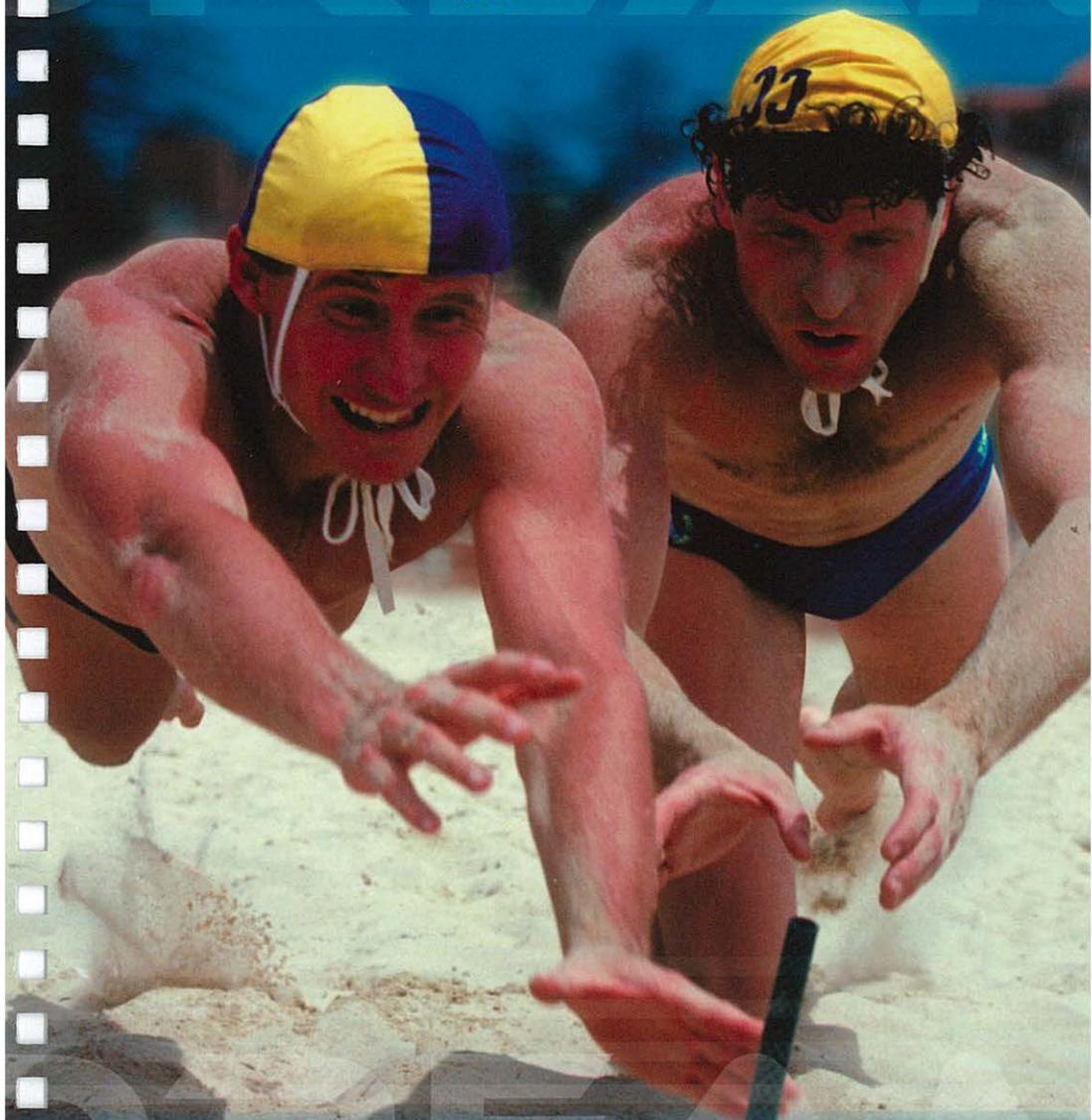


A BEACHIES

DREAM

A Training guide for runners



DARREN PETERS

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I dedicate this book to the spouses, mums and dads,
and siblings who have watched (or been sick of hearing about)
their children competing in surf lifesaving carnivals;
specifically beach flags, sprint and relays. In my case this book
is dedicated to my wife Cheryl, and children Joshua, Rhys,
Lachlan and Cory. In addition to my Mother and Father
(Bob and Robyn Peters) plus siblings Wayne and Warren.

And to my twin brother Warren
(a fellow Champion Beach Sprinter)
– on your day you were the best!

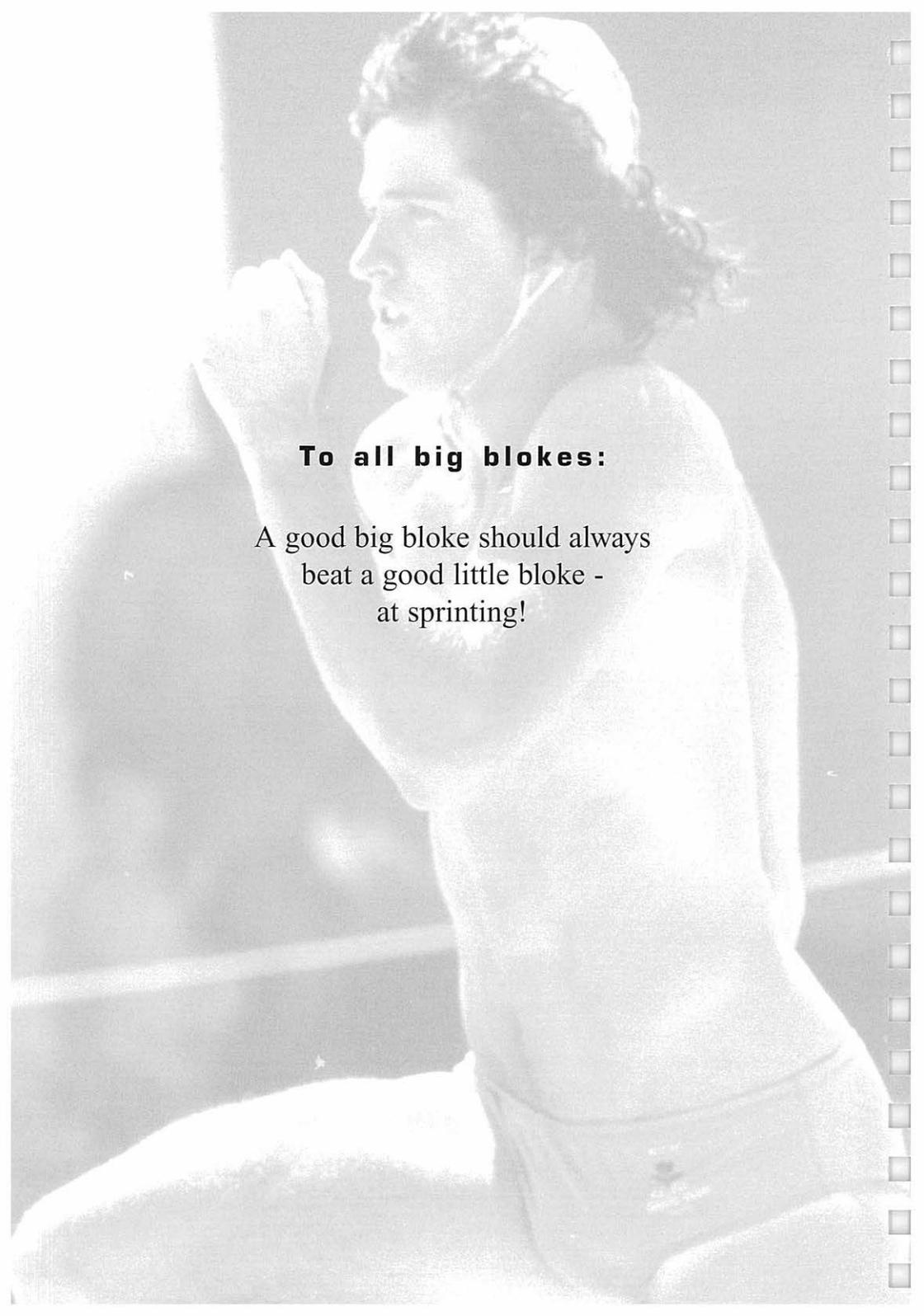




Darren Peters

A BEACHIES DREAM

A Training guide for runners



To all big blokes:

A good big bloke should always
beat a good little bloke -
at sprinting!

Designer - Michelle White

This book has been designed by an emerging young designer Michelle White. Engaged to beach flag competitor Greg Hitchenson, Michelle is a surf lifesaver who competing in R & R events for the Wanda SLSC (NSW). Michelle has designed poker machine screens, posters and now this book.

The cover is taken from a shot from photographer Harvie Allison.

Photographer - Harvie Allison

The quality photos in this book have been taken by Harvie Allison. Some others were personal shots. Harvie is the best lifesaving photographer in the business. He has over 30 years of experience shooting ironman, ironwomen, surfboat, surf ski, surfing and also surfboard plus, naturally, beach sprint and flag shots.

Harvie (plus his extensive list of photographs) can be located at www.harvpix.com

Editor - Gwynneth Scott

This book has been edited by Gwynneth Scott. Gwynneth is the “official” communications consultant to Rowing Australia and the Australian Paralympic Committee. Married to Michael Scott, a former National surf lifesaving champion and current Director of the Australian Institute of Sport. Gwynneth enjoys written and also website communication challenges.





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FOREWORD

The Making of champions

Umina beach on the NSW central coast provided an excellent environment for my brothers and I while growing up. We lived near the beach and were part of a sport mad Australian community. We had a world trampoline champion Brett Austin at school. Greame Eadie (Manly and Australian League star) and John Monie (Parramatta Coach) were central coast locals.

I was the smaller twin to Warren and we had an older brother (Wayne). Warren and Wayne were often mistaken for twins because of their similar height and basic looks. Being vocal and witty gave me the chance to be recognised in my own right, even if this meant I was labelled a “little smart alec”. Any such recognition was always hard fought when you were branded at birth as ‘one of the Peters twins’.

We walked, ran and rode our bikes everywhere and often challenged each other to races. Our father was competitive in spirit and our mother played a mean game of tennis. Their competitive nature rubbed off on each of us. Surfing and Australia’s great beach culture quickly became a part of my teenage lifestyle. I enjoyed running on the sand and loved surfing. Thanks to a school friend’s motivation, I had a strong desire to join the surf club up the road. His love of the club’s community service and sporting opportunities were great incentives for my youthful enthusiasm, personal development and sense of community.

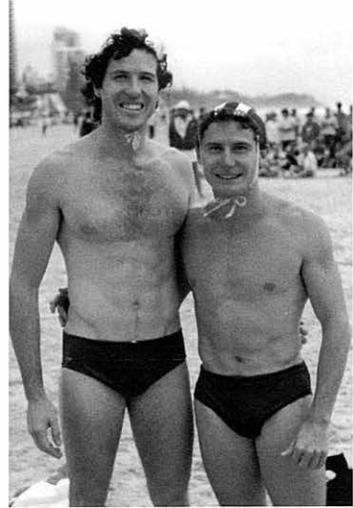


Darren Peters

A B E A C H I E S D R E A M

My parents were hard workers and held two jobs at a time to sustain their ‘three little pigs’. They did their utmost to give us each an equal share of whatever was on offer. I recall how they saved for some time to send us on a special surf club trip to the nationals at Trigg Island (1979).

Even later when Warren or I won major races or grand finals in football the congratulations were toned down so older brother Wayne would feel a part of our achievements. I have an inkling that this did not work. I think big Wayne felt that we were getting a bit more attention from everyone because we were good runners. The problem with this is – it just is the way athletes are treated in society. Australians love sport and people who are good at it!



Warren and Darren Peters (1989)

My twin Warren won most races at high school and I finished second. I was good at cross-country (finishing first most years), 1500m, 800m and 400m plus gymnastics. I am proud that one of my middle distance times (the 800m) at school remained a record for quite a while after it was set. Warren ran an 10.8 second hundred at 17 and a half years of age. I think I was off the pace at this stage running in the 11.1s to 11.3s area. I have no times to recall this accurately. I do though, remember leading most races for the first 30 to 40 meters.

Warren also excelled early in the junior ranks whereas the best I ever achieved was winning the NSW Open inter-branch flags as a junior competitor.

I developed late and didn't reach puberty until 14 years of age. As an avid surfboard rider I spent most of my time in the surf and this meant my shoulders were receiving a solid workout each day when the growth spurt finally hit. I went from five feet tall and a small build to five feet six inches with stocky build.

Warren was six feet tall at the same age but skinny. He had a long stride and was already into solid daily training. I ran smoothly with good early speed but was keen to skip the daily grind of running training. At 18 years of age Warren was a national beach sprint champion whilst at the same stage I was known as quick with potential but not thought to be winning material.

I vividly remember an old timer at the club (Ocean Beach), a life member, telling me I was going to be a good relay asset and perhaps a flag competitor, but that was it. I was never going to win a national surf lifesaving sprint or flag championships. I was too small and not good enough they said!

Naturally, this set the scene firmly in my mind and for the next 10 years I was motivated to prove them all wrong. I was keen to show them a good little man can sometimes beat a good big one even if that someone was his own twin brother.

Giving it back

It took a lot of time, pain (both physical and emotional), learning and planning but I did “show ‘em”. I made it to the top in my chosen sport. I won the World beach sprint championships in 1988 and 1990 (also the National Teams Beach Flags in 1990 and 1991) and finished second in the World sprint in 1992 when I was winding down (aged 30 years). My times in 1988, 89, 90 were consistent at 10.5 to 10.7 seconds (hand) for 100m on the grass and I have run many solid 60m races in 6.5 seconds hand held on the grass.

I won the Australian open beach sprint in 1989 and 1990 (aged 27 and 28 years). I was also the NSW open beach sprint champion three times and Queensland Champion once. On the track I won the NSW relay Championships (for Tiger Wests), running a comfortable 10.7 electric as first leg bend runner.

My best ever times were 8.25 hand for 80m on a grassed track, 10.69 electronic timing on tartan, and 10.4 seconds hand for 90m on the soft sand. On the hard sand (Moana Beach) I ran a time of 9.47 seconds for the 92m in 1986.

After my success at the Worlds, having climbed the summit, I started to consider sharing with others my knowledge and experience as a runner. I sought to become a coach and knew that in the coaching area I could achieve personal goals and intrinsic satisfaction, almost validation, as a beach athlete.



Final World Championship 1990 -
Lubeck Germany



Kip McFarland (left)
Zane Campbell
(right)
1st & 2nd NSW
Championships.
(1998)

As a coach I have trained State, Australian and World beach sprint and flag champions, both male and female.

I have recognised the gift of making athletes self-sufficient. I successfully coached, and continue to coach, athletes by distance education. For example, long time associate Robert Barnes won three Northern Territory Beach Sprint championships and made Australian and Queensland beach sprint and relay finals while living in Darwin. I presently coach Kip McFarland to State, Australian and World championships while he lives in Queensland. World beach flag champion Simon Harris has learnt how to coach himself thanks largely to the foundations established during his time in my 'Rocket Squad'.

The next step then has been for me to write it down and share my coaching knowledge with a wider audience. This book is unashamedly for beach runners. In the first section of the book I have attempted to describe key philosophies underpinning my own athletic journey as well as the athletic preparation of some athletes I have coached. In the next section I take readers through a year in an athlete's life covering the off-season, the development phase, the competition phase and finally competition day where psychology is a major factor.

Because no matter what you do in life your approach is coloured by who and what you are, how life has treated you so far and how you have responded to the challenges thrown your way, the technical information is intertwined with details of my career, my driving forces and my experiences as a beach sprinter.

As far as I am concerned I was always a good runner but others in my era were 'simply the best'. I therefore write this book with due respect for the many characters and also great champions in surf lifesaving beach events such as Johnny Bliss, Nick Yakich, the Lawson twins, John Annand, Michael Jones, Debbie Baker, Paul Singleton, Warren Peters, Veronica Lee, Callum Taylor and Kip McFarland and Steve Munnery just to name a few.

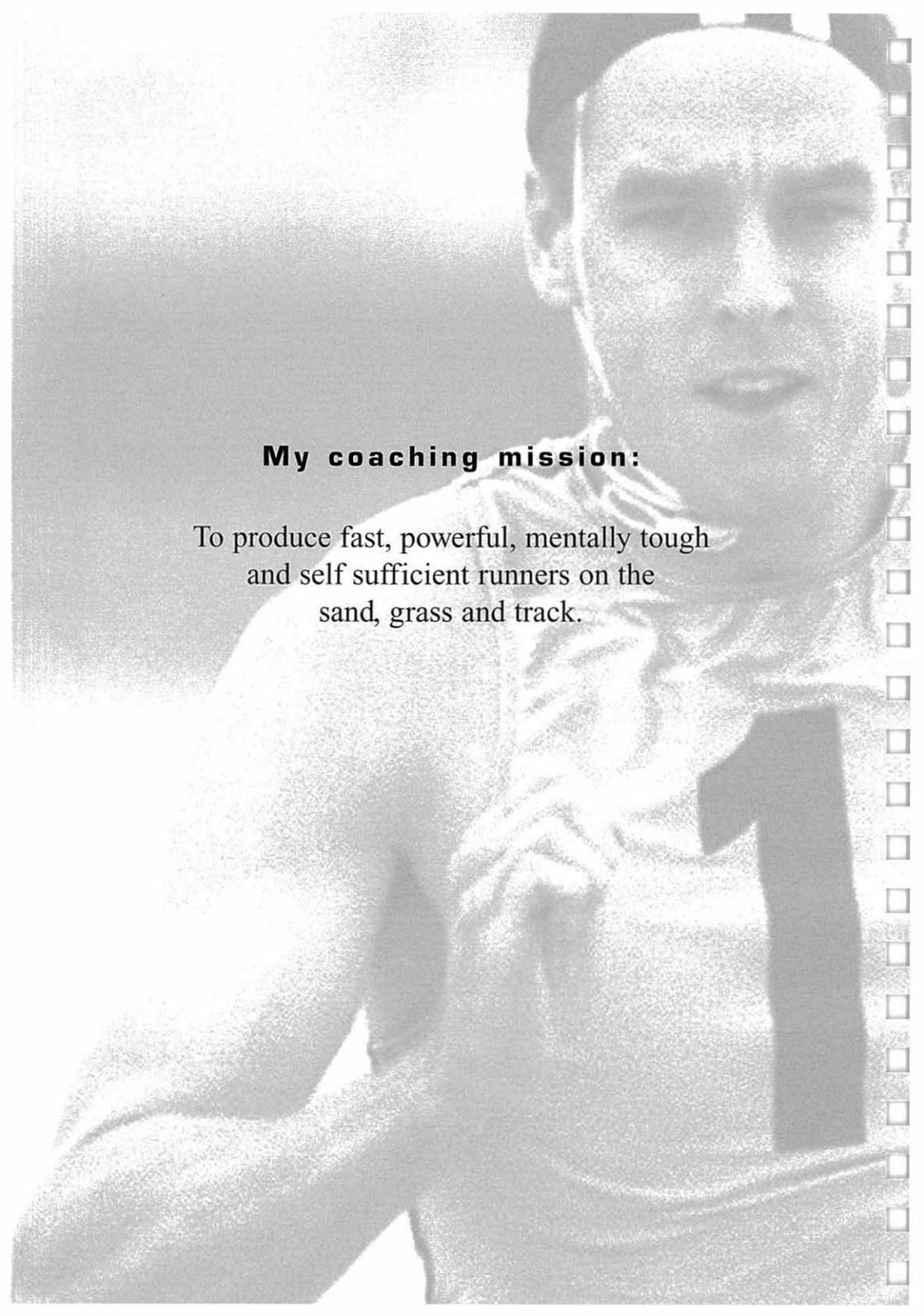
My aim with this book is to honour the sport in which these top athletes and I were privileged to be involved and to contribute to the creation of the beach sprint champions of the future.

Enjoy.

– Darren Peters (Pocket Rocket)



Ashlee Cheney - Australian Champion 2004. (Coached by Author)



My coaching mission:

To produce fast, powerful, mentally tough
and self sufficient runners on the
sand, grass and track.

COACHING FOUNDATIONS

Coaches and coaching styles

Our first coach was Peter Quick. Peter was a very good first coach who nurtured us and provided personal guidance and training advice. He was 10 years older than we were and had recently been married when our training commenced. We would be picked up at 6.00am every weekday morning and taken to the surf club (Ocean Beach NSW).

Once at the club we would run about 2.5 kilometres to 'the point' and back and then stretch. On soft sand mornings this affected us all and on hard sand mornings the going was very pleasant. We performed flag drills and acceleration based drills. This occurred rain, hail or shine.

At 5.00pm each weekday afternoon (except Fridays) training would commence at Umina oval. The sessions included 300m efforts in the September and October general preparation phase. These were reduced to 100m stride through as the season proceeded. We did squat jumps, tuck jumps and sit-ups at each session and starts were added from December to compliment varied pace runs over 100m and acceleration runs over 60m.

Each weekend we competed in at least two divisions (juniors and open) at the scheduled carnival, including sprint, flags and relay. As juniors this meant the coach drove us to the carnival, we competed and then waited until the festivities were over, to come home. My best result under Peter Quick was running third in the Open sprint at the Australian Championships (1982), second in the Open sprint at the New South Wales Championships (1982) and winning the New South Wales Open Beach Relay twice.



Peter Quick (left) me (right) 1981 aged 18



Ocean beach

The only recorded time I remember was a 12.5 second run (off a five metre handicap mark) in a professional race at Erina. I was about 18 years of age and this was 11 second 100 metre pace.

