NATIONAL COACHING INSTITUTE

# Task 5

## Environmental Factors

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## WEATHER SUMMARY

The Central East Midget Development Team is comprised of boys aged fourteen and fifteen years old. The team is selected by coaches from elite high school and club players in the Toronto area. Over the course of thirteen weeks from late May to early August, the team will practice together and compete in games and tournaments to prepare for the Ontario Summer Games in Sudbury. The program bridges the Train to Train stage and the Train to Compete stages of the Long Term Athlete Development Program.

Players will be at risk of some discomfort due to the heat and humidity in Toronto and mild discomfort during the tournament in Sudbury (Weather Network Canada, n.d.).

| July Weather | Toronto                              | Sudbury                              |
|--------------|--------------------------------------|--------------------------------------|
| Activities   | practices, games, tournaments        | shootarounds, tournament             |
| Temperature  | daily average: 22.2°C                | daily average: <b>19.0°C</b>         |
|              | average high: <b>26.4°C</b>          | average high: 24.8°C                 |
|              | average low: 17.9°C                  | average low: 13.3°C                  |
| Humidity     | record Humidex: <b>42.9</b>          | record Humidex: <b>42.9</b>          |
| 5            | days with Humidex over 30: 16        | days with Humidex over 30: <b>9</b>  |
|              | days with Humidex over 35: 6         | days with Humidex over 35: <b>2</b>  |
|              | days with Humidex over 40: 2         | days with Humidex over 40: <b>0</b>  |
|              | mean Relative Humidity - 3:00pm: 53% | mean Relative Humidity - 3:00pm: 51% |

The team will be at the greatest risk of heat illness and dehydration during tournaments, when multiple competitions occur in a short time span. It is necessary to teach the inexperienced players how to perform in the heat and the importance of hydration.

## HEAT

When exposed to heat, athletes will initially experience increased core temperature, increased sweating, increased skin blood blow and vasodilation, and increased strain on the liver, kidneys, and central nervous system. High ambient temperature can exaggerate the heat stress from exercise (Plyley, Environmental Factors, 2006). These symptoms will negatively affect performance and may lead to heat illness after intense exposure.

#### INCREASED CORE TEMPERATURE

Core temperature can rise because of the environment or the contraction of muscles during exercise (Plyley, Environmental Factors, 2006). Individual tolerance for heat varies but most athletes will cease to exercise when core temperature reaches 40°C. Between 37°C and 40°C, cerebral blood flow and maximal voluntary muscular force output decrease with changes in brain wave activity and perceived exertion (American College of Sports Medicine, 2007, p. 557). As the temperature rises, fatigue sets in, sport-specific performance suffers, and decision-making becomes impaired.

Heat stress can be cumulative (when practices and competitions occur in short succession). Symptoms will gradually increase until the onset of heat exhaustion. Coaches should monitor the physical symptoms and hydration status of athletes to ensure that their health does not deteriorate during a camp or tournament.

Common heat illnesses are heat exhaustion and heat stroke. The path to Exertional Heat Stroke does not always pass through heat exhaustion. Although severe heat stroke is more common in outdoor sports such as football or soccer, basketball coaches should be aware that early intervention is critical to cool those who have collapsed due to heat stroke. (American College of Sports Medicine, 2007, pp. 558-9).



#### COMMON HEAT ILLNESSES

|                       | Heat Exhaustion   | Heat Stroke  |
|-----------------------|---|--|
| Signs and<br>Symptoms | <ul> <li>body temperature over 38°C</li> <li>heat cramps</li> <li>extreme thirst</li> <li>weak pulse</li> <li>rapid breathing</li> <li>nausea or vomiting</li> <li>dizziness or blurred vision</li> </ul> | <ul> <li>body temperature over 41°C</li> <li>headaches</li> <li>person feels weak</li> <li>rapid pulse</li> <li>person is confused or acting strangely</li> <li>sweat soaked and pale skin</li> <li>passing out and convulsions</li> <li>CHANCE OF MORTALITY: 20%</li> </ul> |
| Treatment             | <ul> <li>remove person to a cool and<br/>shaded area</li> <li>loosen clothing</li> <li>fan or spray with cool water</li> <li>seek medical attention if<br/>condition worsens</li> </ul>                   | <ul> <li>CALL 911</li> <li>remove excess clothing</li> <li>spray cool water on the person</li> <li>offer sips of water if conscious</li> </ul>   |
| Return                | • 24 to 48 hours  | Up to 7 days   |

