DYNAMICS

If you have great talent, dynamics will improve it. If you have but a moderate ability it will supply its deficiency.

1. DYNAMICS

This relates to the branch of mechanics concerned with those forces which cause or affect the motion of the body in the delivery action.

2. TECHNIQUE

Technique should never be confused with flair or style. Flair and style are an unnecessary added action displayed in a conspicuous or ostentatious manner. Technique is the applied science which relates to the method of performance that helps the bowler to accomplish and perfect the delivery skill with the minimum amount of energy.

3. CONTENT

This section on technique encompasses the following dynamics;

4. BALANCE AND STABILITY

a. **Development:** The capacities of speed, power, strength, flexibility and coordination of the muscles by the central nervous system play a vital role in the delivery technique. The ability to accurately coordinate the timing and contraction strength of the skeletal muscles is essential in the related capacities of balance and stability. Balance and stability rely primarily on the development of neuromuscular control and when both are modified by the physical structure of the bowler it will in turn affect the normal balance technique required in the delivery action

b. **Factors:** All activities, whether stationary or mobile require balance. For example bowlers require static balance when in the stance position and dynamic balance whilst in motion and the development of this capacity is essential in the delivery technique. High levels of balance in the stance position, delivery action and the follow-through posture position are dependent on the following factors;

(1) **Base;** when in the stance position the area of the base support should be maximised e.g. positioning the feet to create a stable platform from which to project the jack or bowl

(2) **Centre of Gravity;** a comfortable upright stance position kept within its base support allows the body to move forward with ease of movement.

(3) **Mass weight;** this applies to the distribution of upper mass body weight over both feet (static balance)

(4) **Minimise;** Minimising time spent in the static balance position

(5) **Distribution;** Counter balancing the distribution of body weight in the delivery action e.g. the precise timing and coordination of the forward body movement

(6) **Posture position;** this is the collimation of bringing the body alignment into the line of sight. which involves the correct placement of the lead foot with 70 to 90% of body weight over it and the delivery hand coming up to the line of sight

c. **The stance position:** Placing the feet close together in the stance position on the mat will creates a narrow unstable base for balance. It is better to take up a wide but comfortable position of the feet, not too wide and not too close, knees flexed but not bent, feet flat on the ground surface not on the balls of the feet, all these points aids the static balance position. Thus the area of the base of support is maximized within the ability of the performer to control their posture. Obviously, an exaggerated base of support caused by the feet being positioned too far apart can restrict the performance of subsequent movements such as the forward direction of movement, alignment and the length of the delivery.

d. **The static balance position:** To obtain the approximate position of the feet for static balance and stability, observe the spread position of your feet each time you stop walking. The feet will automatically take up a comfortably position for static balance, The width will differ slightly according to the body mass, normally about 10 to 20 cm apart.

e. **Resistance:** If the centre of gravity is kept low and within the base of support, it is difficult for the bowler to move the body freely forward e.g. a crouched position. If this is combined

with a very wide base of support of the feet it will makes it difficult for the bowler to shift the line of gravity outside this base. If the bowler achieves this and the forward movement takes place, then balance is lost and the supporting limbs must move sideways or at an angle to avoid a fall. Furthermore, a bowler's inertia, or resistance to motion is determined by their body mass.

f. Common inconsistencies: If the bowlers commence the delivery action with a crouched position and a narrow foot base the following cause and effect will take place to correct the body centre of gravity with the following common inconsistencies;

(1) When the bowler steps forward the foot will automatically be placed alongside or over the centre of the alignment to form a narrow or unstable base,

(2) As the body weight moves forward over the release position, the delivery side hip will drop and the knee of the rear leg will tuck incorrectly behind the lower calf of the front leg. The rear knee will take up a different position with each delivery

(3) The head will tilt and the delivery arm shoulder will drop to one side and veer away from the alignment

(4) The hips will move to the opposite side to counter the unbalanced action

(5) The delivery arm hand will finish across the centre line of the alignment

(6) The bowl may skid to one side at the point of release

(7) Observing from the rear; the spinal column and legs will form an S-shape which in turn places stress on the neck, shoulder, lower back, both knees and ankles

(8) Bowls will have a tendency to be delivered off course when most vitally needed.

