

Information Pack on Physical Conditioning for Rugby Football

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Guide to the Development of Club Training

Terminology

For the sake of simplicity I feel that every other term to describe physical work which is involved in training can be included within these four categories:

- Aerobic Endurance
- Strength Endurance
- Strength
- Speed

Aerobic Endurance

The event which relies heaviest on endurance is the Marathon. The essence of marathon running is that the runner runs at a pace where the supply of oxygen can meet the demand of the muscle tissues for oxygen. This is called running at a steady state pace. Any continuous running at one single pace which lasts over 10 minutes must run at no faster than at steady state pace.

Strength Endurance or Anaerobic Endurance

It is also called anaerobic endurance. This is characterized by the 400m race in track athletics. If the time taken for the first half of the race is compared to the second half, the second 200m is always run at a slower pace. An 800m race is the same, the first 400m is always run faster than the second 400m. In other words there is a drop off in performance. The guy's whose drop off least wins.

Strength endurance always includes a drop off because the demand for energy of the running pace adopted by the athlete exceeds the energy that can be supplied using the oxygen that is available. The body is able to supply the extra energy from another source that does not need oxygen but that source is self-limiting and drop-off in performance (fatigue) results.

Any activity that involves muscle work beyond a steady state level will produce fatigue in a very short time. The nearer the effort is to maximum, the sooner the fatigue sets in. The longer maximum effort is maintained the longer full recovery will take. A rugby player sprinting for 6 seconds flat out will require between 30 - 60s before the same pace could be repeated. Strength endurance is essential for rugby.

Strength

This is the ability to overcome a resistance or hold against a force. It requires maximal voluntary effort.

Speed

Within speed is included:

- reaction time
- speed of thought
- acceleration over the first 20 to 40m
- ability to hold top speed from 20 - 70m
- ability to accelerate from 70% to 100% top pace
- ability to sprint on a curve and change direction on either foot
- ability to move either segment of the body or the whole body at speed from any position be it lying to standing or vice versa.
- Speed of pass

Fitness requirements for rugby

Rugby is a multiple sprint sport, including physical confrontation that lasts for 80 minutes. As much as 50 minutes of the 80 minutes can involve total rest or very low level activity. The amount of playing time at high intensity depends upon the skill of both sides to keep the ball in play. The better the skill level gets the greater the demands on fitness. Fitness then has to be improved to allow skills to be

demonstrated since fatigue reduces skill level. There is a cycle here which is rather like the chicken and the egg relationship. Which comes first? At the end of the day the goal has to be achieve complete integration of skill and fitness where one is continually putting more demands on the other. Initially however, to ensure that both improve, fitness should be taken separately from skill.

What are the fitness priorities in Rugby?

The biggest priority is speed. The game is won and lost on speed. The game is based on strength, power, flexibility and practice at the skill of running fast.

Second is strength endurance. This involves the player working repeatedly at high intensity. To be able to do this the player requires the ability to tolerate high lactate levels and have muscles with a high buffering capacity to combat muscle cell acidosis.

Third is endurance. A good aerobic ability helps the body to deal with the fatiguing effects of strength endurance activities which in turn then enables the player to sprint repeatedly or push in the scrum repeatedly at the individual's maximum output.

Are these fitness components in conflict with each other?

It would appear that as they have been described above they are complementary in that one helps the other. Although this is true there are limitations. Any over emphasis on either speed or strength endurance or aerobic endurance can have negative effects on the other. For example training for a marathon emphasis some metabolic pathways to the exclusion of others. This in the case of rugby would be a disaster because all that a player could do would be to run at one pace. He could not sprint or jump high. If the other extreme is considered, pure sprint training done in isolation would not benefit a winger unless all that was expected of him was to run in the occasional try. To play the modern game he must have all four components of fitness.

The most common approach in rugby training is to over-emphasize strength endurance. The detrimental aspect of this is that the player loses his maximum pace, does not develop aerobic fitness and most important of all suffers general fatigue. Strength endurance sessions are the most demanding of the body to cope with and must be used judiciously.

The challenge when conditioning players to play rugby is how to strike a balance of speed, strength, aerobic - and strength endurance. These have to be integrated and progressed. Doing any one in isolation for too long will be detrimental to overall performance.

The only way to develop an effective and efficient fitness program is to experiment. That is, plan a program - test players fitness - implement the program - test fitness - assess the outcome along with assessment of how the players perform in games. Fitness assessment is described in a separate document.

