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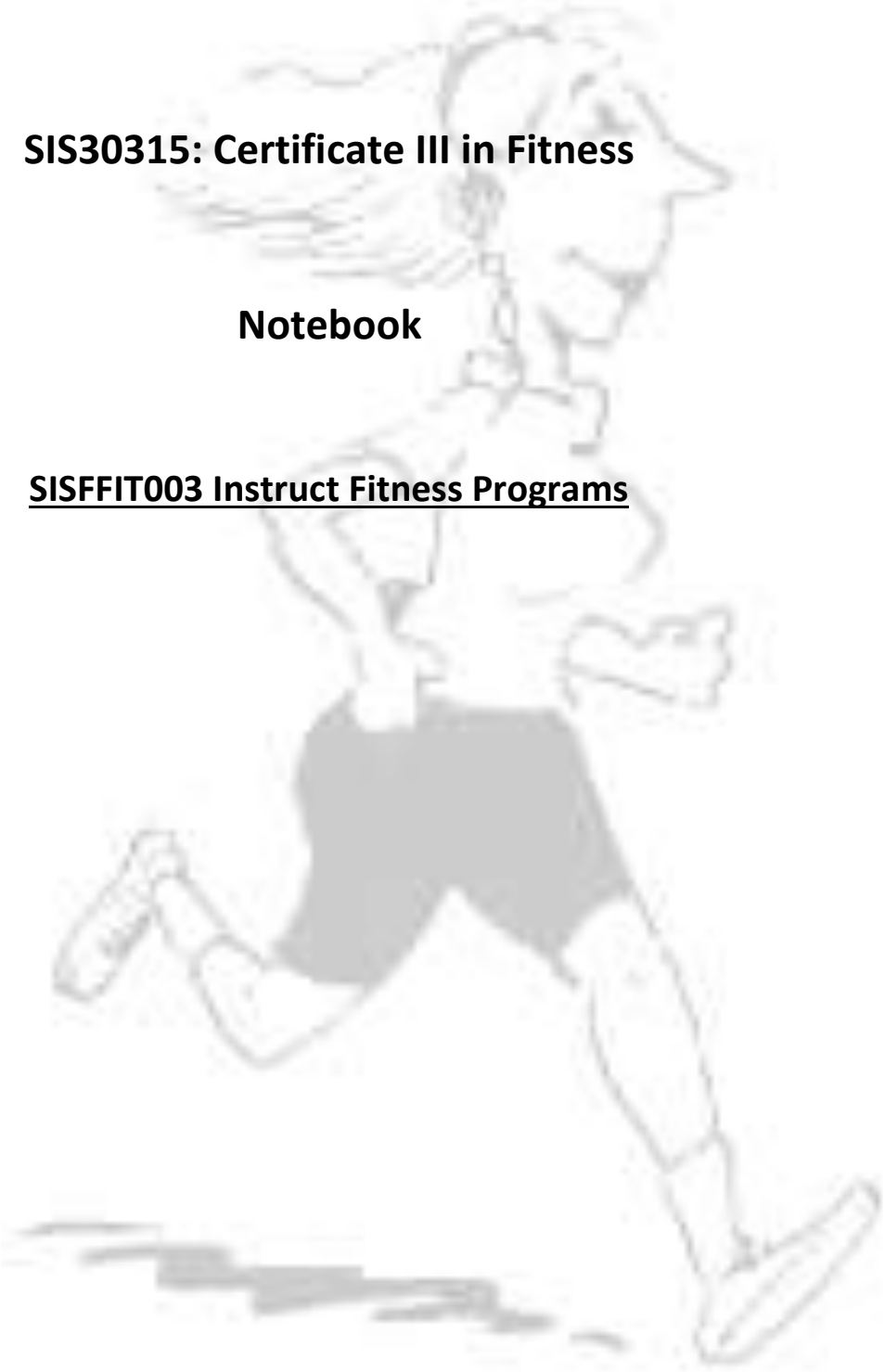
SIS30315: Certificate III in Fitness

Notebook

SISFFIT003 Instruct Fitness Programs



Version 1

SISFFIT003 Instruct Fitness Programs

A major reason of increasing obesity in Australia is that approximately three quarters of the Australian population think they get enough exercise or physical activity.
This is not actually true, and Australia has one of the most overweight and obese people in the world, alongside UK and USA.

Successful fitness programming is not just about giving someone a program. It's about understanding what they want to achieve and providing them with education and the power to achieve it.

While sound specific principles will always be applied when programming, fitness instructors need to develop the art of programming, they need to learn to take into account the individuals needs and responses to give the client a unique program.

If the client is seeing you, then they have already taken the first step into changing their current lifestyle.

Early in the process of induction and screening, you should try to gain some knowledge of the clients past history of exercise or sports. They may have had a bad experience or been injured which may make them apprehensive to start again.

They may feel that as they did not achieve their goals last time, or did not maintain the changes, that they are a failure and they shouldn't keep on trying.

The client may feel an association of tiredness, fatigue, and a chore like activity when performing physical activity which may make them less likely to maintain a program.

Many overweight and uncoordinated clients may have memories of being teased as a child because of their size and lack of ability. These clients may not have been selected in sporting teams, and ridiculed by being forced to participate in sports when they felt uncomfortable.

These clients may feel the pressure of being watched by other people when they exercise, and may have a negative attitude towards public activity.

The fitness instructor needs to assist these clients by ensuring the exercise program is designed specifically for the client's needs, to assure success in the program.

Results = Motivation

There may be barriers beyond your control, such as psychological etc, but you can certainly help the situation by suitably tailoring a program.

An awareness of common barriers will assist you to design an exercise program with the clients specific requirements in mind thereby creating a feeling of ownership for the client, and ultimately enhancing their adherence to the program.

