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A Publication for Race Walking Australia

Photos by Shane Dickson & Bob Cruise

Cover Photo: Dane Bird-Smith Olympic Bronze Medalist Rio 2016

Written by Bob Cruise for Race Walking Australia (2020)

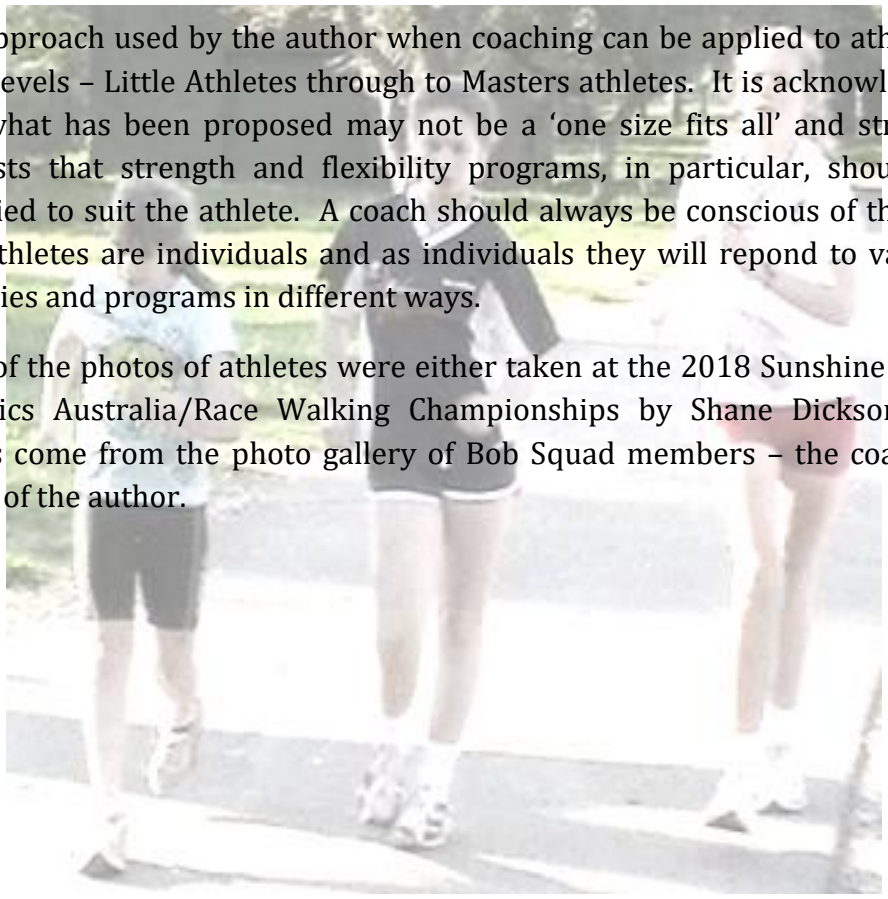
Introduction

This booklet has been prepared for Race Walking Australia to provide members and coaches with a basic introduction into the development of race walking technique, how strength and flexibility is important for the development of good technique, how to recognise technique faults and how to take remedial actiion to correct technique faults.

What is written is a compact presentation of the activities and elements of what is necessary to develop correct race walking technique. The author considers technique to be of fundamental importance in the pursuit of good performance. Hence the title of this booklet is – TECHNIQUE, TECHNIQUE, TECHNIQUE.

The approach used by the author when coaching can be applied to athltetes of all levels – Little Athletes through to Masters athletes. It is acknowledged that what has been proposed may not be a 'one size fits all' and strongly suggests that strength and flexibility programs, in particular, should be modified to suit the athlete. A coach should always be conscious of the fact that athletes are individuals and as individuals they will repond to various activities and programs in different ways.

Most of the photos of athletes were either taken at the 2018 Sunshine Coast Athletics Australia/Race Walking Championships by Shane Dickson and others come from the photo gallery of Bob Squad members – the coaching group of the author.



TECHNIQUE, TECHNIQUE, TECHNIQUE

This booklet is essentially about teaching new walkers how to walk.

Prior to working on developing an athlete's technique it is important that the coach understands the race walking rules. A knowledge of what constitutes a straight leg, loss of contact and what are the implications of an athlete being required to enter the penalty zone.

Following is a brief description of the walking rules.