Training theory and worked examples

Load and intensity

The first requirement is to be able to apply the basic theory of exercise required to achieve a training effect. Manipulating the load produces the training effect. For running use this formula:

$$\text{Load} = \text{intensity} \times \text{volume}$$

The load can be increased by increasing intensity or volume but not both simultaneously since this increases the risk of injury. Each must reach a critical level after which intensity is the most important determinant of the training effect. Intensity has two components: speed and Work : Rest ration (W:R). Here are two examples:

Example 1: The objective is to gain strength endurance

The unit of work is 6 repetitions of 100m in 16 seconds with 35 seconds recovery. The intensity is the speed of 6.25 m/s and a W:R of approximately 1:2. The volume is 600m. The speed must be between 85% and 90% of the player's top pace.

If this is truly improving strength endurance then there should be a drop off of some 10-15% during the set of repetition runs. That is, the player will be taking 1.6 seconds longer to run the 100m. He should be asked to continue to run for as many runs as possible but when the drop off exceeds 10-15% the unit should stop since maximum benefit is not being achieved. If the player cannot complete the 6 reps then the recovery is not long enough, The goal for volume is 10 reps. Once the volume has been achieved increase speed or decrease recovery. The unit could end up as:

10x100m in 15s with 20s recovery

Example 2: Speed

The distance should vary between 15 and 60m and alteration in angle and curve of the run should be introduced. The W:R ratio should be at least 1:5.

A unit could be:

2x50m with 40s recovery

4x25m with 25s recovery

5x20m with 150s recovery

The volume is 300m, intensity 8.3-6.9 m/s and W:R ratio 1:5

Example 3: Aerobic endurance

The minimum duration of running is 2 minutes. It can be shorter but the aerobic effect is reduced. The Work to Rest Ratio (W:R) should be 1:1 or preferably 2:1. If longer work periods than 2 minutes are used the recovery should not be greater than 90 seconds. A training unit would be:

6x2 min. runs with 1 min. recovery

Lets assume the player could run at 7 minute / mile pace which is 13.7 km/h, he should cover 456m in 2 minutes. The volume is 2736m, the intensity 3.8m/s or 7 min miling at a W:R ration of 2:1.

The running pace is critical to aerobic fitness. If it is too fast the volume will suffer and the wrong metabolic pathway will be used. Too slow and the aerobic effect will be less because the metabolic pathways are not being worked to their maximum. The unit of aerobic work described on page 10 has been specifically designed to allow rugby players to maximize their aerobic capacity.

There are examples of units of work for each fitness component in the sections that follow. Once the principles have been mastered then new units can be designed to provide variety.

Guidelines to help structure club training

Initially it is easier to manage club nights when fitness work is kept separate from technical and tactical elements. This is especially the case for the inexperienced coach. However, there are two factors which force these to amalgamate.

The first is that there is limited time available therefor it becomes more efficient to bring fitness and unit skill work together. Secondly it is more effective because the more specific fitness work can be made for any game the greater effect it has.

Objective

1. To use the practice and consolidation of individual and unit skills to improve specific components for rugby.
2. To make best use of time and to insure that fitness training is specific to the game, unit skills must be structured to fulfill a specific fitness objective.

Here are just a few facts extracted from an analysis of international rugby in 1990.

- Duration of work periods: 60% are between 11 and 25 seconds
5% are between 50 - 60 seconds
- Duration of rest periods: 2 seconds to 3 minutes
- Work:rest ratios 80 - 106 per game: 20% are 1:2
20% are 2:1
18% are 1:4 and higher
5% are higher than 3 : 1
- The greatest number of consecutive W:R ratios where the work period is longer than the rest period is six.

Method of including the facts above into club training

Plan three 20min periods to follow the initial warm up.

The warm-up should include leg drills and pressure ball handling activities on the majority of occasions.

Period 1- Speed

The unit skills should last 6 - 10s with a 60s recovery e.g. back row moves, short penalties, modification of grid routines, pressure ball handling routines, etc.

Period 2 - Aerobic

The work periods should be 90-120s with short recovery not greater than 1min e.g. 10 - 15m grid with player running outside the grid to the next or second corner before repeating the activity in the grid.

Period 3 - Strength Endurance

The work:rest ratios should be a mixture of 1:3, 1:2, 1:1, 2:1, 3:1 with a duration of work between 15 and 45 seconds. The balance of duration and work : rest ratio is critical for effect and progression. The 20 minute period should include two rest periods of 2-3 minutes. This can be used for teaching and planning. If you notice the drop off in the performance to be greater than 15% during the activity then the W:R ratios are too severe.