Peter was always available for advice and was a gentle man with a kind nature. He was a mentor and taught me many lessons that are still with me today. Lessons such as:

- Accept every runner for who and what they are. Don't exclude people based upon talent;
- Race days are special days where the training culminates with a test. After the test is a good chance to talk about the days racing and also socialise with other competitors and your own coach[we met the Tubby brothers from Kilcare in the early days and have many memories with them from a range of experiences];
- Respect fellow athletes, coaches and clubs – everyone is there after all for fun!

It is fair to suggest I liked my first coach as a person and also a coach. This distinction in coaches is sometimes rare. My second coach was John Annand who was a dual Australian champion in the open beach sprint. He was a personable man but a hard taskmaster. John knew that hard work, dedication and a bit of animal was required to be a champion. Talent alone was not the significant ingredient. I am not sure whether he ever saw those qualities in me (just the larrikin) although I know he saw those in Warren.

John trained us at 7.00am every morning on the Gold Coast on a grass running track. The closest tartan track was the QE11 stadium in Brisbane. On some occasions the night before got the better of me (beer, girls and so on) and due to this John also did at the next morning's training session. He would make me run a hard 300m or 200m and, when I vomited, tell me to get up and run one more just to teach me a lesson.

This helped instill in me that some coaches were not above making a point the hard way. It is a technique I have used myself. I did though after this, limit drinking to only after race days.

John often pitted Warren and I against each other over handicap (or with none). He also trained us to decreasing sets. As we got fitter and also faster the recovery was reduced and also volume increased. This meant we raced often during the training periods and actual races were merely a reflection of training.

That year (1985 aged 23 years) Warren ran a comfortable 10.4s 100m on the tartan at QE11, whilst I ran my first timed 100m tartan run at 10.6s hand in bare feet (I forgot my shoes) – and both without peaking.

We had a periodised program with one peak in each training year. Early season sessions were 200m and 300m for base and then training tailored off to shorter faster running using varied pace 150's and also handicap 120's on the grass. Warren and I were both asked to perform the same sessions although he was able to do most whilst I often broke down (hamstrings). This concerned me and I began to question the belief that all runners should prepare their body in a similar manner and also ask myself what was wrong with me in terms of body physiology.

I often questioned John about his philosophy but his responses although grounded in hard learnt personal practices lacked scientific 'clout'. His systematic plan was well thought out and routinely implemented though it lacked flexibility and personalisation for any one athlete – in this case me!

In 1985, aged 23, Warren and I finished first and second in Australia respectively in the open beach sprint. I know I was running around 10.6 second hundred speed at the time. We also finished second in the relay. Warren later went on to run second in the Stawell Gift (running a 10.4 second hundred) largely under John's guidance although Warren had some Victorian coaching assistance. These beach results were a defining moment for me and led to some significant changes.

My last coach was Alan Spencer. Alan was a professional running coach who had a mixture of science and style about his coaching. This intrigued me. In 1986 Alan was either teaching or participating in a Sports Science Diploma at the local Gold Coast Technical College. During a solid winter training period he brought to me the basics of energy systems and scientific training methods for sprinters.

Alan always left me searching for more information, and he knew I had a keen quest for knowledge in this area. At the time I was working in a bank and made a commitment to pursuing sport studies in the future. Alan's development phase program at the time is detailed in the following chart.

During an early July/August period of development (the earliest in the year I had ever commenced training at the time) running units comprised; 300's with 90 seconds recovery in 40-45 seconds, 200's in decreasing times (28-24 seconds), maximal acceleration 60's with 3-5 minute recoveries, plus, plyometrics and weights. The mixture of activities and also plyometrics and weights were all new to me at this stage.

The training week looked like this.

SET	NOTES
6 x 300m runs	90s Rest; 45-40 seconds
9 x 60m Accelerations	Maximal efforts, 3-5 mins rest.
Plyometrics & Weights	Sprint Power
4-6 x 200m runs	Walk back recovery, 24-28 seconds
Starts	Block and standing

After a solid June/July general preparation and then Aug/Sept/Oct specialised preparation I was running 10.7s for 100m in November 1986 and 12.3s (hand) off a five metre mark at the Macksville Gift (NSW). During this initial season preparation I focused on weight training in the gym and my strength was very good.

As a result of these overall improvements my 60m times were very quick. I ran one 60m in 6.4s hand on a very calm Gold Coast night. We had some timers present and one commented that I would have just beaten the Australian 60m record at that time. I was 24 years of age with seven years training background. The training regime Alan was using was based upon science, two peaks in the year plus individualised training. This was totally new to me.

We parted ways after a brief stint due to the sense I was playing second fiddle to another runner in his stable. Since I had spent many years doing this as Warren's twin I decided to go my own way. The identity of the runner at the time is irrelevant but when I established he was set for the Macksville Gift and I was not - the scene was set for me to depart. The fact I wasn't briefed about the situation and made to feel second rate (even though I could beat this runner) led me to leave. I could have easily handled someone else being the racer on that day so long as I was informed when my day was going to come along.

I guess it should be said that no runner likes to think someone else is the coach favourite. As a coach I try to make everyone feel good but sometimes the personalities involved just make it easier to 'like' someone as well as train them. I think one of the better young athletes I ever trained (Simon Harris) felt a little second fiddle to another runner (Greg Hitchenson) in our own training squad.

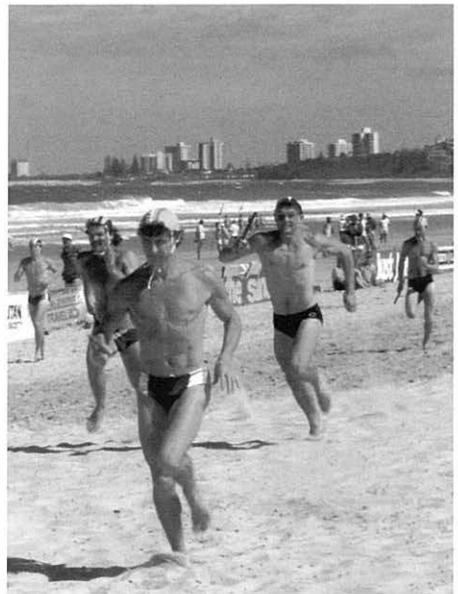
For the record there were no secret training sessions, no favoured advice just one bloke was a larrikin (which always gives me a tickle up) and the other a bit more like a little brother. You treat the larrikin different to the way you would treat a little brother, and this perception is always the runners reality at the time.

At this point I would just like to say that no coach ever gets the human issues perfect. We may make a runner faster and get them medals, but it always seems to come at a cost to one of the parties. One of the better young female sprint and flag competitors I trained (Jamie Schumacher) won medals at the Australian Championships (1994) but the outcome today is she doesn't run much at all anymore.

Another (Greg Hitchenson) started out running in the nippers and I suspect due to this got to the point after he won the nationals in 1994 that he had achieved it all. He then struggled with the normal 'growing up' concepts attached to adolescence. By this I mean those involving the social scene which detracted him from further elite focus. As a coach you often wonder if you could have done more to understand the people you train and nurture.



Greg Hitchenson. Australian Junior Beach Flag Champion



Running for Tugun SLSC. Winning State Relay Championship

Best Practice research

In the summer of 1986-87 I started training myself and used a mentor (E Ross Smith) to help me from time to time. I was living on the Gold Coast and was a member of Tugun SLSC. I was confident that my thirst for running knowledge could be fuelled by an innate desire to achieve.

The first thing I did was to research running best practice. In 1986 I wrote to the Australian Institute of Sport for specialised sprint training information and also started the search for a University of my own. I wanted one where I could study sports management concepts and learn as much as I could about sprint running. I found a book called 'What research tells the coach about sprinting' by George Dintiman. That one book changed the way I thought and felt about this subject of sprint training best practice.

In short, through the presentation of some objective data (which I hadn't previously seen), it supported many of the beliefs I already held. It also refuted many 'running tales'. As we proceed through this section about training many of these concepts will be explored further. Each piece had a significant result and impact in terms of forming my understanding and actual practice of my training beliefs and routines. This review was later influenced by academic concepts gained in my tertiary sports science courses.

Australian Institute of Sport (AIS)

My 1986 correspondence to the AIS asked some questions of the then head track coach Norm Osborne. What he provided changed my view on athlete preparation. Norm had a view that three types of sprinters, with corresponding training regimes, exist. These are:

1. Natural sprinters: "who tend to have a lot of leg speed with a medium amount of power";
2. Power sprinters: "generally very strong who rely on this facet and are generally better at shorter distances";
3. Endurance sprinters: "who tend to have a long moderate speed stride and take a while to wind up".

In presenting this information to me Norm reinforced my own growing belief that I had been trained to suit others most of my life and that no one coach had written the ideal

training regime for Darren Peters. After providing Norm with some personal data he also made some clear statements about my lack of body strength and specific sprinting power. A view was taken I had not prepared my body for “the rigours of intensive training”. I took this advice on board and proceeded with the hardest training year of my life.

The subsequent training program that Norm wrote for me was divided into segments and had training on most days of the week. It also included weight training exercises. I found the program very difficult to keep to without massive fatigue but did perform very quickly at the end of it. I ran a tidy 10.6s hand held 100m in an amateur race (tartan class ‘B’) on the QE2 track in 1986. Later that night I watched Paul Narracott (a multiple national 100m champion) run a 10.00s hand held 100m.

Russian information

In 1987 some information from Russian sources stunned me. At the time Russian coaches had been credited with training the Munich Olympic 100m and 200m sprint champion Valerie Borzov so the data was stated to be ‘best practice’. The general training philosophy and practice listed stages of athlete development based upon a logical and systematic development of the various biological components.

As Borzov (1983) himself stated, his coach Petrovski was a biologist who felt that “in order to achieve better performances all the sub systems of the organism; neuromuscular, cardiovascular, ventilation etc had to be developed to reach new, correctly planned levels”. In addition speed and endurance prognostic training times were set to guide the testing of this development. These times included: fly runs, crouch starts, acceleration runs and step in runs from 30m to 200m.

The training year also consisted of three periods. This was nothing new but the real change came from the fact that each period had similar buildup sections, specialisation sections and peaking sections. The first buildup lasted 17 weeks, the second 11 weeks whilst the final buildup was 7 weeks.

Each section actually rehearsed speed patterns so speed was trained for and tested more than once every year. This was something that I always accepted was the right thing to do. I often wondered about the old-fashioned training regime that only included speed work in February and March. In addition the volumes of training changed in each training phase and decreased as the speed increased.

So the significant changes were that runners actually trained to peak three times in any one-year and the training volume decreased as the intensity increased! The training units

also contained some surprises. They listed sled pulls and hill sprints for power and also towing or downhill running for speed work. This type of work was totally new to me!

Some examples of the variety in training sessions were:

- 6 times 100m hill sprints at 92-96%;
- 6 times 30m sled pulls, 6 times downhill 60m runs, 6 times acceleration 60m (flat);
- 6 times fly 60m downhill (slope at 3-5 degrees);
- 100m, 200m, 300m then 300m, 200m, 100m;
- 4 times 30m blocks; 4 times fly 30m; 3 times 60m blocks;
- peaking processes;
- rigorous weight training sessions.

So at 27 years of age and nearing my peak as a runner I had found out my training did not even include activities aimed at improving the areas of a race I actually enjoyed (and was good at) or was clearly weak at. Somehow I felt the SLSA coaching system had failed me and this led to my desire to address coaching matters within the organisation.

My Coaching Philosophy

It wasn't long before I introduced the following core elements into my training regimes. They focused on some of my strengths (and hence I enjoyed doing them) plus weaknesses (which led me to work hard and cope with things I disliked).

My personal training approach was:

- Two or three peaks a year;
- Decreasing training volume coupled with more rest as speed increased;
- Resistance and assistance training units included (particularly hills and towing);
- Systematic training tables for racing C30m, 60m, 100m, 150m; fly 30m, 60m, 100m;
- Training strengths and weaknesses of each athlete vigorously;
- Due to a personal preference I trained power and acceleration twice each week;

- I trained for striding, top speed and race endurance twice each week;
- I had to lift my core structural strength. I only weighed 62kgs so I used a bulk up program and conducted weight training 3 days a week almost all year round to place 6-8 kgs of muscle on the body;
- When I felt tight or slightly strained I had an easy day. This plus the additional strength work meant my own injuries were reduced by half.

The following years I ran more consistent times (a PB at 10.4 hand - mean 100m time of 10.6s for 100m in 1988,89,90,91) and had few injuries. The latter (i.e. fewer injuries) I suggest was due to the decreased volume at higher intensity (leading to less intra-muscular fatigue) plus, structural changes to my body. I strongly feel today that the increased structural strength and power through weights, hill sprints and tyre pulls played a significant factor in achieving this outcome.

Multi-directional Training

The concept of multi-directional training derived from the Russian biological theory and also Tudor Bompa's 1983 book on training periodisation. I started to play with the idea that training cycles can be directional in many ways. For example:

- Conditioning; speed endurance, general fitness, strength, speed, recovery etc;
- Energy and soul; psychology, diet, social interaction etc;
- Technique; starting, acceleration, striding, bursts, finishes etc.

Each training area would demand its own training plan. The real trick was to work out the year's demands/outputs and then work backwards to produce the sectional training package or what I called training phase objectives and activities. To help me do this I followed the approach of the Polish author Adam Zajac (1988) who used Direct Competition Preparation cycles (DCP) to prepare sprint athletes.

In this approach three phases were used:

1. Accumulation;
2. Intensification;
3. Transformation.

Each had differing objectives, training methods and activities and only lasted 28 days. It provided so much variety in training and also segment based development that I felt it may work. The only thing missing was diet and socio-psychology. I tested this package on myself first and ran some very quick times (8.2s hand time for 80m; 12.4s electric off 4m; 7.45s electric off 3m) and then introduced it to my squad of 10 runners. We all improved in the first 28 days and then after continually using the model on a rotational basis consistently posted good times.

The real issue though was that the training philosophy also led to personal gains due to the changes in physiological stress associated with the concept of decreasing the volume of work as the intensity of work increased. As Charlie Francis aptly stated in his book “Speed Trap”, “less is more” (p100).

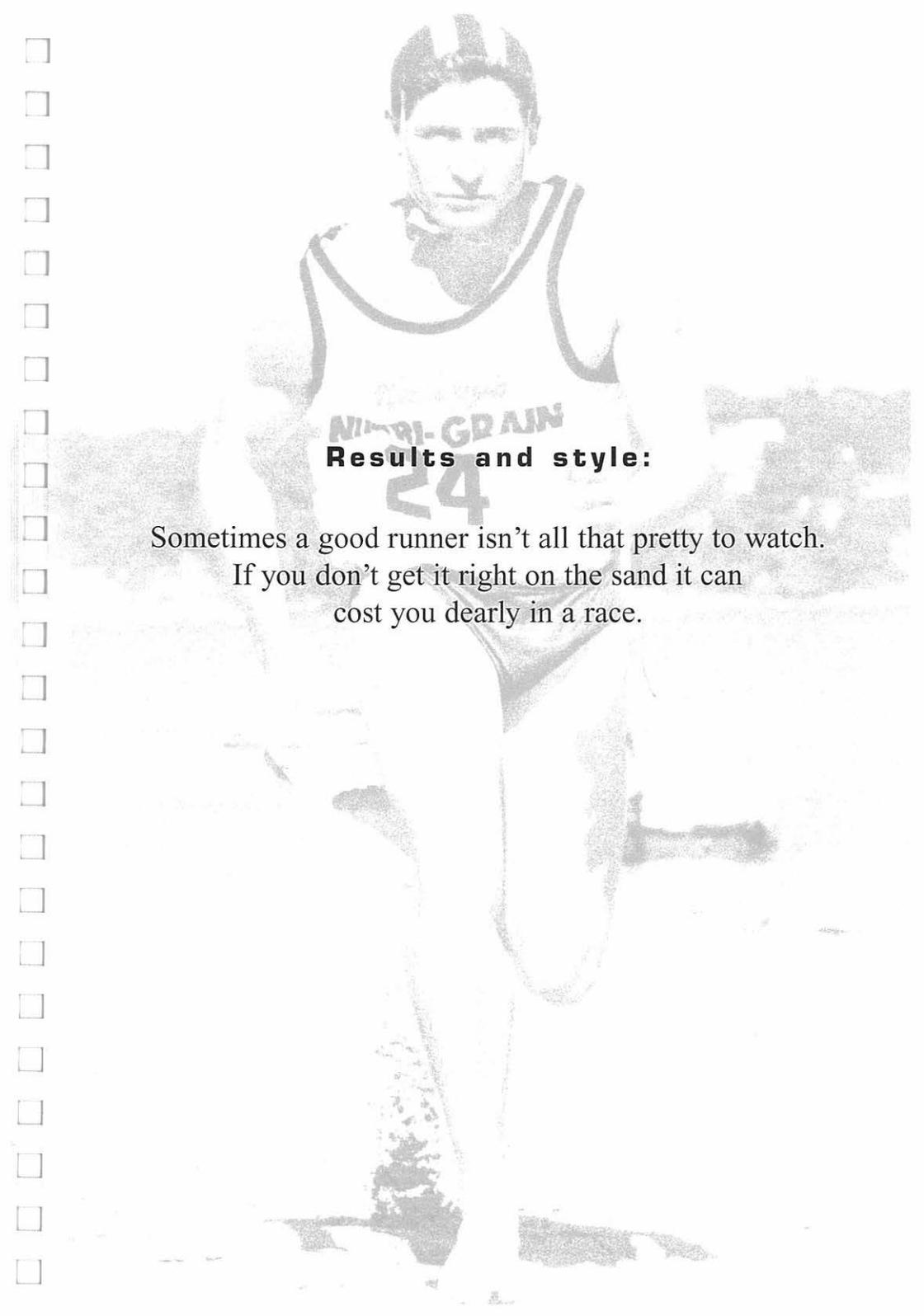
After many years of playing around with scheduling for both male and female runners and flag competitors I have reached some opinions about a preferred training plan. This Plan comprises some key elements of expert regimes tailor made to cope with the quirks of running on the sand. The basis of the differences relate to the need for more power than absolute pure speed, plus some biomechanical differences. Before I write a core program I always assess some individual areas with the athlete. These are: their strengths and weaknesses, training history; common or recurring injuries plus training likes and dislikes.

Following this I develop some core ingredients for the athlete’s training program as follows:

- Development of muscular strength and core movement power;
- Development of basic running form (including acceleration and striding);
- Commencement of the psychological preparation for training and racing;
- Monitoring of nutritional and social considerations;
- Development of specific sprint skills and conditioning;
- Development of racing best practice.

It should be noted that I usually work on levels of these over a 9-12 week initial period. Following this initial training period I assess the athletes progress and then commence a segmented training program in phases.

However before you can develop an appropriate training program for another, there has to be an understanding of the act of sprinting, the following few sections cover these key points mechanics, the variables and the muscles used in sprinting.



NIAMI-GRAIN
24

Results and style:

Sometimes a good runner isn't all that pretty to watch.
If you don't get it right on the sand it can
cost you dearly in a race.

SPRINT RUNNING - THE MECHANICS

General

Many coaches believe that speed must be ‘learned’. I too agree with this concept and feel that whilst the athlete’s natural attributes are genetically provided, the process of speed is more trained. Brent McFarlane, a former National Hurdle Coach of Canada, suggested;

“the skills and techniques of sprinting must be rehearsed and perfected, at slow speeds and transferred to runs at maximum speed” p.35, NSCA Journal, Vol 9, No 5, 1987.

From my own athletic perspective I could easily sprint 10m/s on the track, but struggled every time I was near the 11m/s zone following a keen acceleration. I was well prepared physically and mentally, however had some technical flaws at the top speed end. This made me feel unbalanced, and uncontrolled plus led to me running in surges rather than producing a smooth, well timed, and seemingly controlled sprint race.

The point I wish to make is that I strongly feel sprint technique is slightly different for those running on the sand, grass and track. Occasionally on the grass (hard, fully mowed race surface) I had technique breakdowns and in track racing I often had these concerns especially after the 60m mark, however on the sand I did not have any of these balance and control problems.

The purpose of this chapter is to present some ideas about sprint technique. In particular, the perceived differences between track and sand sprint technique. My intention is to promote the idea of a basic sprint running ‘form’ and to highlight the subtle differences between the basic form and the elite form. I work on two basic technical models – stride rate and stride length. I also believe that there are issues relating to surface variances caused by reactive forces acting upon the foot as it lands.

This section of the book is for anyone. It should assist coaches to reaffirm their own ideas (either for or against key propositions stated here), and for athletes to raise their understanding of sprinting technique on the sand.

Basic Sprint Running Form

Leading sport biomechanists (Don Chu and Remi Korchemny) describe sprinting actions as ‘ballistic cycling’ movements. In particular they suggest;

“Through each stride the muscles contract, relax and stretch vigorously, accelerating attached segments of the body or, slowing them down. In ballistic contractions, the actual muscle firing phase is very short. The rest of the movement is the result of proper utilisation of inertia, stored energy of pre-stretched antagonistics (muscles/tendons), and elastic properties of the muscles” p6, NSCA Journal, Vol 11, No 6, 1989.

These somewhat daunting physical properties form the basis of the movement related forces that effect either the body when moving, or the body segments and muscles when moving. Any discussion of a basic sprint running form needs to explore some of these concepts in reaching any conclusion. Investigations into the basic running form reveal the action follows a process. Muscles work, relax and then stretch. Many authors suggest sprint running is performed in stages (McFarlane, Chu, Korchemny). The names of these stages differ slightly but the general thrust is an airborne stage and a ground stage. The two key areas can be further broken down mechanically to allow for -landing and support, driving and release within the ground stage and recovery and cycle within the airborne stage.