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Benefits of Physical Exercise

Physical	Psychological	Social
More easily able to complete daily tasks	Increased self esteem	Broaden range of contact
Decreased chance of lifestyle diseases e.g. obesity, adult onset diabetes	Feeling of wellbeing	Better quality of life
Increased strength and endurance	Better quality of sleep	Sharing activities with friends and family
Decreased joint and muscular pain	Enhanced ability to cope with stress	Meeting people with similar experiences
Cardiovascular changes	Increased mental acuity	
Increase in bone density		
Decreased risk of premature death		
Decreased incidence of falls and resultant injury		
Helps maintain healthy weight range		
Increased immune efficiency		
Improved posture		

Potential barriers to exercise

Potential barrier to activity	Techniques to overcome barrier
Lack of discipline	Goals should belong to the client not the instructor
Lack of time	Assist the client with use of a diary Encourage physically active family outings
Feeling uncomfortable physically	Prescribe a program that is not too physically demanding Progress program realistically
Feeling uncomfortable socially	Provide exercise opportunities in a private environment until increased self esteem develops Provide exercise opportunities with people in similar conditions Use praise and positive reinforcement regularly
Financial cost	Provide a low cost program, in a park
Lack of motivation	Help client to set short and long term goals Encourage exercising with family and friends
Boredom	Use variety Challenge the client Experiment with different types of programs
Feeling tired	Reassess program, has the program progressed too quickly?
Inappropriate goals	Goals should only be set by client when you can assist so they are achievable
Lack of skill	Write a program to suit skill level

It is estimated at least one third of all Australian adults are at risk of major health problems because they fail to exercise regularly. Exercise of a moderate physical intensity, such as a brisk walk, medium-paced swimming or cycling for just 30 minutes each day is enough to reduce the chance of major health problems.

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PRINCIPLES OF TRAINING

SPECIFICITY

Training methods, exercises, intensities and workloads should be specific to the:-
- **energy systems**
- **fitness components**
- **muscle groups**
- **movement patterns**

This implies that specific modes of training will produce results that have little transfer to other systems.
There will be instances where some transfer occurs, but not as great as the component you are training.

Eg. running will increase cardiovascular conditioning, and may increase aerobic power during swimming, but not as great as if swimming had been undertaken.

The program should be as specific to the client's goals as possible.

Application
- work/rest ratio same as that identified
- distances covered specific to those identified in games analysis
- exercises mirror movement patterns involved in game skills
- training heart rates specific to game intensities

OVERLOAD

This principle involves the gradual increases in workload. It is applied once adaptation has occurred to a certain stimulus.

The 4 R's of overload:
- repetitions
- resistance
- rate
- rest

The body adapts to training loads as the athlete progresses through a training program.

If training loads remain constant the athlete will plateau and no training effect will be achieved. In order for improvement to continue training loads should be progressively increased as the body adapts.

Overload ensures that the training program produces chronic adaptations in the body and performance improvements.
If overload is not applied, no improvement occurs or there is a plateau in performance.

Overload must be progressive.

For effective overload, only 1 variable or a 10% increase should be made in a training session to avoid injury and overtraining.

The following indicators identify when to overload:-
- goal times achieved
- heart rate not elevated to training levels
- RM achieved with ease

Application of progressive overload for various training methods
Ensure that when manipulating variables you continue to remain specific to chosen energy systems.

Continuous Training

- increase distance
- increase difficulty of course
- decrease goal time
- increase heart rate intensity

Interval Training

- decrease goal times
- increase reps and/or sets
- decrease rest period
- increase intensity
- increase distances

Circuit Training

- increase reps
- decrease goal time
- increase number of circuits

Weight Training

- increase weight
- increase reps
- increase sets

PROGRESSION

As a client's physiological performance improves, the training threshold should be increased and the clients programs should evolve to ensure overload is occurring.

It should be noted that it is not possible or desirable to improve components of fitness indefinitely. A client may wish to improve cardiovascular endurance but also maintain flexibility, in this case progression is used to improve cardiovascular endurance while flexibility is maintained rather than progressed.

Although a client's performance will improve rapidly early in the training program, the fitness instructor should be careful to ensure overtraining does not occur.

Overtraining is a physical, behavioural, and emotional condition that occurs when the volume and intensity of an individual's exercise exceeds their recovery capacity. They cease making progress, and can even begin to lose strength and fitness. Overtraining is a common problem in weight training, but it can also be experienced by runners and other athletes.

A client should not be progressed at a rate more than 5% each time progression takes place. Rate of improvement will vary rapidly depending on the client.

DETRAINING

If training is not maintained, at the training threshold the effects will be reversed. To prevent detraining, adopt a maintenance training program, where progression and overload are not applied.

The exact times for detraining in any component of fitness will vary depending on the level of fitness, age, intervening illness or injury, specific conditioning practices undertaken.

INDIVIDUALITY

Area to consider when designing the program:

- age
- sex
- gender
- genetic makeup
- current health status
- previous training
- previous injuries
- diet
- occupation
- testing results
- time available
- equipment available
- clients goals
- motivation and personality
- restrictions imposed by other health professionals

INTENSITY

The principle addressing the amount of effort applied in a training session.
Intensity should be monitored to ensure the client remains above the training threshold and achieves a training effect.

Intensity should be specific to the energy system and fitness component being developed

If intensities are too high (above anaerobic threshold) or too low (below training threshold) the client will not be achieving specific training goals**.**

High intensities

- ATP/CP (85-95%max)
- Lactic Acid (80-90%max)
- Strength (80-95% max)
- Power (60-80% max)

Sub max intensities

- Aerobic (70-80%max)
- Endurance 40-60% max)

Monitoring intensities

- heart rates (heart rate monitors used by many athletes)
- times
- repetition maximums

Measurement of Heart-Rate

Often presented as a % of maximum HR.
Max HR is calculated by 220- age. This is an estimate & can vary by up to 10 beats per minute.

DURATION

Duration is the principle addressing the length of time required to improve in a training program.

This can include time spent during the:

- Length of each session (minutes)
- Length of total program (weeks or months).

Exercise recommendations can be met through 30-60 minutes of moderate-intensity exercise (five days per week) or 20-60 minutes of vigorous-intensity exercise (three days per week).

One continuous session and multiple shorter sessions (of at least 10 minutes) are both acceptable to accumulate desired amount of daily exercise.

Gradual progression of exercise time, frequency and intensity is recommended for best adherence and least injury risk.

People unable to meet these minimums can still benefit from some activity.

Gains in aerobic fitness take longer (12-16 weeks) than gains in anaerobic fitness/strength & power (8-10 weeks)

FREQUENCY

The principle addressing how often one trains per week.
To achieve a training effect it is necessary to train for a minimum of **three sessions per week**.
Aerobic training for beginners should take place at least 3 x per week.

However, endurance athletes perform 5-6 sessions/wk due to the sub-maximal nature of training.

Anaerobic training (strength, muscular power, anaerobic power & speed) takes place 3 - 5 sessions/wk.

The high intensity requires greater recovery time when compared to aerobic training.

Elite endurance athletes can train 7 days a week & more than once a day.

How can they manage this without suffering from overtraining & injury? They vary training methods on the same day & include recovery training sessions.

Getting the client involved in their own program will help them try and incorporate activities throughout their day to increase energy expenditure.

