What are the planning considerations for improving performance?

When individuals decide that they would like to play a sport or join a team they have certain expectations about their involvement. These expectations determine their effort, commitment and enjoyment—all of which help to determine the fun, sense of belonging and skill development to be derived from the involvement. Sports are fun if skills are learnt, performance improves and if people enjoy themselves.

One of the enjoyable aspects of sport is the development of skills in training, and the transfer of those skills to a game situation. This chapter looks at training, and how training sessions are structured to maximise learning, enjoyment, fitness and skill development and avoid the burn-out that can come from trying to do too much.

Initial planning considerations

Careful planning will ensure that an athlete is appropriately prepared for competition. Consideration needs to be given to the various aspects that, when combined, will make a difference to the success of the athlete and/or the team. These aspects can be divided into performance and fitness needs, the competition schedule and the climate and season.
Performance and fitness needs (individual and team)

When a coach arrives at a training session most participants will expect the coach to have arranged a series of activities to develop skills and fitness. Most coaches do this. Whether the coach is preparing a single training session or a program for a whole year, the coach’s ability to plan, organise and implement a training session will often determine the involvement and commitment of the participants. This applies equally at both the beginners’ level and at the elite level. It is therefore very important that coaches consider the fitness, skill level and goals (both team and individual) of the athletes under their care; the athletes rely on them.

An effective coach is one who can plan, organise, implement, observe and evaluate a program to meet the needs of athletes. The coach should gather information about the athletes in order to appropriately address their specific needs. This can be done through surveys to determine previous experiences and goals for the season and aspirations. It can also be done through athlete assessment incorporating tests for both general and specific physical requirements. The age of the athlete and level of competition should be taken into account. Different approaches are required to cater for the age and expectations of the athlete.

Table 21.1 Professional football preparation models

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<th>Monday</th>
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<th>Thursday</th>
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<tbody>
<tr>
<td><strong>Traditional model</strong> (am)</td>
<td>Rest</td>
<td>W</td>
<td>Sk</td>
<td>W</td>
<td>Rest</td>
<td>Rest</td>
<td>Rec</td>
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<td>Sk</td>
<td>Fitness</td>
<td>Sk</td>
<td>Rest</td>
<td>Match</td>
<td>Rec</td>
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<tr>
<td><strong>'Funnel' model (used by the Wallabies, 1998–2001; Brisbane Broncos, 1995–2003)</strong> (am)</td>
<td>W + Sk</td>
<td>Sk</td>
<td>W + Sk</td>
<td>Rest</td>
<td>Run*</td>
<td>Rest</td>
<td>Rec</td>
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<tr>
<td></td>
<td>Sk + run</td>
<td>Rest</td>
<td>Fitness</td>
<td>Rest</td>
<td>Rest</td>
<td>Match</td>
<td>Rec</td>
</tr>
<tr>
<td><strong>New AFL model used by some clubs in Australia</strong> (am)</td>
<td>W</td>
<td>Sk</td>
<td>Rest</td>
<td>Sk</td>
<td>Rest</td>
<td>Rest</td>
<td>Rec</td>
</tr>
<tr>
<td></td>
<td>Sk</td>
<td>Rest</td>
<td>Sk</td>
<td>Rest</td>
<td>Match</td>
<td>Rec + fitness</td>
<td></td>
</tr>
</tbody>
</table>

W = weights; Sk = skills; Rec = recovery sessions; * = brief, intense session

Structuring training sessions

Training sessions should be:

- safe
- relevant
- well balanced (between training for skills and training for fitness)
- structured to allow for practice and improvement
- structured to a familiar routine while allowing flexibility and variety.

The coach must plan to develop athletes technically (skills), physically (conditioning), psychologically and tactically.

When structuring the training sessions the coach should bear in mind the length of time players have for recovery. Elite athletes often train twice a day and consideration needs to be given as to how this is planned. It is recommended that the more important session, based on the phase of competition, be completed first.

Three preparation models are used by professional football teams (of all codes) in Australia. These provide a guideline for effective scheduling of the different components of the training program. Other professional sports would develop their own models to accommodate the training components important to their sport. Amateur teams, having fewer sessions, would place emphasis on seasonal requirements. The professional football models can be summarised as shown in Table 21.1 (page 375).

