

## **APS Athletics Revision Notes**

The APS Athletics exam contains 50 questions based upon information presented during the twenty lectures, the homework and the notes in this pack.

- 10 Questions on Officiating lessons.
- 40 Questions on Athletics based on Homework and lessons.

# Homework

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## The Triple Jump

Go to the Canadian Athletics Coaching Centre Website:

<http://www.athleticscoaching.ca/default.aspx?pid=7&spid=37&ssp=63>

Make notes on the triple jump from the following articles:

- > Model Technique Analysis Sheet for the Horizontal Jumps Part II - The Triple Jump By: Eckhard Hutt
- > Differences in Some Triple Jump Rhythm Parameters By: Gregory Portnoy Ph.D.
- > NSA Photosequence #8 - Triple Jump: Khristo Markov Commentary by Helmar Hommel and Ekhard Hutt
- > The Biomechanics Of Triple Jump Techniques By: James G. Hay
- > Triple Jump Technique By: Irving Schexnayder

Make specific notes under the following headings:

1. Run up
2. Take off
3. Hop
4. Step
5. Jump
6. Landing
7. Rhythm between hop>step>jump
8. Use of the arms when jumping

Go to the Canadian Athletics Coaching Centre Website:

<http://www.athleticscoaching.ca/default.aspx?pid=7&spid=37&ssp=62>

Make notes on the sprint hurdles from the following articles:

Model Technique Analysis Sheets for the Hurdles Part VI: The 100M Hurdles  
By: Johannes Hucklekemkes  
Model Technique Analysis Sheets for the Hurdles Part VII: High Hurdles By:  
Gunter Tidow  
The High Hurdles - From Start to Finish By: Tom Tellez  
NSA Photosequence 35 100m Hurdles: Gail Devers

**1. Make notes under the following headings for both the 100m and 110m hurdles:**

start  
acceleration to the 1st hurdle  
hurdle clearance

preparation phase  
take-off phase  
flight phase  
landing phase  
run between hurdles  
run to the finish

**2. Using the above articles and the internet list the main DIFFERENCES between the men's and women's hurdles in terms of:**

- a. Hurdle settings
- b. Performance profiles of the race (times and velocities for each part of the race – e.g. between hurdles etc)

**3. Go to [www.youtube.com](http://www.youtube.com), search for “hurdles” and watch a few races so you have an understanding of what the race looks like.**

## **Ballistics**

Go to the Canadian Athletics Coaching Centre Website:

<http://www.athleticscoaching.ca/?pid=1&spid=105>

Listen to the Ballistics (18MB) Coach cast and download diagrams for this Coach Cast.

- A. Make notes on the topics presented.

## **Shot Put**

Go to the Canadian Athletics Coaching Centre Website:

<http://www.athleticscoaching.ca/default.aspx?pid=7&spid=37&ssp=64>

Make notes on the Shot Put from the following articles:

Shot Put: Improving the Glide By: Merv Kemp  
The ABC's of Throwing: Glide or Spin? By: Bogdan Poprawski  
NSA Photosequence #10 – Shot Put: Ulf Timmerman, Werner Gunthor, Alessandro Andrei By: H. Hommel & J. Egger  
The Rotational Shot Put Guide By: Charlie DiMarco  
The Rotational Shot Put Guide Part II By: Charlie DiMarco

- B. Break down the Glide Shot Technique and make notes under your headings

- C. Break down the Rotational Technique and make notes under your

headings

D. Note the advantages and disadvantages of the Glide and Rotational Shot Put techniques.

Also look at the BBC Bitesize Website and watch the videos on the Shot Put

<http://www.bbc.co.uk/schools/gcsebitesize/pe/video/athletics/>

## **Javelin**

Go to the Canadian Athletics Coaching Centre Website:

<http://www.athleticscoaching.ca/default.aspx?pid=7&spid=37&ssp=64>

Make notes on the Javelin from the following articles:

Model Technique Analysis Sheet for the Throws Part X: The Javelin Throw

By: Gunter Tidow

The Javelin Throw and the Role of Speed in Throwing Events By: Peter

Ogiolda

The Contemporary Javelin Technique By: O. Dmitrusenko

The Javelin Run-Up By: Hans Torim

A. Break down the Javelin throw into parts and make notes under your headings

Also look at the BBC Bitesize Website and watch the videos on the Javelin

<http://www.bbc.co.uk/schools/gcsebitesize/pe/video/athletics/>

## **Endurance Training**

Read more about New Interval Training here:

<http://www.athleticscoaching.ca/UserFiles/File/Sport%20Science/Theory%20&%20Methodology/Endurance/General%20Concepts/Thompson%20The%20New%20Interval%20Training.pdf>

# Plyometrics in Athletics Notes

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**Etymology:** plio = more; metric = to measure; “to increase measurement”

**Practical definition:** Quick, powerful movement using a prestretch or countermovement, that involves the **stretch shortening cycle (SSC)**.

## Models of Plyometric Exercise

Plyometric exercise can be understood through two models

1. The mechanical model
2. The Neurophysiological model

The degree to which each model contributes to the overall plyometric effect is not fully understood.

### ***Mechanical Model of Plyometrics***

In this model, elastic energy is created in the muscles and tendons and stored as a result of a rapid stretch. This stored energy is then released when the stretch is followed **immediately** by a concentric muscle action. According to Hill (1970) the effect is like that of stretching a spring, which wants to return to its natural length. The spring in this case is a component of the muscles and tendons called the **series elastic component (SEC)**. The SEC includes some muscular tissue but it is mainly the tendons that contribute most.

