Quiz Policies

Eligibility
The NCSF online quizzes are open to any currently certified fitness professional, 18 years or older.

Deadlines
Course completion deadlines correspond with the NCSF Certified Professionals certification expiration date. Students can obtain their expiration dates by reviewing either their certification diploma or certification ID card.

Cancellation/Refund
All NCSF continued education course studies are non-refundable.

General Quiz Rules

- You may not have your quiz back after sending it in.
- Individuals can only take a specific quiz once for continued education units.
- Impersonation of another candidate will result in disqualification from the program without refund.

Disqualification
If disqualified for any of the above-mentioned reasons you may appeal the decision in writing within two weeks of the disqualification date.

Reporting Policy
You will receive your scores within 4 weeks following the quiz. If you do not receive the results after 4 weeks please contact the NCSF Certifying Agency.

Re-testing Procedure
Students who do not successfully pass an online quiz have the option of re-taking. The fees associated with this procedure total $15 (U.S) per request. There are no limits as to the number of times a student may re-test.

Special Needs
If special needs are required to take the quiz please contact the NCSF so that appropriate measures can be taken for your consideration.

Quiz Rules

What Do I Mail Back to the NCSF?
Students are required to submit the quiz answer form.

What do I Need to Score on the Quiz?
In order to gain the .5 NCSF continued education units students need to score 80% (8 out of 10) or greater on the CEU quiz.

Where Do I Mail My Quiz Answer Form?
You will mail your completed answer form to:

NCSF
Attn: Dept. of Continuing Education
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

How Many CEUs Will I Gain?
Professionals who successfully complete the any continuing education quiz will gain .5 NCSF CEUs per quiz.

How Much does each quiz cost?
Each quiz costs the student $15.00.

What Will I Receive When The Course Is Completed?
Students who successfully pass any of the NCSF online quizzes will receive their exam scores, and a confirmation letter.

How Many Times Can I Take The Quizzes For CEUs?
Individuals can take each NCSF quiz once for continuing education credits.

Progressive Overload

Performing routine exercise as recommended for health improvements is hard enough for most people; finding the time, establishing a routine and sticking to it requires focus, motivation, and a daily commitment. For those who have the fortitude to accomplish this challenge it would seem that the rewards should be forth coming. But exercise performed for positive adaptations requires more than just the commitment to daily training.

Improvements in physical condition will occur when one moves from a sedentary state to an active one. Neuromuscular improvements are accompanied by increased metabolic and cardiovascular system adjustments causing the original demands of the physical training to become less stressful for the body. These improvements can be attained in a reasonably short period of time assuming adequate stress is applied with appropriate frequency. Following these initial adaptations the body requires a new demand for further improvements to be made. This concept reflects the application of the exercise principles of specificity and progressive overload. Many exercisers become frustrated by the slowed physiological return for their time and perceived effort. The most common problem with exercise routines is that the intensity is too low to cause any new change.

The body must perceive a stress as new and above which it is accustomed to in order to change. Therefore, simply going to the gym and performing physical work may not be enough to cause any change at all. Anyone who frequents a fitness facility easily recognizes the faces of others who have the same commitment to exercise frequency. The interesting observation that is commonly made is that although the same people are in the gym each day they often do not display this commitment in advancements in performance or visible physical change. In fact, it is not uncommon for a person who works out to be void of any noticeable improvements over an extended period of training. The reason for this phenomenon is that, although work is being performed and calories expended, the quantity of the stress produced is not adequate for the body to justify any new adaptational response. This may be true of anaerobic training, cardiovascular training, weight loss, or all three. Many exercisers who experience this training pitfall are essentially on a maintenance program due to inadequate overload.