During this process of sprint running the limbs are either moving quickly or decelerating. A range of correlating muscle groups are involved in this process but I wish to deal mainly with the mechanics of the action rather than the physiology.

Some research reveals few major (or statistically significant) technical differences between good sprinters and world class sprinters (Mann, 1984). In an investigation of elite and good sprinters Mann (1984) established some interesting data. In particular that a basic running form exists that is modified slightly at elite level to produce ‘pure’ speed. My understanding of the research (summarised below) is that only minor technical adjustments are apparent and required to present an elite versus good sprinter.

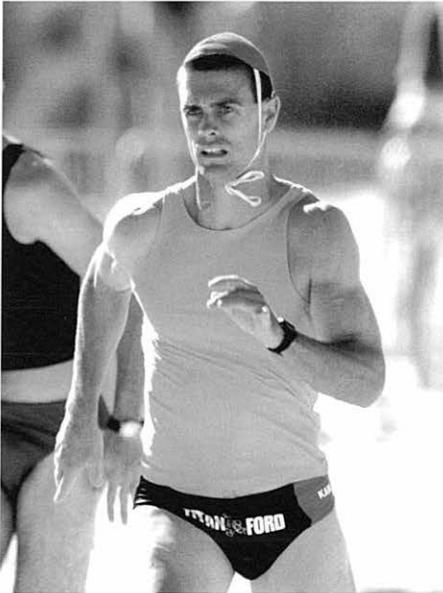
The research indicates:

- Horizontal velocity (speed) of the elite sprinter (11 ms) was significantly greater than good sprinter (9 ms).
- No difference in vertical velocity (height) between elite and good sprinters.
- The stride length of the elite sprinter was only just longer than the good sprinters (2 inches)

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- The stride rate of the elite sprinters was 15% faster than good sprinters and had a faster ground support time.
- The arm rate/length is not a variable in determining speed or height.
- The knee angle at take-off is less for elite sprinters.
- The elite sprinter lands closer 'beneath' the bodies centre of gravity.
- Elite sprinters are running more upright.

In fact based upon these considerations, other authors technical views, and my own observations of track, grass and sand runners I have developed a basic technical model for sprinting.



Marcus Kain - Australian & World Beach Relay Champion.



Female Runners competing.

Basic sprint running model

Running focus	Key technical elements
<p>Jogging The goal is to produce a smooth jogging action with few forced body movements. This is to increase efficiency and reduce efforts. The arm swing is relaxed but purposeful, the cycling at the hips is deliberate but smooth, whilst knee movement is linear and rolling.</p>	<ul style="list-style-type: none"> • Relax the wrists and push them up to chest height and back to behind the waist with rhythm. • Keep the torso rotation minimised and use the hands and elbows to swing slightly medially and laterally. • Pull the knee (leg) up smoothly to near knee height (whilst running). • Push the lower leg out slightly aiming to land slightly in front of the bodies centre of gravity. • Upon landing pull and then push on the ground firmly (not rapidly). • Let the rear foot glide off the ground and float towards the buttocks. • Cycle the rear foot smoothly underneath the body and push it in front of its knee joint.
<p>Accelerating; The goal is to produce a firm and controlled acceleration from either a still, walking or jogging position. The early body angle is low working up to high with a stable trunk. The arm swing is forceful but controlled from behind the waist to shoulder high. The action to and from the hip is aggressive, but controlled, pulling upwards and pushing downward firmly whilst the knee action is linear and thrusting.</p>	<ul style="list-style-type: none"> • Hold the hand and wrists cocked and swing them back hard upon drive and upwards hard upon lift during acceleration. This should be a vigorous movement. • Try to keep the torso rotation minimised however some medial and lateral rotation should occur during powerful leg thrust backwards and upwards. • Pull the knee up vigorously to aim for hip height. Some male and female runners only reach mid-femur height. • Push the lower leg up and then out slightly to be in front of the knee joint. • Pull the lower leg down and then backwards to enable for ward drive to occur. • Punch the foot off the ground to generate a strong reactive force. • Aim for the rear leg between the knee joint (height) and buttocks. • Cycle the rear foot quickly under the body.
<p>Striding; The goal is to produce a fast and controlled stride action where the running height is 6-9 inches off the ground and the cyclic pattern is smooth and mechanical to the external eye. Knees aim for hip height and the landing leg is pulled back quickly with a short ground time just in front of the bodies centre of gravity. The body has a slight forward lean.</p>	<ul style="list-style-type: none"> • Hold the hand and wrists cocked swinging them firmly upwards to eye height, and back behind the waist (slightly). • Keep torso rotation minimised. • Pull the knee up firmly to just near the hip height. • Push the lower leg up to past knee height and then let it move forward past the knee 'swinging'. Pull the lower leg back to the body and land it on the bodies C of G (consider forward momentum) • Punch the ground firmly aiming for a quick turnover of the foot. • Have a slightly straight upper body shape. • Recommence cycling.

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Note aggressive arm swing and body lean



Note body angle during acceleration



Note knee lift and high arm swing (Callum Taylor - Australian Champion)



Note rear leg lag of runners (Steve Munnery - Australian Champion)



Note body carriage and slight right leg rotation of right runner (Kip McFarland - Australian Champion)



Note body angle during acceleration

General

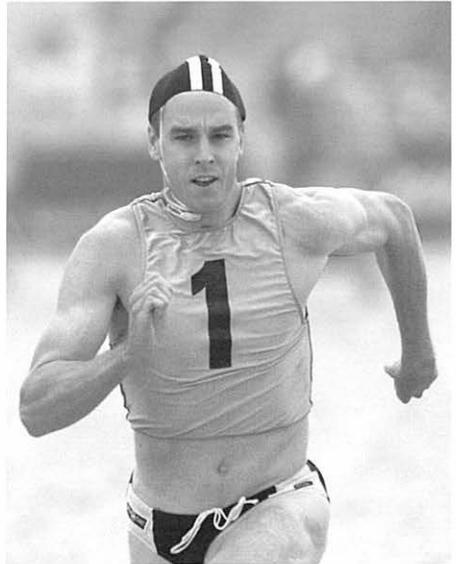
The action of sprint running is about a cyclic rotation of the legs underneath the hips. As the body falls forward a corresponding survival action must occur – a leg is raised so the foot can land and prevent the body falling onto the ground. This fundamental action creates forward momentum and leads to running and sprinting.

To balance the body's torso and prevent it from rotating to one side, when a leg is lifted (which causes the hips to rotate slightly), the opposite arm acts to counterbalance the action. In real terms this enables the body to remain upright rather than act on a tilt. The arms therefore serve a primary purpose of stabilisers of the trunk when running. It should be pointed out that this basic flow of movement is the precursor for walking, jogging, running (striding) and sprinting. It is in the manipulation of these actions that real speed is developed.

Now if we take this above movement flow as the base element of running we can assume all sprint running techniques and subsequent errors must derive from its movement fundamentals.



Ashlee Cheney - Australian Junior Champion & Open Sprint Champion



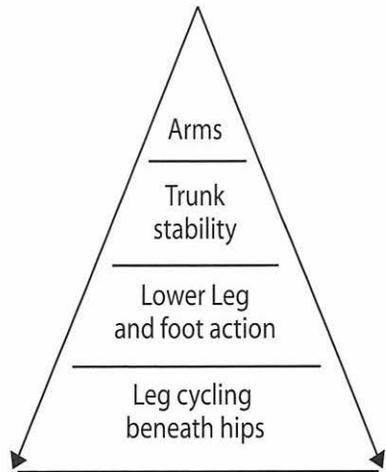
Kip McFarland - originally expertly coached by Ray Fox. I started training Kip in mid to late 90's. He ran 10.56 electric in the Sydney 2000 Olympic trials.

Using these sprint movement fundamentals I have developed a correlating technical hierarchy and priority pyramid for each of the following major actions involved:

1. The action of leg lift and cycling beneath the hips;
2. The lower leg and foot action of preparation, landing or support, and drive during the cycle;
3. The actions of the trunk to control torso rotation;
4. The actions of the arms related to preventing torso rotation, and to supplement leg cycling.

Technical hierarchy within the Act of Sprinting

It should be assumed from this model that I feel that *leg cycling is the most important running activity to perfect*. Using the metaphor of the car I feel leg cycling is similar to the feel of drive experienced by the chassis and engine, through the drive chain and wheels. In particular, the structure of the hips, legs, and ankles all work together to compliment the contractions and sensory firing of the muscles. The goal is to produce a smooth and controlled leg cycling just like the goal of driving is a smooth powerful ride. If the cycling isn't correct the rest of the actions will be hard to establish. (see photo sequence on page 24.)



Surface Impact

A further consideration of sprint mechanics relates to the physical and ground reactive forces experienced by the foot upon landing.

To quote a leading academic biomechanist, Hay (1985), on these concepts;

“whether the athletes forward momentum is reduced during the supporting phase depends upon the nature of the horizontal forces his foot exerts upon the ground, or more precisely on the equal and opposite forces the ground exerts on his foot during this time... If the foot is travelling forward at the instant it strikes the ground, it will tend to continue to do so (Newtons first law), and will thus exert a forward horizontal force against the ground. In reaction the ground will exert a backward horizontal force that will retard the athletes forward motion... If the athletes foot is travelling neither forward nor backward at the instant it strikes the ground, the ground reaction is entirely vertical and the athletes horizontal motion is unaffected. Finally if the athletes foot is moving backward at the instant it lands, a forward horizontal reaction is evoked and the athletes forward momentum is increased.” pp 395

Key mechanical position

It is my belief that an elite beach sprinter must be able to alter their sprint method depending upon the characteristics of the surface they are running on. Sometimes this needs to occur in the one race and differs on a day due to surface changes. Naturally this is a dangerous principle to propose and difficult to implement, but some have!

Running on *‘soft sand’* is best approached as follows:

Standard of runner	Running model
Elite runner	Stride length model
Non elite runner	Stride length model

Running on more *‘firmer base sand’* is best approached as follows:

Standard of runner	Running model
Elite runner	Stride rate model
Non elite runner	Modified Stride length model



Author. Interstate Championships - stride length model, note slight overstride. (1988)



Marcus Kain. NSW, Australian & World Beach Relay Champion - stride frequency model, note understride.

The theories behind these propositions are:

1. Elite runners have more fast twitch fibres, motor coordination and control and are usually stronger and more technically efficient runners. They must be able to more easily run on any surface; grass, sand or track. This assumption implies they can adjust their technique to suit the racing goal and technical models aimed for.
2. Non elite runners would have moderate levels of; fast twitch fibres, motor coordination (i.e. need more trained experiences), running control, strength and technical efficiency. This assumption implies they would have less chance of being able to adjust their technical model to suit a race plan because they would be simply struggling to keep up.
3. A naturally fast runner should use their speed to win on firmer base surfaces.
4. A naturally strong (but not fast) runner could use their strength to win on soft surfaces.
5. The use of a slight overstride on soft sand reduces the impact stress and sinking. Sinking then places enormous demands upon the flexors to pull the leg out of the hole it has just dug for itself. At top speed these holes then lead to a more exaggerated hip rotation and possible torso rotation.
6. The use of the rotation model on soft sand can reduce the risks of muscle tear because the muscles and tendons are at less stretch point (concentric and eccentric).

To support this philosophy I would point out that I once won the Curl Curl 120m in good time against a fast and fit David Dwyornanon (who ran 10.3 hand on the track a week or so prior). I used the bullet start, established a hard and fast acceleration, and focused upon the rotation model. On the same beach in the late eighties (soft sand) I won a State Championships with a slight hamstring tendon strain all weekend and focused on the rotation model to prevent further injury through over stretching.



South Curl Curl - Beach Sprint. Peters first; David Dwyornanon Second. (1987)

Now anyone who has been to Curl Curl knows the sand is usually soft. It is like Scarborough (Perth) and Stanwell Park (South Sydney) in characteristics. In the lead up to the Curl Curl Gift it had rained for two weeks prior to the race in Sydney, and I was training in sunny Queensland. I realised the local grass tracks would be heavy (runners would have trained less), but I felt on race day the sand would have a firm base. I trained for rotation.

My preparation comprised 200m hill sprints in around 25-26 seconds, 110m accelerations at 90-95%, overspeed work (towing), plus starts and accelerations over 20-60m. I was in 10.5 hand held 100m shape and knew I was as strong as an ox. My race plan was to get out quick and try to secure a gap by the 60m zone and then suck in for another burst at the 90m mark.

I won the race easily that day to David and had 1-2m lead by the 60m zone. By the end of the race I was still in front by the same amount.

During the State Championships I knew the sand was soft and that I had to carry the injury. I wanted to race well to be selected in the State Team. Rather than use the stride length model for the soft sand I chose to cut my stride back so I would not place too much stress on the injured muscles and tendon. I won the race that day by just 1/2th a metre rather than the usual 1-2 meters.

Speed, Striding and Surface

I base my thinking around two models for running on the sand. These are the stride rate model and stride-length model. Both emphasise 'cycling' but one model (stride-length) focuses on a longer front leg lead than the other. Each has some common and separate separate objectives and specific training activities, however the primary goal is the same – to run fast on the sand.

Stride Rate Model

Like other sprint coaches, I divide the process of sprint running into stages. The stages are divided into specific segments. These are:

- Preparation – getting lower leg and foot ready to land
- Landing – initial impact and support stage
- Drive – pull and push
- Release and lift – leg pull upwards

The purpose of the stride rate model is to present a technique where an athlete focuses on speed to perform. This model involves a quicker leg rotation, controlled lower leg and hip/knee extension/flexion plus machine like arm swing.

Speed 1 Preparation

During the preparation phase the lower leg is swung forward past the knee line of gravity and then pulled back towards the ground for landing. The goal is to land exerting a zero or positive ground reactive force.

To achieve this result a runner must rotate the leg and feet underneath the buttocks and swing them smoothly through towards the knee. Once they move past the knee line of gravity the lower leg is swung forward and then pulled backwards, on or just in front of the bodies moving centre of gravity to create horizontal velocity.



Female runner changing baton. Note slight overstride.

Speed 2 Landing

I believe that better beach sprinters land on the ball of their feet and impact with the front portion more than the rear. A view of any sand imprints demonstrates more sinking in the front of the plant than the rear. Very few runners produce an even plant imprint. It is well known that the best beach sprinters produce a clean sand pit from a ‘slapping’ effect on the ground. This is evidence that they are trying to create a positive reaction on the sand and also disperse more reactive forces over a wider foot plant area (similar to snow shoe effect).

The foot should land beneath the runner’s centre of gravity minimising the range of leg motion and also creating an opportunity for a shorter support time. The angle of the leg joint upon landing for runners is 140–155 degrees.

Speed 3 Drive

During the drive stage the goal is to push firmly on the sand (not with a jerk) over the shortest possible time frame. This follows the ‘slapping’ action. The drive should be controlled aiming for a small extension of the leg prior to release. The angle of the leg joint upon drive moves to 160-170 degrees.

A difficulty in beach sprinting is that the rear leg can ‘lag’ behind during the drive. It causes a slower rotation and also extended rear leg push/release. A classic example of this can be seen when the runner appears to have full extension at the knee joint whilst the opposite knee is still lifting upwards and is not at, or near, hip height.

Speed 4 Release and recovery

The release and recovery are key components of the stride. Irregular sand tracks, holes, soft and harder sand make the track inconsistent. During the preceding two stages the legs have forced the foot deeper into the sand surface requiring some effort to ‘dig’ it out. This means the likely reaction is to pull hard to get the foot from the sand causing a small rotation at the hips.

The knee should be lifted forcefully towards the hips with a slight lateral (outward) and then medial (inward) rotation. The toes actually assist this to occur with a final push upon release. The foot must then become relaxed after release and commence a movement up under the knee to aim towards the buttocks. Lagging of the rear leg is not allowed in this model as it delays rotation time.

Speed 5 General speed model considerations

- An athletes trunk lean is 10-15 degrees to ensure forward momentum and to manage the rigorous thrust involved in power running.
- The arm swing is between shoulder to eye height on the upswing and just past the hip on the back swing.
- The elbow joint is flexed around 70-90 degrees upon upswing and 130-140 degrees upon back swing.
- I feel that a slight body lean, vigorous arm swing help to balance the rotation of the torso during the cycling action of the legs.
- When sprinting quickly the knees may not meet an ideal hip height rather perform just under this height to promote speed of rotation.

Stride-length Model

The purpose of the stride-length model is to present a sprint running technique that allows for some over-stride (aiming for a nil reactive force), that caters for an extended forward leg, higher overall knee lift and flatter more sensitive step on the sand when landing. This model has a goal of reducing ‘sinking’ during sand running and also subsequent ground reactive forces.

Stride Length 1 Preparation

During the preparation phase the lower leg is swung forward past the knee line of gravity and then ‘pulled’ back towards the ground. The foot however, lands in front of the body’s line of momentum using a flat placement. This means the angle between the leg and hip is more acute than when using the speed model. The trunk has a 15-20 degree body lean and the angle of the body to leg is around 140 degrees.

During the preparation for landing the leg is glided down towards the ground with a mild ‘slapping’ of the sand.

Stride Length 2 Landing

During the landing phase a sprinter aims for a flat foot grounding. This then leads to more controlled and less forceful impact upon the sand. It should reduce impact depression and also reactive forces. The idea is that a smaller hole is easier to dig out of and consumes less energy.

The foot should be placed in front of the centre of gravity (slightly) thus creating a dig in the sand and then forcing the muscles to pull the body towards the feet. The danger of this technique is that athletes are not strong enough to deliver the pull or actually place the foot too far in front of body's centre of gravity causing a negative reactive force from the ground and greater tension on stretched muscles/tendons.

I have experience with this as an athlete and when I got it wrong received tendon pulls. When I got it right, I became more fluent on soft sand.

Stride Length 3 Drive

During the drive phase the goal is to push the body forward by flexing the leg/knee extensors (quadriceps) and also foot. On soft sand this action must be managed carefully due to the likelihood of a longer ground time. When the leg is placed forward more the arms counter by a longer and slower arm swing.

The angle of the drive is similar to that of the speed model but the time spent on the ground is longer.

Stride Length 4 Release and recovery

The release and recovery phases are key components in running. A spirited lift will place tension on the stretched muscles, but could force timing elements of the stride rate and length. A more relaxed lift and lower leg drag (behind the body) mean the outcome would be a longer stride and slower arm swing.

The goal with a stride-length model is to promote a clean release and longer stride.

Application

The reason I operate on two models is because I consider that each is useful depending upon the sand surface and running depth. In addition, each is dependant upon the experience and preparation of the beach sprinter. An elite sprinter should adjust the model used based upon the sand type whilst a non-elite sprinter should perform the skill that they are comfortable with knowing their limitations.

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On harder base sand an elite sprinter should adopt a stride rate model. They have natural speed and should use it to exploit a result. Similarly a non-elite sprinter should adopt a stride-length model in an attempt to balance out their weakness (speed) with a trained strength.

On softer sand surfaces an elite sprinter should adopt a stride-length model because using rotation speed will mean more effort and loss of efficiency through less impact reactive forces. On softer sand non-elite runners should also try to use trained strength to exploit stride-length and get themselves nearer to the leading pack of runners.

Who knows what a good start and firm acceleration can bring? Perhaps you can win!



Brian Dolly - Australian & World Beach Relay Champion. Note height off sand and slight overstride.



Female runner - note use of stride rate model.

*Both these runners are twisting their torso and shoulders when carrying the baton. A perfect technique does not.

Essential Race Skills

Over the years I have collected a range of beliefs on the essential skills required for both flag running and sprinting.

Table 1: Sprinting Essentials

Essential skill	Focus area	Rationale
Starting	<p>Athletes should practice coming out of the blocks using their hips to ‘pull’ the legs out rather than their feet to drive the body out.</p> <p>Note: this is different to track starting.</p>	<p>In crouch starting each athlete has a block spacing suited to their leg/body lengths and personal starting preferences. On hard sand starts a runner will benefit from a reaction potential from the blocks. This reaction potential decreases when the sand gets softer since the softer sand collapses when you push against it.</p> <p>When an athlete tries to drive from the blocks on medium or soft sand using a ‘bunched’ or ‘normal’ start they often stumble during the first 2-3 steps. Block spacing should be practiced to prevent an aggressive driving action against the sand from the start.</p>
Acceleration	<p>Athletes should use a high hip action when running on the sand. This requires an aggressive arm swing plus full use of the hip flexors and abdominal muscles to control hip rotation during acceleration.</p>	<p>In track acceleration a hard pushing action against the surface results in forward drive. On the sand this very same action leads to a slower acceleration because athletes dig holes and use excess energy to pull their legs out of the holes. They also rotate their hips more during this action. This leads to a quicker fatigue during the race and a weaker ‘kick’ during the middle and finish sections of the race.</p>
Race Striding	<p>Athletes should lean forward more during racing to enable the body’s centre of gravity to continually push through the sand.</p>	<p>If an athlete sits ‘tall’ on the sand they increase the forces working against the hamstrings and quadriceps to ‘pull’ and then ‘push’ the body over the sand. Because of the negative surface reaction leg speed is also reduced hence the greater need for body lean.</p>

Table 2: Flag Essentials

Essential Skill	Focus Area	Rationale
Concentration	Athletes should rehearse concentration and listening skills in a prone position. They should attempt to block out all irrelevant noise and focus on commands.	Noise from athletes, crowd and announcers distract athletes. This must be managed to ensure they react to the cues of the starter with minimal anxiety.
Turns	<p>Athletes should turn as close to (or past) the front line as possible.</p> <p>Athletes should reduce excessive body movements and aim for a smooth controlled turn.</p> <p>The body should move towards the line (whether jumping or pivot turning)</p>	<p>Starting behind the line ensures others have a head start from the beginning.</p> <p>Wide arm swings leads to bumps against other athletes and stumbling.</p> <p>Fast turns lead to less control of the resultant angle of the turn and acceleration that is slightly off course.</p>
Accelerations	<p>Athletes should aim to run low and hard ‘hitting’ it from the 2nd and 3rd step out of the turn.</p> <p>They should use an aggressive arm swing and knee lift.</p>	<p>A hard acceleration can make up for a poor turn.</p> <p>Sometimes flaggers are better turners than runners and a good runner can catch them over 20m.</p>
Diving	Athletes should practice running for a primary and secondary flag. The primary flag is the closest one to them. The secondary flag is the one either side of the primary flag.	<p>There is always someone better on at least one run through. If you cannot beat them then you may just beat the next person.</p> <p>This increases odds.</p>

Strength:

I believe that all beach sprinters need to do weight and resistance training to be strong enough to withstand the rigors of running on the sand.