### ***Neurophysiological Model of Plyometrics***

When a quick stretch is detected in the muscles, an involuntary, protective response occurs to prevent overstretching and injury. This response is known as the **stretch reflex**, which is primarily the result of **muscle spindle** activity. Muscle spindles are proprioceptive organs that are sensitive to the rate and magnitude of a stretch. They protect the muscle/tendon complex from excessive stretching.

The stretch reflex increases the activity in the muscles undergoing the stretch or eccentric muscle action, allowing them to act much more forcefully. The result is a powerful braking effect and the potential for a powerful concentric muscle action.

If the concentric muscle action does not occur immediately after the pre-stretch, the potential energy produced by the stretch reflex response is lost. (i.e. if there is a delay between dipping down and then jumping up, the effect of the counter-dip is lost).

## **The Stretch Shortening Cycle (SSC)**

All plyometric movements involve **three** phases. The first phase is the pre-stretch or eccentric muscle action. Here, elastic energy is generated and stored.

The second phase is the time between the end of the pre-stretch and the start of the concentric muscle action. This brief transition period from stretching to contracting is known as the **amortization** phase. The shorter this phase is, the more powerful the subsequent muscle contraction will be because if it lasts too long, the energy stored is lost as heat and the stretch reflex cannot contribute to the proceeding movement.

The third and final phase is the actual muscle contraction. In practice, this is the movement the athlete desires.

This sequence of three phases is called the **stretch-shortening cycle**. In fact, plyometrics could also be called stretch-shortening cycle exercises.

<b>Phase</b>	<b>Action</b>	<b>Physiological event</b>
1: Eccentric	Stretch antagonist muscle	Elastic energy is stored in the SEC. Muscle spindles are stimulated
2: Amortisation	Pause	Signals transmitted to agonist muscle groups.
3: Concentric	Shortening of agonist muscle fibres	Elastic energy is released from the SEC. Agonist muscle group stimulated

## **Plyometrics in Practice**

When applying the underlying theory behind plyometrics in practice there are several things that need to be considered:

### **Intensity**

In plyometrics intensity relates the amount of stress placed on involved muscles, connective tissues and joints. The greater the energy translated to the body the higher the intensity of an exercise. Consider the difference in intensity for jumping up onto a box compared to jumping down from it – which is more intense?

### **Recovery**

Recovery must be substantial for optimal performance. Recommendations are 10s between reps and 2-3min between sets. In reality many athletes use longer.

### **Surface**

When selecting the surface to use for plyometric training a trade off must be made between safety and performance. The harder the surface the shorter the ground contact can be but “damage” is done to the athlete’s body.

### **Mode**

Exercises can be performed for both the upper and lower body using a variety of methods including jumping, bounding, weight training and medicine ball work.

## References

- Hill AV. (1970) First and last experiments in muscle mechanics. Cambridge: University Press
- Baechle. T.R., Earle. R.W., (2000) Essentials of Strength and Conditioning (2nd ed) Human Kinetics, Champaign Illinois.

## Current World Records

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### Men

Discipline	Perf	Athlete	Nat
100 Metres	9.69	Usain Bolt	 JAM
200 Metres	19.30	Usain Bolt	 JAM
400 Metres	43.18	Michael Johnson	 USA
800 Metres	1:41.11	Wilson Kipketer	 DEN
1000 Metres	2:11.96	Noah Ngeny	 KEN
1500 Metres	3:26.00	Hicham El Guerrouj	 MAR
5000 Metres	12:37.35	Kenenisa Bekele	 ETH
10,000 Metres	26:17.53	Kenenisa Bekele	 ETH
Marathon	2:03:59	Haile Gebrselassie	 ETH
3000 Metres Steeplechase	7:53.63	Saif Saaeed Shaheen	 QAT
110 Metres Hurdles	12.87	Dayron Robles	 CUB
400 Metres Hurdles	46.78	Kevin Young	 USA
High Jump	2.45	Javier Sotomayor	 CUB
Pole Vault	6.14	Sergey Bubka	 UKR
Long Jump	8.95	Mike Powell	 USA
Triple Jump	18.29	Jonathan Edwards	 GBR
Shot Put	23.12	Randy Barnes	 USA
Discus Throw	74.08	Jürgen Schult	 GDR
Hammer Throw	86.74	Yuriy Sedykh	 URS
Javelin Throw	98.48	Jan Zelezný	 CZE
Decathlon	9026	Roman Šebrle	 CZE
20 Kilometres Race Walk	1:17:16	Vladimir Kanaykin	 RUS
50 Kilometres Race Walk	3:34:14	Denis Nizhegorodov	 RUS
4x100 Metres Relay	37.10	Jamaica (Powell Asafa, Carter Nesta, Frater Michael, Bolt Usain)	 JAM
4x400 Metres Relay	2:54.29	United States (Valmon Andrew, Watts Quincy, Reynolds Harry, Johnson Michael)	 USA

## Women

Discipline	Perf	Athlete	Nat
100 Metres	10.49	Florence Griffith-Joyner	USA
200 Metres	21.34	Florence Griffith-Joyner	USA
400 Metres	47.60	Marita Koch	GDR
800 Metres	1:53.28	Jarmila Kratochvílová	TCH
1500 Metres	3:50.46	Yunxia Qu	CHN
5000 Metres	14:11.15	Tirunesh Dibaba	ETH
10,000 Metres	29:31.78	Junxia Wang	CHN
Marathon	2:15:25	Paula Radcliffe	GBR
3000 Metres Steeplechase	8:58.81	Gulnara Galkina	RUS
100 Metres Hurdles	12.21	Yordanka Donkova	BUL
400 Metres Hurdles	52.34	Yuliya Pechenkina	RUS
High Jump	2.09	Stefka Kostadinova	BUL
Pole Vault	5.05	Elena Isinbaeva	RUS
Long Jump	7.52	Galina Chistyakova	URS
Triple Jump	15.50	Inessa Kravets	UKR
Shot Put	22.63	Natalya Lisovskaya	URS
Discus Throw	76.80	Gabriele Reinsch	GDR
Hammer Throw	77.80	Tatyana Lysenko	RUS
Javelin Throw	72.28	Barbora Špotáková	CZE
Heptathlon	7291	Jackie Joyner-Kersey	USA
20 Kilometres Race Walk	1:25:41	Olimpiada Ivanova	RUS
4x100 Metres Relay	41.37	German Democratic Republic (Göhr Marlies, Gladisch-Möller Silke, Rieger-Günther Sabine, Auerswald- Lange Ingrid)	GDR
4x400 Metres Relay	3:15.17	USSR (Nazarova Olga V., Ledovskaya Tatyana, Vladykina-Bryzgina Olga, Kulchunova- Pinigina Mariya)	URS