In general, people prefer to exercise at a level of training that is comfortable. Researchers have routinely identified that when left to their own accord the exercise intensity most often selected by non-competitive participants, both aerobically and anaerobically, is less than 60% of maximal capacity. Anecdotally, the most common method of aerobic training is sub-moderate intensity, steady-state training, and for resistance training most participants select multiple sets (2-4) of the same weight or use the pyramid system, to perceivably increase the intensity. In all cases once the body has adapted to an intensity, that intensity will no longer stimulate new improvements. In fact, neural efficiency changes may actually lead to a reduction in adaptations as the economy of the movement no longer requires as much physiological support. Even with the variation of resistance used in pyramid sets, it is often only the last set that is challenging. If only one out of three sets is actually difficult for the body, then only one-third of the total workout is effective. The other two-thirds serves only as specific warm-up preparation for the last set and does not contribute to the adaptational response.

When aerobic training is evaluated, a similar but different problem exists. Most people who perform aerobic training select to use one level of resistance and continue at steady-state for the full duration of the workout. When they attempt to challenge themselves it is often the addition of time at the same intensity rather than an increase in work rate intensity. Adding time certainly increases caloric expenditure, but without ever increasing the heart rate intensity, the adaptation response is limited.

Most literature suggests that for on-going improvements the body should experience a progressive overload of 2-5% per week. Although these values seem low they are nothing to baulk at based on the process of physiological adaptation. It is a process for the body to first identify stress, resist that stress through acute response, recognize when the stress is

chronic and make the necessary adjustments in the different systems of the body to more effectively manage the stress. Interestingly, the adaptations of a new exerciser accelerate at a rate beyond that of a previously trained individual due to inefficient systems at the onset of the training. New exercisers may very well experience an improvement rate of 8-10% in a week in response to the initial neurological efficiency changes. But, once the current tissue potential is attained results plateau and the rate of improvement slows. These initial values are impressive, but must also be put in perspective. An 8-10% increase may reflect jumping from ten push-ups to eleven in a week or increasing from 3 mph on the treadmill to 3.3 mph for the same duration of time at the same heart rate. The cells of the human body take time to adjust to the new stress. Whereas a 2-3% increase over two weeks may sound miniscule, consider the duration of time in the lifespan of the human body. If a person lives 75 years (3900 weeks) the improvement rate of 1% a week is actually impressive, considering a two percent improvement occurs in 0.0005 of a person's time on earth. If 1% improvement is consistent each week a person may experience physiological changes of 50% in a year's time; an impressive improvement by any account.

To correctly create progressive overload on a level that one can adapt to requires specific calculations to ensure the stress is applied effectively.

To correctly create progressive overload on a level that one can adapt to requires specific calculations to ensure the stress is applied effectively. It is calculated by analyzing the current workload and then properly distributing the stress over the duration of time the stress is applied. Simply adding more weight may in fact overload the tissue during a resistance exercise, but if the overload is too great the body cannot properly adapt. If the weight or stress is excessive, the duration of time it can be applied is often too short for the body to experience the signals for cellular change within the tissue.

If the same repetitions are used, the calculation of overload for a repetition scheme is easy; the overload intensity is multiplied by the resistance and the product is added to the weight being lifted in the subsequent exercise bout.

Example: Leg press

150 lbs performed for 3 sets of 12 repetitions

150 lbs x 5% overload = 7.5 lbs. per repetition

150 lbs + 7.5 lbs = 157.5 lbs.

The new training weight for 3 sets of 12 repetitions is 157.5 pounds

In many cases, exercisers incorrectly increase the resistance too aggressively. Instead of adding a total of 7-10 lbs. on the leg press (5 lb. plate on either side) it is more common to add 10 lbs. or more to a side, which may cause excessive overload.

If the overload is being determined for different set and repetition schemes, calculating the percentage of overload requires an adjustment to the basic formula. To determine the resistance at a new repetition schematic (assuming sets stay the same) the resistance can be adjusted to reflect the change in the intensity while maintaining the appropriate overload. Each repetition adjustment equates to a 2.5% change in resistance (as a standard), up to 12 repetitions. After 12 repetitions the standard is compromised by the demands placed on the stabilizing muscles. Therefore, adding or taking away from this value will equate to the resistance that should be used for the designated number of repetitions. Since 12 repetitions was the value used for the repetition maximum of the example it serves as the reference number in the overload prediction equation. If the exercise repetitions are adjusted to 10 and the overload is intended to remain consistent, the difference between the reference value and the new desired repetition scheme is 2 reps (12 reps - 10 reps = 2 reps). This value is plugged into the formula to calculate the new overload at 10 repetitions.