World Athletics Competition Rules - Rule 54.1:

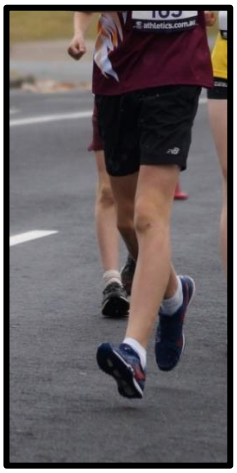
> *Race Walking is a progression of steps so taken that the walker makes contact with the ground, so that no visible (to the human eye) loss of contact occurs. The advancing leg must be straightened (i.e. not bent at the knee) from the moment of first contact with the ground until the vertical upright position.*

Essentially there are two parts to the rule:

1. The lead leg must be straight when it lands and remain so until the vertical upright position;
2. The walker must make contact with the ground at all times.

Below are several photos of walkers in breach of the walking rules. Breaches may result in disqualification of the athlete.

Loss of Contact



Loss of Contact

Very obvious bent leg

Leg not straightened

Clearly if a coach detects loss of contact or a bent leg then remedial action is essential. The development of sound technique will, for the most part, eliminate loss of contact and a bent leg.

An athlete may receive a yellow paddle from a walking judge if that judge is not completely satisfied that the walker is complying with the rules and a red card (not visible to the walker) if the judge is satisfied.

When in receipt of three red cards the walker is required to enter a penalty zone for a period of time. Once re-entering the race if the athlete gets a fourth red card then that athlete will be disqualified.

Developing Technique.

One of the first tasks of a race walking coach, when starting to coach a new walker, is to concentrate on the development of sound technique. The goal is **Technique, Technique, Technique**. Without sound technique the walker will have difficulty with the development of speed endurance and indeed speed.

To develop sound technique patience will, in most cases, be necessary. Sometimes a coach will be fortunate enough to have an athlete arrive at his/her squad that is already in possession of a natural race walking action. But this is rare. To develop a sound technique a number of steps need to be taken. But the coach and indeed the walker should be aware that the process can be lengthy.

When starting, an athlete should be asked to stand on the spot with feet about twenty centimetres apart and with the heels flat on the ground. The athlete should begin moving their knees backwards and forward whilst keeping the heels on the ground. The athlete increases the speed of the knees. When doing so the arms of the athlete begin to move, the heels start coming up off the ground and there is a tendency to want to move forward.

The athlete should allow the body to move forward but movement should be by tiny steps gradually moving into longer naturally occurring steps.

The above procedure should be repeated several times until the athlete has adopted a fast walking action.

Coupled with the above a beginning athlete should undertake a range of drills in order to assist in the development of technique. These are listed below:

An athlete should, using the technique developed above, should walk approximately 30 – 40 metres with:

- Arms crossed at front of body.
- Arms clasped at the back.
- Hands clasped behing the head.
- Arms held horizontally to the side at shoulder height.
- Arms held horizontally in front of the the body at shoulder height.
- Right arm swinging forwards.
- Left arm swinging backwards.
- Left arm swinging forwards.
- Right arm swinging backwards.
- Feet walking along a lane line.
- Feet alternatively crossing over a lane line.
- Athletes walking in unison with each other, arms linked to the athlete next to them. For this to work effectively athletes need to be of similar heights.

Some of these activities are included in the general Conditioning Strength session/program included later in this booklet.

The Hips, Legs & Feet.

The development of technique must be done in conjunction with sound compliance with the race walking rules. To assist in maintaining a straight leg at the moment of first contact with the ground the lead toe should be held reasonably high but not so high as to cause extreme shin pain or soreness.

At heel strike the foot of the leading leg should be moving backwards not causing a breaking action, raking the ground not stationary relative to the body.

As the lead foot moves backwards the opposite leg bends at the knee and drives forward – called 'toe off'. At the same time the hip of the walker drops to allow the bent leg to move forward i.e. the motion of the hip is forward and dropping not rotational.

Walkers should minimise hyperextension[1]. By doing so the time taken for a single stride length is lessened and overall performance improved.

At all stages of the stride the feet are kept as close to the ground as possible. This is referred to as a 'low trail leg'. By doing so the chance of being 'red carded' for loss of contact is minimised along with lessening the time taken for a single stride to occur. Thus efficiency is enhanced.

A walker with excessive high trail leg and a hyperextended leg on the left and a walker exhibiting excessive hyperextension on the right

[1] Hyperextension is the bending backwards of the leg. Research suggests that most elite walkers exhibit hyperextension but it should be minimised in order to improve efficiency and ultimately performance.