# **Sprint Training Notes**

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## **Block Starts**

See attached diagram at end of this document.

## **The Running Gait Cycle**

See attached diagram at end of this document.

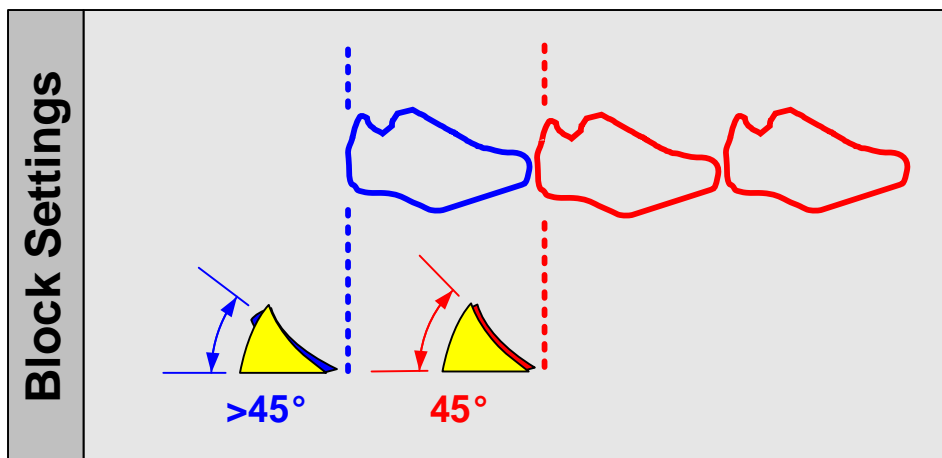
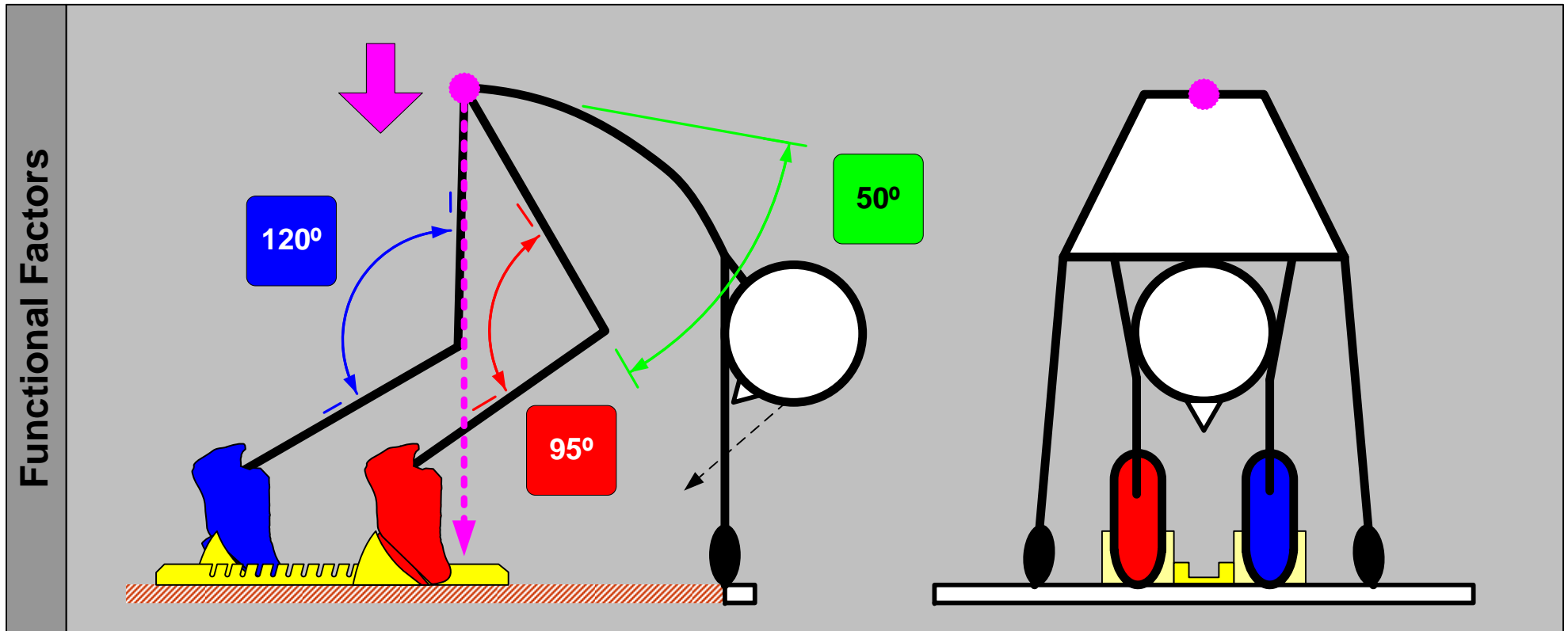
## **100m Race Model**

See attached diagram at end of this document.