Examples: scrumming with back row move and front five getting to the breakdown, the tunnel and other ruck practice, walking rugby, five-a-side modified league in a restricted field area.

Note: it would be possible to change the order of these work periods e.g. do number 2, 1 then 3; occasionally 3, 2 and 1. Never do three followed by one because the fatigue produced by vigorous strength endurance unit will last several hours. If speed work would was done the risk of muscle injury is very high and top speed would not be reached in any case so a speed unit would not have its maximum effect.

Introduction to specific training units for player and coach

The aim of this section is to enable each player to become his own fitness coach. To make the most gains from any unit of work, the work load and the rate of progression over days and weeks must be specific to each individual. The only way to achieve this is for players to understand and apply the basic principles of fitness training. It is highly unlikely that every player will have individual supervision from a personal fitness adviser 365 days a year. The player will also hear conflicting views on what type of work which best suits him.

Structuring a program which reduces injury risk

The ideal amount of time to prepare for a season includes eight weeks of group training prior to the first warm-up game. Four warm-up games should be played over the next four weeks before the first important game of your season. The individual should prepare himself for 4-6 weeks before group sessions start to ensure a gradual build up in training. A gradual build up is the only way to reduce the risk of injury. You should only introduce yourself to work that 'hurts' on the fifth week. The key to an injury free pre-season is gentle progression.

It is only prudent to remember that slight strains which are felt in training should be responded to by stopping the session, missing and / or modifying the next 1 - 3 sessions. If this is not done the risk that a minimum of 3 - 6 weeks could be lost. If that occurs then the whole preparatory phase of the season is disrupted.

The option is a clear one:

- Respect what your body tissues tell you.
- When in doubt always err on the side of safety.
- Modify sessions to include pain free function only, that is cut intensity and volume.

Volume then intensity should be progressed as long if no pain is experienced and no adverse reaction occurs the next day. Continue modified session until full pain free function has been achieved.

Structure: Training cycles including rest and recovery.

Training objectives usually exist for six-week periods (meso-cycle). Within these meso-cycles are micro-cycles of seven days.

A blend of training units is included in each micro-cycle and is progressed to achieve the objectives of the meso-cycle. If the objective is not met in six weeks then that meso-cycle would have to be extended.

Within each meso-cycle there have to be "easy weeks" where the number of units, intensity and volume must be reduced. This essential to enable the body systems to regenerate and prevent over use injury and staleness. The best time to take an easy week is when you have been going really well for the past 5-7 days.

The reason for this is that you are going well, much more is achieved. This puts maximum stress on tissues and if 'purple patch' is maintained too long the tissues will break down.

Structure: Content Overview

Rugby requires a mixed profile of endurance, strength, power, strength endurance and speed. The individual is more important determinant of the blend of these than the position he plays. Rigid training schedules determined by playing position are outdated.

The rugby player does not have to develop any one component of fitness to an extreme therefore he can happily work on several components at once without one training effect interfering with the other. As the season progresses he must keep highlighting certain components in his personal training time. The advantage of this is that every 4-6 weeks the training units will change to emphasize different components of fitness and therefore reduce tedium.

Training Units for each component

Basic Aerobic Unit: Two Minute Runs

Introduction

The most important factor in improving aerobic fitness is pace judgement. This unit has been specifically designed to ensure that the correct pace is identified for each player. The structure of the unit enables it to be used for training and testing improvement in aerobic fitness.

Description

The unit uses a maximum size rugby pitch (100m by 69m). The duration of each run is 2 minutes and 1 minute is given for recovery. The diagram shows the seven different starting points. The fitter the player, the further he will run in 2 minutes. Initially the player will have to experiment with different starting points before the correct pace is identified. The player should aim to complete a minimum of eight 2 minute runs. The correct pace will have been achieved if the player completes the runs and states the following: "Although the first runs felt easy, I am glad I didn't run faster otherwise I would have never have completed the last three runs in 2 minutes".

Intermediate timings are listed for each starting point. For example a small group of players starting at corner C will reach the halfway line in 13 seconds, the first corner in 26 seconds and so on. This feedback ensures a steady pace is maintained. If a player cannot complete the eight two minute runs or if it was too easy, then on the next training day another starting point should be chosen. It should not take more than three attempts to identify the correct starting point for each individual.

As fitness improves a player should move to a harder starting point. You should aim to achieve 8 times 2 minute runs at 6 mile pace with 1 minute recovery between runs.

The biggest advantage of this unit is that the whole squad can run at the same time yet because different starting points are used, each player can work to his maximum.