Example:

Overload for 12 repetitions = 157.5 lbs (reference overload)
Adjustment needed to predict the overload for 10 repetitions

Overload Prediction Equation for Repetition Adjustments

Reference overload x {0.025 x (reference repetitions - new repetitions) + 1} = overload weight

157.5 x {0.025 x (12 reps – 10 reps) + 1} = overload weight

157.5 x {0.025 x (2) + 1} = overload weight

157.5 x (.05 + 1) = overload weight

157.5 x 1.05 = 166 lbs

If the leg press exercise is performed for 10 repetitions with a progressive overload of 5% the new resistance would be 166 lbs. The same equation can be used for any repetition. If the repetitions increase in number, the calculation will use a negative value in the repetition conversion but still predict accordingly. If the repetitions increased to 14, the same calculation will transfer the overload.

Example:

157.5 x {0.025 x (12 reps – 14 reps) + 1} = overload weight

157.5 x {0.025 x (-2) + 1} = overload weight

157.5 x (-.05 + 1) = overload weight

157.5 x .95 = 149.5 lbs

When calculating aerobic intensity the adjustments can be made for resistance, time, or by interval. The intensity of aerobic exercise is based on the challenges the body must overcome to maintain a pace. The intensity is reflected by changes in heart rate and perceived exertion and may come from different forms of stress. In some cases the speed presents the difficulty, other times it is the resistance to the movement or variations in terrain. Any of these variables can be manipulated to create an overload. If the rate of movement is the factor that is defined as the primary overload source, the speed of the movement can be increased by the progressive percentile value. If, for instance, a person is jogging at 4.7 miles per hour, using a 5% adjustment would increase the speed by 0.25 mph, creating a new training speed of 4.95 mph. The same can be done when cycling, rowing or using the elliptical trainer. For instance, biking at 14 mph would be adjusted to 14.7 mph for a 5% overload. The elliptical trainer utilizes rotations per minute (rpm) to determine speed. This can also be increased in a similar fashion (128 rpm x 5% = an increase of 6.5 rpm).

At a steady-state pace, where the overload is not based on heart rate intensity, adequate increases in duration are needed for improvements in cardiovascular adaptation.

If increasing intensity through increased duration is the intended goal, then the 5% increase should be applied to the total volume, which is calculated by adding the total number of minutes exercised per week and multiplying by 5%. For example, if a person biked for 20 minutes three times last week the total volume of 60 minutes should be multiplied by 5%. This would add three minutes to each workout, rather than the one minute increase if calculated individually. At a steady-state pace, where the overload is not based on heart rate intensity, adequate increases in duration are needed for improvements in cardiovascular adaptation. If 5% of a single bout duration of 20 minutes is used the progressive overload would be below the adaptation rate of the body. In this case it would take almost three months to increase duration from 20 to 30 minutes. Howerer, this increase should take approximately 4 weeks to occur.

When aerobic intervals are used for conditioning, the adjustments can be calculated using heart rates or duration. Experienced exercisers may increase their training intensity based on their exercise heart rates. If the selected interval causes the heart rate to reach 170 beats per minute, the next week's goal should be 2.5-5% greater than that value, which would equate to a 4-8 beat per minute increase per interval. This method may be a bit aggressive for new exercisers who may benefit from a more moderate adjustment. For these exercisers the interval modifications may come from changes to the interval duration rather than the speed or resistance.

To calculate the interval duration overload, simply multiply the interval duration in seconds by the 5% overload value. For example, if a person exercises for 20 minutes on the bike using five 40-second intervals, the new interval time for the next exercise bout would be 42 seconds durations. At this rate, over an initial five week period, the intervals will jump to over 50 seconds to establish a comfortable base and acclimation to exercise before adjusting speeds and resistance. In addition, the low intensity segments should also increase by 5% to cause greater total duration of the exercise bout. This gradual progression allows for ongoing adaptations with little risk of overtraining and injury.