g. The delivery action: During the delivery the dynamic nature of the movement imposes a centrifugal force on the body. This addition of external force or load is caused by the distribution of body weight and the weight of the bowl in the pendulum swing. However, slight adjustment to the bowler's posture may be required throughout the execution of this skill as the external force varies in magnitude and direction. If the direction of an external force is known, as described above, bowlers can be advised to widen their base and displace their centre of gravity closer to the edge of the base of support nearest to the external force in order to enhance stability. The edge of that base support being the placement of the foot on the ground surface directly towards the focal point, followed by the forward swing of the pendulum arm towards the same point for counter balance and alignment. Therefore the application of the initial stepping movement towards a directional focus point and the precise

alignment in the follow-through is required to maintain dynamic balance, which is also reliant upon timing and a well developed and coordinated skeletal movement.

h. Senses: The control of skeletal muscle activity is reliant upon the supply of information from certain senses receptors within the body i.e. the senses of sight, hearing (the vestibular system), touch and the correct interpretation of their signals, so that an appropriate movement response is initiated by the brain. With respect to balance or postural control the senses which provide the information are as follows;

(1) **Visual;** the eyes provide information on the relative spatial location of objects in the field of view such as direction, alignment and length.

(2) **Vestibular system;** the inner ear provides the perception of movement of the head and body through the semicircular canals structure which indicates balance, either static, or dynamic movement i.e. forward, backward, sideways, upward or downward.

(3) **Kinaesthetic;** the sense of touch provides information regarding the relative location of one body part to another, the position of the body in space and an awareness of body movements e.g. leverage of the arms, legs and distribution of body weight.

i. Critical elements: Loss of direction and balance is a common occurrence with most bowlers. The key elements of good direction and balance are keeping the eyes focused on the aiming point, maintaining the forward momentum with timing, direction, and body alignment. During the delivery these critical elements are converged towards the aiming point and should any error of balance occur it can be seen and felt ***(see Diagram 1. Direction and Balance)***

j. Timing and convergence: Good balance is attained in the delivery action if the following three areas are adhered to;

(1) **Direction elements;**

(a) The eyes remain focused on the aiming point throughout the delivery

(b) The forward step is taken towards the aiming point

(c) The jack or bowl is delivered towards the aiming point

(2) **Momentum with timing;** the three areas of timing must be maintained e.g. breathing, the forward step and back swing, and a consistent ratio of the backward and forward swing of the delivery arm.

(3) **Alignment;** the bowl or jack must be initially aligned towards the aiming point. The delivery arm hand must swing back and forward towards the aiming point. The delivery hand must finish correctly aligned with eye, hand and aiming point alignment

k. Posture and follow-through: The following points for loss of balance can be felt and seen by the bowler in the delivery action and final posture position;

(1) Felt in delivery action;

(a) There is a slow back swing and a rapid forward swing e.g. bowl will feel heavy

(b) There is a double action in the delivery e.g. the forward step or delivery arm is jerky or both with lack of coordination

(c) The backward and forward swing of the delivery arm will strike the hip area as it passes

(d) The forward step is too long e.g. stepping forward faster then required.

(2) Seen in posture position;

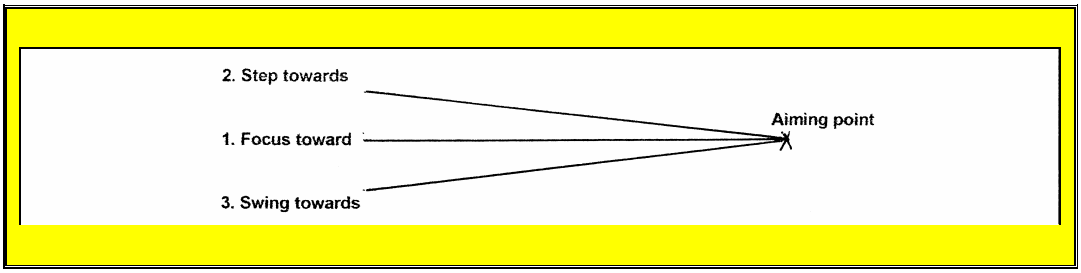
(a) The delivery hand alignment is not seen at approximately 30 cm below the line of sight in the peripheral vision

(b) The delivery hand finishes across, wide or above the line of sight

(c) The delivery hand is not seen at all

l. Stability: The key to stability in the delivery action revolves around the aiming point as follows; the eyes must focus on it throughout the delivery, the step forward with the lead foot must be taken towards it and the forward swing of the delivery arm must swing towards it. These three dimensions counter balance the forward and side body movement.