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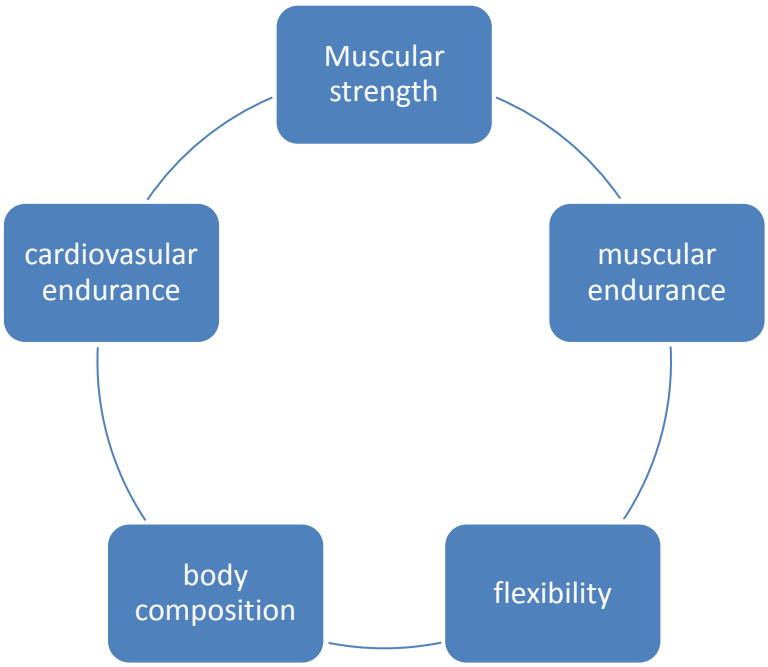
Health related components of fitness



Cardiorespiratory endurance

- Ability of the heart and lungs to take in and deliver an adequate supply of oxygen to exercising muscles
- Improved primarily through aerobic exercise
- If cardiorespiratory endurance is poor, other components of fitness will suffer
- Cardio-respiratory endurance (Aerobic capacity): the ability of the heart and lungs to supply oxygen to working
- muscles, allowing whole body activities to be performed over long periods.

Factors influencing cardiorespiratory endurance

- functional efficiency of cardiorespiratory system
- percentage distribution of muscle fibre types
- gender
- age
- genetics

Muscular strength

- Amount of power a muscle can generate in a given instant
- The maximal amount of force that can be generated in one maximal contraction (1RM)

Factors influencing strength:

- muscle fibre recruitment
- cross sectional area of muscle
- muscle length and angle of pull of muscle
- type of muscle fibre
- muscle fibre arrangement
- age of individual
- gender
- contraction speed

Muscular Power

The ability to produce force rapidly

Factors influencing power
• force generated by a muscle decreases and power increases with increasing speed of movement

Muscular endurance

- Ability to sustain repeated contractions or one contraction over a period of time
- Muscular Endurance: the capacity of a muscle or group of muscles to contract repeatedly against a light resistance, or sustain a contraction for an extended period of time

Factors influencing muscular endurance

- aerobic energy production
- fibre type
- blood flow to muscles

Flexibility

- Range of motion (ROM) at a joint, or that a joint can move through
- Important for posture, joint stability, coordination and balance
- Flexibility is limited by tight muscles and tendons surrounding a joint and by stiff ligaments connecting the bones that make up a joint
- Flexibility : the range of motion around a joint –(static); resistance of a joint to motion –(dynamic)

Factors influencing flexibility

- joint type - structures associated with joint capsule, bone
- muscle length
- muscle temperature
- gender
- structure - muscle, tendon, skin

Body composition

- Amount of water, fat, muscle and bone in the body
- Excess body fat is associated with certain conditions

Anaerobic Capacity:
The ability to produce energy without the need for oxygen

Factors influencing anaerobic capacity
• anaerobic energy production
• muscle fibre types
• speed of nerve impulses

Speed:
The ability to move the body rapidly from one point to another

Agility:
The ability to move quickly and change direction whilst maintaining balance

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PLANNING A TRAINING SESSION

Once you have gathered all the pre-programming information (as outlined in 'Introduction to Fitness & Exercise Science Module'), including a client's current fitness level, preferences, health details and fitness test results, you should be able to create a basic fitness program for a client.

This includes:

- identifying a client fitness level from their fitness screening and appraisal
- identifying a range of exercises to target specific fitness components
- identify any factors (medical conditions/injuries/recommended alterations) that will affect a client's ability to perform in an exercise program

The next step is to develop a fitness exercise plan of general activities suited to client's needs, lifestyle and exercise preferences.

Remember to maximise the positive aspects of the environment and personal attributes for long term adherence to a program, incorporating motivational techniques.

The beginner program should:

- Increase flexibility in identified inflexible areas while maintaining flexibility in areas that do not require improvement
- Strengthen weak muscles while maintaining strength in muscles that do not require improvement
- Change static and dynamic posture to reflect adequate balance in the body
- Produce adequate changes to connective tissue to assist in avoiding injury in daily life and subsequent programming.
- Incorporate exercise into the clients daily life
- Improve self image and enhance kinaesthetic awareness

WARM UP

By definition, a warm up is a group of exercises performed immediately before an activity, which provides the body with a period of adjustment from rest to exercise.

There are two categories of warm ups:

a) Passive warm up
b) Active warm up

A Passive warm up may include activities such as sauna, spas, infra-red lights, ultrasounds...etc.

An active warm up, which is the preferable method employed in preparation for a session of activity, includes activities such as calisthenics, jogging, stationary cycling, or movements that rehearse the actual performance about to be undertaken.

The warm up is known to provide the following benefits:

- Increase muscle temperature.
- Increase blood flow & O2 supply to working muscles.
- Increase flexibility by improving elasticity of connective tissue.
- Increase speed of the conduction of nerve impulses and hence Increase speed of muscular contraction.
- Enhances psychological preparation
- Decreases muscle viscosity, improving mechanical efficiency and power

CONDITIONING / SKILL DEVELOPMENT

The conditioning component of the training session consists of the training methods outlined such as continuous, interval or weight training.

The training methods selected for the sport are specific to the energy systems, fitness components & muscle groups identified in the data analysis.

They are also specific to the individual according to the strengths & weaknesses identified in the fitness testing.

Skill development may be developed in combination with or separately to conditioning.

Motor skill training can be performed early in a training session to enhance technique, or later in the training session so that fatigue is high to simulate a competitive game situation.

Skill development involves a number of drills or activities designed to enhance motor skills & tactical understanding.

Conditioning is used in the earlier stages of the preparatory phase.
Skills (if required) are generally introduced during the preparatory phase.