Schedule of events/competitions

Initial planning considerations for many team and individual sports must take into account the schedule of particular events and competitions, and it is essential to optimise the performance of athletes around these. Planning is affected by the:

- competition structure
- phases of the competition
- special events in the season
- availability of resources
- motivations and attitudes of the athletes
- demands of the sport
- climate.

An annual plan should be based around a build-up to a specific event or, as with some sports, a series of events. The aim of this is to produce the best performance at the appropriate time. Highlighting these events on a calendar enables training to be divided into a series of cycles, each with a specific focus. For example, a team in a team sport competition generally aims to reach the final series, along the way adapting training for particular games. In the final series a particular approach will be taken to maintain maximum performance.

Climate and season

A coach needs to take a sensible approach to training and competition in adverse weather. Planning should involve variations to a program to cater for potential adverse conditions. The yearly training plan should take into account the season where each phase falls and anticipate the likely weather patterns. Adverse weather conditions (such as when it is too hot or cold) may mean changing the training time or the length of the session. Alternate venues can be considered and booked in advance. These venues include gyms, pools and indoor courts. ‘Classroom’ sessions may be held to review tactics and plan ahead.

Acclimatisation to conditions can also be part of the planning for a season. Elite athletes may attend training camps in conditions similar to those in which they may be competing. Athletes competing at altitude will often travel to these areas up to a week in advance in order to acclimatise.

Plans to take into account the climate should also encourage individuals to do all they can to minimise the effects of adverse weather on themselves. In the case of hot weather, for example, athletes should ensure that their clothing and headwear is appropriate, that they have ensured their hydration levels are adequate and that they have acclimatised to the exertion levels required in the prevailing conditions. (For a discussion of the effects of exercise in hot, cold and humid conditions, and how the body regulates temperature, see Option 3: Sports Medicine.)
**Planning a training year (periodisation)**

The division of the training year into certain periods must be considered when designing a yearly training program. Peaking for major events must also be taken into consideration. A long-term training plan is required so that the coach and athlete can set goals and work towards the achievement of those goals over the year. Long-term and short-term goals should be decided on in consultation between the coach, the athlete and the team.

It is not uncommon for athletes to train all year round. Even though the cricket season is in summer, cricketers train in the winter. Athletes of the winter sports—rugby league, soccer, netball, rugby union and AFL—train during the summer months. This is done to maintain fitness and, in some cases, skill levels.

The dividing of a program into phases is called periodisation. Subtle and important differences in training exist in each of these stages.

**Phases of competition: post-season, pre-season and in-season training**

The total training program of athletes can be broken down into three distinct phases:

- post-season or off-season (transition)
- pre-season (preparatory)
- in-season (competition).

Table 21.2 suggests some activities for various training phases throughout the year.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Post-season</th>
<th>Pre-season</th>
<th>In-season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight training</td>
<td>3 days per week</td>
<td>2–3 days per week</td>
<td>1 day per week</td>
</tr>
<tr>
<td>Running</td>
<td>Low intensity: 1–2 days per week</td>
<td>High intensity: 3 days per week</td>
<td>High intensity: 1–2 days per week</td>
</tr>
<tr>
<td>Skills</td>
<td>Skills practice</td>
<td>Skills practice</td>
<td>Skills and drills practice</td>
</tr>
<tr>
<td>Other</td>
<td>Limited sport-specific practice</td>
<td>Learning strategies</td>
<td>Game-like activities; regular competition</td>
</tr>
</tbody>
</table>

Post-season training

Post-season (or off-season) training varies from sport to sport, but has the following general aims:
- to prevent weight gain
- to maintain the aerobic fitness base (low intensity)
- to maintain strength (increase endurance, strength and power)
- to maintain a reasonable sports skill level (participate in games)
- to repair injuries
- to recuperate physically and mentally.

An off-season program involves post-season competitions in the athlete’s sport (or a similar sport) and also involves recreational and social activities for fun and enjoyment. For example, an endurance runner might focus more on aerobic capacity maintenance than on strength, a spin bowler might focus more on skill development, a tennis player with an injury might concentrate on rehabilitation and mental strategies, and a netball team might play in a touch-football competition to maintain ball skills.

Regardless of the sport, variety is the key to post-season training programs. Post-season training is usually of low intensity, but of high volume. This time also allows athletes to concentrate on areas in which they might be weak.