Diagram 1: Direction and Balance



5. FOCUSING

a. Visual perception: Research has shown that what we see is influenced by what our mind expects to see. There is a feed back loop that allows the mind to alter visual perception; even suppressing complete images, or to fit with its interpretation of events. In the delivery technique the brain is fed incomplete or ambiguous snippets of information because; bowlers are physically moving, lighting is poor, glare is reflected from the green surface, objects are obscured, or the bowler is concentrating on something else e.g. what we see,

hear, touch, smell, taste or reactions from our inner emotions. Our mind is constantly filling in the gaps and constructing its best guess of what is out there and the view it provides us might be rather more subjective than we would expect. Experiments show that many bowlers have two very different, incompatible images, one in each eye. This intricate interpretation occurs deep inside the mind, at a late stage of visual processing, long after information from the two eyes has been combined. If the eyes move the mind simply flips between both images and many bowlers see one picture than the other, consequently concentration with both eyes on a single image is lost,

b. Eye movement: We are not normally conscious of our eye movements, if you observe many bowlers in the stance position and delivery action, you will see that they move their eyes in different directions in a systematic way depending on how they are thinking. Neurological studies and Human Performance Research has shown that eye movement both laterally and vertically are associated with activating different parts of the brain which control our senses such as sight, hearing, touch/feeling, smell and taste ***(emotions are also included in this category)***. In bowls, these senses, if not controlled, affect our mental and physical ability in maintaining concentration, balance, the forward body direction, alignment and length of the delivery.

c. Control: The key to controlling and improving quality of work, effort levels and self-satisfaction is training the eyes to remain focused on an aiming point prior to stepping on the mat and throughout the delivery. The application of a focal point controls what you think about, converges your senses and body movement towards a central axis to determine alignment and the sensitivity for judging length. Should the eyes be distracted from the aiming point when taking up the stance or during delivery, then concentration, balance, the forward body direction, alignment and length will be lost.

6. TIMING AND COORDINATION

Principle: The following timing and coordination instruction is based on the principle that the body rotating steadily along an axis will tend to resist change in direction of the axis, maintain equilibrium, determines direction and leverage. It involves the respiratory system, distribution of body weight, movement of the upper and lower limbs into a combined harmonious relation or action for economy of movement that facilitate a smooth delivery technique. These areas are as follows:

a. The respiratory system: Research has shown that the correct timing of breathing plays a very important part in the

delivery of a jack or bowl. It relaxes the stomach muscles, takes pressure off the spine, allows the body to bend forward freely and counters the upper body veering sideways. The respiratory timing is as follows;

(1) Timing; as the back-swing commences the bowler breathes in with the speed of the delivery arm, breathes out with the forward swing and continues exhaling into the follow-through. This breathing action applies to all the shots, i.e. draw shot, on-shot, running or drive shot.

b. The forward step, arms and body momentum: The synchronisation of the initial movement of the limbs and distribution of body weight gives the maximum power force to facilitate a smooth delivery with economy of movement and determines the amount of leverage applied at the point of release of the jack or bowl. This is as follows;

(1) Initial timing; the initial delivery action is commenced conjointly by;

(a) Inhale with the speed of the pendulum arm back swing

(b) Taking a normal walking step forward with the lead foot towards the aiming point in a heel and toe action,

(c) Lowering the delivery shoulder as the arm is withdrawn to the rear in a pendulum action

(d) Withdrawing the supporting arm and placing the hand on the knee area of the forward leg, or withdrawing the arm perpendicular to the side

(e) Bending the upper body forward from the hips towards the aiming point,

(f) Bending both knees to lower the body height

(2) In course timing; during the forward delivery action the following timing and coordination is paramount;

(a) As the heel of the lead foot touches the ground the delivery arm should be at the end of the back swing and the supporting hand placed slightly above the knee of the leading leg in a backhand position**,**

(b) When the delivery arm swings forward towards the aiming point exhale with the speed of the delivery arm,

(c) During the forward swing of the delivery arm, lean forward to place 70 to 90 % of body weight over the lead foot at the point of release of bowl or jack,

(d) The bowl or jack is released when the forward swing of the delivery hand reaches a point

approximately 10 cm to the side of and 15 to 20 cm forward of the front foot.

c. The pendulum arm swing: To coordinate a smooth delivery action the backward and forward swing should be in a pendulum action e.g. the pendulum arm and spring action of a clock. When applied, the same speed back and same speed forward produces consistency in length. These critical features are explained as follows;

(1) Elastic energy; the timing of the backward and forward swing of the delivery arm plays a very important part in facilitating a smooth delivery and determining the amount of energy force applied at the release point of the bowl or jack. This applied force is known as elastic energy and is initiated at the end of the back swing by the shoulder muscles stretching and expanding in and around the ball and socket joint, which is the fulcrum of the arm swing. The pendulum timing operates best when both the delivery shoulder is slightly lowered to a natural comfortable position and the arm is withdrawn to the rear with the required power force. Elastic energy operates to its maximum when the upper body is bent forward with 70 to 90 percent of body weight over the front foot.

