

Contents

1	History of the Swiss Ball	1
1.1	Introduction	1
1.2	History of Literature on the Swiss Ball	2
	References	3
2	Neuroanatomical, Neurophysiological, and Physiological Bases: A Hypothesis	4
2.1	Brain Stem and Reticular Formation	4
2.2	Cerebellum	8
2.3	Vestibular System	11
2.3.1	Vestibular Nuclei	11
2.3.2	Visual and Auditory Tracts	12
2.4	Hypothalamus	13
2.5	Thalamus	14
2.6	Basal Ganglia	14
2.7	Autonomic Nervous System	16
2.8	Limbic System	17
2.9	Sensorimotor System	22
2.10	Physiological Responses	29
2.10.1	Valsalva Maneuver	32
	References	33
3	Motor Learning	36
3.1	Stages of Learning	37
3.2	Knowledge of Result, Knowledge of Performance	37
3.3	Feedback	38
3.4	Clinical Applications: Examples	38
3.5	Plasticity of the Brain	40
	References	41
4	Practical Considerations	43
4.1	Ball Conditions	43
4.1.1	Exercise Surface	43
4.1.2	Cleaning the Ball	43
4.1.3	Pressure in the Ball	44

4.1.4	Size of the Ball	45
4.2	Safety Conditions	47
4.3	Precautions, Contraindications	49
	References	51
5	Points of Observation	52
5.1	Ball–Floor	52
5.2	Ball–Body	53
5.3	Body–Floor	55
5.4	Base of Support	55
5.5	Bisecting Plane	56
5.6	Body Distances	58
5.7	Hinged Joints	58
5.8	Continuing Movement and Buttrressing	63
	References	64
6	Exercise Terminology and Muscle Activity	65
6.1	Exercise Terminology	65
6.1.1	Body Segments	65
6.1.2	Potential Mobility	66
6.1.3	Dynamic Stabilization	66
6.2	Variations of Muscle Activity	66
6.2.1	Parking Function	66
6.2.2	Supporting Function	67
6.2.3	Free-Play Function	69
6.2.4	Bridging Activity	70
6.2.5	Hanging Activity	70
6.3	Primary Movement, Actio–Reactio	72
6.4	Conditio–Limitatio	72
	References	73
7	Planning of Exercises, Screening, Evaluation, and Treatment	75
7.1	Evaluation	75
7.2	Muscle Strength and Range of Motion	78
7.2.1	Hip Extensor and Flexor Muscles: Testing Strength in Side-Lying Position	82
7.2.2	Hip Extensor Muscles: Testing Strength in Supine Position	84
7.2.3	Hip Extensor Muscles: Testing Strength in Prone Position.	85
7.2.4	Hip Abductor and Adductor Muscles: Testing Strength in Supine Position	87
7.2.5	Hip Abductor and Adductor Muscles: Testing Strength in Side-Lying Position	88
7.2.6	Combination of Movements in Several Planes	89

7.3	Back Extensor and Trapezius Muscles: Testing Strength	90
7.4	Triceps Brachii Muscle: Testing Strength	95
7.5	Abdominal Muscles and Hip Flexor Muscles (Iliopsoas): Testing Strength in Sitting Position	95
7.5.1	Abdominal Muscles and Hip Flexor Muscles: Testing Strength in Supine Position	96
7.5.2	Combination of Strengthening Abdominal and Hamstring Muscles	96
7.5.3	Abdominal Muscles: Testing/Strengthening in Prone Position	97
7.6	Evaluating Alignment	97
7.6.1	Supine Position with the Swiss Ball Under One Leg .	101
7.6.2	Common Patterns of Deviation from Normal Alignment of Femur, Lower Leg, and Foot	101
7.6.3	Sitting on a Bench/Chair and with the Swiss Ball Placed Under the Feet	102
7.6.4	Sitting on the Swiss Ball	102
7.6.5	Sitting on the Swiss Ball and Taking Steps Until Reaching Supine Position on the Swiss Ball	102
7.7	Evaluating Quality of Movement and Dissociation of the Lower Extremities	103
7.7.1	Supine Position, Both Legs on the Swiss Ball	104
7.7.2	Supine Position, One Leg Resting on the Swiss Ball .	104
7.7.3	Supine Position with Alternate Leg Movements	104
7.7.4	Prone Position Over the Swiss Ball	105
7.8	Testing Balance	105
7.8.1	Balance Deficits	105
7.8.2	Screening Balance	107
7.9	Identifying Neurotension Problems and Treatment .	114
7.9.1	Prone Position over the Swiss Ball	114
7.9.2	Supine Position over the Swiss Ball	115
7.9.3	Supine with the Legs on the Swiss Ball	115
	References	116
8	Assistive Devices	118
8.1	Sitfit and Swiss Ball	118
8.2	Foam Roll and Swiss Ball	120
8.3	Swiss Ball and Thera-Band	125
8.4	Swiss Ball and Dumbbells	130
8.5	Swiss Ball as an Assistive Device in Manual Therapy	133
	References	141
9	Exercise Descriptions	143
9.1	"Cowboy"	144
9.2	"Scale"	146

