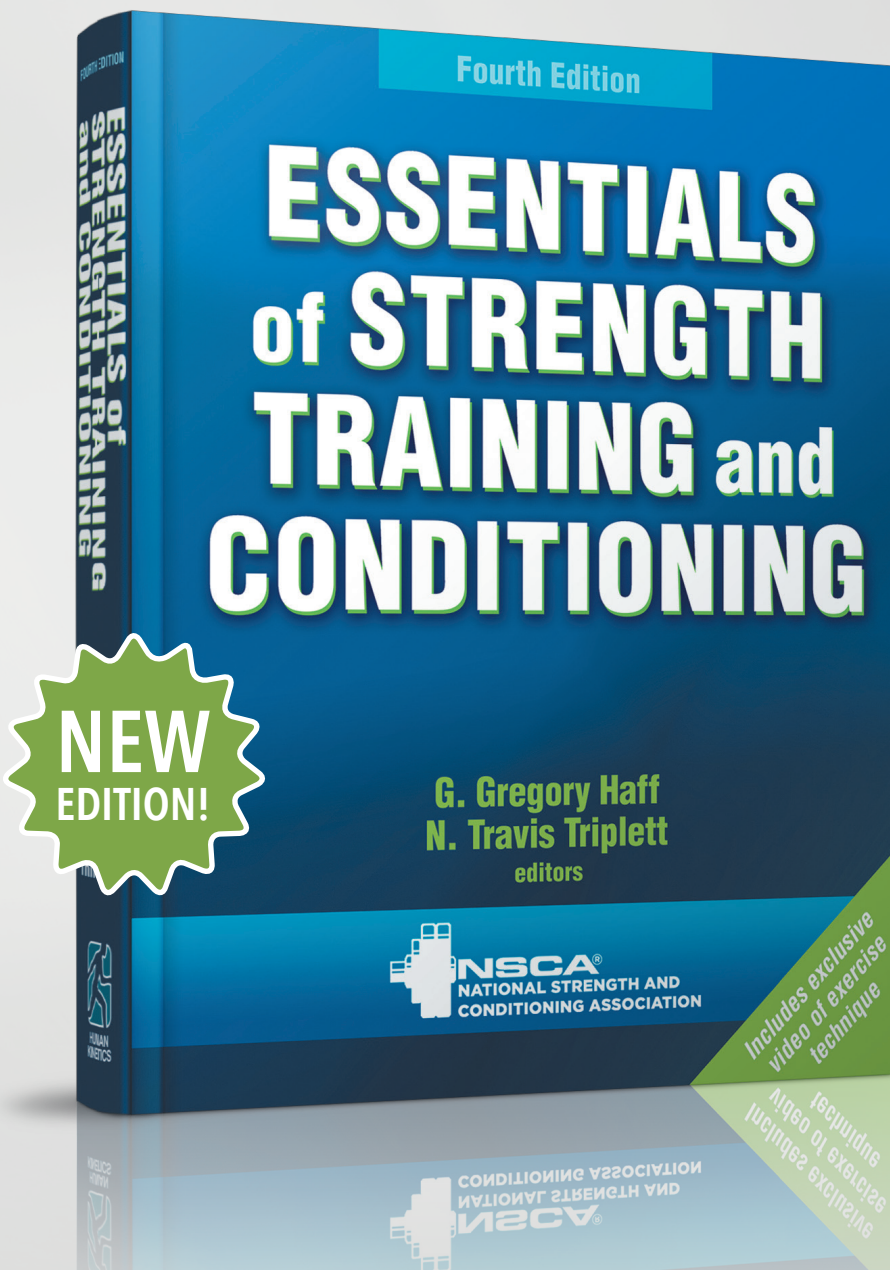


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- Updated content to reflect the latest information on the CSCS exam
- Online videos demonstrating resistance training techniques
- New research on high-intensity interval training
- Techniques for exercises using alternative modes and nontraditional implements
- Ten additional tests for strength, speed, and agility



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Fourth Edition

ESSENTIALS of STRENGTH TRAINING and CONDITIONING

NEW
EDITION!

G. Gregory Haff
N. Travis Triplett
editors



Includes exclusive
video of exercise
technique

Available November 2015

Prepare for a career in strength and conditioning with the field's leading reference

Audiences: A text for those preparing for the Certified Strength and Conditioning Specialist (CSCS) examination and for upper-level undergraduates taking courses in the exercise sciences related to strength training and conditioning. Also a reference for strength and conditioning specialists, coaches, athletic trainers, physical therapists, personal trainers, and other sport science professionals.

Developed by the National Strength and Conditioning Association (NSCA), *Essentials of Strength Training and Conditioning, Fourth Edition With Web Resource*, is the fundamental text for strength and conditioning professionals and students. It provides comprehensive information on organization and administration of facilities, testing and evaluation, exercise techniques, training adaptations, program design, and structure and function of body systems.