An athlete with perfect contact

A very safe walker with too much contact

Excessive height of trail leg

The Head, Arms and Shoulders.

Shoulders of the athlete should remain relatively stationary and should not move very much in any direction, up or down, forwards or backwards.

The angle of the bend in the arm at the elbow should remain around 90 degrees throughout the total arm swing. The backwards motion of the arm terminates when the hand is adjacent to the hip. The forward arm terminates when the hands reach approximately chest height and the vertical centre line of the body.

The head of the athlete should remain relatively still throughout all actions of the walker. Head movement can result in unbalance and loss of efficiency.

A young athlete with excessive arm swing

Low arm swing

Excessive across the body arm & shoulder swing

Incorporating Strength and Flexibility into a Training Session.

Consistent with the development of sound technique must be strength and flexibility. An elite full time athlete may well enjoy the opportunity of being able to undergo a specific S & C activity on a regular basis however the younger athlete with school, university and work activities will need to incorporate strength and conditioning into each training session.

Head and upper body with excessive lateral lean

Athlete looking down

Sound arm action and hip drop

Excessive hip drop

Flexibility is undoubtedly extremely important to the race walker and is invaluable in developing a sound technique. Kelvin Giles in Modern Athlete and Coach (p8 45 (1) 2007) sees a lack of flexibility as the major limitation to the development of physical competence. Flexibility is essentially about increasing an athlete's range of motion[2] and can be achieved in a number of ways.

Following are some suggested activities.

Warm Up:

Current belief seems to be that a warm-up increases the blood flow to the muscles and consequently increases the muscle/body temperature, increases the muscles ability to stretch and contract quickly thus increasing the range of motion and, because of this, reduces the likelihood of injury. Warm-up programs are generally designed to ensure this happens via a range of stretching exercises/activities. But debate has been ongoing.

As a general rule, dynamic stretches are considered best for warm-up and static stretches and/or PNF[3] best for warm-down.

General movement is dynamic such as:

- Running over various distances – used primarily as a warm up activity.
- Skipping over various distances – used primarily as a warm up activity.
- Games such as football.
- Using a rope to skip.
- Leg swings.
- Long slow walk.
- Shoulder rolls.

To improve strength and flexibility the following activities can be undertaken:

[2] Range of motion is limited by a number of physiological factors such as age, weight, gender and muscle bulk.
[3] PNF stretching is stretching against a force (see photo of two girls on page 10).

For Upper Body:

• Medicine ball activities e.g. throwing a one or two kilogram ball with two hands from the chest of one athlete to another and/or throwing a one or two kilogram ball with alternate arms over various distances between two or more athletes.

For the Hips:

• Athletes standing back to back passing a medicine ball by rotating the hips.
• Lying on back and have legs cross- over alternately.

For the ankles and feet:

The structure of the foot is complex. There are 26 bones, 19 muscles, 33 joints and in excess of 100 ligaments.

The bones of the foot are segmented (phalanges, metatarsals and tarsal) to allow the foot to move over various surfaces: pushing down (plantar flexion), raising the foot (dorsiflexion), turning the foot inwards (inversion) and turning foot the outwards (eversion).

The Achilles tendon is attached to the calcaneus bone (heel). Running on the underside of the foot between the heel and toes is the plantar fasciitis. The exercises below are best done without footwear.

- Walking on toes for say 20 metres or so. This is aimed at strengthening ankles – plantar flexion.
- Walking on heels for say 20 metres or so. This is aimed at strengthening ankles – dorsi flexion.
- Walking on the outside of the feet for say 20 metres or so. This is aimed at improving lateral ankle stability.
- Walking on the inside of the feet for say 20 metres or so. This is also aimed at improving lateral stability.








- Rocking backwards and forwards to improve lateral stability (strength).
- Rolling backwards and forwards using a small rubber type ball. This helps ease plantar fasciitis problems.
- Rotating the feet in the same and then in opposite directions improves overall flexibility of the ankle.
- Picking up a towel with the toes will assist with drive off the rear foot.

Shin Stretches:

This is an activity designed to increase the flexibility of the shin thus minimizing shin soreness during linear (straight line) walking.

Of course there are many others.

Groin Stretches:

• The athlete should sit on the ground with one leg in the hurdle position at right angles to the other leg. This should be repeated with the legs in the opposite positions (see photo following).
• The athlete should sit with a leg in the 'reverse' hurdle position with the shin being at right angles to the other leg. Muscle Groups stretched include gastrocnemius and hamstrings;

In the exercise above the athlete should lean forward attempting to touch their forehead on the knee of the straightened leg. This can be done repetitiously (say twenty or thirty times) or as a hold for twenty or thirty seconds.