Pre-season training

Pre-season training usually occurs 8–12 weeks before the start of the season or competition. The predominant energy systems used in the sport are increased to maximum capacities. The principal difference between post-season training and pre-season training is the intensity. The post-season weights program should be continued during pre-season. A shift is made from low-intensity, high-volume training to high-intensity (progressive overload), low-volume training. Sports-specific skill training is also intensified. If specific components of fitness or skill are required, significant time should be allocated to practising these in the pre-season.

In-season training

The general aim of the in-season training program is to maintain the fitness, strength and skills developed during the pre-season. There is an increased emphasis on game-like skills and strategic development, and on practice involving opposition. Practice should still be of sufficient volume and intensity to maintain strength and endurance throughout the season.

The involvement of athletes in actual games and game-like practices allows less emphasis on aerobic capacity and strength-conditioning at training. Drills with components of game skills and fitness are important. The only exception is athletes who do not receive much game time. They might need to engage in alternative high-intensity conditioning or skills practice during the week for three days.

Critical inquiry

1. Study the article opposite about marathon training. Identify some basic features of this program that demonstrate it is appropriate for the athlete in the competition phase.
2. Identify the types of testing that would be conducted in a yearly plan. Why are they repeated?
3. Suggest pre-season training programs for:
   a. downhill skier
   b. high jumper.
4. What would happen if an athlete:
   a. continued the post-season program for the whole year?
   b. stopped training at the end of the in-season, and then started up again at the beginning of the in-season of the next year?

Practical application

Phases of competition

1. Choose a team sport and an individual sport/activity.
   a. Design a suitable eight-week post-season training program for each.
   b. What other factors should the athlete consider in this period?
2. Design a typical week of an in-season program for a team sport of your choice. Include:
   a. two team training sessions, giving specific details of activities to be included in each session
   b. one match-day session
   c. suitable individual training for the participants during the week.
An individual sport guide to the competition phase of training: specific marathon training

In the last month before the event you should be focusing on running efficiently at race pace. The important sessions will therefore be repetition runs over 2–4 km at a pace, which varies between your expected marathon pace and a pace that is about five seconds per kilometre faster. Thus the athlete who is hoping to run 2 hrs 24 mins will do their repetitions from 5.30 to 5.20 per mile or, if working in kilometres, from 3.25 to 3.18 per km. As well as this, you will be doing timed ‘pace runs’ at your marathon speed, up to 10 miles in training, or possibly in the form of a controlled half-marathon race. Whatever you do in training is no good unless you can reproduce it in race conditions. It is important, therefore, to rehearse as fully as possible the situations you are likely to encounter. These include getting up and breakfasting early for an early start, practising the pre-race diet before long training runs, taking drinks during the run and wearing the shoes you are going to wear in the race. The best way of doing this, of course, is to incorporate some races into your programme, preferably over distances from 10–20 miles (15–32 km).

Recovery

This is an essential part of the training, which must be programmed in, to take account of the effects of the hardest training runs and the races. Proper post-run routines should be worked out, including eating, drinking, bathing and, if possible, massage.

Countdown to the race

13 weeks to go
From now on marathon training takes preference over races. First two-hour run. These will be repeated every two weeks.

12 weeks to go
Introduce the quality sessions, once a week at first, increasing to two a week, plus one long run, pace run or race. A typical session would be 6 x 1 mile or 5 x 2 km, with 3–4 minutes rest between each.

11 weeks to go
Assess the training load of the first two weeks. From now on you should establish a pattern, based on either a 7-day or a 14-day cycle, which will enable you to do the hard work and recover from it by the beginning of the next cycle.

9 weeks to go
After four or five weeks you should be running a race to measure your progress, and also getting up to two-and-a-half hours for your long run.

8 weeks to go
At the end of this week you should allow yourself a recuperation period to absorb what you have done.

7 weeks to go
The next four weeks will include the hardest training, but you should rest up before having a serious race or pace run.

5 weeks to go
This is probably the best time to put in your three-hour run. It also gives you an opportunity to try out drinking before and during the run.

4 weeks to go
Your last race. Rehearse the pre-race routines of carbo-loading in the last two days before the race, and the pre-race meal. Decide on the right shoes. During the next three weeks most of your serious running will be done at marathon pace to get into the right rhythm.