Intermediate times for each starting point

Starting point A.	8,25 min / mile
Corner 1	15.5
Corner 2	37
Half-way	52
Corner 3	1:07
Corner 4	1:28
Half-way	1:44

Starting point B.	7,7 min / mile
Corner 1	23
Corner 2	43
Half-way	57
Corner 3	1:11
Corner 4	1:31
Half-way	1:45

Starting point C.	7,3 min / mile
Half-way	13
Corner 1	26
Corner 2	45
Half-way	59
Corner 3	1:13
Corner 4	1:32
Half-way	1:46

Starting point D.	6,74 min / mile
Corner C	9.5
Half-way	25
Corner 1	37
Corner 2	55
Half-way	1:08
Corner 3	1:20
Corner 4	1:37

Starting point E.	6,3 min / mile
Corner C	16
Corner 1	40
Corner 2	57
Half-way	1:09
Corner 3	1:21
Corner 4	1:38
Half-way	1:49

Starting point F.	6,1 min / mile
Corner E	5
Corner C	20,5
Half-way	32
Corner 1	43
Corner 2	60
Half-way	1:11
Corner 3 (finish)	1:22
Corner 4	1:38
Halfway	1:49

Starting point G.	5,75 min / mile
Corner E	11

Corner C	26
Half-way	37
Corner 1	48
Corner 2	1:03
Half-way	1:14
Corner 3	1:25
Corner 4	1:40
Halfway	1:50

Muscle strengthening

General

The commonest piece of equipment available for strength training is the multigym. If other equipment is used the principles described below remain the same. It is important to know that no one blend of exercise, number of repetitions or sets of repetitions is better than the other. Research has shown there to be a wide range of programs one of which is no better than the other. It is for this reason that everyone advising on strength training will say something different and why only the central principles are included here.

The first objective is to familiarize yourself with equipment and ensure that each exercise is done technically correct to avoid injury. To do this use a light weight and up to 20 repetitions of each exercise. This will also teach you which order to do the exercises in. Try to keep the exercises which work the same muscle groups spaced out from each other. Over the first three sessions experiment with the order.

It is advisable to move from one exercise to the next without rest until each exercise in the circuit has been carried out. This will produce a general endurance effect that a staged circuit which includes will not provide

For strength gain of the major muscle groups of the body a circuit of 7-12 times through full range and at moderate to fast speed. A rest of 2-3 minutes should be taken between sets and 2-4 sets should be done in one session. Sessions which work the same muscle groups should only be done every second day.

To gain strength 2-3 sessions must be done per week for a minimum of 6 weeks. To maintain strength gain one session is required per week.

Having become familiar with the equipment, identified a circuit of exercises and practiced these on three occasions using a moderate weight the next objective is to identify the maximum resistance for each exercise, that is the weight which can be lifted between 7-12 times.

Follow the six steps described below:

1. Warm up using moderate resistance for each exercise.
2. Now choose a resistance well beyond the weight you might expect to lift.
3. Make an attempt to lift the weight by building the force gently towards your maximal effort.
4. Reduce the weight in stages attempting to lift each weight as described in step 3. By the third or fourth reduction you will have found a weight you can lift through full range.
5. Now count the number of lifts that can be made in succession until full range on each lift can not be reached. This should fall between 7 and 12. If not make some minor adjustments to the weight.
6. Repeat each step for each exercise in the circuit and record the resistance for each.

Performing the circuit

Do three circuits of all exercises resting for three minutes between sets. Do not rest between each individual exercise. Try to do each exercise as many times as possible and record the number of repetitions achieved. During the rest period it is important to stretch all the major muscle groups which have been exercised. Warm down including mobility. Add up the repetitions for each exercise in the three circuits. When this total increases more than 20% increase the resistance.

Precautions: muscles on the wrist, elbow, shoulder and back are at greatest risk. Let the tissues get accustomed to the stresses by using light and moderate weights initially. Ensure that you warm up and perform the exercises technically correct.

Muscle power

Having done strength training the same exercises can be followed to achieve power. What need to be changed is the speed, resistance and the number of repetitions.

The speed through range should be faster and explosive. The resistance should be between 60-85% of maximum used for strength. The repetitions should be between 10 and 20.

Progression is made by increasing the speed then the number of repetitions then the weight.

Although the same circuit of exercises can be used as for strength there are good reasons to have two different circuits for both which may share some of the same exercises. Strength gain is specific to the range the exercise is carried out in and the speed it is performed at. The greater the variety of exercises used the more useful your strength gain will be to the work required in rugby.