The scope and content of *Essentials of Strength Training and Conditioning, Fourth Edition*, have been updated to convey the knowledge, skills, and abilities required of a strength and conditioning professional and to address the latest information found on the Certified Strength and Conditioning Specialist (CSCS) exam. The evidence-based approach and unbeatable accuracy of the text make it the primary resource to rely on for CSCS exam preparation. The text is organized to lead readers from theory to program design and practical strategies for administration and management of strength and conditioning facilities.

The fourth edition contains online video, updated research—specifically in the areas of high-intensity interval training, overtraining, agility and change of direction, nutrition for health and performance, and periodization—and a new chapter that presents techniques for exercises using alternative modes and nontraditional implements. Ten additional tests, including those for maximum strength, power, and aerobic capacity, are presented along with new flexibility exercises, resistance training exercises, plyometric exercises, and speed and agility drills. Key points, chapter objectives, key terms, and self-study questions help students conceptualize the information and reinforce fundamental facts.

Essentials of Strength Training and Conditioning, Fourth Edition With Web Resource

National Strength and Conditioning Association

G. Gregory Haff, PhD, and N. Travis Triplett, PhD, Editors

©2016 • Hardback • Approx. 752 pp

Print: ISBN 978-1-4925-0162-6 • \$104.00 (£74.49 UK, €104.30 EURO, \$148.70 AUS/NZ)

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All ancillaries are free to course adopters and available at

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Instructor guide. Includes additional resources to aid in lecture preparation, including sample application questions, key terms with definitions, and chapter objectives and outlines.

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Chapter 1. Structure and Function of Body Systems
Chapter 2. Biomechanics of Resistance Exercise
Chapter 3. Bioenergetics of Exercise and Training
Chapter 4. Endocrine Responses to Resistance Exercise
Chapter 5. Adaptations to Anaerobic Training Programs
Chapter 6. Adaptations to Aerobic Endurance Training Programs
Chapter 7. Age- and Sex-Related Differences and Their Implications for Resistance Exercise
Chapter 8. Psychology of Athletic Preparation and Performance
Chapter 9. Basic Nutrition Factors in Health
Chapter 10. Nutrition Strategies for Maximizing Performance
Chapter 11. Performance-Enhancing Substances and Methods
Chapter 12. Principles of Test Selection and Administration

Chapter 13. Administration, Scoring, and Interpretation of Selected Tests
Chapter 14. Warm-Up and Flexibility Training
Chapter 15. Exercise Technique for Free-Weight and Machine Training
Chapter 16. Exercise Technique for Alternative Modes and Nontraditional Implement Training
Chapter 17. Program Design for Resistance Training
Chapter 18. Program Design and Technique for Plyometric Training
Chapter 19. Program Design and Technique for Speed and Agility Training
Chapter 20. Program Design and Technique for Aerobic Endurance Training
Chapter 21. Periodization
Chapter 22. Rehabilitation and Reconditioning
Chapter 23. Facility Design, Layout, and Organization
Chapter 24. Facility Policies, Procedures, and Legal Issues

Online videos complement the text and demonstrate proper techniques

Full-color photos and illustrations highlight form and function

Illustrations and medical artwork demonstrate how and why exercises are effective

New chapters and updated research on periodization, nutrition, overtraining, and more

Sidebar provide practical applications

Back

15.4 BENT-OVER ROW

Before Beginning

- Grasp the bar with a closed, pronated grip.
- Grip should be wider than shoulderwidth.
- Lift the bar from the floor as described for the deadlift exercise. Use a pronated grip, not an alternated grip.

Starting Position

- Position the feet in a shoulder-width stance with the knees slightly flexed.
- Flex the torso forward so that it is slightly above parallel to the floor.
- Create a flat-back torso position.
- Focus the eyes a short distance ahead of the feet.
- Allow the bar to hang with the elbows fully extended.
- All repetitions begin from this position.

Upward Movement Phase

- Pull the bar toward the torso.
- Keep the torso rigid, back flat, and knees slightly flexed.
- Do not jerk the torso upward.
- Touch the bar to the lower chest or upper abdomen.

Downward Movement Phase

- Lower the bar back to the starting position.
- Maintain the flat-back and stationary torso and knee positions.
- At the end of the set, flex the hips and knees to place the bar on the floor and stand up.