SPRINT RUNNING – THE MUSCLES

General

The forces that drive the mechanics of the sprinting machine are the muscles. It is imperative for both coach and athlete to fully understand the function of each muscle group and to develop a “specific-muscle” training regime.

The following is a summary of the key muscles used in running, specifically related to sprinting. The descriptions are provided in segments; hips, knee joint, lower leg, shoulder and elbow joint and with recommended weight training exercises specific to each muscle group and action. At the end of this chapter I have set out a chart of key muscles and the appropriate exercises and stretches I incorporate into my training programs.

Key muscles used in running

1. Hips

According to Rasch (1989, p195) there are 22 muscles “that act on the hip joint”. In specific running terms three muscle groups pass over the hips. These are the buttock muscles, groin muscles and hip flexors. Each plays a role in running either in moving or stabilising the body. The key actions are:

- The large buttock muscle is used to provide the backward thrust or drive of the leg during the drive action of running;
- The intermediate and small buttock muscles are used to move the thigh in many directions but the most important function during running is to stabilise the hip joint when one leg is on the ground;
- The groin (adductor) pulls the leg towards the midline of the body during the upswing;
- The hip flexors pull the leg upwards during the recovery and stride phase.

The key movements at the hip are:

- hip flexors pull the knee upwards towards the trunk (some abduction followed by adduction occurs);

- the knee joint extensors start pulling the leg down from the trunk (with a slight front push first by the lower leg);
- upon landing the hip/knee and ankle joint extensors work hard to support then drive the body forward;
- the knee joint flexors are applied to pull the rear leg backwards in readiness for the next rotation.

1.1 Buttock muscles

There are three main buttock muscles; large (maximus), medium (medius) and small (minimus). The large buttock muscle is a primary mover during the running action. It drives the leg backwards aggressively.

The large buttock muscle can be aggressively trained by weights (half to a third squat) plus running uphill.

It should be acknowledged that the large buttock muscle is more powerful when the body is bent forward at the hip therefore a slight forward body lean will always produce a stronger drive during acceleration or top speed drive segments of a race. The medium and smaller buttock muscles stabilise the hip during the running action particularly when slowing down, running downhill or on uneven surfaces such as sand.

1.2 Groin muscles

The groin muscle (adductor) has the following key role:

- To pull the leg towards the midline centre of the body.

When the rear foot leaves the surface it moves the leg up and outward slightly as the knee is lifted. Once the leg starts to move up more easily it begins to swing outward and then the adductor muscle pulls it back into the body towards the midline as the leg goes up to hip height.

The adductors can be trained by weight exercises (pulleys), PNF stretching and running against resistance (water, hills, sleds).

1.3 Hip flexors

The hip flexor muscles (iliopsoas) play a vital role in sprinting. The hip flexor muscles have the following key responsibilities:

- To pull the leg upwards towards the stomach during the running cycle. I like to refer to this as the lift phase;
- To eccentrically contracting during the drive phase.

The hip flexor muscles can be aggressively trained by weight training, resistance exercises such as raised leg crunches, knee pull-ups, hill sprints and stair climbs. Training should also be performed on the abdominal muscles because they have the task of supporting any related muscle tension caused by this action.

The abdominal muscles must be tightened to sustain rigorous sprint training and hip torsion. This can be achieved by crunches, leg raises (to chest), oblique exercises.

2. Knee Joint

When running the knee joint has two primary and two secondary roles. These are:

- Straighten knee joint through extension (primary role);
- Close knee joint through flexion (primary role);
- Rotate lower leg inward or outward (secondary roles).

The knee joint acts to control the application of power through the hips/legs. During knee lift the power command is from the ‘hips’ and the action is to pull the legs upwards towards the trunk. During striding the power command is from the knee joint and the action is to push the lower leg up/out (during lift) and then down/back (during push).

2.1 Quadriceps

The quadriceps muscles straighten the legs during the drive phase of running. They extend the knee joint. They assist the large buttock muscles in this action.

The quadriceps muscles can be aggressively trained by stair climbs, hill sprints. Weight exercises (half squat, leg press) and exercises such as steps ups and plyometrics. Training should be performed on the lower back and abdominal region to sustain systematic quadriceps strengthening.

2.2 Hamstrings

The hamstrings muscles bend and extend the leg during the recovery and lift phase of running. Initially they flex or bend the knee joint (recovery stage) and then following the movement to the buttocks they start to extend the knee joint (lift stage) to aim for a comfortable stride length. The hamstrings initially move from a lengthened (load eccentric) state, to a position of shortened length (load concentric) and relaxed state.

The hamstrings muscles can be aggressively trained by weight training (half squat, lunges, leg curls), buttock kicks (with resistance). In addition by lying on your stomach and raising one leg and holding it the hamstring and buttock muscle on that side is trained. A key PNF hamstring exercise is commonly used. This involves an athlete kneeling then leaning forward (with someone holding their rear legs). This pulls on the hamstrings and buttocks and requires some strength to maintain. Perform this exercise slowly and progressively during the year.

2.3 Leg rotation (inward and outward)

The outward action of the thigh is known as adduction and inward action of the thigh abduction. As a runner lifts the thigh in sprinting the thigh drifts outward. This then results in an inward 'pull' of the thigh when the knees are brought up towards the hip in sprinting.

The best way to train these is to use PNF stretching and have partners 'sitting' one pushing the knees in and the other pushing the knees outward. This is then reversed.

3. Lower Leg

The calf muscle group (gastrocnemius plus soleus) is essential for running and jumping. The gastrocnemius muscles (twin heads in middle of lower leg) flex or bend the knee and the ankle so the body can be raised on its toes. This action occurs in running and jumping (plantarflexion). The soleus muscle acts to assist ankle joint movement. The lower legs are important to control the cycling underneath the body during lift and also foot placement and duration during support/drive phases of the striding action.

An excellent exercise to strengthen this muscle group is standing on the balls of the feet on a slightly raised platform, where the ankle is lower than the toes, and then pushing your body up until the ankle is higher than the raised platform. This is called a calf raising exercise. To stretch this muscle group you should place the feet flatly on the ground and lean with your arms against a wall in front of the body. Hold this for 15 seconds prior to training and 30 seconds after training. If the knees are straight the gastrocnemius (calf) is stretched, if the knees are bent the soleus is stretched.

4. Shoulder/elbows

During running the shoulder is raised and lowered as the arms are forcefully swung upwards and downward. The muscles that assist are:

- Raise shoulder – levator scapulae and rhomboids. These are assisted by the trapezius muscle which raises and adducts (inward pull) the shoulder blade. A single row and running curl ensures this group is trained specifically for sprinting.
- Lower shoulder – pectoralis major and pectoral muscles (chest). A running curl ensures this group is trained specifically for sprinting.
- All round shoulder control – deltoids. The deltoid is trained by most arm exercise. These include bench press, curls, flies, single row etc.

The shoulder acts as a stabiliser for the movements of the arms at the elbow joint where a forceful upswing and downswing is being managed.

In particular the *elbow joint* flexors such as Biceps brachii, brachialis, brachioradialis and Pronator Teres are used to bend the arm towards the shoulder on the upswing. Likewise the elbow extensors such as Triceps brachii and Anconeus are used to extend the arm during the backswing.

The bench press is standard exercise to train the shoulder girdle, whilst running curls are the primary weight exercise to train the arm swing. In addition single row exercises can help with shoulder joint extension and power cleans are a good all round shoulder/leg exercise.

On the next two pages, I have presented a summary muscle exercise chart and also strength training loading chart. Because I consider weight training a “fundamental” component of training for sprints I have also built sample routines into the training schedules listed in the back of the book.

In the next section of the book I have listed a summary training overview and Annual Plan, plus ideas for Off-Season, Developmental and Competition phases of training. I feel most runners buying this book will aim for this section to explore what I have to offer to athletes while most coaches may assess the plans with a view to say why theirs might be better!

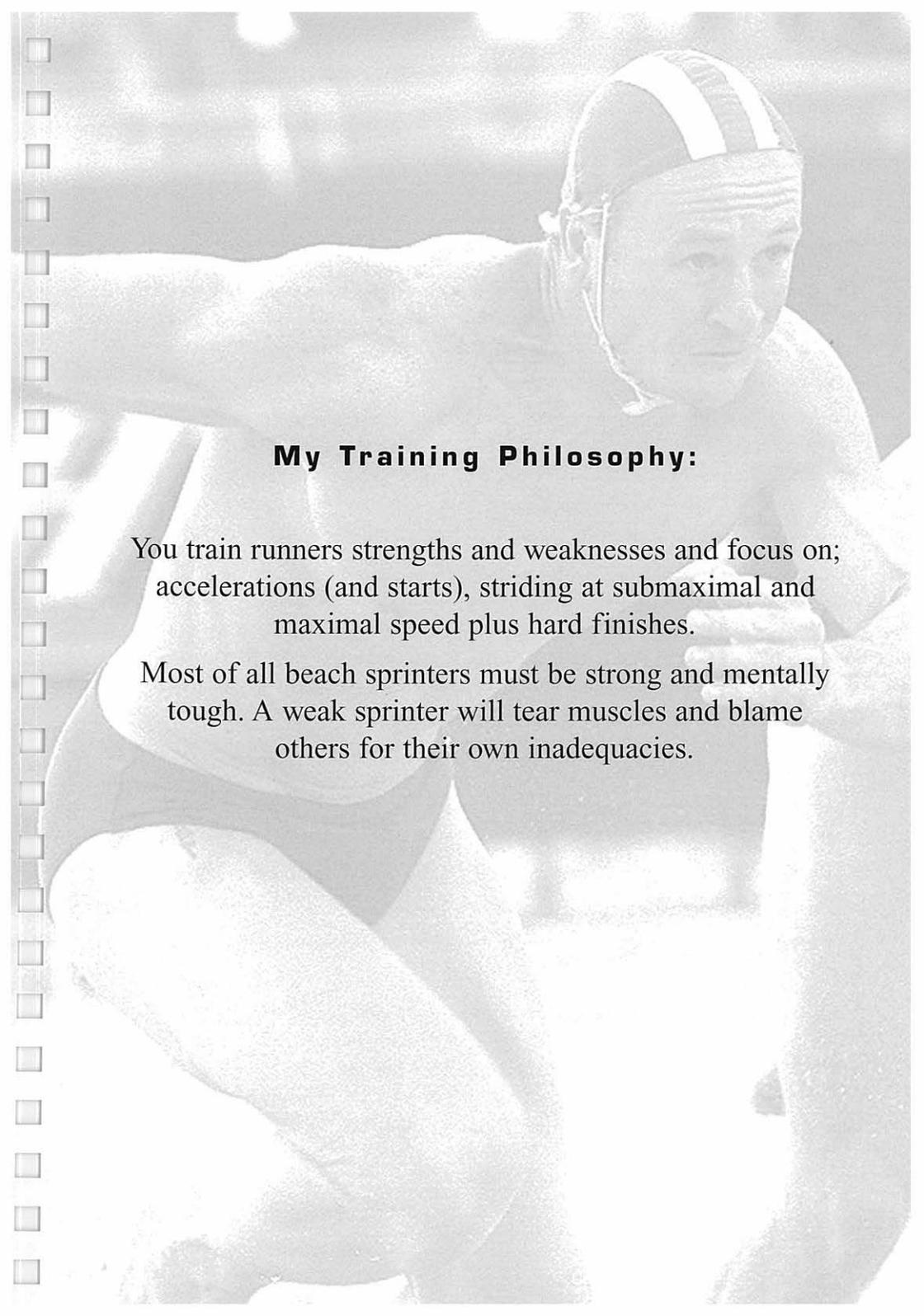
In any event I am the first modern era beach sprint coach to have my plans public in the form of a book so I challenge to publicly (through writing their own publications) tell me why they may have differing views.

Runners Key Muscle Exercise Chart

Joint	Key Muscles	Exercise	Stretch
Hip joint (flexors) * knee lift	<i>Iliopsoas</i> <i>Pectineus</i> <i>Rectus Femoris</i> <i>Sartorius</i> <i>Tensor Fascia Latae</i> <i>Adductor Longus</i> <i>Adductor Brevis</i> <i>Gracilis</i>	Hip flexor machine Hanging Knee raises Hill sprints Stair climbs Bent knee sit ups	Gentle lunge with one foot (in overstride position) and opposite knee on the ground.
Hip joint (extensors) *drive	<i>Gluteus Maximus</i> <i>Biceps Femoris</i> <i>Semitendinosus</i> <i>Semimembranosus</i>	1/2 or 1/3rd Squat Stair climbs Hill sprints	Lie down (with both legs bent) and place either the left or right ankle of one leg above the knee on the other. Then raise the knee slowly.
Hip joint (adductors) *move legs inward	<i>Pectineus</i> <i>Adductor Longus</i> <i>Adductor Magnus</i> <i>Adductor Brevis</i> <i>Gracilis</i>	Inward pulleys Hill sprints	Standing stretch. Keep one leg straight and step sideways supporting through bending the knee.
Hip joint (abductors) * move legs outward	<i>Tensor Fascia Latae</i> <i>Gluteus Medius</i> <i>Gluteus Minimus</i> <i>Gluteus Maximus</i>	Outward pulleys Side leg raises	Standing stretch keep one leg straight and glide it in front and past the other.
Knee joint (flexors) * bending	<i>Semitendinosus</i> <i>Semimembranosus</i> <i>Biceps Femoris</i> <i>Popliteus</i> <i>Gastrocnemius</i> <i>Sartorius</i>	Leg curls	Seated hamstring stretch
Knee joint (extensors) * straightening	<i>Rectus Femoris</i> <i>Vastus</i> <i>Intermedius</i> <i>Vastus Medialis</i> <i>Vastus Lateralis</i>	1/2 or 1/3rd Squat Incline leg press Stair climbs Hill sprints	Quadricep stretch
Shoulder joint (flexors) * upswing	<i>Deltoid</i> <i>Pectoralis Major</i> <i>Coracobrachialis</i> <i>Biceps Brachii</i>	Running curls Bench press	Rear 'stiff arm' stretches
Shoulder joint (extensors) * Backswing	<i>Pectoralis Major</i> <i>Deltoid</i> <i>Latissimus Dorsi</i> <i>Teres Major</i> <i>Triceps Brachii</i> <i>Subscapularis</i> <i>Infraspinatus</i> <i>Teres Minor</i>	Dumbell row Bench press	Arm stretch across chest.
Elbow joint (flexors) * for upswing	<i>Biceps Brachii</i> <i>Brachialis</i> <i>Brachioradialis</i> <i>Pronator Teres</i>	Bicep curls Running curl	Outstretch arm on wall and turn away slightly.
Elbow joint (extensors) * for downswing	<i>Triceps Brachii</i> <i>Anconeus</i>	Tricep rear raise Running curl	Place elbow behind your head and hold.

Purpose	Reps	Sets	Intensity	Recovery	Speed of lift	Comment
Endurance	15-30 reps	2-3	Under 70%	30 seconds	Fast	Less than 60% for fat burning
Body bulk	8-10 reps	3-5	70-85% max	3 minutes	Moderate	Aim for fatigue, don't over stretch joints
Strength	5-6 reps	3-5	80-85% max	2-3 minutes	Slow to mod	complete a unit of this in most weeks
Power	1-5	3-5	Above 85% max	3-5 minutes	Mod - fast	Complete strength or endurance phase prior to this.

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My Training Philosophy:

You train runners strengths and weaknesses and focus on; accelerations (and starts), striding at submaximal and maximal speed plus hard finishes.

Most of all beach sprinters must be strong and mentally tough. A weak sprinter will tear muscles and blame others for their own inadequacies.

A SUMMARY OF TRAINING

General

The following key chapters of this book deal exclusively with training. In particular; off season, development, competition phases. Since this is the primary purpose of the book I have included samples where possible and also referred to other coaches practices that I feel are relevant.

You would have now read in previous sections, the information from others, such as my coaches; Peter Quick, John Annand and Alan Spencer. In addition, I outlined the information received from the Institute of Sport, articles read based upon training used by Valerie Borzov, Tundo Bompá, Adam Zajac and some training philosophy of coach Charlie Francis. Each adds a unique plank to underpin the training approach I adopt today.

Although I have experimented with my athletes (and did with myself) the basic training model is very clear and presented in the sample Annual Plan. To support this my last years efforts - Australian Female Open Sprint Champion (Ashley Cheney), as well as Marcus Kain (Open Relay Champion), seem to vindicate the training model. Many runners I have trained in the past have also achieved medals due to the recommended training approach. It must therefore, with their personal talent, be successful!

I generally follow a training plan that has three key components. These are:

- Develop general strength, running form and aerobic and anaerobic base conditioning (6-12 weeks)
- Build specialised movement power, sprinting form and improve anaerobic lactate and alactate conditioning (6-9 weeks)
- Rehearse competitive speed, race form and anaerobic lactate and alactate conditioning (4-9 weeks).

For elite athletes I usually employ a double periodised training year with peaking at the end of November to mid December, and again, in mid March to early April. Another model I favour with seasoned runners is to perform a general buildup, development or specialised period, followed by 2-3 competitive cycles of 5-6 weeks. I find this helps with the pro running circuit and improves 'peak' race form and capacity.

More on this model later.

For general athletes or people just in the early starting phases of training I like to employ a simple one peak training year ending in March or early April (i.e. at the Nationals). They usually perform a general buildup from September until November and a specialised stage from December until mid February. The competition stage starts here and ends after the last race (Nationals or Stawell).

In an elite runners training year the initial macro-cycle is approximately 22 weeks and the final macro-cycle is approximately 15 weeks (see sample Annual Plan). This ensures power and speed is practiced in the first cycle and also second cycle or about half of the annual training year. Athletes are improved because they practice running fast more often and also build key components of their body in achievable pieces. I have a strong belief (like Francis) that in order to run fast you must train hard and more often than not – fast!

Like other coaches I believe general form and strength must be aimed for first before adding the ingredients of power and speed. This is because the body collapses when asked to go ‘all out’ when either/or; its muscles, neural system, techniques, athlete confidence is not ready to do so. Many a runner has been broken mentally early in the year because they were trying to race above their weight without doing the necessary training work. A soft runner cannot come back from this in the year.

I fundamentally feel weight training is essential for structural integrity due to the high forces placed upon the body by sprinting. I also feel that hill sprints are vital in building hip and shoulder strength required by beach sprinters to enable them to overcome the pressures of racing on the sand. Soft hip flexors will always stop runners on soft sand even if they have presented with strong grass/track speed and leg strength. It has happened to me in the past and many others before and after me!

In short, beach sprinters must be able to cope with the rigors of running on the soft sand. Running on the soft sand is always harder than running on the track or grass surfaces and will fatigue the best of runners due to the many days of repeat 90m and 20m efforts (sprints, flags, relays – heats, semi’s, finals).

So to make the training summary very clear, I advise the following practices:

1. Get strong first before sprinting fast. Weight training, fartlek runs, hill sprints (sand and grass) plus repeat 200-300m runs will build strength. Cycling also helps with conditioning.
2. Develop running form and sprint power techniques to cope with racing. Even if you are fast (like many track runners who try to beat us), power is the essential ingredient on the sand. So repeat form runs – my favourite is 9-15 by 100’s on either the walk or jog back recovery always help here. For power 6-9 by 60-90m hill sprints. This will make you work!

3. Rehearse accelerations and top speed on the sand, grass and tartan tracks. Too much sand will slow you down, too much grass will make you forget the sand and too much track will make you sore and also a 'soft' runner. It is a balance of the three that gets you there! There is nothing like repeat step in, standing or block 60's or; 20 by 20m runs (fly, step in, belly etc) to get the system fired up. In addition simple repeat (and varied pace) 120's or hard 150's around the bend will always develop power.

So, the training plan for beach sprinters and flaggers is very simple. Just do the right work, in the right training sequences, and you will do okay. For the record my preferred training sequence is:

- Strength and general endurance,
- Power and specific endurance,
- Speed and race techniques.

Sometimes you can build speed without the others but you don't last long. Endurance must be added to finish a race. Power must be added to work the 'guts' of a race where it counts.

For flaggers you don't really have to do all the long work but the Annual Plan is basically the same. Only the ingredients change. I cut down some of the longer work (150's instead of 300's), and the annual plan can be achieved in a shorter period of time. In some cases 9-12 weeks. Greg Hitchenson (Australian Junior Flag Champion and 3rd in the Open Men's) plus also Narelle Cummins (World Women's Flag Champion) has achieved this type of result. I do though, recommend a full training year of about 20-24 weeks.

To complete some specific flag information I feel a good sprinter should always out accelerate a good flagger near the last 5m of the 20m run. Flaggers must train the turn naturally, but they must also train to run. Too many just spend their time learning the turn!