3 weeks to go
Your last long run, about 20 miles, with a few stretches at marathon speed, the rest easy.

2 weeks to go
From now on you are tapering. The mileage should be cut to two-thirds of normal and you should concentrate on feeling good, just doing a bit of striding out to keep the leg speed and the stride length. Run no more than 15 miles with 2 weeks to go.

The last week
You will have done 8–10 miles with seven days to go, and after that it doesn’t really matter. I advise a little running each day, no more than half an hour. If you are going to carbo-load, the right period is from the Thursday evening to the Saturday evening before a Sunday race. It is advisable to be at the race venue the day before to check out the exact finish of the race and the arrangements regarding getting to the start.

Race day
For a morning race, get up three-and-a-half hours before, breakfast three hours before, and bring a drink with you to take 10 minutes before the start. Make sure that you have clothing for either a warm day or a cold day. Finally, run the first mile as close to your target time as possible. After that? You have done all you can so enjoy it!

Source: Brian Mackenzie, UK Athletics Senior Coach, Sports Coach webmaster, www.pponline.co.uk
**Subphases: macrocycles and microcycles**

While a yearly training program can be divided into phases of competition, it can be broken down further to allow a coach to plan a comprehensive yearly training program.

*Macrocycles* are large blocks within a cycle of training that usually last for 3–6 weeks and vary throughout the year depending on the phases of competition and training outcomes required.

*Microcycles* are smaller blocks within a macrocycle. Microcycles usually last for 7–10 days. These allow for the manipulation of training volumes, intensities and recovery.

Figure 21.3 provides a great deal of information for a coach wishing to construct a yearly training plan. Note how each daily training session in a microcycle (7–10 days) forms an important part of the larger cycle of training in the macrocycle (3–6 weeks), and that these longer cycles vary in content throughout the year; depending on the phases of the competition and the training outcome required. Note also how different types of training are emphasised at different stages of the year. The transition period or post-season is a period of low impact and regeneration. The unloading phases in the macrocycle refer to a decreasing extent of training, but an increase in intensity. It is hoped that performance will follow the intensity curve (that is, will peak at the end of the season), with a decrease in the volume (amount and duration) of training.

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<tr>
<td>Competition</td>
<td>Pre-season</td>
<td>IN SEASON</td>
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<td>Macrocycles</td>
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<td>Specific conditioning</td>
<td>Unloading</td>
<td>Unloading</td>
<td>Unloading</td>
<td>Peaking</td>
<td>Transition</td>
<td>Conditioning</td>
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<td>Microcycles</td>
<td>Preparation</td>
<td>Competition</td>
<td>Finals</td>
<td>Transition</td>
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<td>Strength</td>
<td>General</td>
<td>Maximum</td>
<td>Maintain</td>
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<td>Develop running speed</td>
<td>Develop movement speed</td>
<td>Maintain</td>
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<td>Maintain aerobic capacity</td>
<td>Maintain</td>
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<td>Skill</td>
<td>Improve specific skills</td>
<td>Develop skills under pressure</td>
<td>Improve basic skills</td>
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<td>Tactics</td>
<td>Implement</td>
<td>Consolidate</td>
<td>Devise and test</td>
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<td>Simulate competition strategies</td>
<td>Increase motivation</td>
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<td>% Training time: Conditioning</td>
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<td>Skill</td>
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<tr>
<td>Tactical</td>
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</tbody>
</table>

Adapted from TO Bompa, *Theory and Methodology of Training: The Key to Athletic Performance*, 3rd edn, Kendall/Hunt, Iowa

**Figure 21.3** Annual training plan
Peaking for performance

As competitions begin, the training regimen should be adjusted to achieve peak performance, both physically and psychologically. The peak performance might be required in September for a rugby league player (for the grand final) or in a few years time for a swimmer (say, the 200-metre final at the Olympics). Coaches design training programs that take into consideration the development of fitness, skills, tactics and competition throughout the season, all aimed at peak performance at particular times of the year.

Peaking for performance results from the athlete's ability to adapt to various training methods and types. It does not occur 'overnight', and it must be planned. It involves a sequential, cumulative training program that focuses on preparing the athlete for a peak performance. The peak performance is a temporary state that occurs when the psychological and physical capacities of the athlete are at a maximum, and when the technical and tactical preparation is optimal.

