Section 6: Program Design

Chapter 21. The Optimum Performance Training Model

- Exercise programs need individuality, based on the client's assessment results, to make them impactful for clients, which likely increases adherence to the program.
- Fitness professionals should adopt an integrated, multicomponent approach to program design that includes flexibility, cardiorespiratory, core, balance, plyometric, SAQ, and resistance training.
- Exercise programs must consider many variables, such as teaching proper movement patterns, improving mobility and stability, enhancing endurance, and reducing the likelihood of injury.
- A training plan determines the forms of training to be used, how long it will take, how often it will change, and what specific exercises will be performed.
- Periodization is a systematic approach to program design that varies the amount and type of stress placed on the body to produce a physical adaptation and reduce the likelihood of overtraining and injury.
- An annual training plan, or macrocycle, demonstrates the long-term training program and how it progresses each month.
- A monthly training plan, or mesocycle, typically outlines a training plan for one month.
- A weekly plan, or microcycle, describes the specific workouts for the week.
- Linear periodization gradually increases the intensity of the training program while simultaneously decreasing volume over a specific period of time.
- Undulating periodization uses changes in volume, intensity, and exercise selection to provide loading differences on a daily or weekly basis.
- The OPT model consists of three levels: stabilization, strength, and power.
- The OPT model includes five unique phases of training: Phase 1 Stabilization Endurance Training, Phase 2 Strength Endurance Training, Phase 3 Muscular Development Training, Phase 4 Maximal Strength Training, and Phase 5 Power Training.
- The OPT workout template is divided into six parts: Warm-up, Activation, Skill Development, Resistance Training, Client's Choice, and Cool-down. Cardiorespiratory training can be integrated into any section of the OPT template.
- Phase 1 Stabilization Endurance Training teaches clients how to perform proper movement patterns, including pushing, pulling, pressing, squatting, hip hinging, trunk rotation, and overall movement competency.
- Once clients display adequate movement patterns, Phase 1 programs are progressed by placing a greater emphasis on enhancing proprioception, balance, and postural control.

- Phase 2 Strength Endurance Training is a hybrid form of training that involves the use of superset training in which a strength-focused exercise is immediately followed by a stabilization-focused exercise with similar biomechanical motions.
- Phase 3 Muscular Development Training is designed to enhance muscle hypertrophy using a high volume of strength-focused exercises.
- Phase 4 Maximal Strength Training requires the inclusion of heavy resistance training exercises to increase muscular strength.
- Phase 5 Power Training uses superset techniques to increase rate of force production. These superset techniques include performing a heavy resistance training exercise immediately followed by an explosive power-based exercise with similar biomechanical motions.
- The OPT model is an exercise program model that uses both linear and undulating periodization to help clients of all levels and abilities achieve a variety of different goals, including but not limited to reduced body fat, increased muscle mass, and improved athletic performance.

Important Concepts (not an exhaustive list)

Phase 1 resistance training protocols

Sets	Reps	Tempo	Rest	Intensity
1-3	12-20	Slow	0-90 secs	12-20 RM

**very important

Phase 2 resistance training protocols

Sets	Reps	Tempo	Rest	Intensity
2-4	8-12 (strength) 8-12 (stability)	Moderate and Slow	0-60 secs after each superset	8-12 RM

**very important

Phase 2 example superset sets

Strength-Focused Exercise	Stability-Focused Exercise
Bench press	Push-up
Machine chest press	Single-leg cable press
Machine lat pulldown	Stading lat pulldown
Machine cable row	Standing cable row
Machine shoulder press	Standing bottoms-up kettlebell press
Seated dumbbell shoulder press	Single-leg dumbbell shoulder press
Barbell squat	Single-leg squat
Romanian deadlift	Single-leg Romanian deadlift
Machine calf raise	Single-leg calf raise

