

Contents

I Introduction	I		
Development of the Movement System	1		
Balance Concept			
First Era: Focus on Dysfunction of the Peripheral Neuromuscular and Musculoskeletal Systems	1		
Second Era: Focus on Central Nervous System Dysfunction	2		
Third Era: Focus on Joint Dysfunction	2		
Current Era: Focus on the Movement System	2		
Underlying Premise of Movement as a Cause of Pain Syndromes	3		
Overview	4		
Concepts and Principles	4		
Movement Impairment Syndromes	5		
Definition	5		
Prevalence	5		
Diagnosis and Management	5		
Structures Affected	6		
Treatment Approaches Based on Intervention	6		
Cause Identification Versus Symptom Reduction	7		
Need for Classification	7		
2 Concepts and Principles of Movement	9		
Kinesiologic Model	9		
Composition of the Model	9		
Clinical Relevance of the Model	10		
Pathokinesiologic Model	10		
Composition of the Model	10		
Clinical Relevance of the Model	11		
Kinesiopathologic Model	12		
Rationale for the Model	12		
Clinical Relevance of the Model	14		
Base Element Impairments of the Muscular System	16		
Muscle Strength	16		
Muscle Length	19		
Case Presentation 1	20		
Case Presentation 2	21		
Case Presentation 3	24		
Case Presentation 4	27		
Base Element Impairments of the Skeletal System: Structural Variations in Joint Alignment	34		
Hip Antetorsion	34		
Case Presentation	34		
Hip Retrotorsion	34		
Modular Element Impairments of the Nervous System	35		
Altered Recruitment Patterns	35		
Altered Dominance in Recruitment Patterns of Synergistic Muscles	35		
Recruitment and Relative Flexibility	39		
		Patterns of Eccentric Contraction	40
		Biomechanical Element Impairments	41
		Statics: Effects of Gravitational Forces	42
		Dynamics: The Relationship Between Motion and the Forces Producing Motion	44
		Kinematics and Impairments of Joint Function	45
		Kinesiopathologic Model Applied to Patellofemoral Joint Dysfunction	46
		Multiple Impairments of the Components of Movement	47
		Case Presentation	47
		Support Element Impairments	47
		Summary	49
3 Movement Impairment Syndromes of the Lumbar Spine	51		
Introduction	51		
Normal Alignment of the Lumbar Spine	52		
Standing	52		
Sitting	54		
Motions of the Lumbar Spine	57		
Path of the Instant Center of Rotation	57		
Flexion: Forward Bending	58		
Return from Flexion	60		
Extension	60		
Rotation	61		
Lateral Flexion or Side Bending	63		
Translation Motion	63		
Compression	63		
Summary	64		
Muscular Actions of the Lumbar Spine	65		
Back Muscles	65		
Abdominal Muscles	69		
Summary	73		
Movement Impairment Syndromes of the Low Back	74		
Lumbar Rotation-Extension Syndrome With or Without Radiating Symptoms	74		
Case Presentation 1	84		
Case Presentation 2	87		
Lumbar Extension Syndrome	88		
Case Presentation	91		
Lumbar Rotation Syndrome	93		
Case Presentation	96		
Lumbar Rotation-Flexion Syndrome	98		
Case Presentation	100		
Lumbar Flexion Syndrome	103		
Case Presentation	105		
Sacroiliac Dysfunction	107		
Compression	108		
Additional Considerations	108		

<i>Chapter 3 Appendix: Grid for Low Back Impairment Syndromes</i>	110	<i>Chapter 4 Appendix: Grid for Hip Impairment Syndromes</i>	176
Lumbar Flexion Syndrome	110	Femoral Anterior Glide Syndrome	176
Lumbar Extension Syndrome	112	Femoral Anterior Glide With Medial Rotation Syndrome	178