Strength Endurance Weight Program

Introduction

This program develops strength at high speed. It will enable the player to repeatedly take part in the explosive aspects of running, jumping, kicking, tackling, rucking and mauling.

Weights programs are inherently dangerous so in the interests of safety great care is required. Correct technique is essential.

The equipment required is a 5-foot bar, sleeve, collars and up to 30 kg in small weights.

Guidelines on performance

Each circuit must be done in total, not in part. This means that the identification of the correct weight and repetitions for each exercise must be such that the whole circuit can be completed at top speed. The benefit gained is from the combination of all the exercises is not the individual exercises.

The speed and range of movement are critical. When using free weights in the circuit the time taken in seconds for any set of repetitions of one exercise should not exceed the number of repetitions by more than 20%. If this is the case the weight is too heavy. It may be that the number of repetitions in the last circuit has to be reduced to ensure proper that speed is maintained.

The speed of one movement through range is more important than speed of repetition. Speed of repetition only comes with practice and must not cause the range of movement to decrease.

Each exercise is done between 10-20 times. No rest is given between each exercise. 2-3 minutes rest is taken between sets. Mobility exercises should be done during the rest period. The weight should be somewhere between 15-30% of body weight.

Progression options

- For endurance, increase the reps then cut recovery.
- For strength, increase the weight.
- For strength endurance increase the weight, then reps, then the number of circuits, then cut the recovery between sets.

Circuit content

The warm up should include all the exercises done at slow pace. The suggested order of exercises are as follows.

Exercises

1. Upright row
2. Shoulder press from the chest
3. Half squat shoulder press from behind the head
4. Single leg step ups with bar on the shoulders
5. Sit ups with 2.5kg or 5kg held on top of the head
6. Bent arm pull-overs
7. Straight arm pull-overs
8. Bicep curl
9. Half squat jumps
10. Clean and press

Inclusion in the total training program

For the back row, hooker and the backs it should take the place of strength weights 4-6 weeks before the start of the season and be continued once per week in season for a further four weeks. It should be reintroduced towards the end of November.

Strength Endurance Running Program

In rugby there is a range of duration passages of play and a range of work rest ratios (W:R). The training should reflect these. The following program is based on an analysis of the game. The aim is to enable a player to be involved in all the high intensity work during an international match.

Select one option from each category for each session. The rest period between each category should be 3, 5, or 10 minutes depending on the unit, the order of units in the session, and fitness level. The session will last approximately 40 min. to 1 hour. It is a very arduous program, which must be followed by a complete warm down.

Example session

A possible session could be as follows:

Category	Duration	Unit	Recovery	Total Distance
B	15s	3 x 110 - 130m	45s	330 - 390m
G	25s	2 x 175 - 200m	50s	350 - 400m
H	5s	4x3 x 35 - 40m	5s & 2 min	420 - 480m
K	10s	3x3 x 70 - 80m	5s & 3-5 min	630 - 720m
M	10s	3-5 x 40m shuttle	3s	120 - 200m
N	18s	3x2 x 5 & 15m shuttle	6s	160 - 240m
				2010 - 2430m

Note: 4x3 | 35m | 5s | 2min means 4 sets of 3 repetitions with 5 seconds rest between the repetitions and 2 minutes rest between the sets. The distance is a target to achieve. Players run for the time allocated rather than the prescribed distance.

Category 1. W:R = 1:3 Distance to be run 300m

Category	Duration	Unit	Recovery	Total Distance
A	5s	3x3 x 35 - 40m	15s & 2 min	315 - 360m
B	15s	3 x 110 - 130m	45s	330 - 390m
C	25s	3 x 175 - 200m	75s	525 - 600m
D	30s	3 x 200 - 250m	90s	600 - 750m

Category 2. W:R = 1:2 Distance to be run 400m

Category	Duration	Unit	Recovery	Total Distance
E	5s	4x3 x 35 - 40m	10s & 2-3 min	400 - 480m
F	10s	2x3 x 70 - 80m	20s & 3-5 min	420 - 480m
G	25s	2 x 175 - 200m	50s	350 - 400m

Category 3. W:R = 1:1 Distance to be run 400m

Category	Duration	Unit	Recovery	Total Distance
H	5s	4x3 x 35 - 40m	5s & 2 min	420 - 480m
I	10s	2x3 x 70 - 80m	10s & 3-5 min	420 - 480m
J	25s	1x2 x 175 - 200m	25s	350 - 400m