Phase 3 resistance training protocols

Sets	Reps	Tempo	Rest	Intensity
3-6	6-12	Moderate	0-3 minutes	N/A

Notes: 12-20 reps is allowed if additional muscular endurance is desired

**very important

Phase 4 resistance

Sets	Reps	Tempo	Rest	Intensity
4-6	1-5	Explosive	0-3 minutes	1-5RM

<table>
<tr><td>training protocols</td><td>**very important</td></tr>
<tr><td>Phase 5 resistance training protocols</td><td>
<table>
<tr><th>Sets</th><th>Reps</th><th>Tempo</th><th>Rest</th><th>Intensity</th></tr>
<tr><td>3-5</td><td>1-5 (strength)
and
8-10 (power)</td><td>Explosive</td><td>1-2 minutes between pairs; 3-5 minutes between circuits</td><td>1-5RM
and
8-10 RM, or
30-45% 1RM</td></tr>
</table>
**very important</td></tr>
<tr><td>Phase 5 example superset sets</td><td>
<table>
<tr><th>Strength-Focused Exercise</th><th>Power-Focused Exercise</th></tr>
<tr><td>Bench press</td><td>Medicine ball chest pass</td></tr>
<tr><td>Machine chest press</td><td>Plyometric push-up</td></tr>
<tr><td>Machine lat pulldown</td><td>Medicine ball soccer throw</td></tr>
<tr><td>Machine cable row</td><td>Medicine ball pullover throw</td></tr>
<tr><td>Machine shoulder press</td><td>Front medicine ball oblique throw</td></tr>
<tr><td>Seated dumbbell shoulder press</td><td>Overhead medicine ball throw</td></tr>
<tr><td>Barbell squat</td><td>Squat jump</td></tr>
<tr><td>Romanian deadlift</td><td>Tuck jump</td></tr>
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Chapter 22. Introduction to Exercise Modalities

- Exercise modalities are tools that are designed to enhance an exercise or movement to create a desired outcome.
- There are many types of exercise modalities, including resistance training equipment, balance tools, and fitness trackers.
- It is important to keep safety and effectiveness in mind when deciding which training modalities may be the best to use and when to integrate them into a program.
- Because most novice exercisers lack resistance training experience, strength-training machines may offer a safer and effective option to free weights. Strength-training machines, however, are regarded as inferior to free weights for improving core stability and muscular coordination, as they offer artificial support instead of using one's core musculature.
- Free weights can be used by most populations, in a variety of fashions, for many goals, and in all phases of the OPT model. Although extremely versatile, free weights can be intimidating for some clients.
- Cable machines can provide greater ROM when compared to selectorized strength equipment. When using cable machines, it is important to match the cable's resistance to the muscle's natural line of pull.
- Elastic bands and tubing also allow clients to perform resisted exercises that mimic sport-specific movements, such as a golf swing or tennis forehand. Elastic resistance is portable and inexpensive but may not be ideal when trying to develop high levels of strength and muscular hypertrophy.

- Medicine balls can be used like other resistance implements to add load or instability to an exercise. Medicine balls can be used with a variety of populations as part of a program to increase muscular strength, endurance, and power, or in some cases, to help rehabilitate from injury.
- A kettlebell differs from a dumbbell, barbell, or medicine ball in that the center of mass is away from the handle, which may require more strength and coordination, as well as increased recruitment from stabilizers and prime movers simultaneously during particular movements. Many kettlebell exercises involve multiple joint motions and muscle groups.
- Suspended bodyweight training is an innovative approach to bodyweight fitness training in that it uses a system of ropes and webbing that allows the user to work against their own bodyweight while performing various exercises.
- Sandbags are designed to be carried, lifted, thrown, and pulled, and most come with several handles to easily change grips. Unlike barbells, dumbbells, and selectorized machines, the sand within the bag is constantly shifting, providing continuous instability.
- ViPR is an acronym for vitality, performance, and reconditioning. It is designed to be dragged, tossed, lifted, pulled, pressed, and carried. This design provides the fitness professional the ability to perform multidirectional, full-body exercises with external load resistance, known as loaded movement training.
- Battle ropes are typically made of heavy-duty nylon and come in a variety of lengths and thicknesses. Battle ropes are low-impact activities, which provide less impact on the joints.
- Balance modalities improve balance, ankle stability, and coordination but should not be used to perform maximal or near maximal lifts for safety reasons.
- Stability balls, also known as Swiss balls, are frequently used in a variety of training facilities with a wide range of populations. They are primarily used to increase the demand for stability in an exercise, but they can also be used to reinforce proper posture during squatting movements.
- The BOSU ball is an inflated rubber hemisphere attached to a solid plastic surface; it looks like a stability ball cut in half. Training with the BOSU ball offers the ability to increase the intensity of an exercise by decreasing the stability.
- The Terra-Core is comprised of an inflatable rubber bladder and hard-surfaced backing. Unlike stability balls, it is safe to perform several resistance training exercises, such as a dumbbell chest press, while lying supine on the Terra-Core.
- Fitness trackers are electronic wearable devices that enable a user to track their activity levels. They come in many forms, such as watches, bands, rings, heart rate monitors, and pedometers. Ease of use and intrinsic motivation are key factors for continued use of fitness trackers among those who purchase trackers.

