

TABLE OF CONTENTS

FOREWORD 17

I. INTRODUCTION TO GYMNASTICS TECHNIQUE 19

 The Ideal Model Concept..... 20

 A Systems Approach 21

 Factors Affecting Success..... 21

 1. Gymnastics—A Long and Winding Road..... 21

 2. All Systems GO 22

 3. Mastery of Basic Skills..... 22

 4. Persistent Use of Repetitions..... 23

 5. Use of Appropriate Skill Progressions..... 23

 6. Learning versus Performance 24

 7. Skill Sequencing 24

 8. Compensatory Techniques—The Achilles Heel..... 25

 9. Sureness of Execution..... 25

 10. Psychological Readiness—The Ultimate Domain 26

II. BASIC CONCEPTS FOR REFINING GYMNASTICS MOVEMENT..... 27

 Five Movement-Refining Principles..... 27

 1. Amplitude Principle 27

 A. External Amplitude..... 28

 B. Internal Amplitude..... 29

 2. Segmentation Principle 31

 3. Closure Principle..... 36

 4. Peaking Principle 40

 5. Diversification Principle 45

 Fundamentals of Refined Movement..... 46

III. THE COMMON DENOMINATOR—THE HANDSTAND 47

 The Handstand-Training Triad..... 49

 1. Shape..... 50

 2. Tension 53

 3. Balance..... 55

 A. The Sixth Sense 57

 B. Counterbalancing versus On-Line Balancing..... 57

 C. Stability, Equilibrium, and Balance..... 58

 D. Hollowing the Shoulder Girdle..... 60

 E. Body-Tilt Training Technique..... 62

 Training Summary for the Handstand..... 63

IV. THE MECHANICS OF SWING	65
Internal and External Swing.....	65
1. Internal Swing	68
A. Transfer of Momentum.....	69
B. Kinetic Chain.....	70
2. External Swing	72
A. Descent Swing Amplitude	74
B. Conservation of Angular Momentum.....	76
3. Optimizing Swing Mechanics.....	76
A. Body Shape and Radius of Swing Rotation	77
B. Ascent Swing Amplitude	81
C. The Tangent-Release Principle	83
Fundamental Concepts of Swing.....	86
V. THE MECHANICS OF IMPACT	87
Leg Impact and Take-Off.....	88
1. Trajectory	88
A. Maximizing Lift	90
B. Optimizing the Angle of Input for Take-Off	92
2. Angular Momentum.....	93
A. Transferring Momentum from Part to Whole	93
B. Altering the Direction of Take-Off.....	95
C. Converting Horizontal Motion into Rotary Motion.....	96
3. The Trajectory-Angular Momentum Relationship.....	98
4. The Angle of Input.....	100
Hand Impact and Repulsion	102
1. Shoulder Girdle Action	104
Leg Impact and Landing.....	105
1. Landing Techniques	107
2. The Angle of Touch-Down.....	108
Similarities in Movement Patterns	110
Fundamental Concepts of Impact.....	111
VI. THE MECHANICS OF ROTATION AND TWISTING	113
Somersault Rotation	115
Twist Rotation	120
Fundamental Techniques of Twisting.....	121
Biaxial Rotation—Twisting Somersaults	122
1. The On-Ground Twist Initiation Technique	123
A. Advantages of On-Ground Twist Initiation	125
B. Disadvantages of On-Ground Twist Initiation	126
2. The Body-Extension Twist Initiation Technique	126
A. Advantages of Body-Extension Twist Initiation.....	128
B. Disadvantages of Body-Extension Twist Initiation	129

3. The Body-Tilt Twist Initiation Technique	130
A. Resulting Direction with Body-Tilt Twist Initiation.....	132
B. Advantages of Body-Tilt Twist Initiation	132
C. Disadvantages of Body-Tilt Twist Initiation	133
Arm-Wrap Techniques for Twisting	133
Twist Direction for Somersault Skills.....	136
Turn Direction for the Round-Off.....	136
Fundamental Concepts of Rotation and Twisting	138
VII. PATTERNS OF MOTION	139
Mastery of Body Shape	140
Fundamental Concepts of Body Shaping	141
1. Flexion—Forward Bending	142
2. Extension—Backward Bending	144
3. Flexion—Forward Bending in Long-Hang Swing Position.....	146
4. Extension—Backward Bending in Long-Hang Swing Position	148
5. Repetitive Forward/Backward Bending	149
Patterns of Motion—The Kinetic Chain.....	150
1. Kinetic Chain Sequence for Take-Offs and Landings.....	151
2. Kinetic Chain Sequence for Tucking/Opening Forward Somersaults.....	153
3. Kinetic Chain Sequence for Tucking/Opening Backward Somersaults..	155
4. Kinetic Chain Sequence for Closing/Opening Swing-Oriented Skills.....	159
Breaking the Kinetic Chain.....	160
Fundamental Concepts of Patterned Movement.....	165
VIII. CONCEPTS OF TRAINING	167
Flexibility.....	168
1. Constraints on Joint Flexibility.....	169
2. Range of Motion in the More Critical Joint Areas.....	169
3. Flexibility Training Protocols	173
A. Static Flexibility Training	174
B. Dynamic Flexibility Training.....	176
4. Specificity for Flexibility Training.....	177
5. Flexibility Training Intensity	178
Power	179
1. Specificity for Power Training	180
2. Resistance Techniques.....	181
A. Increasing the Rate of Movement	181
B. Changing Body Position Relative to the Ground.....	182
3. Additional Core Power Training Examples.....	183
A. Running and Jumping	183
B. Frontal (Flexor) Muscles.....	183
C. Pull-Through Exercise	185
D. Core Muscle Training	186