(2) Timing; the initial withdrawal thrust of the back-swing determines the speed of the forward swing and the consistent distance the jack or bowl is to travel e.g. hypothetically if the initial thrust of the back-swing is drawn back at a speed of 0 to 10, then the forward swing should be 0 to 10.

Note: If the timing is correct at the point of release, the sensation is that the jack or bowl feels light and will glide out of the hand.

(3) Adjustment of length; working on a 0 to 10 ratio; should the bowl be short of the required length then the thrust ratio is increased from 0 to 11. If it is long of the required length then the ratio is decreased from 0 to 9. For greater or lesser distances the thrust ratio is increased or decreased according to the distance the jack or bowl is to be delivered.

(4) Timing inconsistencies; if the pendulum action is commenced by letting the arm fall and not forcibly withdrawn, it will result in the backward action being too slow and the forward action too fast and will have the following effect;

(a) Feeling; the bowl will feel heavier than normal in the delivery which if not checked may develop into a short muscular back swing action

(b) Flicking action; this flicking may be a forward or turning action of the delivery hand and generally causes inconsistency of length and the jack or bowl to skid sideways. Although many bowlers develop this into a flair or style, it should be noted, that when the pressure of the game builds up, every now and then a bowl will be inconsistent in length or drift off the alignment course when it is most vitally needed

(c) Pushing action; this is a muscular action and there is little or no pendulum swing. The bowler will push the jack or bowl forward causing possible loss of balance and the bowler's head and upper body will swing off alignment

(d) Rapid forward acceleration; in the pendulum action the rapid forward acceleration of the delivery arm will also cause loss of balance and the head and upper body to swing off alignment

(e) Fatigue; during the game the bowler may feel weariness or lack of concentration caused from bodily and mental exertion

(f) Alignment and length; any or all of the above inconsistencies will cause loss of alignment and inconsistent delivery length

7. THE FOLLOW-THROUGH POSTURE

Embodiment: Holding the posture position at the end of the follow-through till the jack or bowl has travelled 14 to 15 metres along the green is probably the most neglected part of the delivery action. This is the observation point where the bowlers can see how precise their delivery action has been. It is the embodiment of the delivery where the whole action of alignment and length come together. Many bowlers believe and preach that once the bowl is released it is the end of the delivery action. This belief can be no further from the truth because the following important aspects of the delivery can be either seen or felt, e.g. how precisely the technique has been accomplished and the results of any inconsistencies that may have occurred. These inconsistencies are as follows:

a. Technique:

(1) Visual; the quality of precise technique can be seen when the delivery hand automatically swings up to its correct position for eye, hand and aiming point alignment (30cm below the line of sight)

(2) Feeling; the stability of the posture position will indicate a feeling of good balance and a smooth and effortless delivery will indicate the correct timing. This

will also be accompanied with a feeling that the bowl or jack has glided out of the hand.

b. Inconsistencies:

(1) Alignment; if the hand is not seen in the lower portion of the peripheral vision with hand, eye and aiming point alignment it will have the following effect;

(a) Poor body alignment and balance
(b) Bowlers are inclined to step sideways as they stand up
(c) Poor timing with inconsistency in length (caused by loss of balance)
(d) The pattern of bowls will be scattered right and left of the head
(e) The inability of the bowler to deliver another bowl along the same path
(f) The inability of the bowler to adjust or obtain the correct aiming line

(2) The round arm action; this can be observed when in the posture position and occurs through loss of balance or lack of delivery arm control resulting with the hand finishing across the aiming line. This round-arm action will cause the bowls to:

(a) Cut across the front of the head.
(b) Skid sideways at the point of release.
(c) Wobble along the delivery path.
(d) Be inconsistent along its delivery path under windy conditions