- FITT formula should be utilised to determine; frequency of exercise, intensity of exercise, time and type of exercise. (Explained in detail in module 1- Introduction to fitness & exercise science)
- Program phases should be taken into account when structuring the program; preparation phase, conditioning phase, recovery phase, and adaptation phase.
- Program and exercise selection type; including sets and reps, circuit, single set to failure, split routines, matrix.

AEROBIC ACTIVITY

The aim is to improve the efficiency of the heart, lungs, vascular system and muscles in picking up, delivering and utilising oxygen.
Rhythmic or dynamic activities involving large muscle groups are the most effective for improving the cardiovascular system, and lasting no less than 20 minutes.

Initial conditioning- usually lasts 4 – 6 weeks, client should complete low level exercise every other day for 10 – 15 minutes. This prepares the client for involvement in the exercise program as well as introducing exercise into their daily lifestyle.

Improvement conditioning- may last 6 months, progression and overload should be applied by increasing duration and intensity when appropriate.

Maintenance- client maintains good adherence to an exercise routine beyond 6 months

Cardiovascular conditioning program guidelines

Minimum threshold

Minimum training required to achieve improvements in cardio endurance

- frequency 3 x a week
- intensity rhythmic activities using large muscle groups at 60% of HR. beginners may need to start at 40-50% of HR.
- duration 20 minutes of continuous or discontinuous aerobic activity per session

Suggested program

- frequency 5 x a week
- intensity rhythmic activity using large muscle groups at 60-90% of HR
- duration 20-60 minutes of continuous or discontinuous aerobic activity per session

MUSCULAR STRENGTH & ENDURANCE

The aim of resistance training is to improve the efficiency of the muscular system.

Muscular strength; is the ability to produce a maximum force once 1RM

Muscular endurance; is the ability to repeat or sustain contractions over a period of time against a sub-maximal load

Exercise order: generally speaking, the best drills for beginner clients are those that work large muscle groups across multiple joints (compound exercises)

Look at the following program as an example

- leg press, squats, lunges
- bench press, seated row
- lat pulldown, upright row
- crunch, reverse crunch
- back extensions

Training guidelines for dynamic (isotonic) muscular endurance

Minimum threshold

Minimum training required to achieve improvements in dynamic muscular endurance

- frequency 3 x a week
- intensity 30% of 1RM
- duration 1 set of 9 reps for each exercise

Suggested program

- frequency every second day
- intensity 50% of 1RM
- duration 2-5 sets of 15-25 reps

Training guidelines for static (isometric) muscular endurance

Minimum threshold

Minimum training required to achieve improvements in static muscular endurance

- frequency 3 x a week
- intensity static contraction of between 50% and 100% 1RM
- duration hold for 10-50% shorter than required activity length
- perform 10-30 sets

Suggested program

- frequency every second day
- intensity 100-150% of resistance to be used in activities
- duration 5-10 sets of times 20% longer than activity duration

Training guidelines for muscular strength

Minimum threshold

Minimum training required to achieve improvements in muscular strength

- frequency each body part 2 x a week
- intensity 50-65% 1RM
- duration 2 sets incorporating 14-16 reps

Recommended training

- frequency each body part 2 x a week
- intensity enough to elicit failure in the last few reps of the final set
- duration 3 sets incorporation reps appropriate to clients goals

FLEXIBILITY

Refers to the range of movement or motion of a group of joints or joint.

Training guidelines for flexibility

Recommended training

- frequency 3-5 x a week
- intensity slight discomfort
- time 15-30 seconds for maintenance, 30-60 seconds for improvement

WARM DOWN/COOL DOWN

The warm down provides a number of benefits that include:

- A warm-down increases the breakdown of waste products such as ADP, phosphates, hydrogen ions & lactic acid.
- A warm-down prevents venous pooling, or the pooling of blood in the veins.

- Warm down activities recommended include the same activity as in the conditioning session, but at a reduced intensity and stretching.

RECOVERY SESSIONS

A number of strategies are used to enhance recovery.

These can include:

Stretching
Massage
Hydrotherapy
Diet
Sports Skins

Recovery should focus on decreasing DOMS (delayed onset muscle soreness), repairing muscle fibres damaged during session, recovering nervous system, taking in adequate nutrients and food to repair and recover.

REVIEW

Review and adapt a client's exercise program in accordance with their progress.

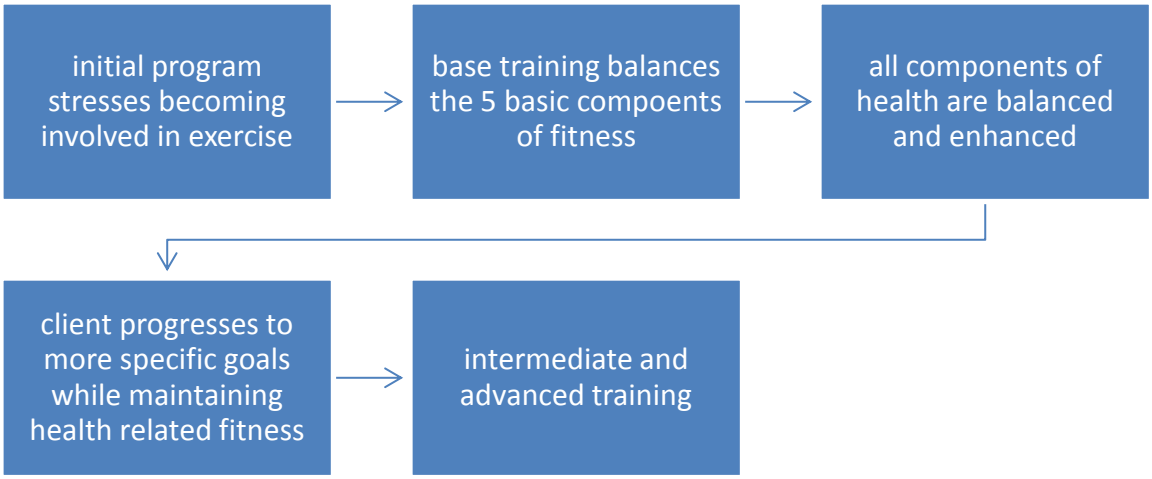
Obtain feedback from clients on their own personal progress and their degree of satisfaction with the program and facilities

Undertake relevant fitness appraisals to monitor a client's fitness development. The same tests should be used as in the initial consultation, to give the client an idea of how they have progressed.

Fitness levels of a client may be indicated not only by physical fitness, but also by motivation levels, and psychological or emotional fitness/wellness.

Record the clients amended/adapted exercise program onto a program card.

Progression



It is important that the client is continually asked about their personal progress and customer satisfaction to ensure exercise adherence.