Repeat 20m runs every single session is their training base. They should perform walk back recovery, jog back recovery and also full rest recovery. I usually give them sprinters work including 60m accelerations and walk back 100's. However, the most important training ingredients are; 20m belly runs, 20-60m hill sprints, 20-30m tyre pulls and repeat 100-150's just to ensure they can run! But in reality they should also learn to; turn fast, accelerate from a turn plus shut out all interferences.

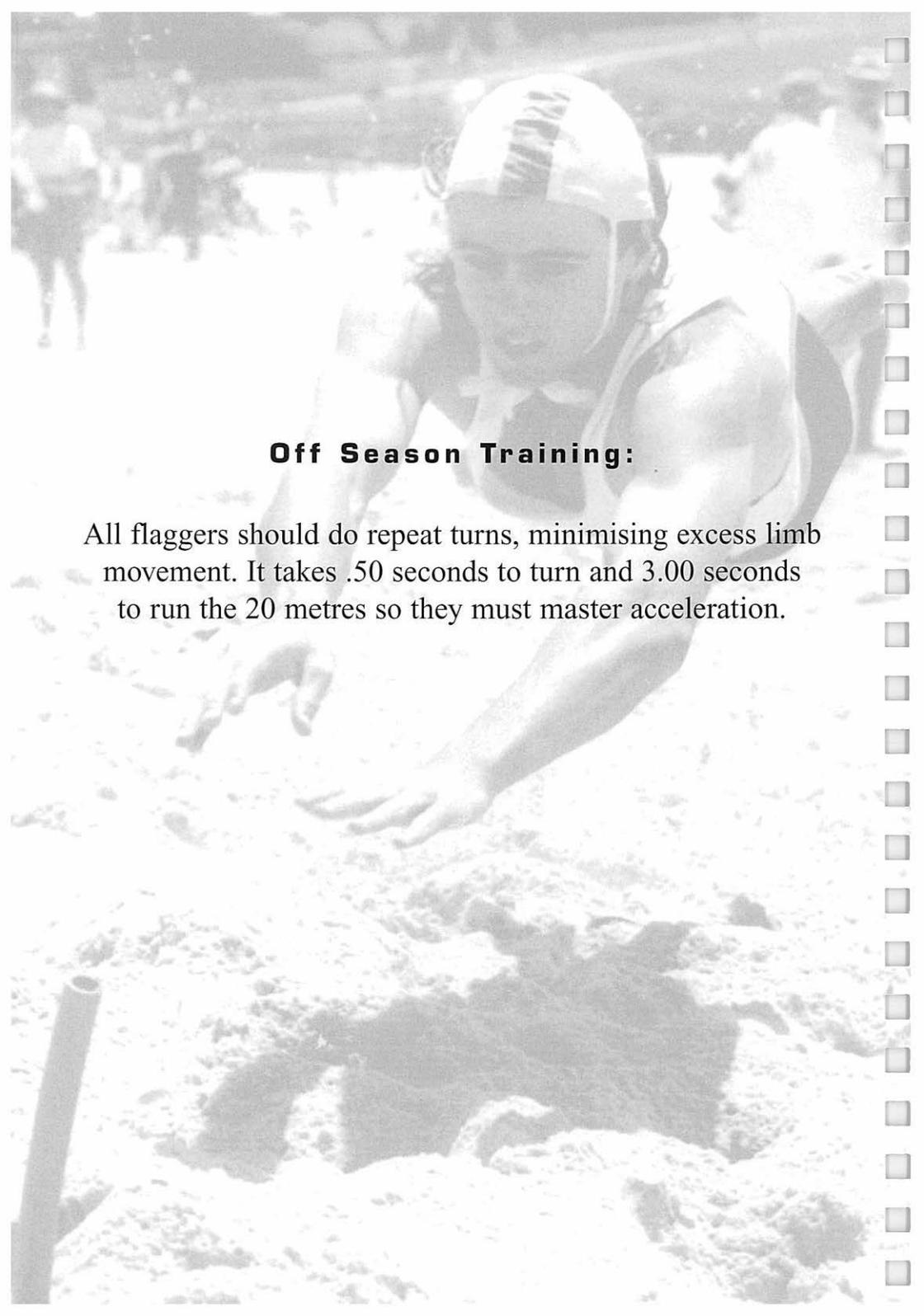
Having said all this I hope you enjoy the next few sections. We start with off-season training then move to development or specialised stage training and finally competition training.

Annual Plan 2003-2004

Competition Phase

Phase - One (July-Dec)	General - 1	Specialised - 1	Power - 1	Competition - 1	Comments
Time frame (21-23 weeks)	8 weeks	6 weeks	4-5 weeks	3-4 weeks	21-23 wks
Weights (hypertrophy + strength)	3 days/8-10reps	3 days/3-6 reps	2-3 days/1-3 reps	1 day/maintain	Vol high-low
Plyometrics	1 day/standing jumps	1 day/run & bound	1 day/quick jumps	1 day/quick jumps	Slow to fast
Hill training	1 day/6-9 by 30m	1 day/6-9 by 60m	1 day/6-9 by 90m	1 day in 10/maintain	Short to long
Tempo (100's to 300's)	2 days/mod volume	3 days/high volume	2 days/mod volume	1-2 days/low volume	Long to short
Speed (starts;fly;accels)	1 day 30m runs	1 day 30/40/50/60m	2 days/repeat 60 -80's	2 days/Racing	Mod to fast
Typical training period	July/August	September/October	November	December	July - Dec

Phase - Two (Jan-May)	General - 2	Specialised - 2	Power - 2	Competition - 2	Comments
Time frame (13-17 weeks)	2-3 weeks	2-3 weeks	3 weeks	6-8 weeks	13-17 wks
Weights (hypertrophy + strength)	3 days/8-10 reps	3 days/3-6 reps	2-3 days/1-3 reps	1-2 days maintenance	Vol high-low
Plyometrics	1 day/bound/ run 20m	1 day/repeat jumps/run	1 day/speed bound	1 day/quick jumps	Mod to fast
Hill training/tyre pulls	1 day/6-9 by 30m	1 day/6-9 by 20/40/90m	2 days/ 4 by 30/60/90	1 day repeat 20/40's	Short to long
Tempo (120's to 200's)	2 days/200's & 300's	2 days/6-8 by 170's/120's	2 days/5-6 by 150's	2 days/120's or 200's	Long to short
Speed (starts;fly;accels)	2 days/6 by 20/30/40m	2 days/ 9 by 60m	1 day 60/70/80m	2 days 30/60/120m	Short to long
Typical training period	January	January/February	February	March/April	34-40 wks



Off Season Training:

All flaggers should do repeat turns, minimising excess limb movement. It takes .50 seconds to turn and 3.00 seconds to run the 20 metres so they must master acceleration.

OFF SEASON TRAINING

General

I often get asked by runners “what should I do in the off-season”?

This simple question can actually open Pandora’s box if you are not careful. During the off-season a coach must own up to their own mistakes with their athletes. In addition athletes must also own up to their shortcomings and also future aspirations. It is a time for both the athlete and coach to have a frank assessment of each other’s performance and aspirations. It is one time of the year when the coach and athlete must end up at the same point. That is, just whether the athlete is going to get better and what the athlete must do to get better. It is also a time when the athlete must make up their mind if they want to train harder next year, give it all away, or just aim for more of the same. Let me explain.

I recall a time in the mid eighties when I had reached this crossroad myself. I was about 24-25 years of age, had been training on and off for about 9-10 years and was starting to wonder if I would ever win. I was injured at least once every training year, had won silver and bronze medals at State and National Championships, but I knew (deep down) that something had to change if I ever was going to get this running ‘caper’ right. The real change came when I realised that I must give the next three to four years the best I had. I had reached the view it needed my full attention, and if, after this time, I still couldn’t win - I figured it just wasn’t meant to be.

So I gave up my job and went to University to study sport science and spent many nights in the library reading everything I could about sprint training. I had a strong desire to understand the rationale behind training so I also read what I could find about planning training, physiology and sports psychology.

I soon found out that sprint training throughout the world wasn’t that much different. I also found out that what I had been doing wasn’t fundamentally wrong – just not packaged to suit my personal situation. Now this did come as a revelation to me because I had always thought ‘secret’ training methods existed and only the fast people had them!

The method I used to focus this energy on myself was to determine my own strengths and weaknesses as a runner. In doing this I made a number of working charts and one such chart listed my strengths, weaknesses and ‘developmental’ opportunities. This was, after all the best way to understand what I had, what I didn’t have and what I needed to get better. In addition the personal assessment led to the strategy I needed to use in order to beat people in racing.

Table 2. Assessment- Darren Peters (1985)

Strengths	Weaknesses	Opportunities
Starts	Finishes	Fix finishes
Acceleration 0-50m	60-90 mtr section	Work on top speed
Like weight training	Core structural strength	Develop segment strength
Technique – smooth	Over striding at speed	Cut stride slightly - aim for speed/rotation
Motivated to race/win	Doubt ability over best rivals	Build confidence
Available time – student	Over training tendency	Manage in segments
Aggressive when needed	Can be distracted	Work on attention

This chart became useful in a number of ways. I used it to provide positive affirmation on the things I did well, and I used it to motivate me to train for the things I did not do so well. A benefit was that it helped me to determine where others were going to beat me. I only had to assess a ‘theoretical chart’ of my twin brother to see that he always had a better 60-80m section than me and I always had a better first 30-40m section than him. If nothing else this revelation made me feel more confident that at one stage of the race I could beat him!

The goals of off-season training are published in many running books. Rather than regurgitate these in detail here are a list of key rules related to off-season training that I consider most pertinent. These represent my off-season doctrine.

Rule One: Never forget that you must balance out your training objectives with fun and learning. The off-season is a time to explore some new techniques and training practices. It is also a time to re-motivate your athletes.

During one off-season I experimented with gym sessions and established a routine I still enjoy today (although casually). It involved; running curls, reverse leg press, matrix (decreasing reps increasing loading) bench press, single row, cycling at moderate and super speeds in bursts, plus pulls (wide arm). This program differed from what I had been doing, which was a straight set and repetition session each time at the gymnasium. It enabled me to set strength targets and speed targets and break the boredom.

During another session I experimented with towing. I knew my body wasn’t ready for longer fast runs but I was prepared for short bursts of work at top speed. I still remember the sensation of the training sessions where I ran over 45km/h behind the car.

Rule two: During the off-season you must build the strengths and weaknesses of your body.

Since one of my weaknesses was speed endurance I decided to employ 200m to 300m hill sprints once or twice a week to develop a sound base of running strength. This addressed speed endurance and also my lactate tolerance. When I was in good shape I could run 26-28 second 200m hill sprints. Once I reached this target I knew I had the necessary power to win on the sand.

Now if I was a flag competitor who had missed out on a round of the Championships because I missed the start and was a step behind all the way the things I would focus on would be:

1. reaction drills;
2. focus of attention;
3. blocking external noises;
4. snappy first few steps.

Rule three: The off-season is also a time to practice what you like.

All coaches should give their athletes sessions they like. To make a bold generalisation most short (as in size) sprinters I have met like accelerations, and most taller sprinters I have met like stride running. I like to give these two groups of runners a bit of what they like whilst still working on what they 'tolerate'. An example would be:

- 9-12 repetitions of 20-30m runs (short runners like this) followed by,
- 1-3 sets of ladder runs. These could be 150m, 200m 250m (repeat) or any real combination of the above (taller runners enjoy striding).

Rule four: Map out the next year's training focus and plan of racing, but allow for some flexibility.

The off-season is the time to get things right. This means athlete assessment, planning, race scheduling and 'what if' scenarios. Any coach or athlete who does not do this is a fool. Finally here are what I believe are the standard types of off-season objectives and accepted training patterns.

A B E A C H I E S D R E A M

Many of you might be simply looking to confirm these:

- Training and race motivators;
- Dietary (meaning bulk up or refine);
- Aerobic endurance (I prefer both ends, base and threshold);
- Strength endurance and lactate tolerance;
- Mobility and related sprint motor patterns;
- Strength (all core segments).

Each area can be linked to performance milestones and measured against so called industry standards. The general training loads are low and as fitness improves so does the capacity to do more work. Some typical sessions in an off-season period might be:

- Tennis, soccer, basketball, treadmill or cycling for 30-40mins;
- Uphill runs 5-8 times 150-300m for sprinters; 6-10 times 20-40m for flag competitors;
- Weight lifting aimed at strength if the athlete has a background or form if they do not;
- Stride running over 150-300m; flag competitors perform 60-120m;
- Swimming and /or easy jogging;
- Some bounding;
- Sand hill running (20-50m);
- Downhill sand running (100-200m);
- Repeat 20's (for power).

Off Season Training Program

1. General

Training during the off season is aimed at developing: general aerobic and anaerobic conditioning, core structural strength plus basic running form (acceleration and striding). It usually means training 3-4 times a week in the gymnasium and two to three times a week on the road/track.

2. Objectives

- 2.1 Develop aerobic conditioning
- 2.2 Develop anaerobic conditioning
- 2.3 Develop basic acceleration form
- 2.4 Develop basic stride form
- 2.5 Develop structural strength (shoulder girdle, hips, knee, ankle)

3. Training Activities

- 3.1 Athletes either run for 20-40 minutes aiming (after 4-6 weeks build-up) for either 5 minute kilometers (females) or 4 minute kilometers (males), or, they cycle for 40-60 minutes at good pace.
- 3.2 Athletes complete repeat 20m and/or 60m hill sprints. Usually 3-4 sets of 3 reps.
- 3.3 Athletes complete repeat 100's at threshold speeds. Usually 6-12 reps. As they get faster this speed lifts.
- 3.4 Athletes complete: repeat 400's, 300's or 200's at slow to moderate speeds. Usually about 5-6 reps.
- 3.5 See separate weight schedules

4. Training Flow

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Weights (Heavy)	Long run (20/40mins)	60m hills Weights (mod)	5-6 by 200-400's	Rest	Weights	6-12 by 100's

Development Phase

Training schedules are a guide during this training phase
– it is now all about what and how you feel,
and what and how you need to feel

READY TO RUN - DEVELOPMENT PHASE

Development Training Objectives.

I personally follow these core objectives for any athlete.

1. Develop basic running form over short and longer distance (10m to 300m). Flag competitors stop at 150m.
2. Develop aerobic and anaerobic conditioning to reach baseline targets (fartlek, intervals with jog or walk back rest and circuit training).
3. Develop core system strength (hips, shoulder girdle, arms, knee joint).
4. Develop consistent training, social and eating habits (2-3 running days 2-3 weight training sessions, 1-2 recovery sessions, few late nights).
5. Develop essential or basic movement skills (acceleration, stride, starts, turns).

Now having said this the regimes that apply to the elite, general or introductory athlete are different. You would not train an introductory athlete five days a week when they are just starting out. They get shin soreness, aerobic and anaerobic induced respiratory fatigue and feel less than complimentary towards running. Similarly an elite athlete needs regular training to remain at consistent levels of 'body' 'mind' and 'pattern' preparation all year round. The determination of this is up to each athlete and their coach.

General Training Philosophy

During this training stage I ask athletes to attend 'core' training sessions 2-3 times per week and then perform additional training units aimed at developing form and basic conditioning. It is expected that athletes would stick to the weight training regime issued at the start of the stage at least 1-2 sessions per week.

The aspects of skill I am looking to develop are listed in this book. Essentially I use basic training sessions to focus on a particular facet of the core movement skill of either the shoulder, hip, knee or ankle joints. If you recall that each athlete has a strengths/weaknesses chart this means the sessions here are aimed at building some strengths and also attending to some weaknesses. Whilst one session performed focuses on remedial actions, for running form, another will focus on pure conditioning aspects.

During the warm-up all runners perform repeated 10-30m accelerations. The skill related focus is a smooth, low acceleration with a step in start. Athletes are asked to have a longer first and second step from the go to lower the body centre of gravity and align the Shoulder, hip, knee and ankle joints.

The related conditioning focus here is anaerobic power aiming at challenging; neural firing, the use of creatine phosphate, plus core lift and push related musculature development.

For example, the main training activity for the day could be to perform repeat 200m hill sprints. The goal is to aim for shoulder high arm swing and smooth cycling with a solid lift stage at hip height. These goals however do not detract from the central aim of running 5-6 by 200m hills in set times.

My best training years were from 1987 to 1990. Following a clean sweep of State, Australian and World Championships in 1990, and a new job, I lost a lot of motivation to train and became more focused on work and University. During this personal developmental period (1987 – 1990) I tried different methods of getting ready for racing. These different approaches represent the embryonic stage of the coaching strategies I use today with the athletes I coach, train or just advise.

During 1987 I used an approach (initially guided by a previous coach Alan Spencer) that involved repeat 300m, 60m accelerations, 200m runs to set times plus weight training and plyometrics. The 300m runs assisted with ‘lactate tolerance’ plus running form. The step in 60’s assisted with pure running power and acceleration skills, plus the 200m runs to times were aimed at ‘speed endurance’.

I changed this later in the program to include 200m hill sprints at target times, 60m accelerations (step ins, standing starts and three point starts), reverse leg press to maximum, and also running curls in the gymnasium for added strength and power. I found that the longer hills were good to build mental toughness, a more pronounced knee lift and arm swing, plus simple running power and endurance. When you get an elite squad running 24-27 second (male), or 26-30 second (female) up a 5 degree slope on the hill (grass or concrete) you know they will have little trouble on the beach.

During this period I was running 6.5-6.6 second 60m, 10.6 - 10.7 hand 100m by October/November, and also 200m hill sprints in 27 seconds (at Nerang on the Gold Coast). By the end of November 1987 I was at 10.5s 100m speed and ready for any racing. A sample training week during this period (at that time) is listed opposite.

Day	Session/s
Monday	6 by 300m at set times (42–45 seconds) with 90 seconds recovery
Tuesday	6-9 by 60m accelerations at 90%, plus weights
Wednesday	Recovery
Thursday	6 by 200m at 25-26 seconds, plus weights or 6 by 200m hill sprints
Friday	Easy run
Saturday	Starts, 100m and finish with 400m run.
Sunday	Jumping, plus weights

In 1988 (when I feel I was running very quickly) I used a Polish coaches method (Adam Zajac) which involved an accumulation phase, intensification phase and transformation phase. During the accumulation or development phase the training ingredients were:

- Aerobic work (soccer, tennis) for 30-40mins;
- 6 by 100m speed bounding;
- 8-10 by 150m accelerations;
- repeat 60m accelerations;
- 3-5 km easy run;
- 5-6 by 200m to target times;
- weight training (2-3 times per week).

I did the 150m runs using towing (behind a car) and had already reached significant physical strength levels. Using the above routine for 10 days plus some short warm up routines focusing on accelerations I was able to be at readiness speeds for the next phase of training. These speeds included:

- 19.0 second hill sprints over 150m;
- 3 minute 45 second kilometres;
- 200m runs at 26-27 seconds with only 90 seconds to 2minutes recovery;
- 3.85 second 30m accelerations (step in's).

I found that after a short time my body was getting comfortable with the training and my search for greater speed was met without as much fatigue, injury or loss of purpose. I guess the difference was that I now had confidence in a training segment (or microcycle) which could get me to set times after a known training period. The method I had previously used involved a 6-9 week preparation period for such 'development'.

Now before anyone argues about prolonged or sustainable conditioning benefits from such a short cycle it should be remembered I always had a 4-6 week 'general' period of off season training prior to any set program commencement. This was based upon the initial fears of reducing injuries (shin splints, hamstrings, groin) plus enhancing technical abilities of the body by having my general running form at some level of 'readiness'. A sample training week during this period is listed below.

Day	Session/s
Monday	Half Court Tennis, plus bike ride; weights
Tuesday	6 times 150m hill sprints
Wednesday	Half Court Tennis, plus bike ride; weights
Thursday	6 times 200m accelerations (26-28 seconds)
Friday	Recovery
Saturday	5 times 20m, 40m, 60m accelerations (hard)

The approach I take now is listed in the coaching schedule. So it blends the concepts of form with conditioning and lists some key areas to work on. I employ this approach for two weeks and after that period test the athletes over the following distances:

1. standing 20m;
2. acceleration 60m;
3. acceleration 200m;
4. explore what they are lifting in terms of leg press, bench press, 1/2 squat over 6 reps.

Athletes who have proven they are 'ready' to take the next step are moved to the competitive stage. Athletes who have not yet proved their readiness are kept on this program for another week or two to make sure they can comfortably, and technically, run the core segments of a race. By this I mean the initial surge (up to 60m), plus the mid race section (60-80m). I also watch them for their tolerance to lactate and performance when fatigued to see if they 'collapse' their technique under stress. This latter notion is essential. I feel all athletes must learn to be technically correct at each phase of a race under stress, and be able to cope with fast hard running.

Development Phase Training Program

1. Objectives:

1. Develop anaerobic conditioning for sprinting
2. Develop sprint running form for acceleration and striding
3. Develop running power
4. Rehearse changing pace during running
5. Develop structural strength (Shoulders, Hip, Knee, Ankle joints)

2. Warm-up:

- Easy jog for 400-800m
- Stretch lower legs
- 5 by 20m accelerations
- Shoulder rotations
- 5 by 30m accelerations
- Hip/Groin/Hamstrings/Quadriceps stretch.
- 5 by 10m belly runs
- Rest and stretch
- 3-4 by fly 20m runs (in spikes)
- Rest and Stretch

3. Session Flow (2 weeks):

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Recovery	Medium	Hard	Light	Recovery	Medium	Hard
Recovery	Light	Medium	Hard	Recovery	Light	Hard

4. Weights:

Perform 2-3 sessions each week. These should use three methods; increasing intensity/decreasing repetition (rep) method for one session, constant rep/increasing intensity for one session, constant rep/low intensity for one session. This assumes that the athletes have already bulked up, or lost weight whatever their personal situation demands. The types of weight sessions are:

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- [10,8,6,4,2] reps at increasing intensity - Include bench press, lateral pull, leg press plus crunches (30 reps).
- [6-8 reps by 5 sets] at low to medium intensity - Include bench press, power clean, single row plus crunches (30 reps).
- [15-20 reps by 3 sets] at low intensity - Include running curl, leg curl/s (front and back), hip raisers.