Forward, backward, side and diagonal lunges:

This activity seeks to flex and strengthen the muscles of the upper leg. Major muscle groups targeted are Illiopsoas, Rectus Femorous, Gluteus Maximus and Hamstrings.

- Forward lunge walk. Each lunge should be held for approximately ten seconds before moving forward;
- Backward lunge walk. As above each lunge should be held for approximately ten seconds before taking the next lunge;

- Diagonal lunge. This is sometimes referred to as the 'Hockey Lunge'. Similar to the above each lunge should be held for ten seconds; and
- Side lunge holding for ten seconds.

When undertaking these activities hands should be behind the head. It is important not to allow the knee to move any farther forward the mid shoe. The rear leg should be parallel to the ground whereas the front leg should be at right angles to the ground/floor.

Forward Lunge – hands should be behind head

PNF Stretch

Hamstring Stretches

A General Condition Stand Alone Strength and Flexibility Session for a Young Walker:

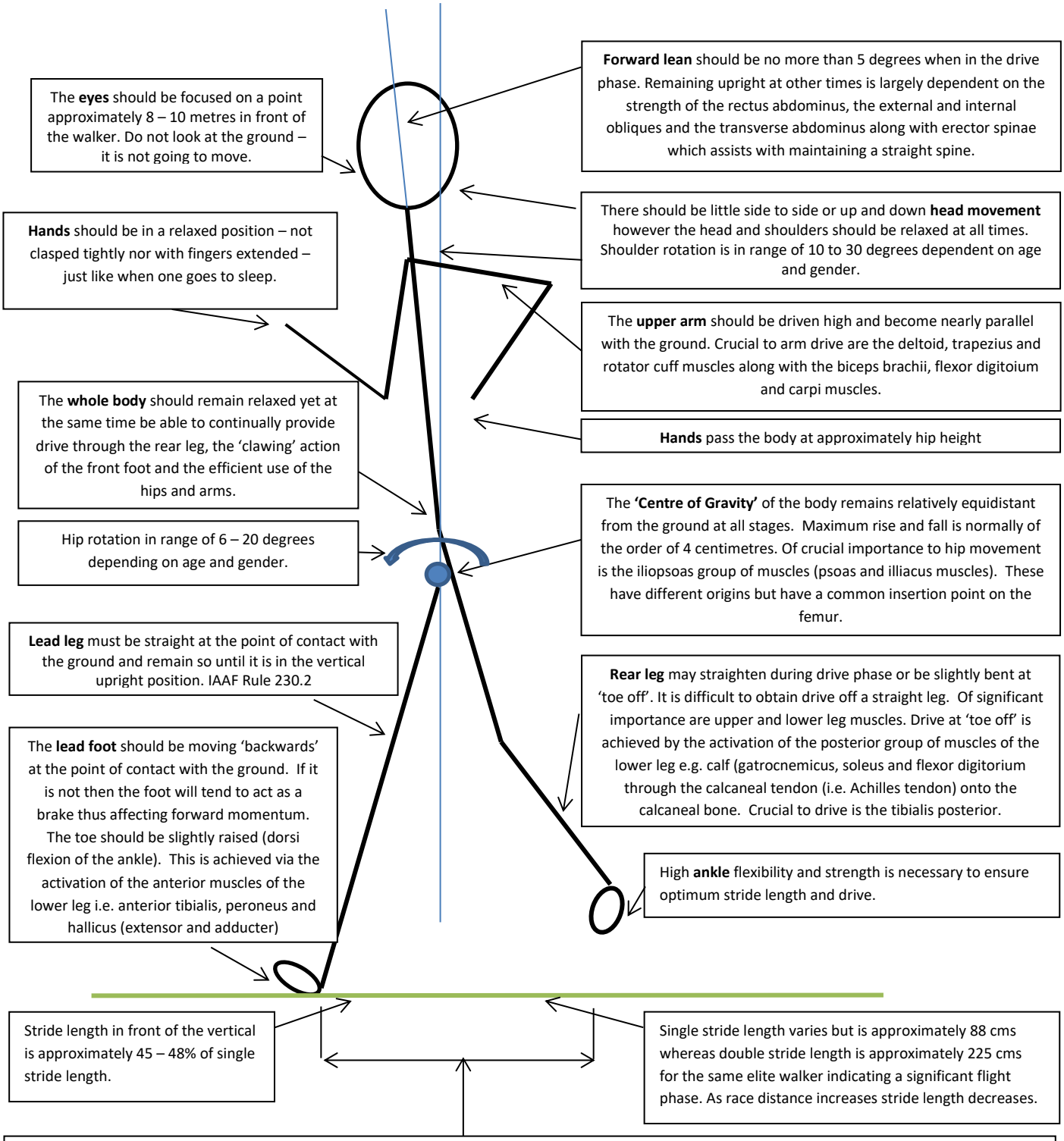
Following is a stand-alone strength and flexibility session designed for a young walker. The activities within the session do not require the walker to access a gymnasium and can be done at home.