Lumbar Rotation Syndrome	114	Femoral Anterior Glide With Lateral Rotation Syndrome	180
Lumbar Rotation With Flexion Syndrome	116	Hip Adduction Syndrome Without Medial Rotation	180
Lumbar Rotation With Extension Syndrome	118	Hip Adduction Syndrome With Medial Rotation	182
4 Movement Impairment Syndromes of the Hip	121	Femoral Lateral Glide Syndrome	184
Introduction	121	Hip Extension With Knee Extension	184
Normal Alignment of the Hip	122	Hip Extension With Medial Rotation	186
Pelvis	122	Femoral Hypomobility Syndrome With Superior Glide	186
Hip Joint	124	Femoral Accessory Hypermobility Syndrome	188
Knee Joint	129	Hip Lateral Rotation Syndrome	190
Foot	134	5 Movement Impairment Syndromes of the Shoulder Girdle	193
Motions of the Hip	134	Introduction	193
Pelvic Girdle Motions	134	Normal Alignment of the Shoulder Girdle	194
Hip Joint Motions	134	Shoulders	194
Hip Joint Accessory Motions	135	Scapula	195
Muscular Actions of the Hip	135	Humerus	198
Anterior Trunk Muscles Affecting the Pelvis	135	Thoracic Spine	199
Posterior Muscles Affecting the Pelvis	136	Motions of the Shoulder Girdle	199
Anterior Muscles Affecting the Hip Joint	136	Glossary of Scapular Motions	199
Posterior Muscles Affecting the Hip	137	Shoulder Girdle Movement Patterns	201
Medial Muscles Affecting the Hip	138	Muscular Actions of the Shoulder Girdle	206
Anterior Muscles Affecting the Hip and Knee	138	Thoracoscapular Muscles	206
Posterior Muscles Affecting the Hip and Knee	139	Thoracohumeral Muscles	211
Posterior Leg Muscles Affecting the Knee and Ankle	140	Scapulohumeral Muscles	212
Anterior Leg Muscles Affecting the Ankle	140	Movement Impairment Syndromes of the Scapula	216
Lateral Leg Muscles Affecting the Foot	142	Relationship Between Alignment and Movement	216
Posterior Leg Muscles Affecting the Foot	142	Criteria for the Diagnosis of a Scapular Syndrome	217
Muscles Attached to the Foot	143	Scapular Syndromes in Observed Frequency of Occurrence	217
Muscle and Movement Impairments	143	Case Presentation 1	222
Movement Impairment Syndromes of the Hip	144	Case Presentation 2	224
Femoral Anterior Glide Syndrome	144	Case Presentation 3	227
Case Presentation 1	148	Case Presentation 4	230
Case Presentation 2	150	Movement Impairment Syndromes of the Humerus	231
Femoral Anterior Glide Syndrome With Lateral Rotation	151	Relationships Between Alignment and Movement	231
Case Presentation	153	Criteria for a Diagnosis of a Humeral Syndrome	231
Hip Adduction Syndrome	154	Order of Observed Frequency of Humeral Syndromes	231
Case Presentation 1	156	Case Presentation 1	233
Case Presentation 2	157	Case Presentation 2	236
Case Presentation 3	159	Case Presentation 3	240
Hip Extension With Knee Extension Syndrome	161	Case Presentation 4	243
Case Presentation	162	Summary	244
Hip Lateral Rotation Syndrome	164		
Case Presentation	165		
Femoral Accessory Motion Hypermobility	166		
Case Presentation	167		
Femoral Hypomobility With Superior Glide	168		
Case Presentation	170		
Femoral Lateral Glide Syndrome With Short-Axis Distraction	171		
Case Presentation	172		
Conclusion	174		

Chapter 5 Appendix: Grid for Shoulder Girdle Impairment Syndromes	246	Shoulder Abduction	380
Scapular Downward Rotation Syndrome	246	Shoulder Abduction in Lateral Rotation With Elbows Flexed	380