Energy systems summary

Characteristic	ATP-PC Energy System	Lactic Acid System	Aerobic Energy system
Also Known As	**PC system, CP system, phosphagen system, alactic system**	**Anaerobic glycolysis Lactacid system**	**Oxygen system, aerobic glycolysis**
Fuel Source	Phospho Creatine (**PC**) or Creatine Phosphate (**CP**) (same thing, different name)	Glycogen	a) At rest: Free Fatty Acids(FFA's) & CHO b) Submaximal intensities: • CHO • Fats: when glycogen sparing & when glycogen stores diminished • Proteins (only under extreme conditions such as starvation, extended illness of depletion of CHO's & FFA's) c) Maximal intensities (shot duration): • CHO **only**
Intensity of Activity	High intensity (95+% max HR)	• High intensity (85%+% max HR) • Used for increases in intensity during long duration events when PC has not restored.	a) Resting b) Submaximal intensity (<80% max HR)
The duration that the energy systems are dominant DURING activity	Short duration (1-5 seconds)	Intermediate duration (5 – 60 seconds)	Long duration (75 + seconds)
Peak Power	2-4 seconds	5-15 seconds	1-1.5 minutes
Amount of ATP produced	• Extremely limited (0.7 ATP for every PC	• Small amounts • (2-3 ATP for each	• Large amounts (endless) • Carbohydrates (38 ATP per

	molecule)	glucose molecule)	glucose molecule) • Fats (441 ATP per triglyceride molecule)
Speed of ATP produced	• Explosive/Instantaneous • Relies on fast and simple chemical reactions	• Fast • Longer chemical reactions (12) in the break down of glycogen compared to ATP-PC.	• Medium • Complex chemical reactions • Availability of oxygen delays maximum power • Fats slower to resynthesise ATP that CHOs
By products	• Inorganic phosphates (Pi) • ADP & AMP	• Lactic acid • H+ ions • ADP	• CO2 • H2O • Heat
Total % Event Duration	0-10 seconds	10-75 seconds	75 seconds + It is the major contributor of energy in events that are of more than 75 seconds in **total** event duration.
Fitness Components	• Anaerobic Power & Speed • Muscular Strength (1-3 seconds) • Muscular Power • Dynamic Flexibility • Agility	• Anaerobic Power & Speed • Muscular power (when repeated efforts are made during activity) • Muscular Strength (isometric > 5 seconds) • Dynamic Flexibility • Local Muscular Endurance • Agility (only if fatiguing)	• Aerobic Capacity / CV Endurance • Local Muscular Endurance • Static Flexibility
Disadvantages of the energy systems	• Resynthesises very limited amounts of ATP • Limited stores of ATP & PC in muscle (higher in fast twitch fibres) • Produces Inorganic phosphate as a metabolic by-product	• Produces H+ ions that cause fatigue in large amounts • Produces large amounts of H+ which greatly decreases muscle pH • Produces relatively small amounts of ATP compared to the aerobic system.	• Resynthesises ATP slowly (particularly fats). • Fats have a high oxygen cost resulting in a reduced intensity.
Advantages of the energy systems	• Resynthesises ATP explosively/immediately • Doesn't need long chemical reactions • Used for high intensity activities	• Resynthesises ATP quickly • Provides anaerobic energy in large amounts that ATP-PC system (x3) • When working above 85% max HR and no chance for PC replenishment, only anaerobic contributor	• Resynthesises large amounts of ATP • "Endless" energy provider • Produces non toxic by-products • Allows for oxidation of metabolic by-products and resynthesis of glycogen from LA

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Training Methods

Depending on the fitness goals and objectives of a training program, as well as the equipment and facilities available, various conditioning methods are often employed.

These may include:

Continuous Training (aerobic)

A major component of any comprehensive fitness program should be aerobic exercise to develop cardio-respiratory endurance, which is the ability to continue strenuous tasks involving larger muscle groups for extended periods of time.

A continuous training session, which generally involves brisk walking, jogging, swimming, cycling or other moderate-to-vigorous activities, usually lasts between 15 minutes to 1 hour without rest periods.

The optimal training zone for inducing cardiovascular effect is around 70 - 85% max HR
This intensity should be maintained consistently throughout the exercise session.

Interval Training (aerobic or anaerobic)

Interval training involves repeated bouts of intense exercise interspersed by periods of recovery which allows for replenishment of energy stores and a drop in heart rate.

It enables more intensive work to be completed without high levels of fatigue, due to the opportunity to partially recover between efforts. Recovery enables partial replenishment of ATP/CP system.

Interval training can be structured to suit the development of both anaerobic and aerobic fitness.

Variables which can be manipulated include:

- duration of work period
- intensity of work
- duration of recovery period

Fartlek Training (aerobic + anaerobic)

Fartlek Training involves short bursts of faster work interspersed throughout a session of continuous training

A sessions may last 5-30sec every two or three minutes throughout a 30 minutes training session, but is determined by the participant themselves, and is less structured than interval training.

