

Lesson 4 - Exercise Prescription

Developing an Effective Exercise Prescription

Exercise prescription is the systematic process of designing a physical activity program tailored to an individual's health status, fitness level, and personal goals. A well-designed exercise prescription follows the FITT-VP principle, which stands for Frequency, Intensity, Time, Type, Volume, and Progression. This framework ensures that all essential elements of an exercise program are considered and individualized to maximize benefits while minimizing risks.

Principles of Exercise Prescription

Individualization represents the foundation of effective exercise prescription. Exercise prescriptions must be tailored to each person's unique circumstances, considering current fitness level, health status, and medical conditions that may require modifications. Personal preferences, available resources, and barriers to adherence significantly influence the likelihood that a prescription will be followed. Specific goals such as weight management, improved function, or disease management should guide the emphasis and structure of the program. A prescription that works well for one individual may be entirely inappropriate for another, making individualization essential rather than optional.

The FITT-VP framework provides the core structure for any exercise prescription. Frequency refers to how often the activity is performed, typically measured in days per week. Intensity describes how hard the activity is performed, which can be quantified through various methods such as percentage of maximum heart rate, rating of perceived exertion, or percentage of one-repetition maximum for strength training. Time indicates the duration of each activity session. Type specifies the kind of activity performed, such as walking, cycling, or resistance training. Volume represents the total amount of activity, often calculated as frequency multiplied by time. Progression describes how the prescription advances over time as fitness improves. Each of these elements must be specified to create a complete and actionable exercise prescription.

The principle of specificity recognizes that exercise adaptations are specific to the type of training performed. Training effects are most pronounced in the systems and tissues directly involved in the activity. For example, running primarily improves cardiovascular fitness and leg strength but has limited effects on upper body strength. The prescription should match desired outcomes, with endurance training prescribed for cardiovascular benefits and resistance training for strength gains. Different activities produce different physiological adaptations, making activity selection an important consideration based on the individual's goals.

Overload and progression ensure that exercise continues to produce adaptations over time. Exercise must challenge the body beyond normal levels to produce adaptations, as the body

only adapts to demands that exceed its current capacity. The initial prescription should exceed baseline activity but remain achievable to build confidence and prevent injury. Gradual progression is necessary as adaptations occur, because what was initially challenging becomes easier as fitness improves. The rate of progression should be individualized based on adaptation rate and tolerance, as some individuals adapt more quickly than others and can progress faster.

Aerobic Exercise Prescription

For aerobic exercise, frequency recommendations vary based on intensity. Moderate-intensity activity should be performed on 3-5 days per week, while vigorous-intensity activity can be performed on 3 days per week due to its greater intensity and need for recovery. Daily activity may be appropriate for previously sedentary individuals starting at lower intensities, as frequent exposure to activity helps establish habits while the low intensity minimizes fatigue and injury risk.

Intensity prescription for aerobic exercise can be determined through several methods, each with advantages and limitations. Using percentage of maximum heart rate, moderate intensity corresponds to 64-76% and vigorous intensity to 77-95% of maximum heart rate. Heart rate reserve, which accounts for resting heart rate, defines moderate intensity as 40-59% and vigorous intensity as 60-89%. Rating of perceived exertion on a 6-20 scale places moderate intensity at 12-13 (somewhat hard) and vigorous intensity at 14-17 (hard to very hard). The talk test provides a simple field method where moderate intensity allows talking but not singing, while vigorous intensity makes talking difficult. Each method has utility in different contexts, with heart rate methods providing objective measures and perceived exertion and talk test offering practical approaches that don't require equipment.

Time or duration considerations for aerobic exercise recommend 30-60 minutes per session for moderate-intensity activity and 20-60 minutes per session for vigorous-intensity activity. These durations can be accumulated in bouts of at least 10 minutes throughout the day, making it possible to achieve recommendations even with a busy schedule. Longer durations may be needed for weight management goals, as greater energy expenditure supports weight loss and maintenance.

Types of aerobic activities include a wide range of options that can be selected based on individual factors. Walking, jogging, cycling, swimming, dancing, and rowing are common aerobic activities. Selection should consider joint health, with low-impact activities like swimming or cycling appropriate for those with joint problems. Skill requirements vary, with activities like dancing requiring more coordination than walking. Personal preference strongly influences adherence, making it important to help individuals find activities they enjoy. Cross-training with different activities can reduce injury risk from repetitive stress and improve adherence by providing variety.

Progression guidelines for aerobic exercise emphasize a conservative approach to reduce injury risk. Initially, duration should be increased before intensity, as the body adapts to longer durations more easily than higher intensities. For beginners, time can be increased by 5-10 minutes every 1-2 weeks as tolerance builds. Intensity should be increased only after establishing consistent activity patterns and adequate duration. A general rule is no more than a 10% increase in volume per week to reduce injury risk, though individual tolerance varies.

Resistance Exercise Prescription

Resistance exercise prescription follows similar FITT-VP principles but with parameters specific to strength training. Frequency recommendations suggest 2-3 non-consecutive days per week for each major muscle group, allowing 48 hours of recovery between sessions targeting the same muscle groups. This recovery time is essential for muscle repair and adaptation. More advanced individuals may use split routines that train different muscle groups on consecutive days, allowing some muscles to recover while others are trained.

Intensity prescription methods for resistance training differ from aerobic exercise. Using percentage of one-repetition maximum, beginners should train at 60-70%, while intermediate and advanced individuals can train at 70-85%. Repetition maximum approaches specify the number of repetitions that can be completed with proper form, with 8-12 RM appropriate for general fitness, 1-6 RM for maximal strength development, and 15-25 RM for muscular endurance. Rating of perceived exertion on a 0-10 scale places moderate intensity at 5-6 and vigorous intensity at 7-8.