Category 4. W:R = 2:1 Distance to be run 600m

Category	Duration	Unit	Recovery	Total Distance
K	10s	3x3 x 70 - 80m	5s & 3-5 min	630 - 720m
L	15s	3x2 x 110 - 130m	10s & 5 min	660 - 780m

Category 5. W:R = 3:1 Distance to be run 300m

Category	Duration	Unit	Recovery	Total Distance
M	10s	3-5 x 40m shuttle	3s	120 - 200m
N	18s	2-3x2 x 5 & 15m shuttle	6s	160 - 240m

Remarks

- As fitness improves the volume in some units should be increased.
- 40m shuttle is running from halfway to 10m line to the other 10m line and finishing halfway.
- 5 & 15m shuttle is run from the touch to the 5m line to touch to 15m line and to touch done twice.

peed development

Definition

Within the term speed is included:

- Reaction time
- Speed of thought
- Acceleration over the first 20 to 40m
- Ability to hold top pace
- Ability to change pace
- Ability to sprint on a curve and change direction off either foot
- Ability to move either one segment of the body or the whole body at speed from any position be it lying to standing or vice versa
- Speed of pass
- Speed endurance, which is the ability to sprint repeatedly

Speed development

Speed gain depends on:

- Fast muscle strength
- Limb speed
- Stride length
- Muscle fiber recruitment and coordination

Fast muscle strength can be gained from weight training, hill sessions, tire sessions and bounding exercises.

Limb speed is improved by practicing limb speed drills

Stride length is improved by mobility and running for distance with each stride as a running drill.

Recruitment and coordination of muscle depends on practicing running which involves total concentration, avoids unnecessary muscle tension and is based on a belief that improvement of speed is attainable. The structure of the session must include a complete warm-up. Fatigue must be avoided. Fatigue is prevented if a work rest ratio of at least 1:5 is used. There should be no muscle tightness, soreness or fatigue from previous training units otherwise there is a high risk of muscle tear. It is important to include straight running and slalom running with and without the ball since each is a skill in its own right.

Speed session

1. Warm-up
2. Leg - and arm speed drills
3. Bounding activities
4. Strides gradually building to full acceleration
5. Sprints over 20 - 60m some straight, some slalom
6. Competitive reaction sprints
7. Unit practices involving speed and change of pace

Limb speed and bounding activities

Each drill should be done over 25m:

1. Arms only
2. Run ankles only
3. Pop ups
4. Alternate knee lifts
5. Bum kicks
6. Fast cadence

7. Run for height
8. Run for distance
9. Tuck jumps for height and distance

Example session

1. 2 x 4 x 20m 1:5 & 3min rest between sets (2 sets of 4 repetitions of 20m, W:R = 1:5, 3min rest between sets)
2. 2 x 4 x 20m 1:5 & 3min rest
3. 1 x 4 x 50m 1:5 & 3min rest
4. 1 x 4 x 50m 1:5 slalom & 3min rest
5. 1 x 4 x 30m 1:5 slalom & 3min rest

Free body Circuit

This is a circuit of exercises that combines fast strength limb speed and lactate tolerance and should be used in the preparatory phase of speed development.

Exercises: arms only, heel raise, half squat, split jumps, sit ups, press ups, tuck jumps, in-out-ins and high knees.

If a group of players is doing a circuit use 10 seconds on each exercise, two sets, one minute recovery between sets.

Progress to three sets then increase time to 15 seconds on each exercise except the jumps. Progress to three sets straight through times two with three minutes recovery between each block of three sets.

To do this circuit as an individual it is easier to count repetitions and progress these.

Hills

Hills are especially good for building leg strength and power and should not be included in the early stages of speed development.

Initially power is the goal. The incline should not be steep enough to alter your running style markedly. An incline of between 12-20% should be used (percentage gradient is the sine of the angle of incline).

Start with lengths of run of 30-60m. To get the right effect there should be no feeling of tiredness in the legs during the run but there should be an appreciation of tiredness when the run has just finished. This must be quality work so the walk back recovery should provide a work:rest ratio of at least 1:5. when you feel the performance drop off during the run then stop for an extended recovery of 3-5 minutes. Whatever the number of runs you have completed is the number of repetitions in each set. Repeat that number until three sets have been completed taking 3-5 mins. recovery between each set. The number of repetitions should be between four and ten.

Hill sessions can be structured to emphasize different components. For acceleration use a distance of 30 meters, for speed and strength use 40-60m with full recovery. It is important to take full recovery here to ensure top quality work.