Peaking is an optimal state of athletic readiness aimed at the highest possible performance. It is characterised by the following:

- good health
- adaptability to training
- quick recovery
- functional synergism (everything acting together)
- extreme efficiency
- adaptability to stress
- self-confidence
- high motivation and aspirations.

practical application

Annual training plan

1. Study Figure 21.2.
   a. To which sports could this training plan be applied?
   b. How many training sessions would you suggest for a microcycle during the in-season?
   c. Design a rough outline of a week of training in the pre-season to put into this yearly plan.

2. a. Choose a team or individual sport and devise a yearly plan for that sport. Present the plan in a table similar to that shown in Figure 21.2.
   b. Develop a suitable training microcycle for each competition phase in this sport. (There is no need to be specific about the exact structure of each training session on each day.)
Tapering

To achieve peak performance in major competitions, many athletes reduce aspects of their training sessions in the weeks leading up to the event. This allows the body and mind to have a break from vigorous physical exertion, and provides an opportunity to heal injuries and recharge energy reserves. This is known as the 'taper period' or 'tapering'. Tapering can be achieved by decreasing the volume or intensity of training. Reducing training volume, but maintaining intensity, is preferable during the taper. It should be accompanied by rest and good nutrition.

The time to begin tapering varies from sport to sport. A taper period of approximately 7–10 days appears to be appropriate for most sports. A taper period of at least two weeks is recommended for swimmers, and a period of one to two weeks for runners. Tapering in swimming improves performances, with increases noted in both max VO₂ and arm strength. In running events, however, no changes occur in performance, although slight improvements in leg power are evident.

Little research has been done on tapering in team sports, cycling and marathon running. In general, as tapering allows for muscle glycogen stores to be increased in preparation for a match, a reduced volume of training prior to the game must be accompanied by a high-carbohydrate diet. Speed, endurance, strength and power cannot be improved within three days of a match. Therefore, any training session held in the 36 hours before competition needs to be brief and intense, so as not to significantly deplete glycogen reserves.

Tapering each week for matches could induce gradual detraining during the course of a season. The coaching staff need to ensure that a well-planned periodised program helps prevent loss of previously acquired adaptations.

The following changes might occur in athletes during the taper period:

• increase in max VO₂
• increase in muscular strength
• decrease in blood lactate levels
• healing of minor injuries
• disappearance of soreness
• replenishment of glycogen stores.

Not all of these will occur in all athletes in the taper period; in fact, none might occur in some athletes.

practical application

Tapering

Suggest a taper program for a team sport of your choice leading up to a grand final.

Sport-specific subphases (fitness requirements, skill requirements)

The phases of competition require different approaches in order to effectively prepare an athlete for competition. The preparation phase (pre-season training) begins with a general conditioning program. This develops to the later stages where emphasis is more focused on the specific requirements of the sport and on skill and strategy practices.

The competition phase is marked by an emphasis on skill and strategy development while continuing with specific conditioning for the sport. Much of this conditioning can be achieved through intense skill practices and small-sided games.

It is important to mix conditioning and skills practice through the competition phase. Planning should emphasise the different aspects across a macrocycle, microcycle and even an individual session.

Figure 21.4 demonstrates macrocycles in the competition phase where one aspect of training is given greater emphasis. Using a systematic approach to plan the pattern of the cycles within a phase of competition, the coach is able to find the correct balance between fitness and skill requirements for the athlete.
Figure 21.4  Macrocycles in the competition phase

**Macrocycle 1:**
- Conditioning emphasis
- Week 1: Low Load, Low Intensity, Low Volume
- Week 2: Medium Load, Medium Intensity, Low Volume
- Week 3: High Load, High Intensity, Low Volume
- Week 4: High Load, High Intensity, High Volume
- Week 5: Medium Load, Medium Intensity, Medium Volume
- Week 6: Low Load, Low Intensity, Medium Volume
- Week 7: Low Load, Low Intensity, Low Volume
- Week 8: Low Load, Low Intensity, Low Volume