Time and volume considerations for resistance training focus on sets and repetitions rather than continuous duration. Performing 2-4 sets per exercise provides optimal gains for most individuals, with more sets potentially beneficial for advanced trainees. Each set should include 8-12 repetitions for general fitness and hypertrophy, as this range effectively stimulates both strength and muscle growth. A complete session should include 6-10 exercises targeting major muscle groups. Rest intervals between sets should be 2-3 minutes for strength-focused training and 1-2 minutes for hypertrophy-focused training.

Types of resistance training include various modalities with different characteristics. Free weights, machines, resistance bands, and bodyweight exercises all provide effective resistance training. Compound exercises that involve multiple joints, such as squats, deadlifts, and bench presses, should form the foundation of the program as they efficiently train multiple muscle groups. The program should include exercises for all major muscle groups: chest, back, shoulders, arms, abdomen, hips, and legs, ensuring balanced development.

Progression guidelines for resistance training emphasize proper form before increasing load. Beginners should focus on learning proper form using lighter weights, as establishing correct movement patterns prevents injury and maximizes long-term progress. Resistance can be

increased by 2-10% when the current weight can be lifted for 1-2 repetitions over the target range. Periodization, which involves systematically varying volume and intensity over time, can optimize long-term progress and prevent plateaus. Advanced techniques like supersets or drop sets should be introduced only after establishing good foundational strength.

Flexibility Exercise Prescription

Flexibility exercise prescription emphasizes consistency and appropriate technique. Frequency recommendations suggest at least 2-3 days per week, though ideally 5-7 days for optimal benefits. Flexibility training can be performed daily as there is minimal recovery requirement, unlike strength and high-intensity aerobic training.

Intensity prescription for flexibility exercise involves stretching to the point of feeling tightness or slight discomfort, but not pain. Stretching should never be painful, as pain indicates potential tissue damage. Intensity should allow maintenance of proper breathing patterns, as breath-holding indicates excessive tension.

Time considerations recommend holding static stretches for 10-30 seconds for adults, with a total stretching time of 60 seconds per muscle group potentially optimal when performed as multiple repetitions. Older adults may benefit from longer hold times of 30-60 seconds, as their tissues may require more time to achieve lengthening.

Types of flexibility exercises include several approaches. Static stretching involves holding a position that elongates a muscle and is the most common form. Dynamic stretching involves controlled movements through range of motion and may be particularly appropriate as part of a warm-up. Proprioceptive neuromuscular facilitation uses contract-relax techniques for enhanced range of motion. The program should include stretches for all major muscle-tendon groups to maintain balanced flexibility.

Progression guidelines for flexibility training focus on gradual increases in range of motion. The duration of the hold can be gradually increased as tolerance improves. Progression can move from assisted to unassisted stretches as appropriate, and advance to more challenging positions as flexibility improves.

Balance and Neuromotor Exercise Prescription

Balance and neuromotor exercise prescription is particularly important for older adults but benefits all age groups. Frequency recommendations suggest 2-3 days per week or more, with balance training also easily incorporated into daily activities for consistent practice.

Intensity considerations for balance training involve providing sufficient challenge to mildly threaten stability but allowing completion without falling. Progression moves from stable to less stable positions as ability improves, ensuring continued adaptation.

Time recommendations suggest 20-30 minutes per session, though this can be distributed throughout the day in shorter segments that may be more practical for some individuals.

Types of balance exercises range from static to dynamic challenges. Static balance activities include standing on one leg or in tandem stance. Dynamic balance activities involve movement, such as walking heel-to-toe or tandem walking. Proprioceptive training uses exercises on unstable surfaces to challenge the balance system. Mind-body practices like tai chi and yoga incorporate specific balance training along with other fitness components.

Progression guidelines for balance training systematically increase difficulty. Reducing the base of support, such as progressing from two-legged to one-legged stance, increases challenge. Reducing sensory input, such as closing eyes during balance activities, forces greater reliance on proprioception. Adding movement components to static positions increases complexity. Incorporating dual-task challenges that require performing cognitive tasks while balancing mimics real-world demands.

Creating a Comprehensive Exercise Prescription

Creating a comprehensive exercise prescription requires integrating all components into a cohesive program. Initial assessment and goal setting establish the foundation by determining baseline fitness and functional capacity, establishing clear, measurable, and realistic goals, and identifying potential barriers and facilitators to adherence.

Balancing components involves prioritizing based on individual needs and goals. For general health, all components should be included with emphasis on aerobic and strength training as these provide the broadest health benefits. For specific conditions, emphasis should be adjusted accordingly, such as more balance training for individuals at high fall risk or more flexibility work for those with movement limitations.

A sample weekly prescription template might include Monday with moderate-intensity aerobic activity for 30 minutes plus full-body resistance training, Tuesday with flexibility and balance training, Wednesday with moderate-intensity aerobic activity for 30 minutes, Thursday with full-body resistance training plus flexibility work, Friday with moderate-intensity aerobic activity for 30 minutes plus balance training, Saturday with longer duration, lower intensity aerobic activity for 45-60 minutes, and Sunday with active recovery such as light walking and flexibility exercises. This template can be modified based on individual circumstances, preferences, and constraints.

Documentation and follow-up ensure accountability and allow for program refinement. Providing written prescriptions with specific FITT-VP parameters gives patients clear guidance. Scheduling regular follow-up to assess progress and adjust the prescription ensures the program remains appropriate as fitness improves. Documenting outcomes evaluates effectiveness and guides modifications based on individual response.

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