Whereas some of the activities have been mentioned previously repetition need not be avoided.

Utilization of furniture within the house or structures around the house should be used where possible e.g. putting feet under the lounge whilst doing crunches or sit ups,

No.	Exercise	Activity	Details	Time/Number
1	**Jogging**	Warm -Up Beep (Bleep) Test		5 minutes As necessary = say every month
2	**Dynamic Exercises**	Star Jumps	Double Touch Down (Fast) Single Touch Down	30 seconds 30 seconds
		Burpees	Full push-up position	x 20
		Running	High Knee 'Drives'	30 seconds
		Arm Swings	Forward Right Arm Backward Right Arm Forward Left Arm Backward Right Arm Forward Both Arms Backwards Both Arms	30 seconds 30 seconds 30 seconds 30 seconds 30 seconds 30 seconds
		Leg Swings	Right Leg Left Leg	30 seconds 30 seconds
		Fast Feet	Running on the spot Speed Test (Hexagon) Sprints over 15 metres Step Ups (Right Leg lead) Step Ups (Left leg lead)	30 seconds x 2 x 4 30 seconds 30 seconds
3	**Strength**	Ankles	Walking on toes Walking on heels Walking on outside of feet Walking on inside of feet Sideways rocking on both feet	20 metres 20 metres 20 metres 20 metres 30 seconds
		Lunges	Forward lunges Backward Lunges 2 x Forward, 1 x Backward Sideways Lunges	2 minutes 2 minutes 2 minutes 2 minutes
		Push-Ups	Standard (Fast) Wide hands (Fast) Wide Feet (Fast) Arms Fixed - legs walk in circle (one x each direction) Legs Fixed - arms walk in circle (one x each direction)	1 minute 30 seconds 30 seconds x1 x1
		Hopping	Right Leg Left Leg	30 seconds 30 seconds
		Jumps	Horizontal Jumps Vertical Jumps	30 seconds 30 seconds
		Sit - Ups	Standard (Fast) Right Elbow to Left Knee Left Elbow to Right Knee Extended over end of Bench	30 seconds 30 seconds 30 seconds 30 seconds
		Ball Work	Figure 8 with 1 kg Ball Overhead/Sideways Throws with 2 Kg ball Side Throws with 3 kg Ball	50 each side 3 minutes 20 each side
		Planks	Standard Left Side Right Side	90 seconds 60 seconds 60 seconds
		Elastic (Resistance) Straps	Pulling (extended arm action) Right arm Pulling (extended arm action) Left arm Both Arms above head Both Arms behind back Right Ankle to Right Arm Left Ankle to Left Arm	30 seconds 30 seconds 30 seconds 30 seconds 30 seconds 30 seconds
4	**Jogging**	Warm - Down		5 minutes

The 'Double Support Phase'



The **eyes** should be focused on a point approximately 8 – 10 metres in front of the walker. Do not look at the ground – it is not going to move.

Forward lean should be no more than 5 degrees when in the drive phase. Remaining upright at other times is largely dependent on the strength of the rectus abdominus, the external and internal obliques and the transverse abdominus along with erector spinae which assists with maintaining a straight spine.

There should be little side to side or up and down **head movement** however the head and shoulders should be relaxed at all times. Shoulder rotation is in range of 10 to 30 degrees dependent on age and gender.

Hands should be in a relaxed position – not clasped tightly nor with fingers extended – just like when one goes to sleep.

The **upper arm** should be driven high and become nearly parallel with the ground. Crucial to arm drive are the deltoid, trapezius and rotator cuff muscles along with the biceps brachii, flexor digitoium and carpi muscles.