MAJOR MUSCLES INVOLVED
 latissimus dorsi, teres major, middle trapezius, rhomboids, posterior deltoids

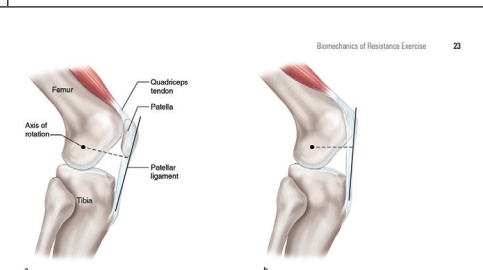


FIGURE 2.6 (a) The patella increases the mechanical advantage of the quadriceps muscle group by maintaining the quadriceps tendon's distance from the knee's axis of rotation. (b) Absence of the patella allows the tendon to fall closer to the knee's center of rotation, shortening the moment arm through which the muscle force acts and thereby reducing the muscle's mechanical advantage. Reprinted, with permission, from Gosselin and Miller, 1988, 132.

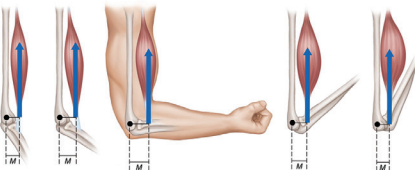


FIGURE 2.8 During elbow flexion with the biceps muscle, the perpendicular distance from the joint axis of rotation to the tendon's line of action varies throughout the range of joint motion. When the moment arm (M) is shorter, there is less mechanical advantage.

Variations in Tendon Insertion

Considerable variation in human anatomical structure exists, including the points at which tendons are attached to bone. A person whose tendons are inserted on the bone farther from the joint center should be able to lift heavier weights because muscle force acts through a longer moment arm and thus can produce greater torque around the joint. (In figure 2.6, for example, consider how the moment arm M would change if the tendon insertion were farther to the right.) It is important, however, to recognize the trade-off involved in tendon insertion. The mechanical advantage gained by having tendons insert farther from the joint center is accompanied by a loss of maximum speed because, with the tendon inserted farther from the joint center, the muscle has to contract more to make the joint move through a given range of motion. In other words, a given amount of muscle shortening results in less rotation of body segments about a joint, which translates into a loss in movement speed.

fitness becomes elevated, but because of the high training loads, a concomitant increase in fatigue occurs. When fitness and fatigue are summed in this case, the level of fatigue results in a reduction in preparedness. On the other hand, when training workloads are low, little fatigue occurs and minimal fitness is developed, resulting in a low level of preparedness. Thus the sequencing of training loads becomes important in that it allows for training workloads to be varied in a systematic manner. An important thing to remember is that fatigue dissipates at a faster rate than fitness, thus allowing preparedness to become elevated if appropriate training strategies are used to retain fitness while reducing fatigue (25, 28). While the fitness-fatigue paradigm is classically represented as one fatigue, fitness, and preparedness curve, it is likely that each training factor stimulates its own individual fitness, fatigue, and preparedness aftereffect response (14, 59). These aftereffects are often considered to be residual training effects and serve as a foundational concept underlying the use of sequential periodization models (25, 28). Ultimately, the residual training effects of one training period have the potential to affect the level of preparedness in subsequent training periods, depending on the overall structure of the periodized training plan (28).

Periodization Hierarchy

Ultimately periodization is simply a means of organizing the planning of a training intervention so that the

period is partitioned into specific time periods (table 21.1) (22, 24). The multiyear training plan covers the most time but is the least detailed plan within a periodized training structure. For example, it may involve the basic progression of a collegiate football player from his freshman to senior year and contain key developmental goals that are targeted within each year of training. This multiyear training structure is then subdivided into more detailed individual annual training plans that are developed based on the athlete's progression through the various stages or benchmarks associated with the multiyear training plan. In sports that have only one competitive season such as American football, an annual training plan would be represented as a macrocycle. However, in a sport like college track and field, the annual plan would be divided into two macrocycles because of the indoor and outdoor seasons typical of this college sport. Typically the macrocycle lasts several months up to a year, depending on the sport. Within each macrocycle are

Periodization of training begins with general global training targets set forth in the multiyear or annual training plan and becomes more specific as the program is developed for the macro-, meso-, and microcycles. For example, annual training plans set the general pathway for a training year, while the other cycles set the means, methods, and modes used to get to the primary competitive targets.

TABLE 21.1 Periodization Cycles

Period	Duration	Description
Multiyear plan	2-4 years	A 4-year training plan is termed a quadrennial plan.
Annual training plan	1 year	The overall training plan can contain single or multiple macrocycles. It is subdivided into various periods of training including preparatory, competitive, and transition periods.
Macrocycle	Several months to a year	Some authors refer to this as an annual plan. It is divided into preparatory, competitive, and transition periods of training.
Mesocycle	2-6 weeks	Medium-sized training cycle, sometimes referred to as a block of training. The most common duration is 4 weeks. Consists of microcycles that are linked together.
Microcycle	Several days to 2 weeks	Small-sized training cycle; can range from several days to 2 weeks in duration; the most common duration is 1 week (7 days). Composed of multiple workouts.
Training day	1 day	One training day that can include multiple training sessions is designed in the context of the particular microcycle it is in.
Training session	Several hours	Generally consists of several hours of training. If the workout includes >20 min of rest between bouts of training, it would comprise multiple sessions.