9.3	“Indian Fakir”	148
9.4	“Donkey Stretch Yourself”	150
9.5	“Stretch Myself”	153
9.6	“Sea Gull”	154
9.7	“Hula-Hula, Forward/Backward”	156
9.8	“Hula-Hula, Side to Side”	158
9.9	“Salamander”	160
9.10	“Swing”	161
9.11	“Duck”	163
9.12	“Crab”	164
9.13	“Trot”	165
9.14	“Sea Urchin”	166
9.15	“Goldfish”	168
9.16	“Walking on Hands”	169
9.17	“Push Me–Pull Me”	171
9.18	“Figurehead”	173
9.19	“Scissors”	174
9.20	“Mermaid”	176
9.21	“Carrousel”	177
9.22	“Perpetual Motion”	179
9.23	“Pendulum”	182
9.24	“Rock’n Roll”	184
9.25	“Move My Leg”	185
9.26	“Easter Bunny”	187
9.27	“Well Figure”	188
9.28	“Cocktail Party”	190
9.29	“Dolphin”	192
9.30	Summary of Exercises	193
	References	196
10	Intensive and Acute Care	197
10.1	Introduction	197
10.2	Applications	199
10.3	Selection of Patients	200
10.3.1	Neurology	200
10.3.2	Cardiology	206
10.3.3	Medical/Surgical	206
	References	211
11	Orthopedic and Sports Medicine	212
11.1	Introduction	212
11.2	After ACL Reconstruction	216
11.2.1	1–3 Weeks After ACL Reconstruction	217
11.2.2	3 Weeks After ACL Reconstruction	221
11.2.3	More than 5 Weeks After ACL Reconstruction	224
11.2.4	Adaptation of Exercises	228

11.3	After Shoulder Injuries and Surgeries	229
11.3.1	Introduction	229
11.3.2	Acute Nonsurgical Shoulder Injury	231
11.3.3	The “Frozen” Shoulder (Adhesive Capsulitis)	234
11.3.4	After Surgical Repair of the Shoulder	235
11.3.5	Additional Exercises for the Shoulder	237
11.4	Posture	238
11.4.1	Introduction	238
11.4.2	Postural Deficits	239
11.5	Dysfunctions of the Back	245
11.5.1	Introduction	245
11.5.2	Treatment Goals	245
11.5.3	Treatment Examples	245
11.6	Scoliosis	249
11.6.1	Introduction	249
11.6.2	Treatment Goals and Approaches	252
11.6.3	Treatment Examples	253
	References	263
12	Medical/Surgical Outpatient Care	266
12.1	Surgical Patients	266
12.1.1	Introduction	266
12.1.2	Evaluation	267
12.1.3	Treatment Approach	267
12.1.4	Treatment Examples	268
12.2	Medical Patients	277
12.3	Osteoporosis	277
12.3.1	Introduction	277
12.3.2	Treatment Approach	278
12.3.3	Treatment Example	279
12.4	Ankylosing Spondylitis	282
12.4.1	Introduction	282
12.4.2	Treatment Approach	284
12.4.3	Physical Therapy	285
12.4.4	Swiss Ball Exercises in AS	286
	References	286
13	Neurological Outpatient Care	289
13.1	Introduction	289
13.2	Symptoms	290
13.2.1	Cerebellar Injuries	290
13.2.2	Parkinson’s Disease	292
13.2.3	Cerebral Vascular Accidents	293
13.2.4	Multiple Sclerosis	295
13.3	Restoration of Function	295
13.3.1	Plasticity of the Brain	296