Hands pass the body at approximately hip height

The **whole body** should remain relaxed yet at the same time be able to continually provide drive through the rear leg, the 'clawing' action of the front foot and the efficient use of the hips and arms.

The **'Centre of Gravity'** of the body remains relatively equidistant from the ground at all stages. Maximum rise and fall is normally of the order of 4 centimetres. Of crucial importance to hip movement is the iliopsoas group of muscles (psoas and illiacus muscles). These have different origins but have a common insertion point on the femur.

Hip rotation in range of 6 – 20 degrees depending on age and gender.

Lead leg must be straight at the point of contact with the ground and remain so until it is in the vertical upright position. IAAF Rule 230.2

Rear leg may straighten during drive phase or be slightly bent at 'toe off'. It is difficult to obtain drive off a straight leg. Of significant importance are upper and lower leg muscles. Drive at 'toe off' is achieved by the activation of the posterior group of muscles of the lower leg e.g. calf (gatrocnemicus, soleus and flexor digitorium through the calcaneal tendon (i.e. Achilles tendon) onto the calcaneal bone. Crucial to drive is the tibialis posterior.

The **lead foot** should be moving 'backwards' at the point of contact with the ground. If it is not then the foot will tend to act as a brake thus affecting forward momentum. The toe should be slightly raised (dorsi flexion of the ankle). This is achieved via the activation of the anterior muscles of the lower leg i.e. anterior tibialis, peroneus and hallicus (extensor and adducter)

High **ankle** flexibility and strength is necessary to ensure optimum stride length and drive.

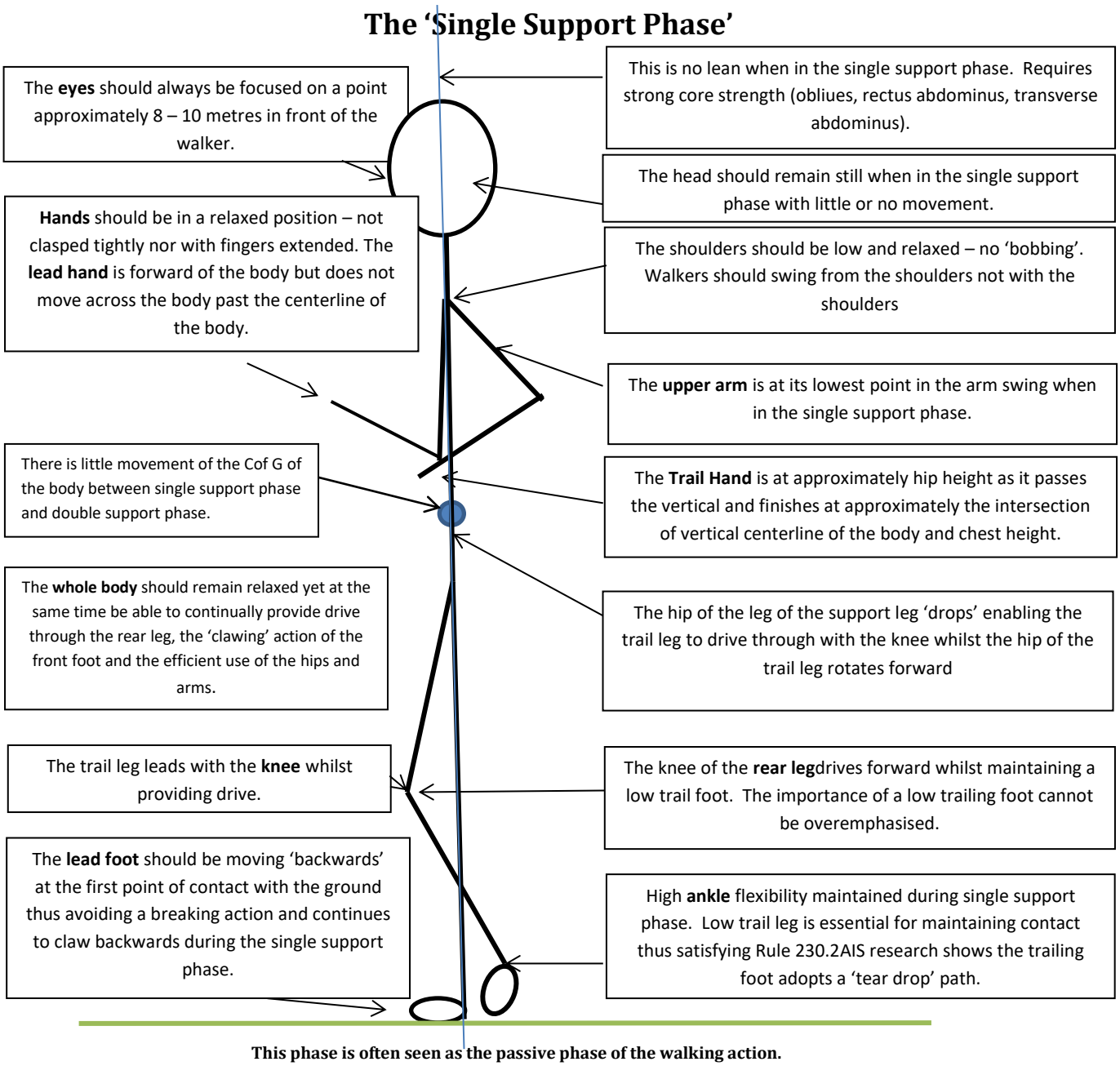
Stride length in front of the vertical is approximately 45 – 48% of single stride length.