#### **INCREASED SWEATING**

Sweating helps the body dissipate heat by evaporation. Sweat glands can release twenty to thirty grams every minute, dissipating twelve to eighteen calories of heat energy. The threshold for sweating is 37.3°C. As the body sweats, the amount of blood volume decreases, making the body work harder to distribute oxygen throughout the body (Plyley, Environmental Factors, 2006).

When fluid deficits exceed three to five percent of body weight, sweat production and skin blood flow begin to decline, reducing heat dissipation (American College of Sports Medicine, 2007, p. 558). Dehydration and increased work for the heart and circulation system to meet oxygen demands may ensue (Plyley, Environmental Factors, 2006).

#### CARDIOVASCULAR DRIFT

Heart rate increases disproportionately to oxygen uptake during intermittent exercise, such as basketball. Some studies have found that it is not a reliable indicator of oxygen uptake due to upper body activity and Cardiovascular (C.V.) Drift.

Stroke Volume - the amount of blood pumped with each heartbeat - falls as Heart Rate rises. If Stroke Volume decreases more than Heart Rate increase, Cardiac Output will fall. This reduces cutaneous circulation and the ability to dissipate heat, causing dehydration and reduced performance (Coyle & González-Alonso, 2001, p. 89).



The entire process is inter-connected, as high body temperature also has the capacity to raise heart rate. Cardiovascular Drift occurs in basketball because of the length of the activity (60 to 90 minutes) and the possibility that athletes may be dehydrated. Dehydration during exercise may reduce body weight (and blood volume) by 3-5% (Coyle & González-Alonso, 2001, pp. 90-1).

#### C.V. DRIFT AND BLOOD VOLUME



#### MECHANISM FOR CARDIOVASCULAR DRIFT



#### C.V. DRIFT AND BODY TEMPERATURE



#### **GLOSSARY OF TERMS**

SV: Stroke Volume MAP: Mean Arterial Pressure HR: Heart Rate BV: Blood Volume

> (Coyle & González-Alonso, 2001, p. 91)

MUSCLE CRAMPS

Heat cramps are painful spasms of skeletal muscles that are commonly observed following prolonged strenuous exercise in the heat. Muscles affected include the legs, arms, and abdomen. Severe muscle cramps are related to large losses of salt (sodium) in sweat and muscle fatigue. Ingesting additional fluids to alleviate muscle cramps *when they occur* is *too late to relieve the problem for that particular match*.

Proper warm-ups may assist athletes prone to cramping and stretching or massage may reduce the discomfort. Athletes should choose snacks to replace sodium during training camps or tournaments (Langley, Introduction, 2004). There is no evidence that potassium, magnesium, or quinine supplements reduce the effects of cramps (Casa, Clarkson, & Roberts, 2005, p. 120).

#### HORMONAL CHANGES

For thermoregulation, the Hypothalamus and Pituitary Gland releases an Antidiuretic hormone to boosts water retention by the kidneys. The Antidiuretic hormone also raises the blood pressure and thirst. The Adrenal Gland releases Aldosterone to increase sodium re-absorption, reduce sweat osmolarity, and conserve electrolytes in order to regulate the balance of water and sodium in the body (Bowen, Austgen, & Rouge, 2006).

#### INCREASED CUTANEOUS BLOOD FLOW AND VASODILATION

The body pumps blood to the skin in order to dissipate heat by convection. Peripheral vasodilation permits more blood to remain near the skin for more heat transfer. Cutaneous blood flow diverts blood from muscles and raises skin temperature, facilitating heat transfer from the environment to the athlete (Plyley, Environmental Factors, 2006).