5. Training Session choices (hard, medium,light):

- 6-9 by acceleration 60's [hard]*
 - 6-8 by 120m form runs with varied pace segments [medium/hard]
 - 6-8 by 200m at target times [medium]
 - 6 by 150's flat or overspeed [hard]
 - 100m, 150m, 200m, 250m (repeat) [medium]
 - 5 by 20m, 5 by 40m, 5 by 60m [hard]*
 - Hills- 3 by 30m, 60m, 90m (up) [hard]
 - Hills- 6 by 60m or 90m (mixture up and down) [medium/hard]*
 - Tyres- 3 by 30m, 60m (repeat) [hard]*
 - 9-12 by 100's on the walk back at target times [medium]
 - 10 by 10m starts, 10 by 20m flags, 5-6 by 30-60m sand runs [light]*
 - 10 by 25m swim starts, jogging, pull ups in pool [light]*
- * for sprinters and in particular for flag competitors to focus on.

6. General Rules:

- Only run hard when the body feels good.
- Always check and report your injuries.
- If you feel flat take a day off or perform a light session.
- Complete one hill/tyre session each week.
- Complete two form/stride session each week.
- Complete one track acceleration session each week.
- In each hill session always do at least 1-2 downhill runs as well to mix up the speed.
- Focus on solid low drive during acceleration with a longer first two steps.
- Focus on a arm drive shoulder/eye height and just behind the waist.

This section started with some theory, presented some of my favourite development training sessions, so now I wish to discuss some of the real issues – some athlete development stories.

Athlete One – 26 year old Male Flagger

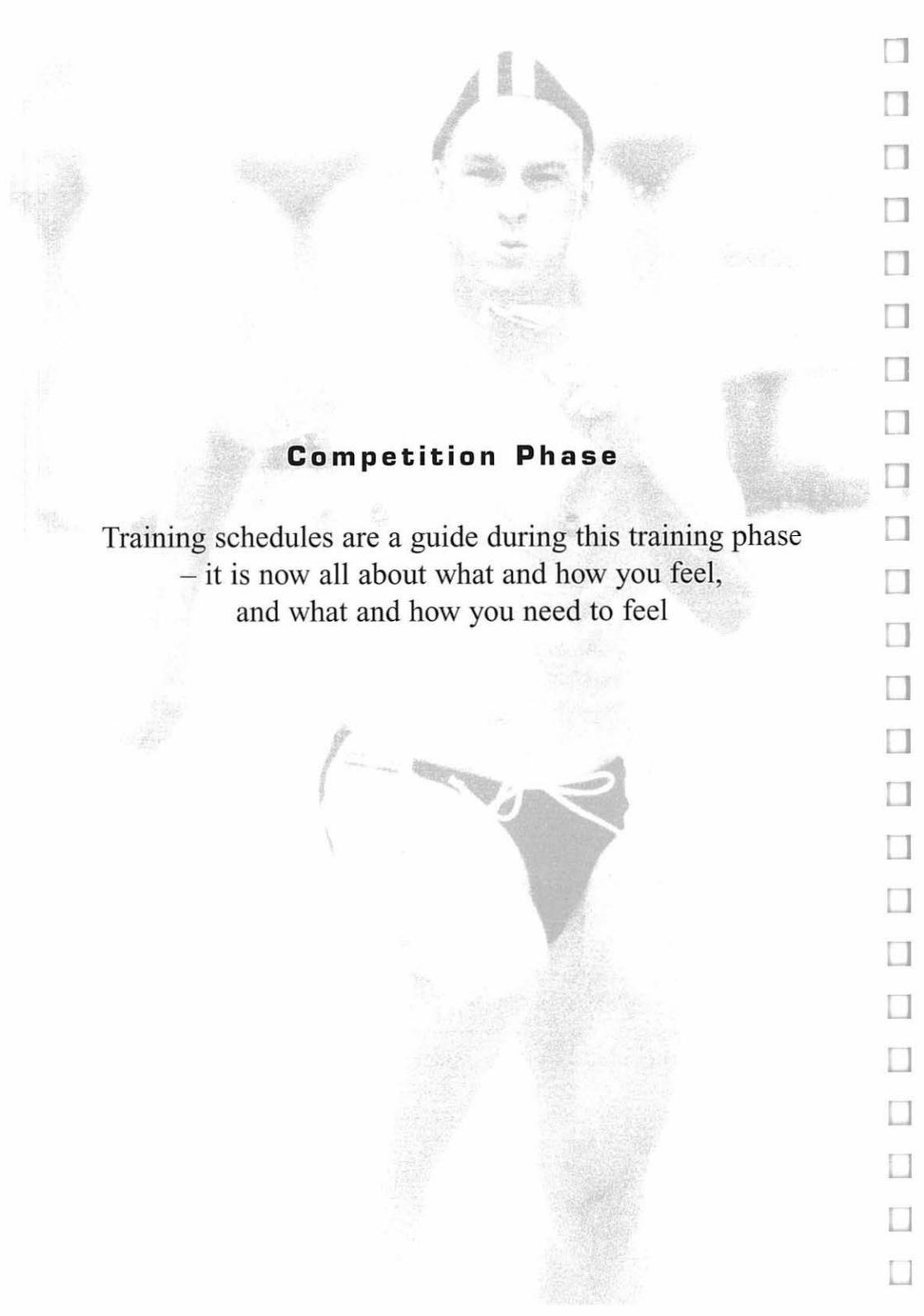
An externally confident and internally doubting runner who was short, had good leg speed but average ‘real’ muscle strength. I had to build both his strength/power capacity and also his self confidence. A significant weight regime was instigated from body bulk phase to peak power phase. I also ensured he competed in easy to hard competition events aimed at improving performances and building confidence. We only raced at places he had a chance, or would win, building up to bigger more ‘testing’ competitions. By the time the State Championships came around he was strong, fast and confident. He won his first gold medal at age 27.

Athlete Two – 16 year old Female Sprint and Flagger

This athlete was an intelligent and talented young runner, who grew tall early and experiencing winning from a young age. As others grew taller she had to cope with their improved performances. In addition she had very supportive parents with high result expectations. I chose to develop her acceleration power and also lactate capacity to tolerate multiple races. She became the queen of the tyre pulls, accelerations and lactate runs. Unfortunately her body changed to be more muscular and this created other problems. She did however, win Under 16 and 18 events at State and National Championships.

Athlete Three – 24 year old Male Sprinter

A quiet and very slight bones/muscled runner who had natural talent. He had keen parental support and enjoyed training, but was tense about the need to be seen to ‘win’. I instigated a serious weight regime resulting in an additional 5-6kgs weight, interval training focusing primarily on 60’s, 120’s and 150’s/200’s/300’s plus many repeat 20’s/40’s/60’s/90’s accelerations and hill sprints. Other than occasional shin splints plus some minor tissue injuries (in the early days) he finally ran consecutive 10.4 runs in gift races at Stawell. That was after a two year training period!



Competition Phase

Training schedules are a guide during this training phase
– it is now all about what and how you feel,
and what and how you need to feel

COMPETITION PHASE

General

To become faster we must prepare the runner and flag competitor for ‘pure’ speed, prolonged speed and race toughness. Also, an athlete must be able to apply the necessary skills involved with sprinting in times of peak pressure. Having said this it is not as easy as it seems and there are as many variables as there are individual athletes. This section however will deal only with the theoretical training concepts involved in getting someone in racing shape and to the race.

Before I get into my specific competition training recommendations I wish to go over some general training theory.

The great sports writer in the 1900’s, Spalding (1914), made the comment that “sprinting is a strain not so much on the muscles as it is on the nervous system” pp7. In any discussion about training for competition we need to note this concept. Complimenting this notion Brent McFarlane (1987), a Canadian national hurdle coach, stated that “for speed runs to be maximal, recovery is critical. Usually after 24-26 hours rest can one’s best results be achieved. ...Speed can only be done successful with one to three days recovery between each session” pp 41. Therefore competition phase training assumes the careful balance of ‘pure’ speed training and ‘other’ training aimed to improve conditioning and also conform to the principles of human recovery.

The leading British sprint coach Frank Dick (1989) added to this training complication by stating that “central to all sprints development is a sound sprint striding technique” and “both striding and lifting are critical to development of maximum speed” pp 347. This essentially means that you cannot run fast until you have learnt how to run fast. He also lists some athlete training tables, over various distances, to assist an 100m/200m athlete’s preparation. They are able to be used in predictive ways by a coach and also aid positive reinforcement of improvement. Three sample time segments from the tables are listed below to illustrate the method.

Hand C30m	Hand F30m	Hand C60m	Hand S150m	Electric 100m
4.04 – 4.08	2.94 – 2.98	6.88 – 6.93	16.21 – 16.35	11.01 – 11.09
4.19 – 4.24	3.09 – 3.14	7.06 – 7.12	16.69 – 16.86	11.30- 11.40
4.55 – 4.60	3.45 – 3.50	7.51 – 7.60	17.89 – 18.09	12.02 – 12.17

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This means that if you are aiming for an 11.00 to 11.10 second hundred (electric timing) then you should aim to run a 4.06 crouch 30m, 2.95 fly 30m, 6.90 C60m and 16.27 standing 150m run in training. The corollary to this is that where times are expected so too can predictive sub-times in training.

Based upon the above methodology we can establish prognostic tables for varying ‘capacity’ runs to tease out athlete effort and readiness. For example I use the following type of approach listed below in the competition phase.

Goal	95%	90%	85%	80%
11.00s 100m	11.58s	12.22s	12.94s	13.75s
10 m/s	9.52 m/s	9.00 m/s	8.47 m/s	8.00 m/s

A runner must prove they can perform sub-maximal runs with sound technique before advancing eagerly to the next goal.

If an athlete is getting ready to race I would tell them to run six to eight by 100m pieces along the following lines. They perform one fast run at 95-100% aiming for either 11.00 seconds or 11.50 seconds, followed by some rest (usually 3-5minutes), and one slower piece at 80-85% aiming for about 13.25 seconds, followed by some rest (usually 2 minutes). The first run is aimed at speed and the latter run at form and specialised endurance plus also assisting neuromuscular recovery. Alternatively I would ask them to run 5 by 100’s at 85%, 5 by 100’s at 90% and finish with 5 by 100’s at 95%.

Too many fast runs in a row drain the ‘developing’ or ‘ready’ athlete. For example I never prescribe too many top speed fly runs in any one session. I would rather they ran at 90-95% over the distance (usually 60-80m) aiming for prescribed times. The rest would be 5 to 8 minutes at this intensity but 10-15 minutes between sets. This type of concept is explored further by other authors below.

To reinforce these training concepts three Olympic 100m or 200m Champions sum up their approach to training in the competitive phase in differing articles. The Russian 100m Olympic Champion, Valeri Borzov (1983), stated that to lift performances he had to “break the speed barrier” pp 16. He suggested this was achieved by using three methods of work/rest. The first was to aim for speed endurance by doing an effort over a variety of distances (30m to 300m) and only having a small recovery (down to 45 seconds). The second was to aim for power. This was developed by performing a maximal (or near maximal) effort over a variety of distances (30m to 200m) and having moderate rest (3-5 minutes). Finally the third was to maintain conditioning and form, through racing. This was always performed with generous rest.

The Italian 200m Olympic Champion, Pietro Mennea (1988), used specific training cycles to develop competitive speed. These cycles correlated with the physiological goals of endurance, power and pure speed. The first stage, employed repeat runs over 60, 80 or 100m with varying rest according to stage of development (less rest at start – more rest at finish of year). The second stage, employed repeat fast runs over longer distances such as 200-500m with full rest (10-15 minutes). Finally the third stage was to aim for power and employed repeat 150m trials at maximum speed with full rest.

The Great Britain 100m Olympic Champion, Allan Wells (1981), performed a sequence of training to build up for competition speed. This is highlighted in the chart listed below.

Week	Activity	Comment
One	2 by 6 by 110m runs	At 50% intensity
Two	2 by 6 by 55m runs	At 75% intensity
Three	2 by 6 by 125m runs	Varied pace hard/mod/hard
Four	2 by 6 by 45m standing runs	All flat out
Five	2 by 3 by 125m runs	Block starts, varied pace

Note – As reported by Margot Wells in address at X1th European Track and Field Coaches Congress, Venice. March 1981. Noted in Track and Field News.

Now having noted all of this, the paradigm of speed development is that a coach must know what to do, and when to do it, based upon a runners state of ‘readiness’. If a runner is a bit flat they should rest and perform some lower intensity speed endurance runs to regenerate. If they lack power they can perform repeat 60’s or hard 150’s to generate endurance or power. For beach sprinters I usually make them do 30m/60m/90m hill sprints. A favourite track power session of mine has been to complete three sets of 3 by 60m runs, at maximal speeds, with 3-5 minutes rest per repetition and 8-10 minutes rest per set. For pure top speed work I like to give runners 6 by 150’s at 90-95%.

It would be remiss of me not to mention a few points of physics here. Speed is a reflection of distance travelled over time taken. So if I run a fly 100m piece in 10 seconds I am travelling 10 metres per second. This is the elite male beach sprinters initial entry point into real running. A female’s real entry point (at this level) is to run at 9.5 metres per second. It is easy to run these times on the track and grass, but it is very hard to get near it on the sand because the best runners race the 90m in 10.5 seconds and the fly time for the sand hundred is more like 11.5 seconds due to the surface resistance. Therefore you must train for track, grass and also sand speeds.

A runners race result will be a combination of their rate of leg movement (leg speed), and also stride length. Small people usually have faster leg turnover, and tall people longer stride length. Naturally there are always exceptions to this and I had to produce one of the longest stride lengths for a little bloke (3 steps) to win. Having said this, the meaning can be explored. For example:

1. If you usually run 3.8 second 30m crouch starts and your goal is to run a 10.5 second hundred (elite male) you must cover the remaining fly 70m in 6.7 seconds. Now this means you must aim to run at 10.7 metres per second.
2. If you usually run 4.30 crouch 30m starts and your goal is to run a 12.00 second hundred (females) you must run the remaining fly 70m in 7.7 seconds.

This means you can train specifically to address starting times (first 30m), 60m times or overall top speed times. Listed below are some sample training activities I like to employ.

Completion Training Objectives

I personally follow these five core objectives for any athlete.

1. Develop starting (or flag turning) reaction and skills.
2. Develop race acceleration conditioning and skills.
3. Develop full speed sprint stride conditioning, skills and thought processes.
4. Develop race tactics and competitive assessments (venue, self and others).
5. Fine tune and maintain the body's power and core levels of muscular strength.

Sprinters and flag competitors do core training elements and then specific elements to train strengths and weaknesses. Training is usually each day and focuses on a core conditioning aspect and one or two skill components. In addition dietary and sleep patterns need to be monitored to maximize energy levels and reduce the risks of over training and other body/mind disorders.

General Training Philosophy

During the competition training stage I ask athletes to attend core training sessions 3-4 times each week and also perform supplementary activities such as weight training, resistance/assistance training, recovery sessions (swimming, cycling).

The relevant weight training chart for the season with application for this period is shown in the appendices.

The particular skills I need to see trained are:

1. Block clearance that is quick, pulling from the hips (rather than pushing excessively) plus demonstrating a low drive (sprint), or, smooth and tight turns near the starting line (flags);
2. Hard and fast acceleration with a smooth lifting of the body over the first 10-15 meters and again through the 60m mark;
3. Cycling of the legs under, rather than behind the hip;
4. A smooth but forceful arm swing (upwards and back);
5. A trunk angle that is not forced forward, or eased backwards, but rather in the mid line with a slight lean;
6. A head and torso that is 'stable' and not bouncing or swaying during the run.

In terms of training I like to execute the following:

1. Reaction training and feedback on block clearance and spacing plus flag turns/s.
2. Repeated 10-60m accelerations at 95-100% effort from a variety of starting positions; step in, standing, crouch and belly starts. Allow at least 30 seconds to 5 minutes recovery depending upon distance.
3. Repeated 'fly' runs to aim for 'pure' speed over shorter distances (10-80M). An athlete has a flat out run and rests completely before performing another.
4. 3 by 3 by 3 times 100m runs at 90% effort with step in starts aiming for technical perfection. Walk back recovery and 3-5 minutes between sets.
5. 6-8 by 60m to 90m hill sprints at 90-95%. Aim for high knees and form and take 2-3 minutes rest per repetition.
6. 6-8 by 100m downhill runs, or, 6-8 by 150m towing at 100%+ speeds. Allow 3-5 minutes rest each repetition and 10-12 minutes per set.

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7. 6-8 tyre or sled pulls over a variety of shorter distances; 20m, 30m, 40m, 50m 60m. Perform these at 90-95% with 3-5 minutes rest each repetition.
8. 6-8 by 150m to 200m runs fast and relaxed. Allow 3 – 5 minutes rest.
9. 6-8 by 120m-150m varied pace runs at 90-100%. Allow 3-5 minutes rest each repetition and 6-8 minutes per set.

In my case I enjoyed the shorter work since it was a personal strength and struggled through the longer runs. In relation to the power and over-speed runs I thoroughly enjoyed them. My best training years were when I included this type of variety in the program for a 2-3 week period with some minor racing as well.

The approach I now take with my athletes is to primarily focus them on power and speed. During this training stage they either are resting, or are performing a power or speed session during the day. This blends the skills of sprinting at top speed with the mental toughness required to be 'hard' in training and/or racing. I often use times or match racing in training to elicit the right environment for the 'race'. Endurance is merely added when required.

There is nothing like seeing 6-10 runners lined up to perform belly runs over 10 -20m, or standing 5m runs, or block starts during this training phase. Not only does the athlete have to be ready but also the timekeeper and starter (coach).

On occasion I have found that some of my athletes have proven they cannot be trusted to monitor their own bodies and rest rather than run. Little injuries can occur, as well as sluggishness. This is a sign of neural tiredness and the onset of over-training symptoms. All coaches must remember a golden rule stated by Charlie Francis in his book 'Speed Trap' (1990, p 102) that "sprinters had a finite envelope of energy to draw from on any given day, and that their final time would be the same whether they drew it early or late". In real terms this philosophy applies to training periods and also a training year.

When a runner gets tired - rest them! I try to race runners every two weeks. They enjoy racing and it serves to measure performance gaps.

Training Schedule- Competition Phase

1. Objectives:

To succeed in sprinting or flags an athlete must be fit, powerful, mentally tough, and fast. In addition they must have the necessary skills to be able to move the body from a still position to full speed quickly and efficiently. The competition phase is aimed at developing an athletes 'top' speed, speed related technique and mental toughness, all required for racing.

2. Methodology:

Training features four (4) running, two (2) weight training, one (1) resistance, one (1) skill/recovery session. The focus of the running units is to 'develop' speed capacity. In addition each training unit has a related skill emphasis. There are four (4) core running sessions and four (4) support sessions to supplement or assist the athletes development.

3. Core Running Sessions:

3.1 Fly runs;

- a) Flag competitors perform 5 by fly 10's and 5 by fly 20's (repeat). The recovery is 3 minutes each repetition and 8-10 minutes a set.
- b) Sprint runners perform 3 by fly 30's and 4 by fly 60's (repeat). The fly 60's can be using over-speed techniques. The recovery is 3-5 minutes on the 30's and 6-8 minutes on the 60's. The recovery between sets is 12-15 minutes.

3.2 Accelerations;

- a) Flag competitors perform 5 by belly 10's, 5 by standing 20's and 5 by acceleration 30's (repeat). The recovery is 3 minutes each repetition and 8-10 minutes a set.
- b) Sprint runners perform 2 by belly 20's, 2 by Block 40's, 3 by Standing 60's (repeat all). The recovery is 3-5 minutes each repetition (except the 60 which is 6-8 minutes) and 12-15 minutes between the large sets.

3.3 Ins/outs;

- a) Flag competitors perform 6 by 40m accelerations where they complete 10m surges on (at maximum) and 10m sections off (at 90%). The rest between each repetition is 5 minutes.
- b) Sprint competitors perform either 6 by 120m accelerations or 6-8 by 150m accelerations where they complete 30m surges on (at maximum) and 30m sections off (at 90%). The rest between each repetition is 8-10 minutes.

4. Supplementary Sessions:

4.1 Plyometrics:

All competitors perform jumps. These should include; standing jumps over a set height, jump and runs, repeated jumps (up to five). Perform these in sand shoes and aim for lift and slight lower leg extension on landing.

4.2 Turns/Starts/Bend running;

All competitors should perform at least one skill session on the sand/track working on starts/turns and if track related bend running.

4.3 Swimming;

All competitors should perform an easy swim once a week that includes 10 by 25m races. The rest will be 3 minutes each repetition.

4.4 Weight Training;

During this phase the athlete should either stick to the overall annual weight plan (i.e. if aiming for)

4.5 Hills, Tyres and sleds

All athletes would complete one of the following sessions each week:

- 5 by 20m hills, 3 by 60m hills, 3 by 90m hills
- 5 by 30m tyres, 5 by 60m tyres
- 3 by 20m sleds, 3 by 40m sleds, 3 by 60m sleds

This section started with some theory, presented some of my favourite competitive training sessions, so now I wish to present some of the real stuff – what some athletes and I have had to do to get there. This is essentially the toughest part of the competition phase, living it as it happens.