Important Concepts (not an exhaustive list)

Pros and cons of strength machines	**Pros**	**Cons**
	May be less intimidating for certain clients	Many machines do not allow the user to perform total-body exercises
	Can emphasize certain muscle groups for rehabilitation or bodybuilding purposes	Moves primarily in one plane of motion
	Various intensities (load) provided in one weight stack	Does little to provide challenge to the core stabilization system
	Does not require a spotter	May not be ideal for improving athletic performance
	Provides extra support for clients with special needs	Machines do not fit all body types (short, tall, or obese clients may have a hard time adjusting the machine)
	Keeps the client in a fixed plane of motion, which may limit excessive ranges of motion	Expensive in comparison to other strength-training modalities
Pros and cons of free weights	**Pros**	**Cons**
	Can be used to emphasize certain muscle groups or target multiple muscle groups	May require a spotter
	Can improve athletic performance	May be too difficult for beginning clients to perform until exercise technique is mastered
	Can challenge the core stabilization system	Requires multiple dumbbells or barbells to change intensity (load)
	May improve dynamic joint stabilization and proprioception	Potentially more dangerous
	Allows individuals to move in multiple planes of motion	Intimidating for certain individuals

Chapter 23. Chronic Health Conditions and Special Populations

- There is a significant need for increased awareness and access to general fitness training for youths year-round, not just during one or more sport seasons.
- Given the alarming increase in childhood obesity and diabetes, current youth fitness guidelines focus on promoting healthy lifestyles and health-related physical fitness. Current recommendations state that children and adolescents should get 60 minutes (1 hour) or more of moderate to vigorous physical activity daily.
- It is important to understand that there are fundamental physiologic differences between children and adults.
- Research has clearly demonstrated that resistance training is both safe and effective in children and adolescents.
- Despite the normal decline in physiologic functioning associated with aging, older adults—with and without other chronic health conditions—can and do respond to exercise much in the same manner as apparently healthy younger adults.

- By adhering to a systematic process, fitness professionals can make a dramatic impact on the overall health and well-being of older adults.
- Regular physical activity and exercise is one of the most important factors related to long-term successful weight loss.
- Exercise has been shown to have a substantial positive effect on the treatment and prevention of type 2 diabetes.
- Clients with stable coronary artery disease—especially those who have participated in a cardiac rehabilitation program—should know or be taught information on the importance and benefits of exercise, which include a lower risk of mortality, increased exercise tolerance, muscle strength, reduction in angina and heart failure symptoms, and improved psychological status and social adjustment.
- Exercise regimens that combine resistance training to increase BMD with flexibility, core, and balance training to enhance proprioception are important for clients with osteoporosis and osteopenia.
- It is important for fitness professionals to understand the difference between rheumatoid arthritis and osteoarthritis and be aware of the signs and symptoms of an acute rheumatoid arthritis exacerbation.
- Fitness professionals should also monitor the progress of clients with arthritis to assess the effects of the exercise program on joint pain.
- Exercise is an important intervention for clients recovering from cancer. It can improve exercise tolerance, reduce the cellular risks associated with cancer, and improve quality of life.
- There has been substantial research documenting the beneficial effects of exercise during pregnancy on the physiology and health of both the mother and developing fetus.
- Clients with lung disease experience fatigue at low levels of exercise and often experience dyspnea.
- The primary limiting factor for exercise in the client with PAD is leg pain.