## **Relays**

See attached relay manual at the end of this document.

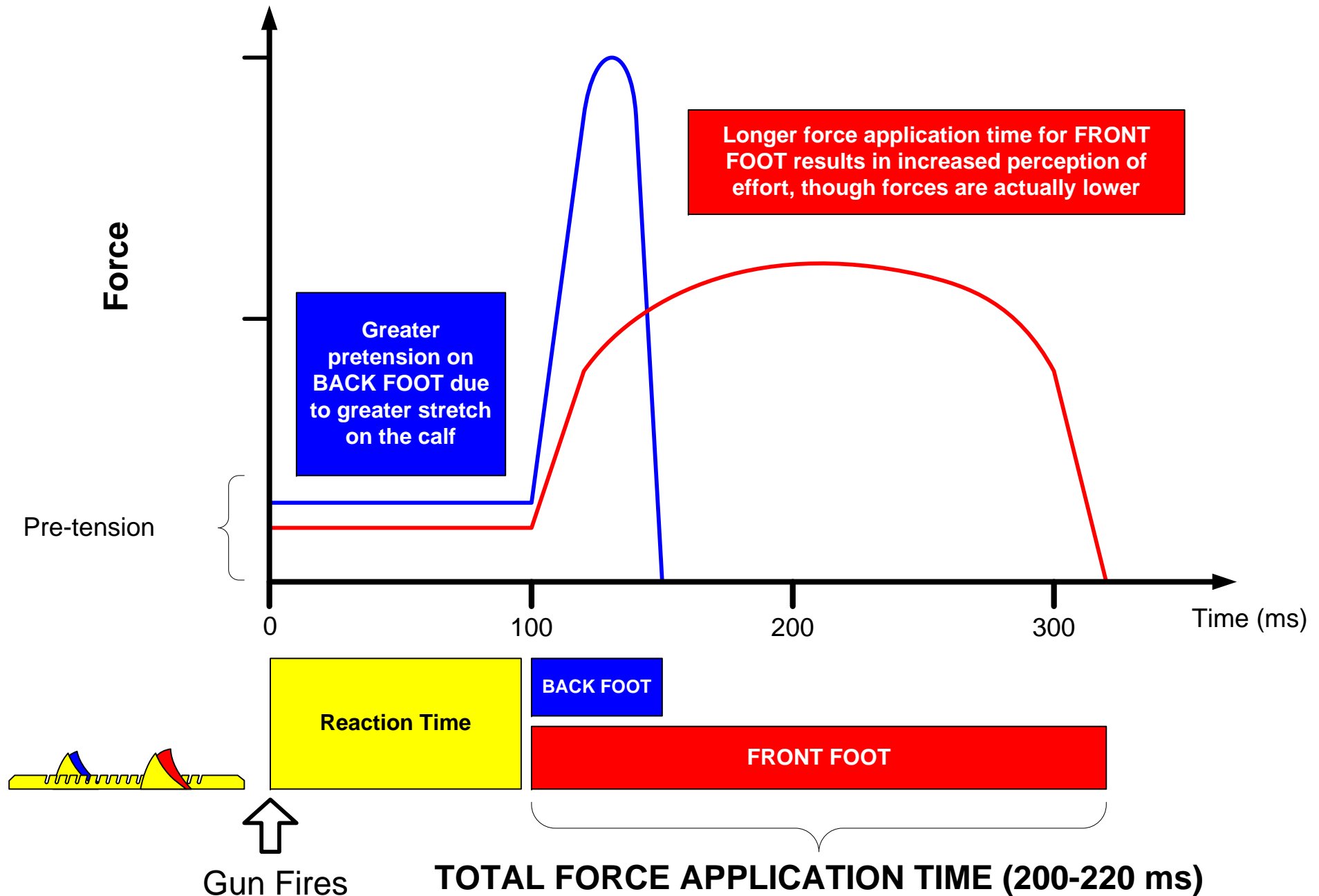
# Model Parameters - Developmental Athlete



**Athlete's Posture**

1. Hand Spacing	Directly under shoulders
2. Shoulder Position	Directly over the start line
3. Hip Height	As high as possible
4. Horizontal Hip Position	Directly over toes
5. Head Position	In line with spine