Adapted, with permission, from Hoff GD and Hoff EE. Training Integration and Periodization. In: NSCA's Guide to Program Design. Hoffman, ed. Champaign, IL: Human Kinetics, 2012, pp 273-298. Adapted from table 15.1, page 202.

Page layouts may be subject to change



INSTRUCTOR VIDEOS

Instructors receive access to a 61-video collection, including the 21 videos available in the web resource, plus an additional 40 videos demonstrating resistance training exercises, plyometric exercises, and exercises using alternative modes and nontraditional implements, bringing practical content to the classroom.



Lab 10: Techniques of Exercise

Static Stretching Techniques

Neck Look right and left	Flexion and extension
Shoulders and Chest Straight arms behind back	Seated lean-back
Posterior of Upper Arm Behind-neck stretch (chicken wing)	
Upper Back Cross arm in front of chest	Arms straight up above head (pillar)
Lower Back Spinal twist (pretzel)	Semi-leg straddle
Hips Forward lunge (fencer)	Supine knee flex
Torso Side bend with straight arms	Side bend with bent arm
Anterior of Thigh and Hip Flexor Side quadriceps stretch	
Posterior of Thigh Sitting toe touch	Semistraddle (figure four)
Groin Straddle (spread eagle)	Butterfly
Calf Wall stretch	Step stretch

Dynamic Stretching Techniques

Arm swings	Walking knee lift
Inchworm	Forward lunge with elbow to instep
Lunge walk	Heel-to-toe walk
Lunge with twist	Walking over and under

- Following the demonstrations by the instructor, perform the static and dynamic flexibility exercises individually using correct technique.

Important note: Use a very low intensity or effort when performing the dynamic flexibility exercises. The focus should be on performing correct technique only.

Performance Report

Name:		
Date:		
Flexibility exercise performed	Muscle(s) affected	Classification (mark one)
1. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
2. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
3. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
4. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
5. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
6. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
7. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic
8. _____	_____	<input type="checkbox"/> Static <input type="checkbox"/> Dynamic

Submit





STUDENT WEB RESOURCE

The web resource provides students with lab activities in fillable form for practice and retention of information. Further, students will benefit from the online videos of 21 foundational exercises that provide visual instruction and reinforce proper technique.

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Nolan Harms, MS, CSCS, NSCA-CPT
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Course Developers


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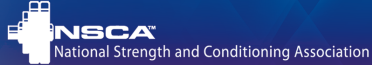

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National Strength and Conditioning Association

Jared W. Coburn, PhD, CSCS,*D and Moh H. Malek, PhD, CSCS,*D, NSCA-CPT,*D, Editors

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Course Developers

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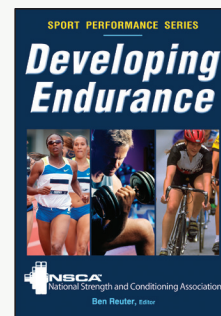
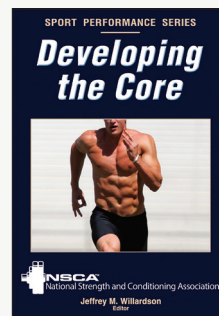
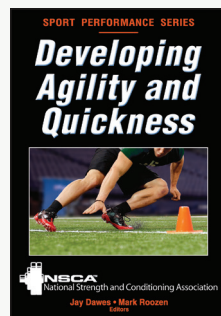


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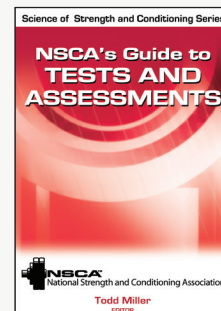
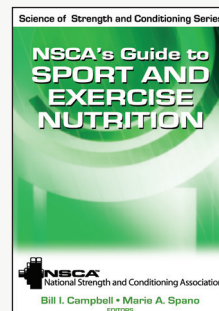
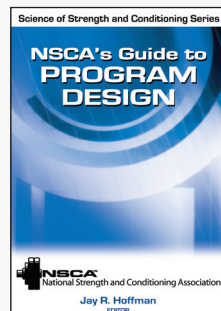
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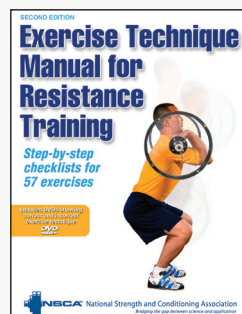
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