Single stride length varies but is approximately 88 cms whereas double stride length is approximately 225 cms for the same elite walker indicating a significant flight phase. As race distance increases stride length decreases.

Stride length is optimal around 70% of athlete's body height. Range is from 65% - 75% of body height dependent on age and gender. **Single stride lengths** may vary considerably however single stride lengths of between 80 centimetres and 115 centimetres are common. For a 23 minute 5000 metre walker a single stride length of 100 centimetres results in the walker covering approximately 217 metres in a minute. This equates to 3.62 steps per second or 0.28 secs per single step.

A 20 minute walker with a stride length of 100 centimetres covers 250 metres in a minute and travels at 4.17 steps per second or 0.24 seconds per step. Given that stride length in front of the body is approximately 40% of total single stride length then the time taken from heel/toe contact with the ground to the vertical upright position is 40% of 0.24 secs = 0.096 secs ≈one tenth of a second.

The 'Single Support Phase'



This phase is often seen as the passive phase of the walking action.

Speed = Strike Rate (steps per minute) x Stride length (metres)

An athlete, in conjunction with their coach, should modify strike rate and stride length to ensure optimum speed. This should be achieved through incremental changes to both.

A Stride length of 80 centimetres coupled with a strike rate of 200 steps per minute equates to a 1500 metre race time of approximately 9 minutes 22 seconds whereas a stride length of 85 centimetres and a strike rate of 202 steps per minute equates to a 1500 metre race time of 8 minutes 43 seconds – a significant gain achieved through incremental changes.

Evaluation and Fault Analysis:

Consistent with the development of sound technique is technique evaluation and fault analysis.

A coach needs to be able to evaluate a walker's performance from a technique point of view and be able to offer remedial actions to correct faults should they exist.

The following Fault Analysis Chart below (Adapted from "Race Walking" by Martin Rudow, "Race Walking" by Julian Hopkins and "A Matter of Judgement" by Bob Cruise) may assist the coach in the development of a sound walking technique. It is far from complete in that there are other technique faults not addressed below.

Observable Fault	Consequences & Remediation
A. Arms held too high 	**Consequences:** Can lead to 'loss of contact', early arm and shoulder fatigue. **Remedies:** 1. Practice walking with arms folded on chest or with hands grasped at small of the back. 2. Practise walking with hands 'brushing' leg of shorts. Work on developing proper arm swing arc
B. Arms held too low. 	**Consequence:** An excellent way to avoid 'loss of contact' slows arms and leg speed. **Remedies:** 1. Practise walking with hands passing in front of nose. 2. Practice walking with arms folded on chest or with hands grasped at small of the back. 3. Work on developing proper arm swing arc.
C. Excessive arm swing. 	**Consequence:** Slows leg speed and can result in loss of balance. **Remedies:** 1. Clasp handkerchief in both hands while walking. 2. Practise walking with arms folded on chest or with hands grasped at small of the back. Work on developing proper arm swing arc.

