lindström, Göteborg, Sweden: Fatigue-induced myoelectric changes from a signal theory point of view.....	166
R. Örtengren, Göteborg, Sweden: Electromyographic evaluation of localized muscle fatigue during static and dynamic loading.....	172
G. Andersson, Göteborg, Sweden: Localized muscle fatigue in posterior back muscles.....	177
A. Grassino, Montreal, Canada: Fatigue of the respiratory muscles.....	182
R. Kadefors and I. Petersén, Göteborg, Sweden: Industrial work and localized muscle fatigue.....	188

<u>SYMPOSIUM 5: Environmental and Toxic Hazards. Neurophysiological methods for the early detection of neuromyopathies.....</u>	195
H.H. Schaumburg, Bronx, N.Y., USA: Neurology of toxic neuropathies.....	197
A.K. Asbury, Philadelphia, Pa, USA: Pathology of industrial toxic neuropathies.....	198
P.M. LeQuesne, London, United Kingdom: Electrophysiological investigation of toxic neuropathies in man.....	202
A.J. Sumner, Philadelphia, Pa, USA: Pathophysiological studies of toxic neuropathies.....	206
F. Buchtal and F. Behse, Copenhagen, Denmark: Nerve conduction, nerve biopsy and electromyography in men with increased blood levels.....	210
R.G. Feldman, D.S. Sax, Z.L. Kovacs and T.L. Johnson, Boston, Mass, USA: Field studies of toxic neuropathies.....	215
G. Caruso, L. Santoro, A. Perretti, L. Serlenga and L. Rossi, Naples, Italy: Electrophysiological findings in the poly-neuropathy of leather cementing workers.....	219
A. Sebille, Paris, France: Prevalence of latent perhexiline neuropathy detected by means of electrophysiological procedures.....	224
U. Lindblom and J.M. Goldberg, Huddinge, Sweden: Screening for neurological symptoms and signs after exposure to jet fuel.....	227