# Block Clearance – Forces Applied to the Blocks



BACKSIDE

FRONTSIDE

Flight Phase

Recovery

Residual

Ground Preparation

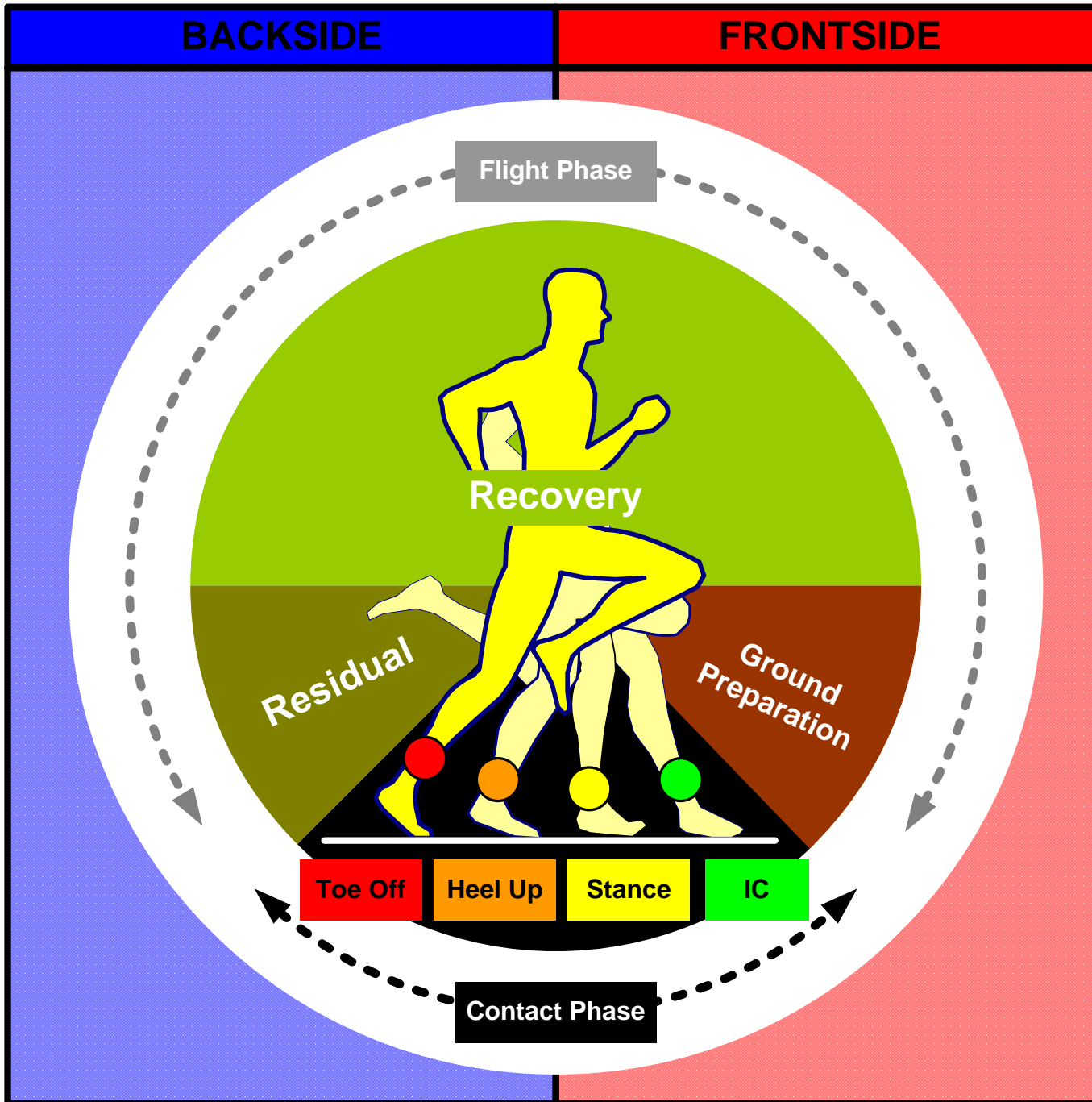
Toe Off

Heel Up

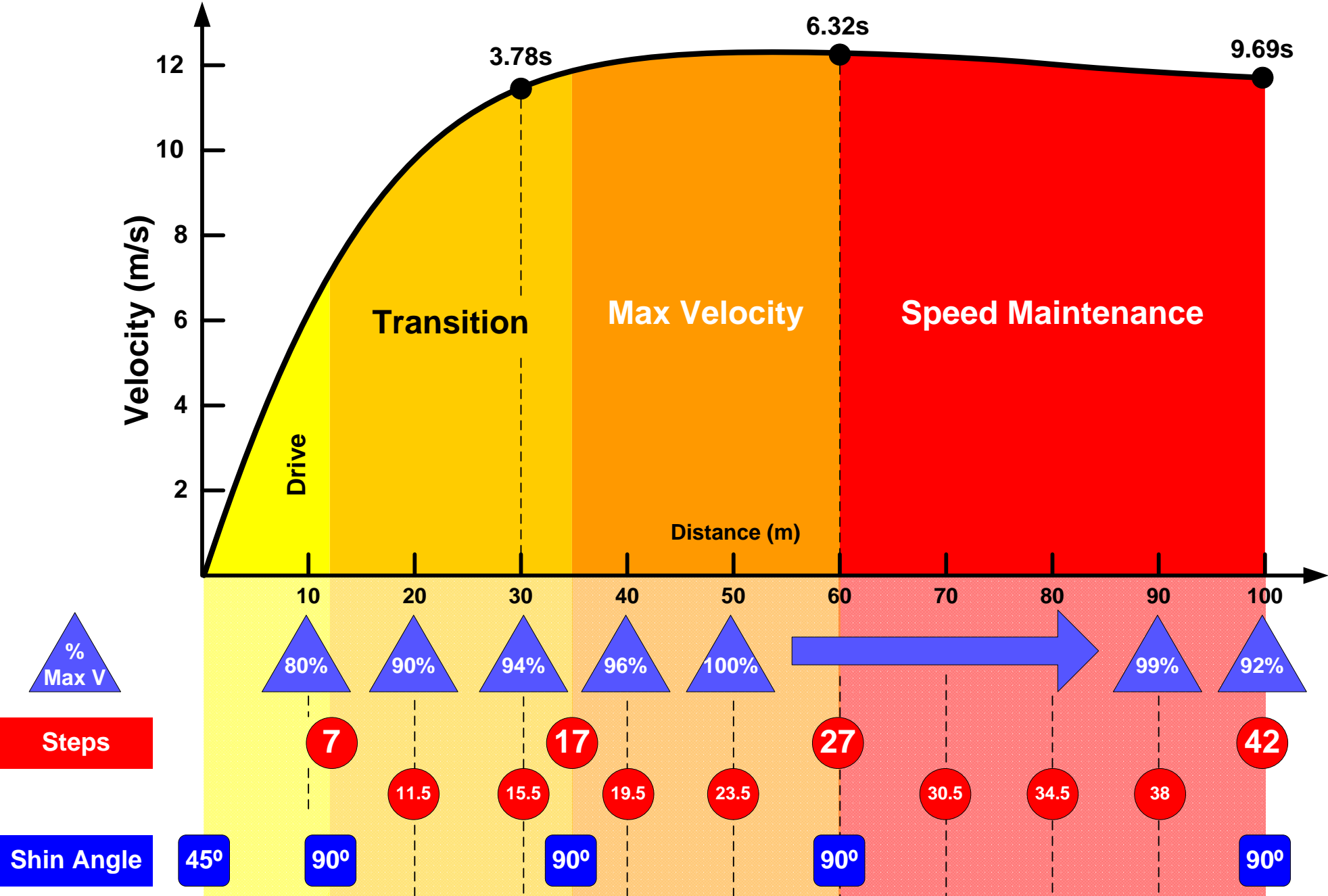
Stance

IC

Contact Phase



# 100m Race Model based on Usain Bolt 9.69s Beijing, 2008



# ***Practical Fundamentals of Relay Running***

*The purpose of this paper is to describe and outline the rationale for technique of baton exchange. In addition, some useful drills are included that will facilitate the development of efficient baton exchange skills.*

## **General concepts associated with 4 x 100m relay racing**

### **Lane discipline**

- This refers to the importance of runners keeping to the correct side of the lane preventing collisions, enhancing the quality and speed of the baton during the exchange zone.
- The first and third leg runners should run on the inside of the lane, even after exchanging the baton. Receive and race with the baton in the right hand.
- The second and fourth leg runners should run on the outside of the lane, even after exchanging the baton. Receive and race with the baton in the left hand.
- At all times during the 4 x 100m race the baton should be in the middle of the lane.

### **Exchange or Free distance**

- This refers to the distance between the incoming runner and the outgoing runner when the baton is exchanged.
- The greater the distance between the two runners when the baton is exchanged, the faster the baton gets to the finish line.

### **Racing your partner**

- To promote the fact that the 4 x 100m is about the speed of the baton, and in particular the speed of the baton through the exchange zone, the concept of racing your partner through the exchange zone is a useful strategy.
- The goal of the incoming runner is to race the outgoing runner to the end of the exchange zone.
- The goal of the outgoing runner is to run away from the incoming runner.

## **What is the best combination?**

The selection of the best team may on occasions require some runners to race in an unfamiliar leg or one in which they have had little experience. In school teams the common practice has been to place the fastest runner on last leg. Often this is not the best position for the fastest runner. The tactics employed in selecting the most appropriate team combination is contingent on the mix of individual talent within the team.

A couple of points to consider when training for a team:

- Athletes should practice in various positions, especially in training, and low level competitions
- Some athletes are often superior on a straight and others superior running the bend and others are equally as good on either the bend or the straight. As a general rule athletes should train for either the bend legs (first & third) or the straight legs (second and fourth), although it is suggested that athletes practice and compete in all legs.
- The constraints of time necessitate that the personal coach should conduct much of the training for relays.

### **Responsibilities of the incoming runner:**

- The responsibility for the exchange is with the incoming runner
- Ensure you are in the correct lane
- Know where the exchange zone is and where to pass the baton in the zone