D. Excessive head lean (forward or back). 	**Consequence:** Results in upper body (back and chest) tension and resultant fatigue. Can upset the walker's balance as well as creating breathing difficulties. **Remedies:** 1. Look at a point some 10-20 feet in front of walker and exercise self control. Practise walking with hands clasped behind back.
E. Excessive backward or forward lean.  	**Consequense:** Leads to general fatigue in that muscles are either cramped or extended, which may well interfere with hip drop. Also severely affects optimum length of stride. Excessive forwards lead may result in inability of walker to straighten leading leg. Backward lean could lead to bouncy action and resultant 'loss of contact.' **Remedies:** 1. Walking with a pole held behind the back in the bend of the elbows. 2. Exercises for strengthening back and/or stomach muscles may help. Look at point some 10-20 feet in front of walker.
F. Insufficient hip rotation (or short stride) – See H. also. 	**Consequence:** Limits optimum length of stride and if walking at speed may lead to loss of contact. **Remedies:** 1. Exaggerate proper hip movement by overstriding and crossing over. Gentle stretching exercises.

G. Excessive hip rotation (or long stride). 	**Consequence:** Longer than normal stride (over-striding) and crossing over feet often resulting in 'loss of contact'. Also, foot is in the air longer, thus limiting period of drive. **Remedies:** 1. Shorten length of stride. 2. Walk so that feet land either side of a line marked on the ground. 3. Practise walking 'straight'.
H. Flats footed run (landing of flat of foot instead of heel). 	**Consequence:** Flat footed run is usually characterised by the early removal of the rear leg (double support not evident). Can easily lead to 'loss of contact'. **Remedies:** 1. Stand in 'Ideal' Double Support position and rock forward and backwards. This action stretches and strengthens the necessary muscles and tendons. 2. Exaggerate stride. 3. Increase ankle flexibility and hip mobility. 4. Reduce speed and concentrate on optimum length of stride.
I. Creeping (walking with bent knees). 	**Consequence:** Disqualification. **Remedies:** 1. Practise 'goose stepping' and hitting with the heel. 2. Walker should practise 'standing tall'. 3. Exercises designed to strengthen legs, e.g. hurdling type exercises.
J. Bent knee (not straightening supporting leg in vertical position). 	**Consequence:** Disqualification – generally caused by walker's speed being too great for technique. Also, muscles strength and stretching of hamstrings influenced. **Remedies:** 1. Reduce speed. 2. Exercises strengthening quadriceps muscles. 3. Exercises for stretching hamstrings. 4. Approach a 'goose stepping' technique.

K. 'Goose Stepping'. 	**Consequence:** Thigh comes forward too early (leads the hip) with consequent early leg straightening and, particularly at speed, may result in 'loss of contact'. **Remedies:** 1. Stand in 'Ideal' Double Support position and rock forward and backwards. This action stretches and strengthens the necessary muscles and tendons. 2. Leg and ankle flexibility exercises. 3. Exaggerate proper hip movement by overstriding and crossing over. 4. Gentle stretching exercises.
L Falling foot on contact. 	**Consequence:** Insufficient utilisation of stride, resulting in considerable lowering of performance – caused by foot swinging through too high due to incomplete hip action. **Remedies:** 1. Improve hip mobility. 2. Skim foot along ground. 3. Hit with heel. .
M. Upper body tenseness. 	**Consequence:** Shoulders tend to rise and fall, resulting in a 'bouncy' action and possible 'loss of contact'. **Remedies:** 1. Mobility exercises for shoulders. **2.** Awareness of trunk tension. **3.** Focus on low shoulders and hands

Excellent Technique.

The Author.

Bob Cruise is a Level 4 Athletics Australia and a Level 4 Australian Track and Field Coaches Association Specialist Race Walking Coach. He has been involved in track and field for more than fifty years having coached in Melbourne, in country Victoria at Horsham and Mildura and in the Northern Territory and South Australia.

Whilst in Alice Springs he became coach of the Northern Territory Team for the National Little Athletics Championships in Melbourne in 1987 where NT walkers won three of the total six race walking medals on offer.

When in Mildura he was awarded the Northern Mallee Sports Coach of the Year on three occasions, in 1995, 1997 and 1998.

He is currently President of Race Walking Australia and has been Chairman of the Athletics Australia Walking Committee and a National Selector for Road, Cross Country and Race Walking. He is a life member of Athletics Australia and was awarded the Australian Sports Medal in 2000.

As a race walking judge he has officiated for more than forty years including judging appointments at the 2000 and 2004 Olympics, at five Commonwealth Games, three World Race Walking Cups, World Juniors and World Youth walking events. He has been an International Judge for 25 years and was a Member of the IAAF Race Walking Committee from 1996 to 2004. He has recently retired from international judging and now applies his energies to the coaching of race walkers. He has coached numerous national champions in race walking.