

Implementing Fitness Programs for Fire Fighters

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Medical clearance is required.

- If returning to work from a medical issue, clearance for return to work must be provided by the treating healthcare provider.
- Completion of a Health Assessment Questionnaire.

Fitness Components

- Body Composition
- Cardiovascular (Aerobic)
- Muscle Strength/Endurance (Anaerobic)
- Flexibility

Body Composition

- Body proportions of:
 - Lean body mass
 - Body Fat

Cardiovascular (Aerobic)

- The body's ability to acquire and utilize oxygen.
- The more efficient your body is at obtaining and utilizing oxygen the more aerobically fit you would be.

Muscle Strength and Endurance

- Strength:
 - measured by the cross sectional diameter of a muscle; the thicker the muscle the stronger it is.
 - 1-repetition maximum
 - 0 to 15-second time frame
- Endurance:
 - muscles ability to repeat activity.
 - muscles ability to tolerate lactic acid build up.
 - 16-second to 2-minute time frame.

Flexibility

- Passive Restraints:
 - ligaments, bones, joint capsules, meniscus
 - Rigid or plastic in nature, difficult to change
- Active Restraints:
 - Muscles
 - Elastic in nature; easier to change
- Overall, the length from point A to point B in a stretched position.

NFPA 1582

Standard on Comprehensive Occupational
Medical Program for Fire Departments
2007 Edition

NFPA 1582 does a nice job of
outlining fitness assessment
criteria

Assessment of Body Composition: Percent Body Fat

- *Skinfold*
- *Circumference*
- Bioimpedance
- Hydrostatic weighing
- *Body Mass Index*
- Waist-to-hip ratio

Assessment of Aerobic Fitness

- 1-mile walk
- 1.5-mile run/walk
- 12 minute run
- Step tests
- *Stair climbing machine: FDNY Stairmill protocol; submaximal*
- Cycle ergometer
- *Treadmill: Gerkin Treadmill Protocol; submaximal*
- *Maximal Cardiopulmonary Evaluation w/MD & crash cart.*

Muscular Strength Testing

- Handgrip dynameter
- Static Biceps curl w/dynameter
- Static Leg press w/dynameter
- Bench Press 1-rep. max. or percent of body weight
- Leg Press 1-rep. max. or percent of body weight
- *Floor to Waist functional lift*

Muscular Endurance Testing

- *Push-ups*
- *Modified Push-ups*
- Pull-ups
- Bent Knee Sit-ups
- *Crunches given time*
- Crunches to cadence

Flexibility Assessment

- Sit and Reach

Who is qualified to test?

- Physicians
- Physical Therapist
- Occupational Therapist
- Chiropractor
- Exercise Physiologist
- Athletic Trainers
- Human Kinesiology - or biomechanical background.

NFPA 1582: Chapter 8, page 1582-17 8.2.1.1

- “All component results of the mandatory fitness evaluation shall be used to establish an individual’s baseline or measured against the individual’s previous assessments and not against any standard or norm.”

Fitness Protocols

- **Reducing % Body Fat:** Typically the combination of dieting and aerobic exercise help reduce % body fat. Recently programs have included strength training as well. Dieting reduces the total number of calories. Exercise helps burn calories, thereby further helping to reducing your total caloric intake. If you have never dieted, or have had trouble keeping weight off in the past, it is recommended you seek guidance from a nutritionist or reputable weight loss program (i.e. Weight Watchers: the Hospital of Saint Raphael's does not endorse any specific diet program). A good diet is a life long behavioral change in the way you eat, exercise and stay active. You don't necessarily need to sacrifice the foods you like; you just need to learn healthy choices. Exercise does not need to consume your life, but can be easily integrated into your daily routines.

Aerobic Conditioning:

- Three to five, 20 to 60-minute sessions per week at a target heart rate intensity of 60 to 85% of your estimated maximum heart rate.
- $(220 - \text{Age}) \times .6 = 60\% \text{ of Max HR}$ and $(220 - \text{Age}) \times .85 = 85\% \text{ Max HR}$
- Running, biking, walking, rowing, swimming, elliptical machines, etc.
- Need to use your big muscle groups

Muscular Strengthening:

- Instruction in particular exercises should be provided by a professional who is trained to do so. Examples would be physical therapists, exercise physiologists, strength and conditioning professional and personal trainers. Typical programs will be performed two to three times a week with 48 to 72-hours rest between sessions. Typically, heavy weights with low repetitions, between 5 and 10; 2-minutes rest between sets.

Muscular Endurance Training:

- To get better at push-ups and curl-ups you need to practice push-ups and curl-ups. Two to three times per week with at least 24-hours rest.
- Weight lifting with higher repetitions, 12 to 15 with lighter weights; between 3 to 12 sets per body part; resting between 30- and 60-seconds between sets.
- Typical programs will be performed two to three times a week with 48 to 72-hours rest between sessions.

Improving Flexibility:

- To improve your flexibility you need to stretch your muscles. Accepted guidelines include a gentle aerobic warm-up (~ 5-minutes; enough to start perspiring) and daily stretching of major muscle groups. Stretching for between 10 and 30-seconds for each muscle group being stretched. Each stretch can be repeated 3 to 5 times. You should be able to relax the muscle being stretched.

Data Collection and Dissemination

- Most important is for the individuals to understand the test results, and for them to see the annual changes in the results.
- General data summaries (averages) for the entire department can be shared with the Department management providing links cannot be made to any individual. Helps to give a general overview of the department health on an annual basis.

Educational Opportunities

- Nutrition and cooking classes to help improve eating habits.
- Strength training classes.
- Muscle endurance classes.
- Cardiovascular classes.
- Flexibility exercises for on and off job scenarios.
- Need to revisit quarterly.

Essential Functions: Physical Demands

- Climb 6-flights of stairs with up to 90-pounds of equipment.
- Rescue dragging or carrying victims up to 200-pounds.
- Department of Labor's Dictionary of Occupational Titles lists Fire Fighting as a very heavy job, meaning in excess of 100-pounds of lifting, carrying, pushing and pulling.

Essential Functions continued ...

- Increased number of medical calls vs. fires
- Obesity in America on the 3rd floor.

Fitness Implementation Considerations

- Perceptions that can make or break participation in a fitness assessment program implementation.
 - Mandatory vs. Voluntary participation
 - Collective Bargaining agreements
 - Maintaining Confidentiality
 - + to – for various reasons
 - S.A.I.D. Principle (Specific Adaptation for Imposed Demands)
- Budget considerations

Challenges with Fitness Programs

- Reasons why people don't exercise:
 - lack of time
 - life's progression
 - multiple jobs, family commitments,
 - Lack of knowledge
- Other pathologies that effect the ability to participate in fitness activities (i.e. arthritis).
- Aging work force
- Motivation
- Injury during testing

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