In 1988-89 I had performed all the necessary assessments of myself and my athletes (I coached as well) and found some of us, including myself, needed more top speed. I read the theory on downhill running, towing and ‘band’ running and the only real option for us was towing since my wife Cheryl could do it. I trusted her to stick to the speeds set since she new I would whine like buggery if she didn’t. We had a road near our house that was rarely used and had a 200m long stretch plus a grass stretch on an oval 30 minutes from us.

During the full 9 weeks of the competition phase I performed towing twice each week (using a bike rack and metal bar behind her Suzuki Sierra) aimed at improving my top speed in fly runs from 10 m/s to 10.5 m/s. I built up to the set speed over 50m and then held the speed for 50m and she slowed down steadily for the last fifty 50m for each of the six to nine repetitions. This enabled me to relax my shoulders and aim to have a higher cycling rate (leg turnover) with a slightly longer stride length. You do, however, run the risk of getting some tendon tears because of the related muscle tension. In addition all runners must be watched closely for any sign of falling over. My mate Paul Ninness went over once and received tar imbedded in his back for his effort.

The training result was that each of us who used this method improved about 1-2 metres in speed that season because of this intervention. I ran my best ever gift times.

When I was Head Beach Coach of the Cronulla Surf Club we did 100m downhill grass runs as well as 30m tyre pulls and 60m hill sprints to tease out speed and also build race power. The downhill runs were actually easy and meant you could focus on running form whilst the tyres and hills were very hard, and each runner had to ask the question of themselves during training. A mentally soft runner will fail on tyres and hills and when they learn to master them will do well on the sand. I had some soft runners in the squad and this intervention toughened them up.

In a race on the sand once, a State final, I started quickly and was ‘floating’ across the surface very well when at the 60m point of the race I hit a soft sand spot. I went off balance but had to remember to perform a vigorous arm swing and forceful knee ‘lift’ for the next 20m to pull myself out of the mess. The problem was that I had relaxed too much! This type of approach is reflected in Stampfl’s (1955) racing message “high speeds necessitate vigorous arm action, knee lift and powerful leg drive...pp21.

I felt the hill sprints and tyre pulls had saved me that year from disaster. Unfortunately Ashley Cheney, in 2002, stuffed up her National final by falling prey to this very same thing when she hit a snag at the point where the flag finals were held the day before. She lurched and lost control whilst in front of Kristy Smith, only to end up second. Naturally we worked on this all the next year focusing on arm-swing, knee lift and body carriage when sprinting. She is unlikely to suffer the same problem again.

A flag competitor I trained, Simon Harris, hated longer runs and so the remedy was to make him do some but more tyre and hill work over 30m. I liked the over distance work because it meant he had to focus on running through the 20m mark. He had a notorious over-stride and this can fail him at the 10-20m stage of the race. Cutting the stride back in training through hills and tyres made sense. Simon later went on to win State and National Flag titles.

Finally you must practice racing against others to be able to relax when doing it in a race. Repeat 20m, 40m, 60m block starts are excellent for race rehearsal. So too are 10-20m belly runs for flaggers. Another two sessions I often give is single file handicap 150's, where males and females and good and average runners can all participate, or repeat fly 60m runs conducted in matched pairs. Racing helps to develop top speed. Many a champion runner has lost a race because they forgot how to relax in a race on the sand/grass.

Tapering

The art of tapering is as unique as the many combinations of size, strength, fibre type and neural responsiveness of runners. You may not be aware but Pavlov, in 1927, studied nerves to establish that fatigue develops quickly through sustained work (i.e. training) and that rest is required to release fatigue. The reason I restate this is to highlight Charlie Francis axiom (influenced by coach Gerard Mach) that “less is more”. Or less work leads to more speed!

Science has moved on since this point but the fundamental principle of rest still applies. In an 1981 article “Peaking” pp 11, authors John Boas and Norm Osborne stated “In general, peaking involves reducing the workload over a period of time to allow the body to build up to a maximum of strength, power, speed and endurance potential”. Naturally when all this happens is open to conjecture – but I feel the peak for the Australian Surf Life Saving Championships must begin after about three to four weeks before the event.

Having stated the above the elements that I feel need to be manipulated to generate a peak usually include the following:

- Reducing the athletes volume of training (decreasing),
- Manipulating the intensity of training (sessions either hard, or slow),
- Altering gym training to be highly specific and then cease 7-10 days prior,
- Providing more rest between hard runs (10-15 mins).

All athletes respond differently to training and a few athletes I have trained need to lift weights right up to the last week to ensure they have the necessary power. It is also problematic trying to change training micro-cycles in this last period because athletes are looking for the comfort of the known training units, loads and rest/recovery periods. You must ensure they don't ‘break’ the pattern of biological super-compensation by sneaking in extra training sessions because they think they are not doing enough. Some of my runners have done this only to be fatigued at the time they should feel great.

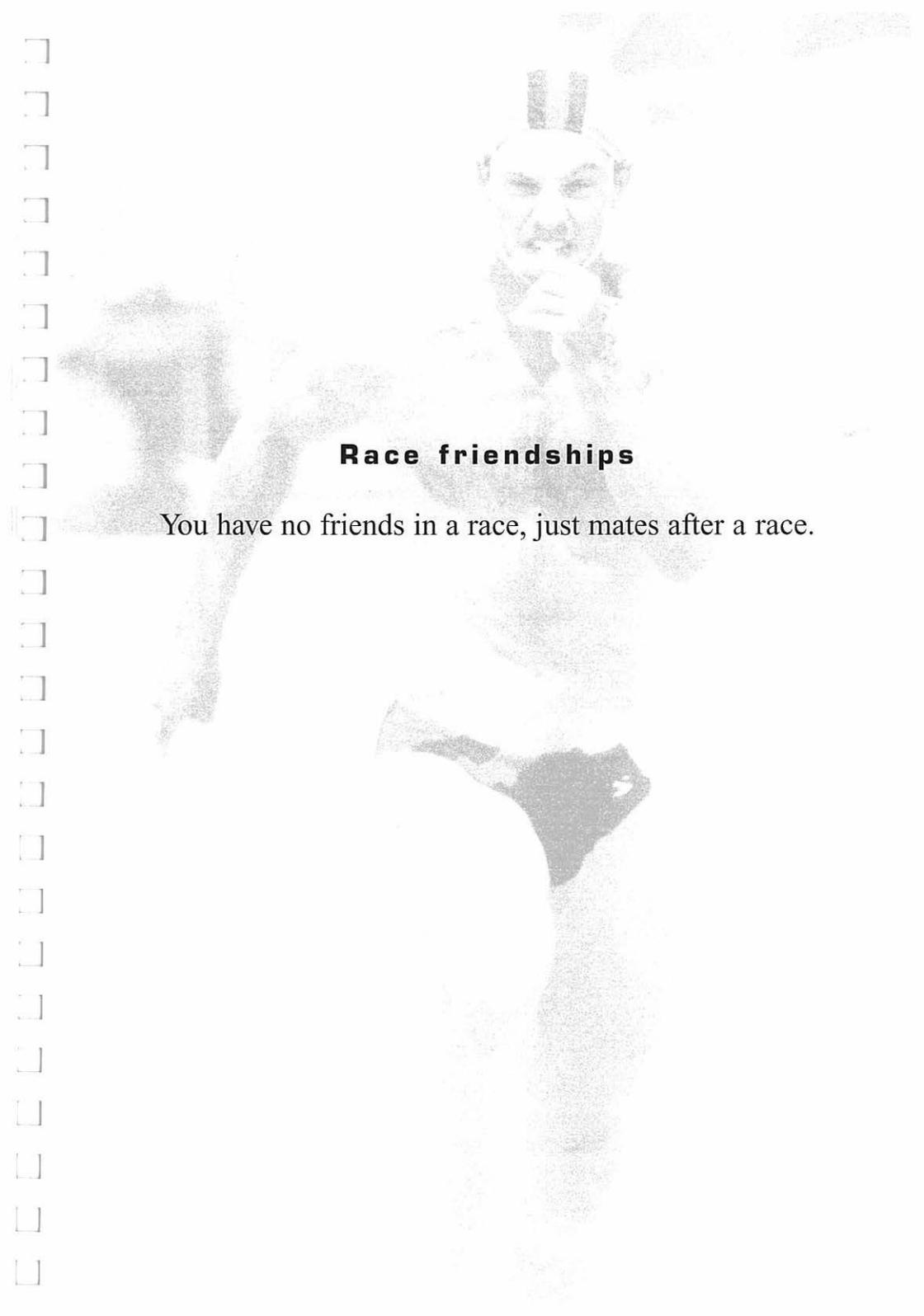
A B E A C H I E S D R E A M

A sample taper phase I have used is listed below.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Race practice; 4 by C20's, 3 by C60's 4-6 by varied pace 120's.	Strength Easy game tennis, basketball; heavy weights	Power 5 by 90m hills at 90%; Or 15 by 20-30m hills (flaggers).	Form Drills; 4 by 60m starts at 85%; Moderate weights	Endurance 20 by 20m runs; 4-5 by 150 at 85%	Recovery swim; Stretching	Speed Over-speed training - running or towing.
Power Weights; 5 by S20m; 4 by C30m; 3 by C60m	Endurance 5-6 by 120m varied pace.	Recovery swim; stretching	Speed 6 by F60-80m; Or 10 by F30m (flaggers).	Power 15 by 20m runs; 3 by 20m & 40m tyres.	Recovery swim; stretching.	Endurance 3 by 150-200m at 95%.
Race practice 2 by C20m, 40m & 60m; Rest and repeat. Or Flag turn practice.	Recovery swim; Stretching	Speed Relaxed downhill running or towing over 100-120m.	Power 4 by 10m belly runs, 3 by standing 20m, 2 by C30m, 1 by C80m.	Recovery swim and Stretching	Race.	Race.

The real principle I wish to demonstrate through this schedule is that you still need to perform a variety of training activities such as endurance, power and speed sessions. The athlete should perform more race related training in this last training block and also experience more rest after each repetition plus decreasing volume of training.

I feel that is the way to balance work with rest to ensure the environment is right to elicit the peaking 'state'.



Race friendships

You have no friends in a race, just mates after a race.

THE RACE IS ON

There is something very special about a surf life-saving Carnival, it combines the excitement and nervous tension of any competitive situation with the sheer joy induced by sand, sea and surf. My first experience at a surf carnival was at age 16 when mum and dad packed us into our Mazda Bongo Van to drive up to watch Warren run in the New South Wales State Championships, at Cudgen Headlands (NSW). Warren had joined Ocean Beach SLSC and was selected by the club to represent them running over the weekend. He had already proved himself in the local carnivals by placing against some known 'quickies'.

It was all a new thing for us and whilst Warren flew up (after some fundraising), we drove, stopping at Bellingen (our Nanna's place). Following this we stopped at Bogangar (near Kingscliff) where I went for the worlds greatest surf. I still remember the long right hand point waves.

During surf carnivals members of the club congregate under the club tent. It is an unspoken rule that athletes have preference or right of way over officers, parents etc, who are essentially the support team. Our family pitched a small tarp near the beach sprint area to watch my brother run. It was a hot weekend with over 1000 competitors plus their supporters. From a young man's perspective there were girl's everywhere. I could not believe the atmosphere and excitement of the surf carnival.

The goal as a spectator was to watch the procession of athletes going from heat to quarter final, quarter to semi-final and then making the final. Not many people from the club made the final that day so the people who did were treated as heroes.

I will never forget the feeling I had when my brother's name was read out as a finalist. He had run hard all weekend and deserved the chance to run for the New South Wales Junior Beach Sprint. I also remember the excitement of the 'tent' when they realised that their little club on the central coast would have its name bandied about as creating another running star. Not only had Warren made us feel good as direct family, he had given the whole club something to cheer about.

I stood on the sand for what seemed like hours that weekend, and again during the final, waiting for the race. At that moment my twin became my first real hero. I remember holding onto the steel fence watching through the 'slot' yelling at him to run on that humid day feeling so proud that he had made the final.

I also remember the feelings of mum and dad when they realised that for Warren, when competing, the club people seemed to take precedence over them. Perhaps it was for that reason they chose not to go to many surf carnivals preferring to leave us to the ‘mob’ down the road.

I recall vividly that it was that day when I decided to be a beach sprinter. I wanted to be part of this exciting surf lifesaving scene and I wished to be like my brother - I wanted to be a beach hero.

Since then I have lost count of the number of carnivals I have attended but I have never lost the enjoyment factor. I still get a buzz when I land on a beach and witness the pre-competition hustle and bustle, the setting up of tents, the stretching of toned muscles, the checking of conditions on land and sea. Now I can sit back somewhat but when I was a competitor the buzz had to be controlled and the nervous tension managed. No matter how good you look and feel in training, it all counts for nothing if you cannot perform on the day. For any athlete the ability to “compete” is essential and when your event lasts only a matter of seconds it is an absolute imperative.

Having said that I also have to accept as a coach that some athletes are great trainers but fall apart in a race. Some athletes are just dumb and never seem to listen, or even apply the things they are taught in training. Some athletes are actually training for the social and health aspects of running, and racing is a mere secondary aspect to the whole ‘experience’. Some athletes have ‘significant others’ who place other pressures on them during competition periods that ‘effect’ the athlete and directly the result. Some athletes have low self esteem and never seem to believe in themselves (when it counts) and hence training and race results are affected. So what do you do? – have some basic rules perhaps?

Some racing mistakes

Here are a few of the mistakes I made in competition. Undoubtedly there were many more, every athlete (and coach) knows when an error has cost them (or their charges) big. The important thing is to recognise and then to learn from them.

- As a young flag competitor I was often not able to concentrate on the task at hand when in a controlled ‘heads down’ position. My mind would wander and I did not focus my attention on the right things. I remember announcers’ messages, attractive girls, sand irregularities underneath me and even where I was placed in the line up would trouble me. It took me some time to overcome these things and just focus on

essential cues and place my attention internally rather than everywhere at once. I gave up the flags later due to a dodgy hip caused by too much first grade Rugby.

- In my early sprint days I would often not have a race plan since I did not think I could win. In my mind Warren or Paul Singleton were going to win and my task was to come second or third depending upon which one of them placed the other in a stress situation causing them to tighten up when running.
- At the Australian Championships in 1980 I made four finals. The final of the Open flags, Junior relay, Junior Sprint and Junior Flags. I did not medal in any of these and was tired for most. I should have just performed the races that I had the best opportunity in.
- In 1986 Warren and I were not on good terms. I had focused negative energy towards him in an effort to develop anger and raise and channel my arousal to defeating him. I won the Gold Coast Championships defeating Warren for the first time in a long while. Warren did not qualify for the national final that year and this devastated me. It was unheard of. During the pre-race marshalling Warren stood behind me to show his support. I was overcome with regret and got a very bad start and subsequently could not catch a very fast Clayton Kearney. Behind me I heard 'The Kid' David Dyworanyan tear his hamstring and drop to the ground. He was trying to become the first junior champion to win both races on the one day something that had evaded Warren in the past. The race day was too full of personal emotion rather than business like running action.
- In 1986 I ran in the Burramine gift in Victoria. I was running quickly at the time (10.6s pre- peaking) and was conscious not to show too much. In hindsight I should have run flat out in the semi-final and qualified as well as in the final. Any win in Victoria is a good one and only the strong finishers are going to win the Stawell Gift. This was something I was not able to do with any confidence.
- In 1986 Warren and I raced for a place in the national team. A special trial was conducted. The selector at the trial Paul Smith always felt Warren would win and he did since I pulled a hamstring during the race. I knew I was sore and should have not declared a start in the trial. This would have meant he would be picked anyway but the tear affected his view of me, while I also had to deal with an injury recovery at a key training period in the year. You should only race when ready.
- In 1988 during the final of the Australian Open Sprint I had raced to the lead and was starting to relax. I was thinking my dream of being a national champion was about to be realised and I was already counting the medal as in the bag. I heard the announcer

say I was 3-4 meters in front so I put my right hand up about 20m before the line. I could also see the channel nine cameras in my lane. As I neared the finish I saw a blur just on my right. Naturally I lost by a whisker and finished second (again). I never ran a slow finish segment again in any championship race.

- In 1991 during the Trans Tasman test event I was in the flags with fellow team member Jim Arnold. He had just won the national flags and I had taken out the sprint. In the last run off it was between Jim and I. I had a flying start. In hindsight I should have informed the starter and simply raced again. That loss still effects Jim but the win means little to me since I was just focused on the sprint and relay at the time and winning the flags was essentially a bonus.

Mind Games

As any elite competitor will tell you the mindset can be as important as the readiness of the body. There are many books written about the psychological aspects of competition and I believe that for every individual there are a complex and entirely different set of influences and predispositions affecting their response to competition based stress. As such I feel that I can only talk about some of my experiences over the years.

As the slower, shorter of the Peters twins I had to battle an identity crisis for a great deal of my sporting life. The physical differences between Warren and I continued to be a source of amazement for others for years. But in reality what I lacked in size I made up for in enthusiasm and in my commitment to the search for running excellence and training knowledge. Eventually I believe that I had more tiger in the tank mentally.

I remember a day on the Gold Coast where I had been too used to being referred to as the bridesmaid and I changed clubs from Surfers Paradise to Tugun SLSC. The reason was merely to get an individual 'brand' for myself and start being Darren the runner rather than the slower of the twins. A few months later (after a very intensive training cycle) I raced Warren in the Gold Coast Championships at Burleigh Heads. Instead of being 'matey' at the track, I did not talk to him. I focused my anger and aggression on what I had to do. I can still remember the cues I set up to focus my attention on the start, the mid race and the finish. I still remember how I used some anger about how felt about him to lift my arousal to optimal levels before the race. I drove out of the blocks and worked hard all the way down the track.

I won the race that day and it was the first time I had won against Warren over the beach sprint distance. In later races I focused this anger and aggression again and it became obvious to me that through attention and focus and mental cues I could switch from

thinking about the result of any race, to what I had to do in the race to be successful. While the anger was originally aimed at Warren I came to realise that the people in the race were important but were not the issue. The issue became me, and what I had to do in training and the race to set myself up for success.

This ability plus some solid training (with weights and hill sprints) was the significant difference. People who knew me before noticed I wasn't as chatty anymore. They also noticed I trained exactly to suit the goal I set myself. Training was personal rather than group focused. Squads I was coaching knew the training was for an outcome not a social activity.

Now that Warren and I have put some distance behind us on these things I can honestly say racing him was and is a pleasure. It is the thrill of the race that I enjoy and beating the person is not what it is all about. And being a twin in the same event can be good as well as bad. On the positive side in the beach flags we often helped each other.



Darren and
Warren
(2003)

Warren let me win a race for Branch selection one day to guarantee my selection (1980). I will never forget that kindness (although that was probably the wrong thing for both of us to do). Later in an inter branch Championships we were set up against each other and I just wished he would ask me the favour I had asked of him years before. Typical of Warren he entered the event thinking he would win. Since he didn't ask I didn't give it over.

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APPENDICES

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APPENDICE 1
TRAINING FRAMEWORK

Goal	Objective	Strategies	Comments
Increase an athlete's general conditioning, specifically; <ul style="list-style-type: none"> • <u>Aerobic capacity</u> • <u>Aerobic power</u> • Anaerobic capacity • General Strength • Mobility/Flexibility 	Develop aerobic capacity	<p>Run for 20-40 minutes at slow to medium pace.</p> <p>Cycle for 5-10 kms at medium pace. [Can be completed on cycle ergometer]</p>	<p>Focus on running smoothly using a relaxed but controlled arm swing [slightly across body] plus leg 'cycle' [lower knee lift but slight overstride].</p> <p>Focus on a smooth action driven through the hips particularly on downhill pieces.</p>
	Develop aerobic power	<p>Run using fartlek style [ons/off] for 20-40 mins. This can be completed on the treadmill.</p> <p>Run for 20 mins and either include hills or faster pieces. [Can be completed on treadmill]</p>	<p>Focus on easy/hard 'pieces'. During hard efforts lift arm swing to shoulder high & raise knee lift.</p> <p>Concentrate on holding 'running form' through the hard efforts.</p>
		<p>Complete 4-6 by 1 km runs with 90 sec to 3 mins rest between each run.</p>	<p>Accelerate easily and build into rhythm during each effort. Aim for a set running speed for each kilometre.</p>



Training Framework for Sprinters

Goal	Objective	Strategies	Comments
Increase an athlete's general conditioning, specifically; <ul style="list-style-type: none"> • Aerobic capacity • Aerobic power • Anaerobic capacity • <u>Strength</u> • Trunk stability • Flexibility 	Develop general muscular strength (4-10 weeks)	Increase muscle bulk and general strength. Complete three to four weight sessions each week lifting 8-10 reps (5-6 sets) at 60-75%.	Perform to 1/3rd squats, Bench press, Single row, Crunches (50 reps), Deadlift, reverse crunch (back arch).
	Develop maximal muscular strength (4-6 weeks)	Increase maximal muscular strength. Complete at least three weight sessions each week lifting 5-8 reps (5-6 sets) at 75-90%. Perform body blitz. Complete decreasing rep sets at increasing intensity. Perform an exercise at 10, 8, 6, 4 and 2 reps.	Perform similar exercises to above and lift moderate, heavy and moderate during a training week. Use this method to provide variety.
	Develop muscular power (4-8 weeks)	Increase muscular endurance. Complete at least two sessions per week lifting 15-20 reps (4-5 sets) at 40-60%. Perform 10m to 200m hill sprints on 5-10 degree slope hill. Perform 10m to 50m stair climbs.	Perform squat lunges, running curls, power cleans, bench press, standing jumps, overhead throws, one leg jumps, push ups, medicine ball work. Perform at least one general and one maximal weight session each week for maintenance.