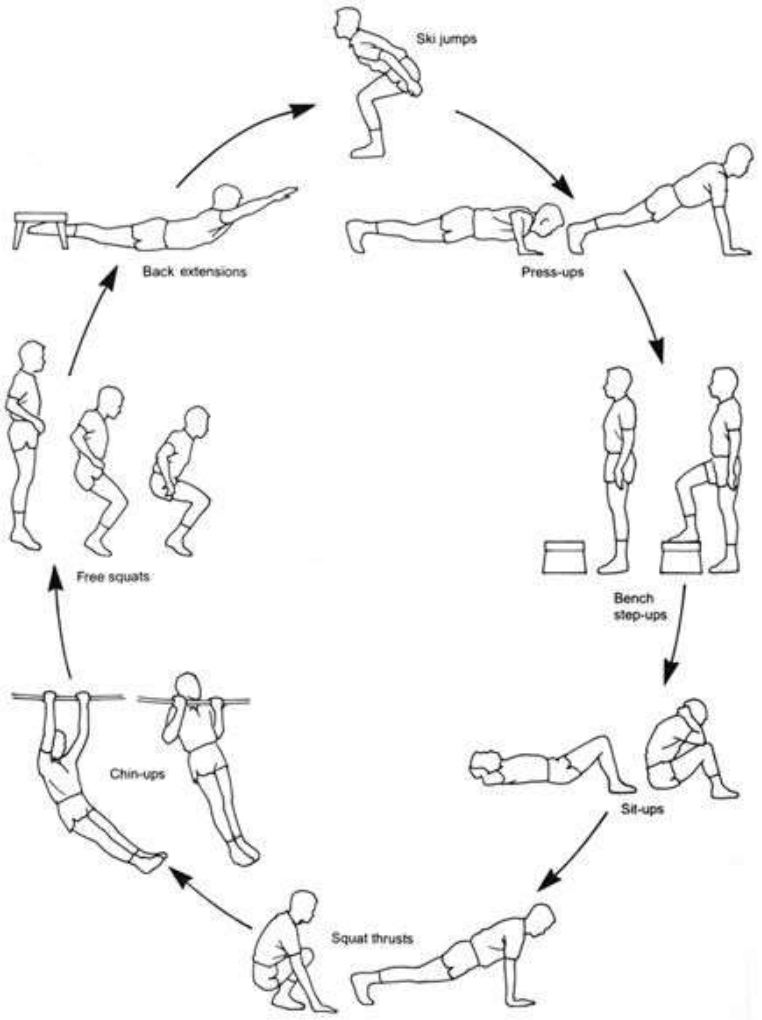
Circuit Training

Circuit training is an effective form of training as it can be used to develop a range of fitness components whilst working with a large group.

It involves a series of stations (usually 10 – 20 exercises) which may include calisthenics and weight lifting exercises, as well as running.

The individual nature of each station allows the client to work at their own intensity which in turn improves the training effect.

Essential to any exercise session is that the client trains at an appropriate intensity for the given energy system and fitness components they are aiming to improve.



Resistance Training

Weight training involves the use of a resistance to facilitate strength, endurance and power gains in the client.

It is possible to achieve specific gains in these areas through the manipulation of weights, repetitions, sets and the style of lifting.

Resistance training can include isotonic, isometric and isokinetic exercises.

The following terminology needs to be understood when developing a weight training program.

Repetition - The performance of a single exercise
Set - The number of repetitions performed in a row.
Resistance - The load that is moved in an exercise.
Repetition maximum - maximum number of repetitions that can be completed for a given resistance.

For example 10 RM represents the load that can be lifted 10 times.

The 1RM method uses a percentage of the maximum load that can be lifted.
E.g. 80% 1RM of 100kg = 80kg.

Safety guidelines for weight training

- Perform a thorough warm up.
- Wear appropriate footwear.
- Close attention must be paid to correct technique.
- Resistance should be set & technique outlined for beginners with the assistance of an instructor.
- Heavy resistance should not be used until lifting techniques are perfected.
- Overload must occur progressively to avoid injury.
- The American College of Sports Medicine has outlined safety guidelines for youth in weight training. These include the use of rubber tubing & weights machines (do not complete maximal exercises), complete 1-3 sets of 15 repetitions 2-3 x per week on non-consecutive days and to make use of an instructor who highlights correct technique.
- When training at a specific RM load, it is recommended that a 2-10% increase in load be applied when the individual can perform the current workload for 1-2 repetitions over the desired number.
- Strength & power training programs should be periodized, where beginners train using high training volume & low intensity. They progress in the following training phase to an increase in intensity and a decrease in volume**.**

Exercise selection guidelines

To optimize the quality of exercise intensity, multiple-joint exercises should be performed before single-joint exercises.

For example: Perform squats, leg press or lunges before leg extension & leg curl.

- Order exercises from largest to smallest muscle groups.
- Perform exercises using stabilising muscle groups at the end of the training session.
- This will prevent them from tiring, ensuring that correct posture is maintained throughout the training session.
- The recommended training frequency for the novice is 2-3 days per week and 4-5 days per week for the advanced.

The following table outlines how to develop the fitness components muscular strength, muscular power & local muscular endurance

Fitness Component	Intensity (% 1 RM)	Number of Reps	Speed of contraction	Number of Sets	Rest between reps (mins)
Muscular Strength	Advanced: 85-100% 1RM Beginner 70-80% 1 RM	1-12 8-12	Slow-medium Slow-medium	Multiple 1-12 1-3	1-3 mins 1-3 mins
Muscular Power	A combination of heavy loads (strength) 80-100% 1 RM With light loads (velocity) 30-60% 1 RM	Heavy: 1-12 Light: 3-6	Moderate Fast	Multiple 1-12 1-3	2-3 mins 2-3 mins
Muscular Endurance	40-60% 1 RM	15 +	Light - Moderate	Multiple sets	Less than 90 secs

PLYOMETRICS

Plyometrics is a type of exercise that utilizes a rapid eccentric movement, followed by a short amortization phase, and then followed by an explosive concentric movement, which enables the synergistic muscles to engage in the myotatic-stretch reflex during the stretch-shortening cycle.

Plyometric exercises use explosive movements to develop muscular power, the ability to generate a large amount of force quickly.

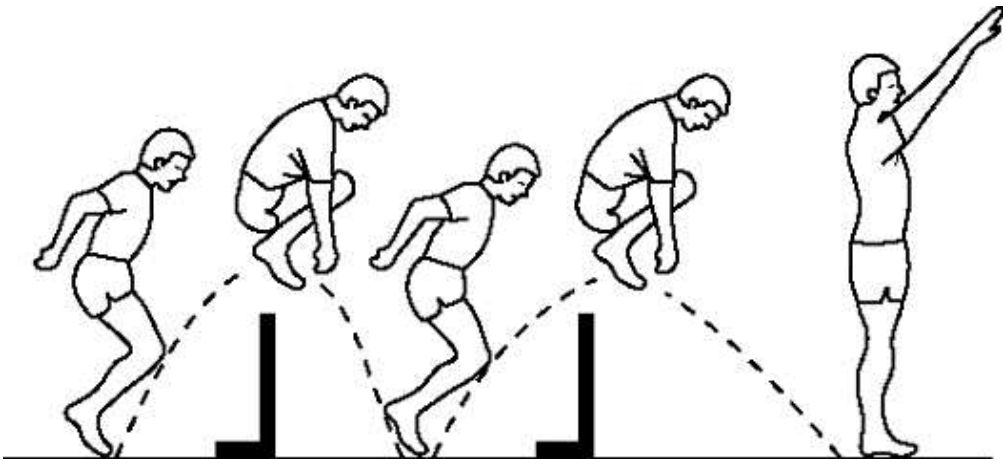
Plyometrics are used to increase the speed or force of muscular contractions, often with goals of increasing the height of a jump or speed of a punch or throw.

Plyometrics activities develop muscular power required in the acceleration & force produced in the stride during the sprint.

Plyometrics is performed at a frequency of 2 x per week in the pre-season & once a week during the competitive season.

2 days of rest is required from one plyometrics workout to the other.