- Lane discipline
- Race the outgoing runner to the end of the exchange zone - maintain speed through zone
- Call for target (e.g., hand, stick)
- Wait for the hand (Le., target) to present
- Spot the target & push the baton into the hand firmly (approx. 1.5-2m between the incoming and outgoing runner) Reach arm forward and pass the baton into outstretched hand with wrist snap- this will "close" the receiving hand around the baton.
- Maintain efficient running form.
- Know emergency command (e. g., WAIT!)
- The incoming runner -the passer- should not anticipate the pass nor slow down to make the pass.
- Stay in lane until all traffic has passed.

***The responsibility for the completion of the exchange all belongs to the incoming runner. If enough practice is spent working on the fundamentals of the exchange both the incoming and outgoing runners will have the confidence that is necessary for a successful exchange.***

***The incoming runner plays a vital role in providing feedback to the outgoing runner. This is because the outgoing runner cannot see what his/her hand is doing with his/her hand (non-visual baton change). If the hand is not steady, is not flat, is too low/high, and/or poor lane disciplines it is the responsibility of the incoming runner to provide feedback to the outgoing runner.***

### **Responsibilities of outgoing runner/receiver:**

- Locate your lane and exchange zone, correctly placing your check mark as soon as permissible; clear the lane of all other check marks
- Lane discipline
- Remain focused and be patient
- Do not panic. Do not anticipate.
- Take same starting positions each time; a consistent acceleration pattern is imperative.
- Be aware of incoming runner but concentrate on GO mark.
- Leave when some - predetermined -part of incoming runner crosses GO mark each time.
- Get head and eyes forward and explode off the mark simultaneously.
- Try to run away from the incoming runner (must try to beat the exchange every time in practice to enable coach to make proper adjustments). The athlete must maximise acceleration out of the exchange zone.

### **The exchange:**

1. Respond immediately to the command of the incoming athlete
2. Present the incoming runner with a high, flat, steady target and wait for the baton to be passed
3. Do not look back.
4. Maintain focus and do not be distracted by what other teams may do around you

### **Where the check mark should be placed**

Competitors are allowed to place one check mark on the track within the designated lane. Ensure that you can clearly sight the check mark from your starting position and that competitors in the adjoining lane do not impede your vision.

An accurate check mark can only be established if the both the incoming and outgoing runners sprint at consistent speeds. This necessitates regular practice in competitions. Adjustments are best made after evaluating the competitive performance.

### **Take off & Acceleration**

The outgoing runner must learn to be patient. Taking off too early or hesitating can lead to disaster. The outgoing runner should be in the take off position before the incoming runner reaches the "go" mark. Once begun, the acceleration to full speed of the outgoing runner must be consistent.