Goal	Objective	Strategies	Comments
<p>Increase an athlete's general conditioning, specifically;</p> <ul style="list-style-type: none"> • Aerobic capacity • <u>Aerobic power</u> • <u>Anaerobic capacity</u> • General Strength • Mobility/Flexibility 	<p>Develop anaerobic capacity</p>	<p>Walk/run over 1-2 miles (1.6 to 3.2 km). Walk bend and stride at 75% the straight.</p> <p>Complete an interval session. Run 400m, 300m, 200m at 75% with 90 sec rest between each & then repeat.</p> <p>Complete either 6 by 400m, 300m or 200m with 90 sec recovery. Rest 5 mins per set of 2-3.</p> <p>Complete 9-15 by 100m runs at 85%. Just have jog/walk back recovery per interval.</p> <p>Cycle for 20 mins going between slow/med/fast pace. Perform 30 to 60 second efforts at each 'piece'.</p> <p>Run for 20 minutes and perform surges between slow/mod/fast pace. Hold all surges for around 30-60 secs.</p>	<p>Focus on smooth low acceleration and a 'balanced' stride with shoulder high arm swing plus at least mid thigh high knee lift.</p> <p>Aim for programmed speeds (i.e. 15 sec 100 pace). Try to hold form when fatigued.</p> <p>Aim for programmed speeds. In addition for 'perfect' striding technique.</p> <p>Aim for 85-90% runs and faster sets of 3-5.</p> <p>Hold form under fatigue. Drive speed through hips.</p> <p>Start out walking, then jogging and then fast efforts for 30 – 60 secs and then walking again.</p>



Training Framework for Sprinters

Goal	Objective	Strategies	Comments
Increase an athlete's general conditioning, specifically; <ul style="list-style-type: none"> • <u>Accelerating</u> • <u>Starting</u> • Striding at speed • Finishes 	Develop early speed (4-6 weeks)	Perform repeat 10-20m runs >90% Perform repeat 50-60m runs >90% Perform repeat 20m, 40m & 60m runs >90%	Can do this on flat, up hill or pulling sleds/tyre. Keep head low and use a rigorous arm swing. Aim for split times at each point.
	Develop starting (2 weeks)	Perform repeat belly runs over 10-20m Perform repeat standing starts over 5- 20m Perform repeat block starts over 10-30m	Perform against partners with mixed start command times. Keep head low and rigorous arm swing. Check block spacing for each athlete; start with medium spacing then amend if necessary.
	Develop 'pure' running speed	Perform fly 20-30m runs Perform ins/outs over 20m segments	Accelerate for 20-30m then 'hit it'. Aim for high arms and knees during fast pieces.

**APPENDICE 2
TRAINING FRAMEWORK:
GENERAL PREPARATION 2**

Training Program – General Preparation 2

1. Running Units:

<p>Session One Speed</p>	<ol style="list-style-type: none"> 1. Walk bend jog straight (1 lap) 2. Walk bend stride straight at 50% (1 lap) 3. Walk bend stride straight at 75% (1 lap) 4. Stretch all major muscles 5. Complete drills; knee lift, heel kick & skipping. 6. Complete 5 by 10m step in runs at 90% walk back rest 7. Complete 5 by 20m 3pt starts at 90% walk back rest 8. Complete 5 by 30m crouch starts at 90% walk back rest 9. Stretch shoulder, hip & knee joints 10. Complete 5 by fly 20m runs at 90% walk back rest 11. Complete 5 by fly 40m runs at 90% 2-3 minutes rest 12. Complete 1-2 by easy 200m runs at 60% walk back rest 13. Stretch all major muscles and walk to finish session.
<p>Session Two Speed Endurance</p>	<ol style="list-style-type: none"> 1. Jog 2 laps at slow pace 2. Stretch all major muscles 3. Complete drills; knee lifts, heel kicks & skipping 4. Complete 5 by 10m step in runs at 90% walk back rest 5. Complete 5 by 20m fly runs at 90% walk back rest 6. Stretch shoulder, hip, & knee joint muscles 7. Complete 3 by 200m at 75-85% [90sec to 2min rest] 8. Rest and stretch shoulder, hip and knee joint muscles 9. Complete 3 by 200m at 75-85% [90sec to 2min rest] 10. Stretch all major muscles and walk to finish.
<p>Session Three Power</p>	<ol style="list-style-type: none"> 1. Complete easy 800-1600m jog at slow pace 2. Stretch all major muscles 3. Complete drills; knee lifts, heel kicks & skipping 4. Complete 5 by 10m step in runs at 90% walk back rest 5. Complete 5 by 20m step in runs at 90% walk back rest 6. Stretch shoulder, hip & knee joint muscles 7. Complete 3-4 by 30m hill sprints at 90% walk back rest 8. Rest & stretch shoulders, hip & knee joint muscles 9. Complete 3-4 by 30m hill sprints at 90% walk back rest 10. Rest & stretch; shoulders, hip & knee joint muscles 11. Complete 3-4 by 30m hill sprints at 90% walk back rest 12. Complete 2 by 60% downhill runs over 200m 13. Rest and stretch all major muscles to finish

2. Weights:

2.1 Key exercises (lifts)

- Bench press
- 1/2 squat
- Single row or seated row
- Dead lift
- Crunch

2.2 Reps and sets

During this phase of training the aim is to complete 4-5 sets of 8-10 reps of exercises. In relation to crunches the goal is ladders; 20,30,40,50 and then eventually as the runner is stronger up and down the ladder (i.e. 20,30,40,50,40,30,20).

2.3 Session/s

Each runner should perform weights three times each week or if they split routines between upper/lower - 5 days in seven.

3. Plyometrics:

3.1 Key jumps

- Repeat Squat jumps (both feet shoulder width apart jump about 1m)
- Repeat Single leg hopping
- Repeat Jump/run efforts
- Tuck jumps

3.2 Reps and sets

Runners should perform five jumps in a set and do at least three sets in the session.

3.3 Session/s

Each runner should perform plyometrics at least once each week. This can be at the start or during another less demanding training session.

**APPENDICE 3
TRAINING PROGRAM:
SPECIAL PREPARATION 2**

Training Program – Special Preparation 2

1. Running Units:

<p>1 & 3 (Monday & Wednesday)</p> <p>Speed Endurance</p>	<ol style="list-style-type: none"> 1. Jog 2 laps at slow pace 2. Stretch all major muscles; shoulders, hips, knee, ankle. 3. Complete 10mins of drills; knee lifts, heel kicks & skipping. 4. Complete 3 by 80-120m runs at 75-85% walk back rest. 5. Drink fluid & stretch hip joint. 6. Complete either; 3-4 by 200m runs at 85-90% or, 6-9 by 120m runs at 85-90%. Walk back rest each unit. 7. Drink fluid & stretch knee joint.
<p>2 (Tuesday)</p> <p>Acceleration speed</p>	<ol style="list-style-type: none"> 1. Walk bend jog straight (2 laps) 2. Walk bend stride straight at 75% (2 laps) 3. Drink fluids & stretch; shoulder, hip, knee & ankle joints. 4. Complete 10mins of drills; knee lift, heel kick & skipping. 5. Complete 10 by 10m accels at 90% walk back rest. 6. Drink fluid & stretch hip joint. 7. Complete 3 by 3 Crouch 60m runs at 95% 2-3 minutes rest. 8. Easy walk and stretch to finish session.
<p>4 (Thursday)</p> <p>Power</p>	<ol style="list-style-type: none"> 1. Complete easy 800-1600m jog at slow pace. 2. Stretch all major muscles; shoulder, hip, knee, ankle joints. 3. Complete plyometrics; standing jumps, jump & run. 4. Complete 5-10 by 20m hill sprints at 90% walk back rest. 5. Drink fluids & stretch hips. 6. Complete 4 by 40m tyre pulls at 90% 2-3 mins rest. 7. Drink fluids & stretch hip & knee joint muscles. 8. Complete 4 by 90m hill sprints at 90% walk back rest. 9. Drink fluids & stretch hip, knee, ankle joint muscles. 10. Complete 2-3 by 150-200m hill sprints at 75%. Walk back. 11. Drink fluids, stretch and easy walk to finish.
<p>5 & 6 (Saturday & Sunday)</p> <p>Race rehearsal</p>	<ol style="list-style-type: none"> 1. Complete walk bend jog straight warm up (2 laps). 2. Stretch all major muscles; shoulder, hip, knee, ankle joints. 3. Complete 9 by 20m accelerations; step in, belly, 3 pt. 4. Drink fluids and stretch hips. 5. Complete 5 by fly 20m runs at 85-95%. 3-5 minutes rest. 6. Drink fluids & stretch knee, ankle joints. 7. Complete either; 6 by fly 60's, or, 6-8 by varied pace 180m. Take 3-5 minutes rest & do 3 reps in each set. 8. Drink fluids & stretch hips, knees, ankles. 9. Complete 15-20 by crouch starts. Walk back rest.

2. Weights:

2.1 Key exercises (lifts)

- Bench press
- 1/2 squat
- Swiss ball hip stretching
- Lateral pull
- Dead lift
- Crunch
- Running curl

2.2 Reps and sets

During this phase of training the aim is to complete 4 sets of 5-6 reps of exercises at 85%. In relation to crunches the goal is ladders; 20,30,40,50 and then eventually as the runner is stronger up and down the ladder (i.e. 20,30,40,50,40,30,20).

2.3 Session/s

Each runner should perform weights three times each week or if they split routines between upper/lower - 5 days in seven.

3. Plyometrics:

3.1 Key jumps

- Repeat Squat jumps (both feet shoulder width apart jump about 1m)
- Repeat Single leg hopping
- Repeat Jump/run efforts
- Tuck jumps

3.2 Reps and sets

Runners should perform five jumps in a set and do at least three sets in the session.

**APPENDICE 4
TRAINING PROGRAM:
RACE PREPARATION 2**

Training Program – Race Preparation 2

1. Running Units:

<p>1 & 3 (Monday & Wednesday PM)</p> <p>Speed</p>	<ol style="list-style-type: none"> 1. Walk straight jog bend (2 laps) 2. Stretch all major muscles; shoulders, hips, knee, ankle. 3. Complete 10mins of drills; knee lifts, heel kicks & skipping. 4. Complete 5 by 100m runs at 75-85% walk back rest. 5. Drink fluid & stretch hip joint. 6. Complete 2 by 20, 40,60m block starts (95%); 3-5 mins rest 7. Drink fluid & stretch hip/knee joints. 8. Complete 3 by fly 30m runs at 100%; full rest. 9. Warm down walk and stretch.
<p>2 (Tuesday PM)</p> <p>Endurance</p>	<ol style="list-style-type: none"> 1. Jog 1-2 laps and then stretch. 2. Complete 10 by 10m accelerations walk back rest. 3. Drink fluids & stretch; shoulder, hip, knee & ankle joints. 4. Complete 10mins of plyo's; standing, single leg, jump/run, skipping/run. 5. Complete 3 by varied pace 150 – 200m at 95%; 3 mins rest. 6. Drink fluid & stretch hip/knee joints. 7. Complete 20 by 20m block starts at 95%; walk back rest. 8. Easy walk and stretch to finish session.
<p>4 (Thursday - AM)</p> <p>Power</p>	<ol style="list-style-type: none"> 1. Complete easy 800-1000m jog at slow pace. 2. Stretch all major muscles; shoulder, hip, knee, ankle joints. 3. Complete plyometrics; standing jumps, jump & run. 4. Complete 10 by 20m hill sprints at 95% walk back rest. 5. Drink fluids & stretch hips. 6. Complete 4 by 40m tyre pulls at 95% 2-3 mins rest. 7. Drink fluids & stretch hip & knee joint muscles. 8. Complete 4 by 90m hill sprints at 95% walk back rest. 9. Drink fluids & stretch hip, knee, ankle joint muscles. 10. Complete 2-3 by 150-200m hill sprints at 85%. Walk back. 11. Drink fluids, stretch and easy walk to finish.
<p>5 & 6 (Saturday & Sunday AM)</p> <p>Race rehearsal</p>	<ol style="list-style-type: none"> 1. Complete walk/run warm up. 2. Stretch all major muscles; shoulder, hip, knee, ankle joints. 3. Complete 9 by 20m accelerations at 95%; step in, belly, 3 pt. 4. Drink fluids and stretch hips. 5. Complete 5 by 100m runs building up intensity. Walk back. 6. Drink fluids & stretch knee, ankle joints. 7. Race Block 30, 60, 100,200m at 100%; full rest.

2. Weights:

2.1 Key exercises (lifts)

- Bench press
- 1/2 squat
- Swiss ball hip stretching
- Lateral pull
- Dead lift
- Crunch
- Running curl

2.2 Reps and sets

During this phase of training the aim is to develop power and also maintain endurance. To develop power athletes must lift at least 3-5 sets of 1-3 reps at high intensity; specifically, 90 - 100%. To maintain endurance athletes must lift at least 3 sets of 15-20 reps at 60%. In relation to crunches and running curls the goal is ladders; 20,30,40,50 and then eventually as the runner is stronger up and down the ladder (i.e. 20,30,40,50,40,30,20).

2.3 Session/s

Each runner should perform two (2) power sessions a week plus one (1) endurance session in the week. They may perform more endurance sessions if they feel the need to train each day.

3. Plyometrics:

3.1 Key jumps

- Repeat Squat jumps (both feet shoulder width apart jump about 1m)
- Repeat Single leg hopping
- Repeat Jump/run efforts over 20m.
- Tuck jumps or hurdle hops over 3-5 hurdles.

3.2 Reps and sets

Runners should perform five jumps in a set and do at least three sets in the session.

APPENDICE 5
TRAINING SESSION RUNNING FORM

Session 1 - Running Form (Off Season)

1. Purpose:

The purpose of this training session is to develop basic running form whilst performing a mixture of base aerobic and anaerobic training. It is a good all year round session when some base conditioning and technique focusing is required.

2. Session Objective/s:

2.1 Develop sprint capacity (aerobic/anaerobic)

2.2 Rehearse basic running form (acceleration and striding)

3. Session synopsis:

A running warm up is performed comprising walking the bend of an oval and jogging/striding the straight. Complete 2-4 laps aimed to run the 100m straights a little harder each time. Athletes stretch and perform some running drills and then complete 5-10 accelerations. The main session involves athletes walking 200m and then accelerating to a half pace run for 100-200m before walking again. This is repeated until fatigue.

4. Key activities:

- Walk bend jog/stride straight. Swing arms comfortably to shoulder height and back behind the waist.
- Complete 10-20m bum kicks [heel hops] and knee lifts.
- Focus on smooth low accelerations during initial running burst/s.
- Stretch all major muscle groups; shoulders, hips, knees, ankle.
- During striding aim for a smooth and balanced leg action. The same knee lift height and limited sideways body movement.

5. Technical Outcomes:

A runner will be able to accelerate smoothly using a rigorous arm swing behind the waist up to shoulder height. They will be able to maintain a 'balanced' stride pattern for a distance at sub-maximal speed.



**APPENDICE 6
TRAINING SESSION ACCELERATIONS**

Session 2 – Accelerations (Development - All Year)

1. Purpose:

The purpose of this session is to develop basic acceleration skills and physical capacity through the ‘massed’ practice technique. This means athletes will perform repeat step in accelerations over 30-60m using walk back recovery. They run singularly or against others, at moderate intensity [85-90%]. It is a good general preparation training session for runners.

2. Session Objective/s:

2.1 Rehearse step-in starting and acceleration skills.

2.2 Rehearse accelerating against others over 30-60m.

3. Session synopsis:

Following a warm up comprising 3-4 walk/jog/stride laps plus some stretching and drills, athletes are asked to spike up. They complete 3-4 step in accelerations over 30m then stretch. They then complete 3-4 step in accelerations over 60m then stretch. Depending upon the fitness of the athletes this should be repeated. Athletes aim for a smooth and low acceleration through the first 15-20m aiming to run at 85-90% intensity for the rest of the effort. They focus on swinging their arms high with hands at eye height during the upswing plus hands behind the waist on the backswing. Walk back recovery is used between repetitions and 3-5 minutes rest is taken between sets. The training session lasts around 45- 60 minutes.

4. Key activities:

- Walk bend and jog/stride straight and then stretch all body segments.
- Complete heel hops, knee lift drills and sideways stepping [each side].
- Complete 3-4 times 30m accelerations building up to 90% and rest.
- Complete 3-4 times 60m accelerations building up to 90% and rest.
- Complete 3-4 times 30m accelerations building up to 90% and rest.
- Complete 3-4 times 60m accelerations building up to 90% and rest.
- Complete 1-2 runs over 200-300m at 50-60% to finish [in sandshoes].

5. Technical Outcomes:

A runner will be able to perform step in accelerations building up to moderate speeds either singularly or against others. They will use a ‘sprinters’ arm swing pattern with high hands and smooth swinging action. They will also produce a more aggressive knee lift. During running they will establish a pattern of ‘doing’ and ‘thinking’ aimed at what they should do in a race.

**APPENDICE 7
TRAINING SESSION FORM**

Session 3 - Form (All Year)

1. Purpose:

The purpose of this session is to develop basic running form when performing stride throughs. This means athletes will perform repeat 100m - 200m runs at moderate intensity. It is a good all year session to perform.

2. Objective:

2.1 Rehearse armswing from behind waist to shoulder and eye height.

2.2 Rehearse knee lift from low to hip high levels.

2.3 Rehearse sprint/stride body angle to 5-10 degrees.

3. Session Synopsis:

Runners warm up and then run repeat 60-85% efforts over a prescribed distance. Flaggers run up to 120m and sprinters to 200m. After each run athletes walk back and perform again in sets of 2-3.

4. Key Activities:

- Jog 400m to 800m and then stretch.
- Perform repeat 20m accelerations
- Stretch and perform plyometrics; standing jumps, jump/run and repeat jumps.
- Complete either; 6-9 times 100m run throughs in sets of 2-3 reps, or, 6-9 times 150's, or 6-9 times 200m.
- Complete stretching and drinking after each set of 2-3 efforts. Take 5-6 mins between a set.

5. Technical Outcome:

Runners will develop local muscle endurance for sprint striding and also rehearse armswing and knee lift with the appropriate body lean during efforts.

APPENDICE 8
TRAINING SESSION RACE SPEED

Session 4 – Race Speed (Competition)

1. Purpose:

The purpose of this session is to develop race speed through the ins/outs method. This means running fast sections of 20-30m and then medium intensity sections over 30-40m for a 120m-150m race piece. It is a good competition preparation training unit for runners.

2. Session Objective/s:

2.1 Rehearse racing against others.

2.2 Develop individual race speed.

2.3 Rehearse sprint technique at speed.

3. Session synopsis:

Following an intensive warm up including accelerations, drills, longer run-throughs plus stretching athletes perform six to nine 120-150m race pieces. During each run they mix the zones that they either race ‘hard’ [20-30m], or race ‘moderately’ [30-40m]. Athletes take 3-5 minutes recovery after each effort and 8-10 minutes between sets. The rest period is used to discuss technique and perform some exercises such as crunches, plyometrics, medicine ball throws etc. The training session lasts around 60-90 minutes.

4. Key activities:

- Focus on smooth low [meaning head down] acceleration over the first 10-15m working the hands/elbow back hard behind the waist and up to shoulder height.
- During race pieces concentrate on a tight abdomen high hips [running tall] and in particular a smooth but faster ‘cycling’ of the legs underneath the body.
- Aim for a slight over stride with an aggressive ‘pull’ down of the foot to the ground.
- Aim for high arms [meaning shoulder to eye height hands on the upswing during hard pieces.
- Aim for ‘perfect’ technique during the ‘moderate’ pieces.

5. Technical Outcomes:

A runner will be able to accelerate smoothly using a rigorous arm swing behind the waist up to shoulder height. In addition they will be able to lift their speed and maintain it for a period of 20-30m aiming for as good a technique as they can under extreme loading.

**APPENDICE 9
TRAINING SESSION STARTS**

Session 5 – Starts (Competition)

1. Purpose:

The purpose of this session is to develop starting ability through the ‘massed practice’ technique. This means performing starts over 10-40m repeatedly, and in this session at low to moderate intensity. It is a good competition preparation training unit for runners.

2. Session Objective/s:

2.1 Rehearse block positioning and starting stance/s.

2.2 Develop block clearance and acceleration skills.

2.3 Rehearse starting against others.

3. Session synopsis:

Following a reduced warm up comprising 3-4 walk/jog laps, stretching and drills athletes are asked to spike up and get their blocks. Ten to thirty starts are completed over a variety of distances from 10 up to 40m. During each start athletes aim for a smooth pull/push out of the blocks before they increase their running intensity. Athletes use walk back recovery between efforts and take 3-5 minutes rest between sets of 4-5 starts. The rest period is used to discuss technique and stretch. The training session lasts around 30-40 minutes.

4. Key activities:

- Set runners blocks according to their size and personal preference. Aim for either a ‘medium’, or ‘bunched’ block spacing.
- Ensure runners are ‘balanced’ with symmetrical shoulder/hip weight.
- During ‘settling’ ensure shoulders are in line with the arms and hands.
- On ‘set’ glide the hips forward and upwards to place body weight on the hands.
- Upon command glide out of the blocks rather than push or jump.
- Focus on a smooth low [meaning head down] acceleration.
- During the initial acceleration [10-15m] ensure they work their hands/elbow back hard behind the waist and up to shoulder height.

5. Technical Outcomes:

A runner will be able to start smoothly using a balanced block clearance whilst accelerating gradually. They will perform a vigorous arm swing behind the waist up to shoulder height. They will be able to perform repeat starts aiming for perfect balance, block clearance and acceleration.