Scapular Depression Syndrome	248	Shoulder Rotation	381
Scapular Abduction Syndrome	250	Pectoralis Minor Stretching	382
Scapular Winging and Tilting Syndrome	252	Side-Lying Exercises (Lower Extremity)	382
Humeral Anterior Glide Syndrome	254	Hip Lateral Rotation	382
Humeral Superior Glide Syndrome	256	Hip Abduction With and Without Lateral Rotation	383
Shoulder Medial Rotation Syndrome	258	Hip Adduction for Strengthening	384
Glenohumeral Hypomobility Syndrome	260	Side-Lying Exercises (Upper Extremity)	384
6 Lower and Upper Quarter Movement Impairment Examinations	263	Shoulder Flexion, Lateral Rotation, and Scapular Adduction	384
Introduction	263	Scapular Abduction and Upward Rotation	385
Movement Impairments: Lower Quarter Examination	264	Prone Exercises (Lower Extremity)	385
Movement Impairments: Upper Quarter Examination	328	Knee Flexion	385
7 Corrective Exercises: Purposes and Special Considerations	367	Hip Rotation	386
Introduction	367	Hip Extension With Knee Extended	386
Standing Exercises	368	Hip Extension With Knee Flexed	387
Forward Bending (Hip Flexion With Flat Lumbar Spine)	368	Hip Abduction	387
Curled Forward Bending (Spinal and Hip Flexion)	369	Isometric Hip Lateral Rotation With Hips Abducted and Knees Flexed	387
Side Bending (Lateral Spinal Flexion)	369	Isometric Gluteus Maximus Contraction	388
Single-Leg Standing (Unilateral Hip and Knee Flexion)	369	Prone Exercises (Upper Extremity)	388
Limited Range of Hip and Knee Flexion With Trunk Erect (Small Squat)	370	Back Extensor Activation (Shoulder Flexion to Elicit Back Extensor Muscle Activity)	388
Supine Exercises	371	Shoulder Flexion	388
Hip Flexor Stretch (Hip and Knee Extension With Maximal Flexion of Contralateral Hip and Knee)	371	Trapezius Muscle Exercise Progression	388
Control of Pelvis With Lower-Extremity Motion (Hip and Knee Extension From Hip and Knee Flexion)	371	Shoulder Rotation	389
Gluteus Maximus Stretch (Hip and Knee Flexion From Hip and Knee Extension)	371	Quadruped Exercises	390
Gluteus Maximus Stretch (Hip and Knee Flexion From Hip and Knee Extension)	372	Quadruped Rocking	390
Hip and Knee Flexion, Sliding Heel From Hip and Knee Extension (Heel Slides)	372	Limb Movement in the Quadruped Position	391
Lower Abdominal Muscle Exercise Progression	373	Cervical Flexion and Extension	392
Trunk-Curl Sit-Up (Upper Abdominal Progression)	376	Cervical Rotation	393
Hip Abduction/Lateral Rotation From Hip Flexed Flexed Position	377	Sitting Exercises	393
Straight-Leg Raises (Hip Flexion With Knee Extended)	378	Knee Extension and Ankle Dorsiflexion	393
Hip Flexor Stretch (Two-Joint)	378	Hip Flexion	394
Latissimus Dorsi and Scapulohumeral Muscle Stretch (Shoulder Flexion/Elevation With Elbow Extended)	379	Standing Exercises	395
		Shoulder Flexion (Back Against Wall)	395
		Shoulder Abduction (Back Against Wall)	396
		Shoulder Flexion (Other Than Back Against Wall)	396
		Shoulder Abduction (Facing Wall and Trapezius Exercises)	398
		Walking Exercises	398
		Control of Hip and Knee Medial Rotation	398
		Limiting Hip Adduction	399
		Preventing Knee Hyperextension	399
		Limiting Knee Rotation	399
		Ankle Plantar Flexion	399
		8 Exercises to Correct Movement Impairment Syndromes	401