#### **Changing acceleration patterns leads to timing problems.**

Make sure that the outgoing runner keeps the hand steady. Never reach for the baton.

Always run through the zone remaining in your lane. Stepping out of your lane even after the exchange is cause for disqualification.

**Remember this event must be a team effort! Perfect practice makes permanent!!**

### **Starting positions**

The starting position for the outgoing runners is inside the acceleration line. Touching the line with your foot will lead to disqualification. Ensure that no part of your foot touches that line before or during your take-off.

The starting position is one of the most critical aspects of relays. The outgoing runner is required to accelerate both consistently and effectively.

There are two important aims/considerations for the adoption of an effective starting position.

- **Start explosively with an effective acceleration; and**
- **Clearly sight both the check mark and incoming runner**

### **The areas of skill to be developed are:**

- The "*free distance*" between incoming runner and the outgoing runner varies according to the pass used. Every time athletes practise together, the giver must judge and then apply that distance. The incoming runner is the only person who can assess the relevant space needed - so must do so, in all sub-maximal drills and fast practises.
- The idea is to give the baton as soon as the outgoing runner is in the position to take it. Some athletes take two strides to get their hand back; others put it back straight away. The "incoming runner" - once he knows the preference of the outgoing runner will then call early for a "delayed" hand and late for an "early hand." The call is timed according to the receiver's speed of hand placement. Plus the giver's assessment of relevant space. It is vital that the receiver is given the top half of the baton to facilitate a similar change at the next exchange zone.
- *Lane discipline* is critical. In other words, if you run the curve keep to the inside of your lane. When running the straight - keep to the outside.
- *Passing the baton* although already at full speed, the incoming runner must work to attack all the way to the end of the exchange zone. The runner must have the mental picture of sprinting past the outgoing runner who is accelerating maximally out of the exchange zone. Before reaching the end of the zone the baton must be exchanged.
- *Receiving the baton:* For the push pass: extend arm back naturally leading with the elbow. Position the hand vertically, the thumb is pointing down towards the ground. The hand should be flat.

**All of these skills are developed through constant rehearsal and contact by both the developing athlete and experienced athlete.**

### **Relay Drills for improving the baton exchange**

### **1. Standing hand slap & baton exchange**

Athletes standing in a lane - respecting lane discipline - stand swinging their arms forwards and backwards as if they are running. Standing with one foot forward is suggested to improve the balance of the runners. When the hand is presented the incoming runner pushes his hand into the palm of the outgoing runner.

#### Aims:

- familiarization with the sequence of call - present target - exchange
- presentation of a high, flat and steady target; palm facing incoming runner

#### Variations:

- same drill jogging
- add a baton (standing)
- jogging with baton

### **2. Check mark drill**

Roll a ball at varying speeds across the check mark. The outgoing runner accelerates from a variety of starting positions or practices his preferred starting position

#### Aims:

- consistent and accurate take-off by outgoing runner
- practice varying starting positions
- outgoing runner matching the varying speeds of the incoming runner

#### Variations:

- Keep check mark at a constant distance (e.g., 25 steps - senior men) and outgoing runner responds by matching the speed of the incoming runner by the first half, middle, or second half the box/exchange zone. Practice only up to 80% of max speed. Outgoing runner - runs approx. 40m.
- Place check mark at 28-30 steps (senior men); incoming runner builds up to 90% of max speed over 40m. Outgoing runner runs approx. 40m.

### **3. Racing Through the Zone (no baton, no hand-slap)**

The incoming runner starts about 50m down the track. The outgoing runner takes off when the incoming runner hits the check mark.

The objective is to see who can hit the end of the zone first. This drill teaches the runners to attack the zone and keep in the proper relationship with each other while in the zone. As coach, you can observe how well the go mark is working for a pair of runners.

#### Aims:

- fast baton speed through the exchange zone
- consistent and accurate take-off by outgoing runner
- establishing a check mark
- lane discipline
- exchange/free distance
- baton exchange technique

#### Variations:

- incoming runner runs with the baton, but does not exchange the baton
- as above but passing the baton
- as above but with opposition

## CORRECTION OF FAULTS

The main task in basic relay training is to develop fast changeovers. Speed losses in baton handling must be kept to a minimum and it is usually the outgoing runner that influences the baton speed more than the incoming runner. It is therefore important in training to concentrate on the action of the outgoing runner. Incoming runners can be, and often are, responsible for poor changeovers, but outgoing runners are more frequently subject to faults and corrections. Here are the list some of the most common relay faults with suggestions for causes and remedies:

### THE APPROACH

#### **Fault 1: The baton is handed over too early. The incoming runner catches his partner before the latter has reached optimal speed.**

**Reasons:**

- Lack of understanding of changeover procedures.
- The check mark is placed too close to the changeover zone.
- The outgoing runner reacts poorly to the optimal signal that the incoming runner has reached the check mark.
- The outgoing runner lacks concentration or misjudges the position of the incoming partner.

**Corrections:**

- Explanation of changeover procedures, stressing the importance of baton speed and acceleration of the outgoing runner.
- Adjustment of the check mark to allow sufficient time for the outgoing runner to reach optimal speed. This can only be achieved when the changeover takes place in the second half of the zone.

#### **Fault 2: The outgoing runner has to slow down in order to receive the baton**

**Reasons:**

- The check mark is placed too far from the changeover zone.
- The outgoing runner over reacts and anticipates the optical signal that the incoming runner has reached the check mark & lacks concentration.
- The speed of the incoming runner in the final stages has been overestimated.

**Corrections:**

- Adjustment of the check mark closer to the changeover zone.
- Improvement of concentration by stressing the need to observe the incoming runner and continuous practice with different partners.