Important Concepts (not an exhaustive list)	
Exercise considerations for youth clients	• Progression for the youth population should be based on postural control and not on the amount of weight that can be used • Make exercising fun
Exercise considerations for older adults	• Progression should be slow, well monitored, and based on postural control. • Exercises should be progressed if possible, toward free sitting (no support) or standing. • Make sure the client is breathing in a normal manner and avoids holding their breath, as in a Valsalva maneuver.

	• If the client cannot tolerate self-myofascial techniques or static stretches, they can opt for slow and controlled active and dynamic stretches.
Exercise considerations for overweight or obese clients	• Make sure client is comfortable—be aware of positions and locations in the facility your client is in. • Exercises should be performed in a standing or seated position. • Clients may have other chronic diseases; in such cases, a medical release should be obtained from the individual's physician. • Resistance exercises performed in a circuit-training manner, with higher repetitions, such as 20, may be used if tolerated by the individual.
Exercise considerations for diabetic clients	• Make sure client has appropriate footwear, and have client or physician check feet for blisters or abnormal wear patterns. • Advise client or class participant to keep a snack (quick source of carbohydrate) available during exercise to avoid sudden hypoglycemia. • Avoid excessive plyometric training, and higher-intensity training is not recommended for clients with diabetes. • Self-myofascial techniques may be contraindicated; a physician's approval is recommended.
Exercise considerations for hypertensive clients	• Avoid heavy lifting and Valsalva maneuvers—make sure client breathes normally. • Do not let client overgrip weights or clench fists when training. • Modify tempo to avoid extended isometric and concentric muscle actions. • Perform exercises in a standing or seated position. • Allow client to stand up slowly to avoid possible dizziness. • Progress client slowly. • Use circuit or peripheral heart action system (PHA) weight training as an option, with appropriate rest intervals. Tempo should not exceed 1 second for isometric and concentric portions of the lift.
Exercise considerations for clients with coronary heart disease	• Be aware that clients may have other diseases to consider as well, such as diabetes, hypertension, peripheral vascular disease, or obesity. • Modify tempo or pace to avoid extended isometric and concentric muscle actions. • Avoid heavy lifting and Valsalva maneuvers—make sure client breathes normally. • Do not let client overgrip weights or clench fists when training. • Perform exercises in a standing or seated position. • Progress exercise slowly. • Use circuit or peripheral heart action system (PHA) weight training as an option, with appropriate rest intervals. Tempo should not exceed 1 second for isometric and concentric portions of the lift.
Exercise considerations	• Progression should be slow, well monitored, and based on postural control. • Exercises should be progressed, if possible, toward free sitting (no support) or standing.

for clients with osteoporosis	• Focus exercises on hips, thighs, back, and arms. • Avoid excessive spinal loading on squat and leg press exercises. • Make sure the client is breathing in normal manner and avoids holding their breath, as in a Valsalva maneuver.
Exercise considerations for arthritic clients	• Avoid heavy lifting and high repetitions. However, high repetitions with low load may be appropriate. • Stay in pain-free ranges of motion. • Start out with only 5 minutes of exercise, if needed, and progressively increase, depending on the severity of conditions. • May use a circuit or peripheral heart action training system.
Exercise considerations for clients with cancer	• Avoid heavy lifting in initial stages of training. • Allow for adequate rest intervals, and progress client slowly. • There may be a need to start with only 5 minutes of exercise and progressively increase, depending on the severity of conditions and fatigue. • May use a circuit or peripheral heart action training system.
Exercise considerations for pregnant clients	• Avoid exercises in a prone (on stomach) or supine (on back) position after 12 weeks of pregnancy. • Avoid self-myofascial techniques on varicose veins and areas of swelling. • Plyometric training is not advised in the second and third trimesters. • Moderate- to high-intensity resistance exercise may be used in the first trimester if the client is accustomed to exercise; however, in the second and third trimesters, lower-intensity exercise programs are advised.
Exercise considerations for clients with lung disease	• Upper-body exercises cause increased dyspnea and must be monitored. • Allow for sufficient rest between exercises. • Peripheral heart action training system is recommended.
Exercise considerations for clients with intermittent claudication or PAD	• Allow for sufficient rest between exercises. • Workout may start with 5–10 minutes of activity. • Slowly progress client. • A circuit-training format is recommended.