Strength endurance can be achieved by using 40-60m with a work:rest ration of 1:2 or 80-100m and 1:3. Here the effort remains maximal but the pace drops towards the end due to fatigue.

Example of hill session

A possible mix of sets would be as follows:

- Do three sets of four repetitions of 30m hills. Work:rest ratio 1:5 and three minutes between sets.

This abbreviated to:

- 3x4x30m hills 1:5 and 3 mins

- now do 2x4x60m hills 1:5 and 3 mins
- now do 2x3x60m hills 1:3 and 3 mins

As you improve progress the numbers in the set and increase the number of sets in the last group. As an alternative to hills is towing a tire. It encourages a good low body position. The structure of the session is the same as that for hills.

Sprinting on a tartan track

Track work: an athletic running session is essential to improve and maintain the edge on pace. It has to be done on a good surface and a tartan track is ideal. Great care should be taken in the introduction to running on tartan. The introductory sessions and speed sessions can be done at lunch time, before club training, on a Friday or even on a Saturday morning. Once you are established on the track do two sessions a week and one session every third week.

The introductory session are essential if you are to avoid the risk of injury and should be repeated in a modified form even after a lapse of three weeks with no track running.

Introductory track sessions

These half pace and three quarter pace sessions are essential if you are to avoid Achilles tendon and hamstring injuries.

Session 1

- Warm-up include leg -, arm drills and mobility
 - 3/4 pace straights and jog bends x 3 = 540m
 - 3/4 pace 1x4x60m = 240m
- total distance = 780m

Session 2

- Warm-up include leg -, arm drills and mobility
 - 3/4 pace straights and jog bends x 4 = 720m
 - 3/4 pace 3x100m = 300m
- total distance = 1020m

Session 3

- Warm-up include leg -, arm drills and mobility
 - 85% top pace 1x4x90m = 360m
 - 85% top pace 1x4x50m = 200m
 - 85% top pace 1x4x30m = 120m
- total distance = 1040m

Session 4 and 5

- Warm-up include leg -, arm drills and mobility
 - 95% top pace 3x4x40m = 480m
 - easy 30m, build 30m, 100% 20m: 3x4x80m = 960m
- total distance = 1440m

Session 6

First real speed session with work:rest of at least 1:5. Run curves left and right, gentle slalom and straights with and without the ball.

- Warm-up include leg -, arm drills and mobility
 - top pace 3x4x40m = 480m
 - top pace 2x4x60m = 240m
 - top pace 1x4x30m = 120m
- total distance = 840m

Session 7 and thereafter are variations and progressions of Session 6.

Flexibility

In contact sport some flexibility is needed but too much is dangerous because it reduces joint stability. Flexibility is essential if strength training is being done. Strength training alone will reduce muscle shortening so flexibility must be part of a strength training program.

In a warm-up or warm-down the objective is only to achieve your available range. This should be done by slow movements held at the end of range for a few seconds. The movements should gradually speed up. Avoid excessive force at the end of the range. Range of movement is always easier to achieve if the body is warm so activities like easy running should precede stretching.

To increase flexibility a different approach is needed. Many different combinations of activity are used to improve flexibility. What follows is an outline of the principles involved.

The muscle to be stretched should not be used to support the weight of the body at the same time. For example standing and touching the toes is not the best way to stretch the hamstrings.

Start gently and maintain a stretch on the muscle for six seconds and release and repeat six times. Move on to the next muscle group and do the whole routine three times through. As you gain more skill more pressure can be applied at the end of range and the duration of hold increased to fifteen seconds,

To increase range flexibility must be done every day. The areas to concentrate on are:

- calves and ankles
- muscles on the four aspects of the thigh
- lower back
- shoulder joints and neck

Combining club training and personal training

Here is an example of how the individual can fit personal training units into the season either to maintain summer gains or improve specific components which have been identified as weaknesses as the season progresses.

Maintenance of summer gains

Method a

Strength weights session per week with one week in four off.

Method b

Aerobic session per week with one week in four off.

Improvement of specific fitness components

Method

For strength or endurance use a period of six weeks to do two sessions per week for three weeks then taper to one per week for two weeks and repeat. For power and speed do two sessions per week for four weeks.

Sample program

Saturday	Game
Sunday	Rest or an aerobic session late afternoon
Monday	Weights
Tuesday	Club
Wednesday	Rest or aerobic work if a rest was taken on Sunday
Thursday	Club
Friday	Pure speed session or power weights not progressed or rest
Saturday	Pure speed in morning or rest. Game afternoon.