- Participants must have a very good strength base before attempting plyometrics.
- Good footwear is required.
- A shock- absorbing surface is advised.
- Plyometrics training is not advised for individuals younger than 15 years of age.
- A thorough warm up must be performed.
- Correct technique must be used.
- Less stressful exercises should be performed at the start of the plyometrics program. Then overload progressively to more stressful exercises.
- At least 2 days recovery time is required between plyometrics training sessions.



FLEXIBILITY TRAINING

Flexibility is defined as "the absolute range of movement in a joint or series of joints". Flexibility is specific to a particular joint or set of joints. Being flexible in one particular area or joint does not necessarily imply being flexible in another.

Flexibility in a joint is also "specific to the action performed at the joint" (e.g. the ability to do front splits doesn't imply the ability to do side splits even though both actions occur at the hip).

Types of Flexibility

These different types of flexibility are grouped according to the various types of activities involved in athletic training.

The ones which involve motion are called *dynamic* and the ones which do not are called *static*.

The different types of flexibility are:

- **dynamic flexibility**
  Dynamic flexibility (also called *kinetic flexibility*) is the ability to perform dynamic (or kinetic) movements of the muscles to bring a limb through its full range of motion in the joints.
- **static-active flexibility**
  Static-active flexibility (also called *active flexibility*) is the ability to assume and maintain extended positions using only the tension of the agonists and synergists while the antagonists are being stretched. For example, lifting the leg and keeping it high without any external support (other than from your own leg muscles).
- **static-passive flexibility**
  Static-passive flexibility (also called *passive flexibility*) is the ability to assume extended positions and then maintain them using only your weight, the support of your limbs, or some other apparatus.

Factors Limiting Flexibility

Flexibility is affected by the following factors:

Internal factors

- the type of joint (some joints simply aren't meant to be flexible)
- the internal resistance within a joint
- bony structures which limit movement
- the elasticity of muscle tissue (muscle scar tissue is not very elastic)
- the elasticity of tendons and ligaments
- the elasticity of skin
- the ability of a muscle to relax and contract
- the temperature of the joint and associated tissues

External factors

- the temperature of the place where one is training
- the time of day
- the stage in the recovery process of a joint/muscle after injury
- age
- gender (females are generally more flexible than males)
- the restrictions of any clothing or equipment

Types of Stretching

Just as there are different types of flexibility, there are also different types of stretching. Stretches are either dynamic (meaning they involve motion) or static (meaning they involve no motion).

Dynamic stretches affect dynamic flexibility and static stretches affect static flexibility (and dynamic flexibility to some degree).

The different types of stretching include:

1. ballistic stretching
2. dynamic stretching
3. active stretching
4. static (passive) stretching
5. PNF stretching

Ballistic Stretching

Ballistic stretching uses the momentum of a moving body or a limb in an attempt to force it beyond its normal range of motion. This is stretching, or "warming up", by bouncing into a stretched position. This type of stretching can lead to injury.

It does not allow your muscles to adjust to, and relax in, the stretched position. It may instead cause them to tighten up by repeatedly activating the stretch reflex.

Dynamic Stretching

Dynamic stretching involves moving parts of your body and gradually increasing reach, speed of movement, or both. Dynamic stretching consists of controlled leg and arm swings that take you to the limits of your range of motion.

In dynamic stretches, there are no bounces or uncontrolled movements.
Dynamic stretching improves dynamic flexibility and is quite useful as part of your warm-up for an active or aerobic workout .

Active Stretching

Active stretching is also referred to as **static-active stretching**. An active stretch is one where you assume a position and then hold it there with no assistance other than using the strength of your agonist muscles.

For example, holding your leg up high and then holding it there without anything to keep the leg in that extended position. The tension of the agonists in an active stretch helps to relax the muscles being stretched (the antagonists) by reciprocal inhibition.

Active stretching increases active flexibility and strengthens the agonistic muscles.

Static (Passive) Stretching

Static stretching is also referred to as passive or relaxed stretching. A passive stretch is one where you assume a position and hold it with some other part of your body, or with the assistance of a partner or some other apparatus.

The splits is an example of a passive stretch.

Slow, relaxed stretching is useful in relieving spasms in muscles that are healing after an injury.
Relaxed stretching is also very good for "cooling down" after a workout and helps reduce post-workout muscle fatigue, and soreness.

PNF Stretching

PNF stretching is currently regarded as the fastest and most effective way known to increase static-passive flexibility. PNF stands for *Proprioceptive neuromuscular facilitation*.

PNF refers to stretching techniques in which a muscle group is passively stretched, then contracts isometrically against resistance while in the stretched position, and then is passively stretched again through an increased range of motion.

PNF stretching usually employs the use of a partner to provide resistance against the isometric contraction and then later to passively take the joint through its increased range of motion.

the *hold-relax* method

This technique is also called the *contract-relax*. After assuming an initial passive stretch, the muscle being stretched is isometrically contracted for 7-15 seconds, after which the muscle is briefly relaxed for 2-3 seconds, and then immediately subjected to a passive stretch which stretches the muscle even further than the initial passive stretch.

This final passive stretch is held for 10-15 seconds. The muscle is then relaxed for 20 seconds before performing another PNF technique.

PNF stretching is also not recommended for children and people whose bones are still growing PNF stretching is very strenuous and should be performed for a given muscle group no more than once per day (ideally, no more than once per 36 hour period).

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Planning a Circuit Training session

Circuit training is effective as it can be used to develop a range of fitness components whilst working with a large group.

The individual nature of each station allows the athlete to work at their own intensity which in turn improves the training effect.

Essential to any exercise session is that the athlete trains at an appropriate intensity.

Types of circuit training:
• fixed load - all individuals perform same amount of work
• fixed time - as many reps completed in given time as possible
• individual load
- min max test completed.
- rep number is halved to indicate workload at each station
- complete 2-3 laps each session trying to improve time each session
- geared to each athletes strengths and weaknesses

Equipment will vary depending on the exercises included in the circuit.

A typical circuit might include:

- Bicep curl - dumbbells / mat
- Shuttle run - cones
- Dumbbell flys - dumbbells / mat

Agility run - cones

- Barbell extension - barbell (unweighted) / mat
- Bench jumps - bench
- Sit ups - medicine ball / mat
- Skipping - skipping rope
- Tricep extension - medicine ball
- Step ups - bench
- Stopwatches

During training it is important to monitor your exercise intensity. It has been determined that your heart rate response can be used as an indicator of the load being placed on the body in general and the cardiorespiratory system specifically.

The higher the heart rate response, the greater the intensity of the exercise. In order to determine the intensity of a training session a training heart rate is established.