(3) The hook arm action; this can be observed when in the posture position and occurs through loss of balance or lack of delivery arm control resulting with the hand finishing away from the aiming line. This hook action is inclined to cause the bowl to;

(a) Track straight down the green
(b) Wobble along its path
(c) Come to rest wide of it objective
(d) Be erratic along its delivery path under windy conditions

8. EXCESSIVE TIME SPENT ON THE MAT

Aspects of Mental Training: The mat should only be used for a delivery platform i.e. Step onto the mat in the stance position with the delivery arm at the required height and after a momentary stance commence the delivery. All preliminary work such as checking the grip and locking the wrist, estimating the required angle and length, focusing the eyes etc. must be calculated and adjusted behind the mat. The following observations should be noted:

a. Concentration: Too much time spent on the mat can have the following disastrous effect on mental concentration;

(1) Repetitious checks; the mind will carry out repetitious and unnecessary checks such as the grip, feet position on the mat etc.

(2) Feelings; the inner feelings will take over and the bowler will begin to worry about unnecessary things

(3) Body senses; the body senses will not be under the bowler's control (no sense no feeling)

(4) Distractions; the mind will become aware of distracting sounds, movement and objects within the surroundings

(5) Moods; the inability to concentrate will cause some bowlers to change their mood e.g. irritation, anger, frustration etc.

(6) Body reaction; the time period in a static position can restrict the initial movement of the body, in particular from the crouch position. This lock down period will have the following reactions;

(a) Muscles will lock to support the body weight

(b) The body organs will slow down or speed up their functional process e.g. adjusting blood flow etc.

(c) The body is inclined to drift into a crouched position

(d) The weight of the bowl held out in front of the body by the delivery arm will cause strain on the back and shoulder muscles. This may appear later as arthritic symptoms

(e) Through lack of blood circulation, stiffness of the muscles occurs in the initial phase of the delivery action. A good example of this is after sitting in a lounge chair for a short period of time, lack of body movement makes it difficult to rise to a standing position.

9. CONTROL OF LENGTH

a. Focusing and Timing: The key to obtaining correct delivery length is controlling the movement of the eyes and coordinating the timing of body movement. This is done conjointly as follows:

(1) Eyes; focusing of the eyes on an aiming point controls your concentration and allows your body senses to work automatically.

(2) Timing; co-ordinating the timing of the arms, legs and the forward body momentum automatically controls the required leverage.

(3) Senses; your senses automatically govern the speed and length of the delivery.

b. **The arm withdrawal speed:** Learning to focus the eyes, timing the step and back swing and breathing is the simple part of the process. The thing to remember is that the withdrawal speed of the back swing controls the reaction speed of elastic energy at the shoulder e.g. same speed back same speed forward ***(refer to previous paragraph Timing & Coordination)***. Should you be short of length then increase the withdrawal speed of the back-swing. If it is long of the required length then reduce the withdrawal speed. You will know when you have the correct timing because the bowl will glide out of your hand and stop at the required length. It is also vital to remember that the speed of the green throughout the day will vary according to weather conditions. If this occurs then you must resist the temptation of pushing or increasing the speed of the forward swing, the trick is to regulate the withdrawal speed of the back swing.

c. **See and Feel:** The only thing for you to concentrate on is the aiming point and finishing with eye, hand and aiming point alignment, the rest is done automatically. When you check your alignment precision in the follow-through posture position you'll also notice if you have made any mistakes, "What you don't see you will certainly feel."

d. **Time on the mat:** Remember too much time spent on the mat allows the mind and eyes to wander. If this happens then you have lost your concentration

e. **Checking concentration:** The best position for the coach to check this is by standing in front of and to one side of the bowler. Make sure the eyes are focused just prior to standing on the mat. Should the eyes move in any direction; during the bowler's forward movement onto the mat, standing on the mat or the delivery, the concentration will be lost and their alignment and length will probably be in error

f. **Video Task:** An important part of the coach's task is teaching bowlers to concentrate their attention on the aiming point so that the internal senses will automatically control the delivery length. Coaches should remember that observing the timing of the delivery arm is best shown to the bowler through the use of the video. This may involve several video shots to get the message across. Training under supervision will teach the bowler to use the senses automatically to acquire the correct length

It should always be remembered that when bowlers lose;
Expert's look for the reason why,
novices blame the last thing they learn.

You're never too old to learn if you are wise enough to know; that forty is the old age of youth, fifty is the youth of old age, and at eighty you have a lot of youth in you to think about!