#### **Fault 3: Lack of full acceleration by the outgoing runner [A common and frequent fault that needs special attention]**

**Reasons:**

- Lack of understanding of the correct movement pattern.
- The start does not correspond to sprint action. Hips, the back leg and trunk are not turned into the direction of the run.
- The athlete is not looking back properly.
- The outgoing runner is "frightened" that the incoming runner will not reach him.
- Looking around after the start.
- Moving the arm back to receive the baton too soon after the start.

**Corrections:**

- Development of the correct movement pattern by continuous practice with and without the baton.

### THE CHANGEOVER

**Fault 1: Loss of speed of the incoming runner who fails to reach the outgoing partner.**

**Reasons:**

- Lack of maximum performance by the incoming runner.
- Onset of fatigue in the incoming runner.

**Corrections:**

- Changing of the running order to reduce the distance to athletes lacking speed endurance.
- Improvement of the direct changeover action, keeping in mind that the incoming runner has the whole procedures in his sight and should act according to the need.
- Changeover practice without the baton.

**Fault 2: Looking or turning around, just before, or during the passing of the baton.**

**Reasons:**

- Lack of confidence by the outgoing runner.
- Wrong position of the receiver's hand.

**Corrections:**

- Explanation of the correct changeover procedures.
- Changeover practices with and without the baton.

**Fault 3: The outgoing runner brings back his arm to receive the baton before the signal from the incoming runner.**

**Reasons:**

- Wrong understanding of the changeover procedures.
- Lack of confidence in the three-stride method: signal - arm back - baton change.

**Corrections:**

- Changeover practice without the baton. & Drills of the three-stride method at slow and medium speed.

**Fault 4: The incoming runner signals too early and runs with the baton arm stretched out for several strides.**

**Reasons:**

- Wrong understanding of the changeover procedures.
- Lack of confidence in the three-stride method: signal - arm forward-baton change.

**Corrections:**

- Changeover practice without the baton.
- Drills of the three-stride method at slow and medium speed.

## **Example Training program**

### **PART I:**

*Team/Group warm up: walking-jogging drills with relay baton*

- a) Standing hand slap
- b) Sanding with baton
- c) Jogging with baton

- familiarization with the sequence of call - present target - exchange
- presentation of a high, flat and steady target; palm facing incoming runner

### **PART II:**

*Individual warm up (including: static stretching/dynamic stretching/technical run's etc) performed individually by athletes by their personal warm up procedure).*

**All athletes should be ready for main part (Part III) of training session at the same agreed time.**

### **PART III:**

#### **1. Exchanges: first to second & third to fourth. On the bend/ off the bend:**

##### **a) Relay Start practice: 3-4 x 20-30m**

Important consideration for effective starting position that enables the outgoing runner:

- to start explosively with an effective acceleration; and
- to clearly sight both the check mark and incoming runner

##### **b) Racing Through the Zone (no baton, no hand-slap): 2 x 40m outgoing & 2 x 60m incoming**

The incoming runner starts about 50m down the track. The outgoing runner takes off when the incoming runner hits the go mark. The objective is to see who can hit the end of the zone first. This drill teaches the runners to attack the zone and keep in the proper relationship with each other while in the zone. Helps to observe how well the go mark is working for a pair of runners.

##### **c) Exchange :**

##### **4 x 40m outgoing and 4 x 60m incoming**

- fast baton speed through the exchange zone
- consistent and accurate take-off by outgoing runner
- establishing a check mark
- lane discipline
- exchange/free distance
- baton exchange technique

#### **2. Exchange: second to third. On the straight into the bend:**

##### **a) Relay Start practice: 2 x 20-30m**

##### **b) Racing Through the Zone (no baton): 1x 40/60m**

##### **c) Exchange : 3-4 x 40/60m**

## 'Push Pass' - method of baton exchange

### Why push pass?

1. The **forward** push of the baton from the incoming runner is more **natural** than either sweeping the hand down or sweeping the hand up.
2. The **shortest distance** is in a straight line. In comparison with the up sweep and down sweep methods, the push pass method is superior in achieving that aim.
3. Sighting the hand of the outgoing runner by the incoming runner is difficult especially when the speed of the runners is around 20 mph. The up sweep and the down sweep provide a smaller target for incoming runner to sight. The horizontal hand position of the push pass methods provides a **larger target** for incoming runner to sight (Oberste, 1979, Vonstein, 1990). The horizontal hand position presents as a **flat target**.
4. The **horizontal** hand position used in the push pass is more **natural** compared with the extended arm/hand position adopted in the down sweep (Oberste, 1979)
5. The push pass like the down sweep facilitates '**free distance**' at baton exchange.

### How to execute the push pass?

The push pass has similarities to both the up sweep and down sweep methods, and is designed to maximise the speed of the exchange and improve its accuracy.

There are two key differences in the push pass compared to other methods. First, the incoming runner passes the baton forwards in the straight line towards the target hand. Second, the hand of the receiver can be held in a vertical position positioned, with superior sighting of the target that provides for the incoming runner.

***For the incoming runner**, the push pass method requires the incoming runner to extend his/her arm forward in a straight line towards the hand of the receiver (outgoing runner). The shortest distance is in a straight line. Eyes are focused on the hand of the receiver, even if the hand is not steady.*

*Coaching cue: Push/Push –press/Push-snap*

***For the outgoing runner/receiver**, extend arm back naturally leading with the elbow. Position the hand vertically, such that the thumb is pointing down towards the ground and the fingers are horizontally pointing out/away from the body at approximately shoulder height. The hand should be flat and as large as possible without being too stiff/rigid. A baton may bounce from a rigid hand. A soft hand upon being hit by the baton will respond quickly by grasping the baton through the reflexes.*

*Coaching cue: Thumb down, fingers out.*

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