**Macrocycle 2:**
- Skills emphasis
- Week 1: Low Load, Low Intensity, Low Volume
- Week 2: Medium Load, Medium Intensity, Medium Volume
- Week 3: High Load, High Intensity, High Volume
- Week 4: High Load, High Intensity, High Volume
- Week 5: Medium Load, Medium Intensity, Medium Volume
- Week 6: Low Load, Low Intensity, Low Volume
- Week 7: Low Load, Low Intensity, Low Volume
- Week 8: Low Load, Low Intensity, Low Volume

**Intensity**
- Skill
- Conditioning

**Practical Application**

**Sport-specific subphases**

1. **Design a post-season, pre-season and in-season training program for a swimmer who has to compete in two major events (January and July) in one training year.**
2. **Specify the particular fitness and skill requirements for this athlete.**

**Research and Review**

1. Distinguish between microcycles and macrocycles. What is the role of each?
2. Explain the nature of peaking for a team throughout a season.
3. What value does a taper period have in a team sport?
4. Apart from the physiological changes, what other benefits can be derived from tapering?
5. Using an Excel spreadsheet, draw a graph that represents the process of peaking during the season. What modifications to training occur during the peaking stage?
Elements to be considered when planning a training session

Certain important elements must be included in all training sessions if improvements in performance are to occur.

Health and safety considerations

Consideration needs to be given to safety. To ensure that athletes can participate safely, equipment and facilities should be safe and well maintained. Coaching methods should be based on safe practices to minimise the risk of injury to participants. Plans should be adapted to take into account the prevailing weather conditions.

Training session sections

Regardless of the age or experience of the athlete, a training session should be broken up into the following sections.

Providing an overview of session to athletes

To psychologically prepare the athletes for the training session, the coach briefly meets with them to explain the objectives and activities involved in the session. Athletes then need to be instructed effectively if they are to perform the tasks well. Effective instructions are clear, concise, relevant, factual, well timed, constructive, positive and informative.

Warm-up

The objective of the warm-up is to prepare the athlete physically and mentally for the demands of the training session. The warm-up increases in intensity until the athlete is prepared for the full training demands. A slight sweat is a good indication of readiness. The warm-up should be followed by a period of stretching.
Skill instruction and practice
After the warm-up and stretch, the coach explains what will happen in the series of drills to follow. The explanation should be brief so that the effect of the warm-up is not lost. Alternatively, the coach might give these instructions before the warm-up, and review them briefly after the warm-up.

The practice of skills and strategies is usually the main part of the in-season training session. If a new skill or strategy is to be learnt, it should be taught straight after the warm-up while the athletes are still fresh. This should be followed by practice. Other skills and strategies from previous training sessions should also be reviewed. In team sports, drills involving all players may also be practised. This section of the training session will consist of a number of skills taught in a variety of learning activities (drills) to individuals and to groups. These drills will begin to resemble game-like situations as proficiency increases.

Conditioning
General fitness conditioning should occur after skill practices to avoid the practice being adversely affected by fatigue or poor light. Fitness conditioning should last for about 15–20 minutes. The only exceptions are Fartlek training and fatigue-loading, which involve tiring the athlete to practise performing skills when fatigued. These should occur after the warm-up.

Cool-down
A cool-down of 5–10 minutes, plus stretching, helps to remove waste products and gradually bring the body back to resting levels. See Chapter 5 for more on warm-ups and cool-downs.
Evaluation

An evaluation of the training session should occur during or after the cool-down. This is an opportunity for the coach and players to reflect on training objectives and performances during the session. It might be a good time to talk about intensity and application in training, punctuality, the next training session, player availability and the coming game. The evaluation should involve the players giving feedback about the training session. This will help to guide future training sessions.

It is important that training starts and finishes on time so that athletes know exactly what is expected of them. Games can also be added into the training session during the warm-up or cool-down, or after conditioning. These serve to motivate, and to reinforce execution of skills in a competitive setting. They can be modified to focus on fun or fitness.

practical application

Minor games in training

1. Minor games can be used in the training sessions for different sports. Choose three sports and identify minor games for each of these sports. For each sport, name a game that can:
   a. develop skills
   b. be used for warm-up
   c. be just for fun.

Research and Review

1. Recommend three conditioning activities that also allow skills practice in each of the following sports:
   a. netball
   b. soccer.
2. Distinguish between a skill and a drill.
3. Explain why a training session should be evaluated.
4. Describe why games are used in training sessions.