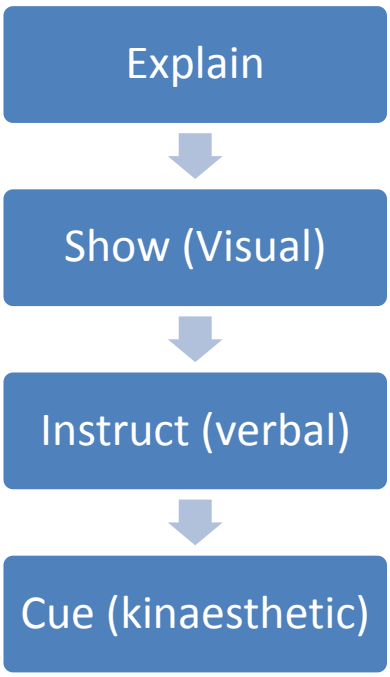
The zone for inducing a cardiovascular training effect is between 70 and 85 per cent of maximum heart rate. This zone lies between the threshold for obtaining a cardiovascular training effect and the anaerobic threshold which, if exceeded, results in the accumulation of lactic acid.

If this intensity is maintained lactic acid accumulation will result in fatigue and a significant reduction in exercise intensity.

Instructional Model

When you meet a client, you as the fitness instructor should have reviewed the clients file, be familiar with their goals and should check that there is no illness or injury since the pre-screening questionnaire.

You may choose to ask them some additional questions to ensure you are familiar with the case.



Explain : explain the name of the drill, the name of any equipment used, drill specific safety, the purpose of the drill

Show: demonstrate correct technique, in its entirety for an adequate number of repetitions

Instruct : verbally instruct the client how the drill was performed. Suggested order for explanation: body position, action, supplementary information, specific safety points, teaching cues

Cue : client performs the exercise to allow feedback from instructor

Clients may experience difficulty with drills, for these clients the following may be helpful:

- Use a whole, part or whole method. That is break the skills into its components and teach separately
- Alter teaching cues to allow the client to focus on key areas that require attention
- Use manual guidance to help the client get a feel for the drill
- Use progressions and ensure client have mastered the pre-requisite skills before attempting more difficult drills
- Modify drill conditions to minimize client apprehension
- Concentrate on giving positive feedback in areas the client is doing well to enhance confidence and self esteem.

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Rules of programming

As a gym instructor it is your job to help clients fit exercise into their lifestyle, not to have to change their lifestyle around the exercise routine.

Clients will be required to make lifestyle changes but the fewer changes you can make the better. The number 1 excuse for not exercising is time, you need to address this in your programming.

These rules are not the normal population they do not take into consideration rehabilitation or special needs.

Such requirements will be covered in more detail in Certificate IV in Fitness

1. Agonist/antagonist balance
2. Largest muscle groups first
3. Technique should not be compensated for weight
4. Full range of movement when possible
5. Make exercises relatable to everyday activities
6. 2-3 points teaching points per exercise
7. Review the program in 6-8 weeks
8. Client is given adequate recovery
9. Progressive overload must occur for results
10. Record your program on the card to monitor results
11. Ensure the program will meet your client's goals and time restrictions.

Program Cards

Program cards are a great way of tracking a client. They also give the client information about the exercises, the set up of the equipment, the weight that they are lifting and the number of times the weight should lifted.

Many times in gyms people do not fill in these cards, or they do not fully understand how to use them. The purpose of a program card is to keep track of your clients progress, so you know what weight they are lifting, the number of times they are lifting it - it is a workout history.

This record can explain a lot about why and person is or is not getting results.

Beginner programs

Beginner programs are designed to help the person get started the program itself is not a master piece it needs to functional, easy to follow, meet the time requirements of the client, yet be enough to keep the person happy.

The best exercises to give a beginner are compound exercises; this is because they use multiple muscle groups which get the metabolism working. Furthermore these exercises can usually be related to everyday activities (which gives the client a better chance of learning such activities).

The beginner program is designed to help the person through the first 8-16 weeks of adaptation; this is mainly co-ordination, technique and neural adaptation. Such adaptations are required to progress so it is best that these programs are keep simple to facilitate this flow.

People can often get bore or stray off their beginner program, this is usually because the client has not been educated, so of the best programs are keep small in exercises and short in duration.

Isolation work is not highly suggested for beginners, this is mainly due to the functional nature of the training. By not including isolation work in these early workouts keep the duration of the sessions short which helps increase the person's motivation to continue with the exercise program.

By not having the isolation exercises in a workout does not mean that certain muscles of the body are not being worked. Compound exercise do work these muscle, isolation exercise separates these muscle to work independently. The muscle still get work but in a group not independently.

Intermediate programs

Intermediate programs offer a diverse range of programs that can vary in duration (in relation to the person's goals and time restrains). The main components may change in an intermediate program. The first is the number of exercises and person will do, the second is the number of sets.

This level of program may also include exercises of linkage muscle such as the shoulders, and arms. Instructors need to be ensure that these programs do not become too long for the person to be able to practically do.

Advanced programs
Traditionally advanced programs break the body down into separate sections termed split routines. There are many different types of split routines but the basic concept is to allow the person to work areas of the body harder over the whole week rather in one workout.

Examples of Split routines

- Chest /Shoulders/ Triceps
- Back/ Biceps
- Legs
- Push/pull program

The number of sets can be anything from 2-6 reps will be dependent on the person's goals.

There are many different ways in which the body can be split up to train, the important factor in all of these splits is whether the body is getting sufficient time to recover from the workout, especial is assisting muscle (arms and shoulders) are trained on a different day to the main muscle groups.

It is at this stage that clients can add in maximal training and supra maximal training techniques. Remember that technique is the foundation to results; poor techniques will only lead to an increase risk of injury, preventing results.

A person has between 8-16 weeks to develop good technique (remember it is during this time that a beginner will not get any strength benefits only co-ordination and neural) so as a trainer you do not need to be in a hurry to increase the weight, this will come as a natural progression at the adaptations of the body occurs.

Exercise selection: Functionality versus safety.

A lot people who go to the gym just the exercises on their program because they were told to, a large number of people watch other gym members doing exercises using these exercises to try to get their results faster. It is common for people add in exercises and try different things.

This is not necessary wrong, but it may nit be right for that person either. Sports specific exercises can be dangerous to the inexperienced person, exercise like shoulder shrugs, shoulder press and even leg press are exercises that people need to do slow and have a gradual increase in load to protect the joints associated soft tissue.

Remember as an instructor there are no such things as wrong exercises or wrong programs you need to ask the person why they are doing the exercise or program first before you make any changes or corrects to their exercise or program.