NERVES AND NERVE INJURIES

SYDNEY SUNDERLAND

C.M.G., M.D., B.S., D.Sc., F.R.A.C.S.(Hon.), F.R.A.C.P., F.A.A. Professor of Experimental Neurology, University of Melbourne

Foreword by SIR FRANCIS WALSHE M.D., D.Sc., F.R.C.P.(Lond.), F.R.S.



E. & S. LIVINGSTONE LTD. EDINBURGH AND LONDON 1968

Contents

FOREWORD by Sir Francis Walshe		e .									v	
PREFA							**					vii
ACKNO	WLEDGEMENTS							٠				xi
				PAR	тΙ							
AN.	ATOMICAL A	ND PHYS								RIPI	HER	RAL
CHAPT												PAGE
1	Peripheral Ner	ve Fibres		-	6					2.5		2
2	Peripheral Nerv											25
3	Anatomical Fea											61
4	The Mechanica	1 Propertie	es of	Perip	heral	Nerve	Tru	nks				62
				PAR	r II							
	DEGENERAT			IERA RVE			CLAS	SIFI	CAT	ION	OF	
5	The Peripheral	Nerve Fil	ore in	n Rela	ation	to Inj	ury					68
6	Interruption of							tinuit	ty of t	he A	xon	70
7	Degeneration o	f the Axor	and	d Asso	ociate	d Cha	nges					79
8	Regeneration o								14,000			96
9	The Peripheral		ınk	in Rel	lation	to In	jury.	A CI	assific	cation	ı of	
	Nerve Injury			20							70	127
				PART	III 1							
	CLINI	CO-PATI	HOL	OGIC	CAL	CONS	IDE	RAT	IONS	8		
10	Causative Ager	nts .									20	140
11	Consequences Neuroma Fo	of Disrupt	ion ibre	of th	e En	doneu n and	rium the A	and rtific	Perin	neuriu	ım. e .	180
12	Infection and I	ntraneural	Fib	rosis							-	194
13	The Applied A											106
	External Fea	atures .	c NT-	т.		: D	·lotio	. :	Nome	Tois		196
14	Internal Fea							n to			iry.	199
				PART	r IV							
	BONES, J	OINTS N	ALIC	70 C C C C C C C C C C C C C C C C C C C		D MC	TOR	FI	INCT	ION		
10020												21.4
15	Peripheral Mo	tor Mecha	nısm	is. Ge	neral	Cons	derat	ions		·		214
16	Changes in Bo	nes, Joints	sano	d Peri	artici	mar Si	ructu	res 1	Jue to	o Dei	ier-	216
17	vation . Morphological	Changes	in.	Stript	ted 1	Muscle	Dny	· to	Den	erveti	ion.	210
17			ш	Sula	icu 1	viuscic	שלם	. 10	Dell	civati	ion.	229
18	Morphological	Changes	in.	Striat	ted N	Muscle	Dne	e to	Den	ervati	ion.	223
10	Degeneration											248
19	Physiological C					le Due	to D	ener	vation	ı .		257

xiv CONTENTS

CHAPT	TER	PAGE					
20	The Biochemical Changes in Striated Muscle Due to Denervation.	290					
21	Changes in Striated Muscle Due to Disuse						
22	Factors Influencing the Onset, Development and Severity of the						
	Changes in Striated Muscle Due to Denervation	312					
23	The Capacity of Human Muscles to Function Efficiently Following						
	Reinnervation after Prolonged Denervation	329					
24	Disturbances of Motor Mechanisms and the Diagnosis of Motor Nerve						
	Involvement. Clinical Considerations	336					
25	Unusual Disturbances of Muscle Function Associated with Nerve Injury 34						
26	The Pattern of Motor Recovery Associated with the Regeneration of						
	Motor Nerve Fibres	350					
	PART V						
	PERIPHERAL SENSORY MECHANISMS						
27	Peripheral Sensory Mechanisms. General Considerations	366					
28	Disturbances of Sensation Occurring in the Area Innervated by the						
	Injured Nerve	373					
29	Testing and Recording Sensory Function	377					
30	Factors Complicating the Evaluation of Sensory Function in Nerve						
	Injuries	391					
31	The Pattern of Sensory Recovery Associated with the Regeneration of						
	Sensory Nerve Fibres	397					
32	Factors Influencing the Quality of Sensory Recovery	402					
33	The Significance of Residual Sensory Defects	407					
34	The Painful Sequelae of Injuries to Peripheral Nerves. Causalgia .	411					
35	Disturbances of Sensation Associated with Amputation Stumps. General Considerations	448					
36	Stump Pain and the Abnormal Sensory Phenomena Superimposed on	110					
50	the Phantom State	465					
37	The Treatment of Pain and Related Abnormal Sensory Phenomena	.00					
	Associated with Amputation Stumps	486					
	PART VI						
	PERIPHERAL SYMPATHETIC MECHANISMS						
38	Sympathetic Denervation and Recovery	506					
39	T . C . 1 . C	514					
40	Changes in the Denervated Skin and Subcutaneous Tissues. Trophic	314					
40	Changes	522					
	Changes	322					
	PART VII						
	DIAGNOSIS AND TREATMENT						
41	Diagnosis. General Considerations	536					
42	Treatment General Considerations	548					
43	Non-Surgical Treatment	550					
44	Neurography. Neurolysis. Transposition	558					
45	Non-Surgical Treatment	564					
46	Factors Influencing the Course of Regeneration and the Quality of the						
	Recovery after Nerve Suture	602					

CHAP	TER	PAGE
47	Special Features of Nerve Suture in Relation to the Quality of the	
	Recovery	621
48	Nerve Suture	637
49		
	Nerves	678
50	Nerve Grafting	687
51	Nerve Grafting	720
	PART VIII	
	INDIVIDUAL NERVES	
52	Individual Peripheral Nerves. General Considerations	733
53		736
54		781
55	Compression Lesions of the Median Nerve in the Carpal Tunnel.	800
56		808
57	Ulnar Nerve Lesions	834
58	Ulnar Nerve Lesions Associated with Disorders About the Elbow.	
	Tardy Ulnar Palsy	861
59	The Musculocutaneous Nerve	886
60	The Radial Nerve, Anatomical Features	894
61	Radial Nerve Lesions	921
62	The Axillary Nerve	939
63	Combined Nerve Lesions	946
64	The Brachial Plexus. Normal Anatomy	953
65	Brachial Plexus Lesions due to Compression, Stretch and Penetrating	
	Injuries	968
66		
	tomical Arrangements in the Cervico-Brachial Region	981
67	Brachial Plexus Lesions due to Abnormal Ribs. The 'Cervical Rib'	
	Syndrome	1005
68	Syndrome	
	Anatomical Features	1012
69		1069
70		1096
71	The Femoral Nerve	
72		1110
73		1114
	AUTHOR INDEX	1125
	SUBJECT INDEX	1143