Another option is to do a double unit day, e.g. Monday weights at lunch and an aerobic unit in the evening or do both in the evening in that order.

All players should have a one session week, one week in six.

The body needs time to regenerate. If workloads are held high for more than four weeks training will have a negative effect on performance.

A possible format could be hard work for four weeks, a comparative easy week, then one hard week, then a one session week, then three weeks hard work etc. It is very important to respond to what you feel you need as a balance of hard work and recovery.

Summer Conditioning

It is important to avoid short frantic preseason fitness programs because the risk of injury is at its highest at this time. A gradual build up over the summer months enables fitness gains to be made without so much pain and with less injury. Try it, or consult someone who can help you out. It is important to get a blend that suits your priorities and the time you have available. Try to do some of the sessions with a few teammates, but first have a break. Let your body and psyche recover from a hard season. Club training will start in August, which gives 4 weeks until the first friendly before the league starts in September. These time-scales require basic fitness levels to be obtained prior to club pre-season training.

Overall structure and content

Irrespective of playing position, all players should select from the following units. Each unit takes 20 - 30 minutes to complete, so the maximum time would be 4 hours of work per week.

Aerobic or stamina work

This is running at a steady state. Take 2 aerobic units per week or 3 if this is a priority to you. Aim to run 2 - 3 miles at a steady state pace. Three miles is the maximum distance needed. Your target should be a 6 - 6.4 minutes per mile pace.

If you can this at 6 minute per mile pace or below, then 1 aerobic unit per week is sufficient to maintain this level. This level of aerobic or stamina training will not reduce sprinting speed provided it is balanced by other running sessions.

Hills

Hill sessions are putting together strength in you legs and are important because it is specific to the running pattern.

150 meter runs

Start with 3 x 3 and aim at just under 22 - 20 seconds with 1 minute recovery and 5 minutes between the sets. Progress to 3 x 4 if possible but ensure quality of pace. The objective is to cut the running time as far below 20 seconds as possible while keeping recovering the same.

Weight training

Do circuits of exercises without recovery between exercises. Weight training is potentially dangerous and requires great care. Look for more under .

Leg drills, mobility and speed

An athletic sprint coach would be able to demonstrate these drills and explain the purpose of each. These will include some plyometric exercises. Please be cautious, they are dangerous to the Achilles, shins and knees. Keep the repetitions low.

A speed session could comprise of a warm up, leg drills and strides followed by sprints over distances of 20 - 60 meters. Some should be straight runs, the next set a slalom, and the next with a ball. Use a Work : Rest ratio of 1 : 5 and 3 - 5 minute rests between each set of 4 repetitions.

Look for more under .

Weekly plan

The columns are headed with a week number and contain the number of times a specific unit should be done in one week.

Week	1	2	3	4	5	6	7	8
Aerobic	2	3	3	3	2	2	2	2
Weights	2	2	2	1	2	2	2	1
Speed	0	1	1	1	1	1	1	1
Hills	0	0	0	1	1	1	2	2

150's	0	0	0	1	1	1	1	1
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The choice of option for each week is yours. The drills and mobility can be done as warm up for any session or in the recovery periods during a weights program. If you want to put 2 units together, then do a weights units first followed by a aerobic unit.

Remember start gently. All sessions should be somewhat hard but keep the real pain for the last six weeks before you first big game of the season. You must let your muscles and tendons get used to taking the strain or you won't be playing but spending your time visiting some medic or a physiotherapist.

Example sessions

	Example 1:	Example 2:
Monday:	weights & aerobic run	aerobic run
Tuesday:	aerobic unit	hills
Wednesday:	hills	hills
Thursday:	rest	rest
Friday:	weights & aerobic run	weights & aerobic run
Saturday:	hills	hills
Sunday:	rest	rest

Recording

A training diary should become an integral part of your training kit. Some prefer to use a section of their personal diary, others like to use an additional personal diary. There are also special training diaries to be purchased. Another option is to use A4 sheets which categorizes the type of work undertaken.

Here is an example of how shorthand can be used to record units of work.

Longhand: seven repetitions of two minute runs with one minute recovery between runs.

Shorthand: 7x2min runs, 1min rec.

Longhand: three sets of four repetitions of four minute runs with five minutes rest between sets and one minute between runs.

Shorthand: 3x4x2min runs, 1min and 5min rec.

Longhand: three sets of six repetitions of thirty meter sprints with two minute recovery between sets and fifteen seconds between runs.

Shorthand: 3x6x30m sprints, 15s and 2min rec.