The decision to manipulate variables for improvements based on progressive overload is individual specific. In some cases, individuals are not comfortable with increasing speed and resistance and doing so may reduce participation interest. Applying different strategies for overload allows for on-going improvements, even for individuals who do not have the motivation, or are not inclined to experience traditional modifications in stress. A person jogging at 4.2 mph may not be comfortable with increasing the speed but may tolerate adjustments in incline in the same way a person performing Romanian deadlifts may respond to asymmetrical loading as a means of increasing the intensity of the exercise versus increasing the weight. The progressive overload should be specific to the desired adaptation but accommodate the client to maximize effort and exercise tolerance. Turning a person off from exercise due to poor overload decisions is just as bad as not applying the appropriate overload to begin with. Overload should be premeditated and defined for a training cycle to ensure progression is applied continuously and properly. If the exercise becomes too difficult and compensatory actions are identified, scale back the rate of applied overload; if the perceived exertion is not consistent with the overload then adjust it accordingly. Many factors affect the adaptation response and may create a varied response among exercisers, but constant attention to the exercise principles is the first step in creating effective programs.

CEU Quiz

Progressive Overload

1. The first physiological changes that occur when an exercise program begins are related to _____.

   A. Hypertrophy response
   B. Neuromuscular improvements
   C. Increased flexibility
   D. Decreased body fat

2. The use of progressively increasing loads in a resistance training program to ensure adequate stress is achieved is known as _____.

   A. the principle of stability
   B. the principle of exercise frequency
   C. the principle of specificity
   D. the principle of overload

3. When left to their own accord, research shows that most individuals will choose to workout at _____ of their maximal capacity.

   A. 80-90% B. 70-80% C. 60-70% D. 50-60%

4. Neural efficiency changes that take place with consistent training may result in _____ in tissue adaptation response due to improved _____.

   A. an increase; flexibility
   B. an increase; economy of movement
   C. a decrease; economy of movement
   D. a decrease; body composition

5. Individuals seeking to improve aerobic conditioning must increase _____, not necessarily just duration or caloric expenditure.

   A. heart rate intensity B. frequency
   C. incline D. none of the above

6. Regardless of the type of exercise, adaptation responses are elicited when weekly increases of intensity are between _____.

   A. 1-2% B. 2-5% C. 5-10% D. 10-20%

7. The inefficiency of movement often experienced by new exercisers allows those individuals to initially see improvements in the rate of their progressive overload _____ than individuals who were previously training.

   A. quicker B. slower
   C. at the same rate D. all of the above

8. Changes made to aerobic training programs that increase heart rate intensity can be achieved by altering which of the following variables?

   A. speed
   B. resistance to movement
   C. duration
   D. all of the above are correct

9. If increased exercise duration is the goal of an aerobic training program, utilizing the 5% increase, improving from 20 minutes 3x per week to 30 minutes 3x per week should take approximately _____.

   A. 1 week
   B. 2 weeks
   C. 4 weeks
   D. 8 weeks

10. The 5% formula can be applied to interval training. The formula should result in a(n) _____.

    A. increase in interval duration only
    B. increase in interval duration and rest periods
    C. decrease in interval duration only
    D. decrease in interval duration and rest periods

Quiz Answer Form

FIRST NAME_____ **LAST NAME**_____ **M.I.**_____

TITLE_____

ADDRESS_____ **APT.**_____

ADDRESS _____

CITY_____ **STATE**_____ **ZIP**_____

COUNTRY_____ **POSTAL CODE**_____

CERTIFICATION NO. _____ **CERTIFICATION EXP.** ____/____/____

MEMBERSHIP NO. _____ **MEMBERSHIP EXP.** ____/____/____

Quiz Name	Member Price	Total
	$15	



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_____ _____ _____
Account No. Exp. Date Security Code

_____ _____
Signature Date

Quiz Answers

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

Fill in each blank with the correct choice on the answer sheet. To receive 0.5 CEUs, you must answer 8 of the 10 questions correctly.

Please mail this Quiz answer form along with the proper enclosed payment to:

NCSF
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

Questions? 800-772-NCSF