13.3.2	Limbic System Function	297
13.3.3	Swiss Ball Application to Aid Recovery of Motor Function	298
13.4	Physical Therapy in Neurological Deficits	298
13.4.1	Evaluation	299
13.4.2	Treatment Approach	299
13.5	Physical Therapy in Parkinson's Disease	301
13.5.1	Group Exercises	301
13.5.2	Treatment Approach	301
13.5.3	Exercise Examples	302
13.6	Physical Therapy After Cerebral Vascular Accidents	307
13.6.1	Evaluation	307
13.6.2	Treatment Approach	307
13.6.3	Exercise Examples	308
13.7	Physical Therapy in Multiple Sclerosis	314
13.7.1	Evaluation	314
13.7.2	Treatment Approach	316
13.7.3	Exercise Examples	317
13.8	Physical Therapy in Muscular Dystrophy	320
13.8.1	Introduction	320
13.8.2	Treatment Approach	320
13.9	Physical Therapy in Cerebral Palsy	321
13.9.1	Introduction	321
13.9.2	Treatment Approach	321
13.9.3	Exercise Examples	322
	References	325
14	Incontinence	327
14.1	Introduction	327
14.2	Tanzberger Concept for Functional Exercises of the Pelvic Floor	330
14.3	Anatomy of the Pelvic Floor	331
14.3.1	The Three Layers of the Pelvic Floor	331
14.3.2	Innervation of the Pelvic Floor Muscles	334
14.3.3	Muscle Physiology of the Pelvic Floor	334
14.4	The Pelvic Floor and its Functional Connections ..	335
14.4.1	Functions	335
14.4.2	Training Functional Connections of the Pelvic Floor to Thorax and Legs	336
14.5	Medical Conditions Which May Require Pelvic Floor Exercises	338
14.5.1	Gynecological Applications	338
14.5.2	Urological and Proctological Applications	339
14.6	Retraining the Pelvic Floor Muscles	340
14.6.1	Preconditions for Functional Exercise of the Invisible Pelvic Floor Muscles	340

14.6.2	Treatment Considerations for Sphincter Muscle Weakness	341
14.6.3	Treatment of Descending Diaphragm Pelvis with Gaping Urogenital Hiatus (Postpartum)	342
14.6.4	Performance and Sequence of Exercises for Treatment of Incontinence	342
14.6.5	Effect of the Bouncing Movement	342
14.6.6	Observation of Movements During Pelvic Floor Exercises	343
14.6.7	Final Observation and Practical Results	344
14.7	Description of Swiss Ball Exercises	344
14.7.1	Exercises in the Sagittal Plane	345
14.7.2	Exercises in the Frontal Plane	346
14.7.3	Rocking/Bouncing Movements	348
14.8	Exercise Examples	349
14.8.1	“Roll-On”	349
14.8.2	“Right Stop–Left Stop”	350
14.8.3	“Sit Upright and Roll Toward the Wall”	350
14.8.4	“Lean Forward and Roll Toward the Wall”	351
14.8.5	“Draw a Urethra”	353
14.8.6	Variation with the Thera-Band	354
14.8.7	“Kick and Kick”	355
	References	357
15	Preventive Applications	359
15.1	Introduction	359
15.2	Evaluating Postural Alignment in Healthy Persons	362
15.3	Applications to Prevent Injury of the Musculoskeletal System	364
15.4	Treatment Examples	365
15.4.1	A Dental Hygienist	365
15.4.2	Musicians	368
15.4.3	Desk/Computer Workers	374
15.4.4	The Swiss Ball in Schools	376
15.4.5	Relief of Aches and Pains in Health Professionals	377
	References	377
	Subject Index	379