Critical inquiry

Use relevant Internet sites to examine different skills and drills that can be used to vary the structure of training sessions. Create a Word document to keep a journal of a number of examples of these.

WEB

Internet support for the task can be accessed via www.oup.com.au/pdhpe12

Planning to avoid over-training

Amount and intensity of training

Undergoing months of training with a session every day, or every few days, has the potential to place considerable stress on athletes, both physically and psychologically. Errors may occur when designing and implementing training programs, and this will compromise athletic performance. Careful planning of all phases and cycles can help to avoid problems. Some common errors include:

- under-training or over-training
- use of exercises and work rates that are not sport specific
- failure to plan long-term training programs to meet goals
- failure to taper training before competition.

Very few athletes are under-trained, but many are over-trained—often in the belief that more is best. Over-training occurs when work-outs are:

- too long and too frequent (training volume)
- too strenuous (training intensity)
- conducted with inadequate recovery times between work-outs.

Over-training occurs when an athlete does more work than can be physically tolerated and the amount of training exceeds the body’s ability to recover and adapt. This results in more damage to tissue, and not enough time to repair it.
Physiological considerations

Physiological considerations, such as lethargy and injury, need to be considered when assessing whether an athlete is over-training. It is natural for athletes to experience periods of fatigue and tiredness during a training program. This is not always an indication of over-training. Many of these periods can be corrected by more rest, alternative practices (for example, swimming) and a good diet (high in carbohydrate). Athletes training regularly sometimes become tired and run-down. Over-training should be suspected when a rapid decline in performance is not remedied by the above methods after a few days. The signs and symptoms listed in Table 21.3 might indicate over-training.

Psychological considerations

It is also natural for athletes to lose motivation throughout a training program. As for physiological considerations, this may be corrected by various means. Athletes sometimes lose their desire to train and perform and, in turn, perform badly. The signs and symptoms of mental fatigue caused by over-training include those listed in Table 21.4 (page 388). These symptoms vary from individual to individual. An over-trained athlete might exhibit various combinations of these signs and symptoms. Over-training should be suspected when a rapid decline in performance is not remedied easily, and when some or all of the listed signs and symptoms are noted.

Table 21.3 Possible physiological signs and symptoms of over-training

<table>
<thead>
<tr>
<th>Physical performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Decline in physical performance</td>
</tr>
<tr>
<td>• Loss of muscle strength</td>
</tr>
<tr>
<td>• Loss of coordination</td>
</tr>
<tr>
<td>• Decrease in maximal aerobic capacity</td>
</tr>
<tr>
<td>• Injury (chronic or acute)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Biological functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased resting and sub-maximal heart rates</td>
</tr>
<tr>
<td>• Elevated heart rate in recovery after exercise</td>
</tr>
<tr>
<td>• Increased blood pressure</td>
</tr>
<tr>
<td>• Increased oxygen uptake and blood lactate during sub-maximal exercise</td>
</tr>
<tr>
<td>• Loss of weight (or no weight loss)</td>
</tr>
<tr>
<td>• Muscle tenderness</td>
</tr>
<tr>
<td>• Head colds, allergic reactions, sore throats (increased risk of infection)</td>
</tr>
<tr>
<td>• Occasional nausea</td>
</tr>
<tr>
<td>• Chronic fatigue</td>
</tr>
<tr>
<td>• Early onset of fatigue when training/competing</td>
</tr>
<tr>
<td>• Decreased max VO₂</td>
</tr>
<tr>
<td>• Decreased muscle glycogen</td>
</tr>
<tr>
<td>• Decreased appetite and libido</td>
</tr>
</tbody>
</table>

Table 21.4 Possible physiological signs and symptoms of over-training

- ‘Staleness’
- Sleep disturbances
- Increased feelings of physical, mental and emotional exhaustion
- Decreased self-esteem
- Negative change in dealings with others
- Social withdrawal
- Feelings of overall chronic stress
- Emotional instability
- Decreased motivation and commitment


Prevention of over-training

Every possible attempt should be made by the coach and athlete to avoid over-training. With increasing pressures to perform, however, many athletes and coaches push too far. Also it is difficult to measure what volume or intensity of training is beneficial or harmful to an athlete. To help prevent over-training, the following measures should be taken:

- Ensure proper nutrition.
- Ensure adequate rest and recovery between work-outs.
- Monitor training loads.
- Vary exercise intensities.
- Monitor physiological changes (for example, increased heart rate, increased oxygen consumption and blood lactate levels—all occurring at fixed work rates).
- Use psychological strategies (for example, mental rehearsal and relaxation).
- Keep a training diary that monitors feelings.