4. Power Training Intensity	188
The Training Pyramid	188
Fundamental Concepts of Flexibility Training	190
Fundamental Concepts of Power Training	191
IX. CONCEPTS OF FLOOR EXERCISE	193
Three-Dimensional Space	193
The Spring Floor.....	195
Fundamental Tumbling Concepts	197
1. Dynamic Tension	197
2. Maximum Horizontal Velocity at Impact.....	199
3. Accelerating the Rotation.....	199
4. Sounding the Rhythm	200
5. Rapid Inversion of the Total Body Unit at Input.....	201
6. The Snap-Up	204
A. Rotary Motion at Input.....	204
B. Mechanics of the Snap-Up	205
7. Standing Tall and Skimming the Stone.....	207
8. Shoulder Girdle Range and Power.....	208
9. Whipback Handspring—Skewing the Curve	209
10. Kinesthetic Awareness—Eye of the Storm.....	210
X. CONCEPTS OF BALANCE BEAM.....	215
In-Line Space	215
Fundamental Balance Beam Concepts	216
1. Mastering Skills at Ground Level	216
2. Training the Core	217
3. Stacking the Vertebrae.....	219
4. Strong Ankles/Wrists and Pliable Feet/Hands.....	219
5. The Cross-Extensor Reflex	221
6. Follow-Through to Completion.....	223
7. Focusing on the Target.....	224
8. Consistent Environmental Perspective	225
9. Progressions and Repetitions	227
10. Smoothing the Transitions.....	227
XI. CONCEPTS OF VAULTING.....	229
Fundamental Vaulting Concepts	230
1. Minimizing the Board Setting	230
2. The Staircase Effect	232
3. Maximizing the Run-Up Distance	233
4. Training for Sprint Speed.....	234
5. Hitting the Mark	236

6. Board-Impact Techniques	238
7. Take-Off and Pre-flight	240
8. Hand Impact and Repulsion	241
9. Shaping the Post-flight Trajectory	243
10. Sounding the Rhythm	245
XII. CONCEPTS OF UNEVEN BARS	249
Fundamental Uneven-Bars Concepts.....	249
1. Swinging—A Closed-Loop System of Kinesthetic Awareness	249
2. Dancing with the Bars	250
3. The Elastic-Ruler Concept	252
4. Keeping the Giant in the Swing	254
5. The Circumduction Technique	255
6. The Handstand Arrival—A Litmus Test for Excellence.....	258
7. Timing the Release.....	260
8. Tapping the Release.....	261
9. The Bottoming Effect.....	263
10. The Slingshot Technique.....	264
REFERENCES AND SUGGESTED READING.....	267
INDEX.....	269

The concepts, explanations, and descriptive illustrations in this book are unique in that they transcend much of the published knowledge currently available to the gymnastics discipline. This book provides a deeper understanding of gymnastics concepts and techniques, which will serve as a valuable aid to gymnasts and coaches alike.

This book is comprehensive, involving the various facets of gymnastics technique, and thoroughly explaining, in detail, the biomechanics of skill types and groups for each of the four women's gymnastics events—Floor Exercise, Balance Beam, Vaulting, and Uneven Bars. Included are the concepts relating to somersault, twist, balance, impact, and swing skills, along with guidelines for achieving optimal levels of conditioning.

Championship Gymnastics is highly recommended for anyone wishing to increase their knowledge and understanding of gymnastics training and technique. It is a must-have for any serious teacher or coach of gymnastics.

Able Grossfeld

Professor Emeritus of Athletics, Southern Connecticut State University

U.S. Olympic Gymnastic Team Member, 1956 and 1960

Head Olympic Gymnastics Coach, 1972, 1984 (team gold medal), and 1988

U.S. Olympic Hall of Fame, 2009