The damage done by over-training cannot be undone in a couple of days. It can take weeks, or even months. Athletes need a marked decrease in the training regimen, or perhaps even complete rest.

Critical inquiry

1. **Explain** the possible links between training intensity and volume and over-training.
2. **Choose** three sports and, for each, suggest how much training is too much.
3. **Describe** how, by maintaining a daily diary, an athlete may be able to avoid over-training as well as modify programs.

practical application

**Strategies to avoid over-training**

1. **Outline** the strategies that could be used in an effort to prevent over-training in the following cases:
   a. A sprinter considers she is not improving quickly enough. She increases her number of training sessions per week. After a few weeks she becomes lethargic, finds it hard to motivate herself, has no improvement in times and complains of a sore hip.
   b. A footballer, on the recommendation of a friend, goes from doing interval sprints for improved speed to doing stair drills in the stadium. He complains of sore shins and is unable to play.

2. As a coach, at the junior level it is difficult to monitor what each child is doing away from your training sessions. Use Microsoft Publisher (or similar) to design a letter/pamphlet to give to the parents/carers of children you coach. In the letter/pamphlet:
   a. **Describe** to them what over-training is.
   b. **Explain** what they can do to help identify over-training and prevent it at home.
what are the planning considerations for improving performance?

chapter summary

- Effective planning of a session or a yearly program should take into account the athlete’s fitness and skill levels and goals.
- Establishing an annual plan based on the distinct phases of competition allows emphasis to be placed on specific types of training in order to improve performance.
- The competition year has three phases: post-season (or off-season), pre-season and in-season. These can be divided into smaller blocks, called microcycles and macrocycles, to allow more specific setting of training type, volume and intensity.
- Peaking requires effective program design in order to achieve optimal performance at one or more specific times during the yearly program.
- Tapering, by reducing training volume, allows the athlete to maximise physical and mental preparation prior to an event.
- Each training session needs to have certain elements in order to ensure safety and improvement in performance. These include appropriate warm-up, skill instruction and practice, conditioning, cool-down and evaluation.
- Ensuring that an athlete’s program has the correct blend of training volume and intensity, rest periods, variety and appropriate diet can avoid the symptoms of over-training.
- Coaches should be aware of the physical and mental signs of over-training as often athletes consider that more is better.

revision activities

1 a Define ‘periodisation’.
   b Explain the types of activity recommended for each training phase.

2 a Describe the components of an individual training session.
   b Outline reasons for including each of these components.

3 Outline the steps you, as the coach, would take to assist an athlete who is over-trained.

4 Design a checklist to recognise the signs and symptoms of over-training in a 100-metre swimmer.

extension activities

1 Examine a sport in which you are currently participating. The following questions provide a guide for your examination.
   a Critically evaluate the training program you are following with respect to the phases of competition. (Highlight features such as training volume and intensity and the types of activity performed.)
   b Compare your training with that of another sport played during the same season. (What aspects of your training are specific to your sport and not to the other sport? Are there aspects of your training that may be relevant to the requirements of the other sport? What may be the value of cross-training?)
   c Justify the appropriateness of your current training program and, if necessary, make recommendations as to how it could be improved.

exam-style questions

1 Explain how periodisation of an athlete’s program can help the athlete to improve his or her performance. (8 marks)

2 Compare and contrast the focus of the preparation (pre-season) stage of an annual program with that of the in-season stage. (12 marks)

3 Skill and tactics are vital components of an athlete’s overall success. Analyse the development of these components during the phases of competition. (12 marks)

4 Propose strategies you would use to ensure that each of the elements of a training session is addressed for an under-12 cricket team that you are coaching. (12 marks)

5 Describe the signs that would assist in identifying an over-trained athlete. (8 marks)

Chapter 21 | WHAT ARE THE PLANNING CONSIDERATIONS FOR IMPROVING PERFORMANCE?