#### INCREASED STRAIN ON THE LIVER, KIDNEYS, AND CENTRAL NERVOUS SYSTEM

When the metabolic heat produced by muscle during activity outpaces body heat transfer to the surroundings, the core temperature rises to levels that disrupt organ function. When core temperature rises, internal organ tissue temperatures climb above critical levels. As a result, cell membranes are damaged and energy systems are disrupted.

When a cell is heated beyond its thermal threshold (40°C), a cascade of events occurs that disrupts cell volume, metabolism, acid-base balance, and membrane permeability. Cell and organ dysfunction are followed by cell death and organ failure. This complex of events explains the variable onset of brain, cardiac, renal, gastrointestinal, hematologic, and muscle dysfunction (American College of Sports Medicine, 2007, p. 559).

#### TRAINING STRATEGIES

A great deal of basketball time is spent close to the maximum heart rate (almost fifty percent of live time). Coaches should be aware that the recorded heart rate for basketball

players during a time motion analysis is higher than what would be predicted based on the breakdown of individual activities (Abdelkrim, El Fazaa, & El Ati, 2007, p. 73).

Practices and workouts should always be conducted at game intensity in order to best simulate the conditions of game play. Less fit athletes must work harder to keep up, raising their core temperature and placing them at risk of Exertional Heat Stroke (American College of Sports Medicine, 2007, p. 559).

Acclimatization - which can occur in a hot gymnasium or hot climate - is most effectively achieved by exercise in the heat. At first, the team may need to reduce the volume and intensity of the training but afterwards the variables can be increased to their original levels. When travelling, it can take up to seven days to acclimatize to hot conditions (Plyley, Air and Noise Pollution, 2009).

To raise awareness of the issue, the coach could post the daily temperature and humidity values in a visible place in the gym, next to the practice plan. In times of excessive heat, teams should take frequent breaks every fifteen to twenty minutes to ensure that players have time to remain hydrated. Players should wear light clothing and bring a towel or change of shirts for comfort and performance.

In controlled laboratory studies, pre-cooling the body will extend the time to exhaustion and pre-heating will shorten the time to exhaustion (American College of Sports Medicine, 2007, p. 557). Shortening the warm-up activities or excluding some components will delay the rise in core temperature.

It is hard to execute precisely due to the stress of the end of game situations without environmental factors. Coaches should adjust tactics to make skills and decision-making easier in hot conditions. When players come out of the game, coaches should make sure that they are feeling well and debrief them on their performance.

#### LEGAL RESPONSIBILITY

Last year, a jury in Kentucky acquitted a football coach of reckless homicide and wanton endangerment. It was the first prosecution of a coach for a player's death due to exertional heat stroke in the United States. It was alleged that the coach withheld the water from the team, made players run excessively, and ignored symptoms of heat stroke among team members. The defense argued that the death was caused by the player's consumption of creatine and viral condition (Green, 2010).

Although the coach was found not guilty in this case, it is clear that coaches are expected to provide leadership in terms of heat illnesses and dehydration. Irrespective of the legal consequences, most coaches would feel a moral responsibility to be proactive about this issue. Given the recent news about the subject, ignorance of the issue is not an excuse. Coaches and team members must be vigilant when heat and humidity is high.

## HUMIDITY

In the summer, basketball players may spend significant time at tournaments or camps. The gymnasiums may be hot and humid, a combination of the weather, the number of people in the facility, and the level of exertion. Humidity increases the risk of heat illness because it does not allow thermoregulation by evaporation.

Athletes can dissipate heat due to evaporation, radiation, convection, and conduction. Given the lack of wind indoors and the thick rubber soles of basketball shoes, convection and conduction are not good alternatives. High gym temperature precludes heat loss by radiation so evaporation (by breathing or sweating) is an important method of thermoregulation (Plyley, Environmental Factors, 2006).

Humidity does not allow evaporation from the skin surface so sweat will drip from the body. This non-functional fluid loss can lead to higher core temperatures and possible dehydration (Dietitians of Canada, the American Dietetic Association, and the American College of Sports Medicine, 2000, p. 12).

Athletes should prepare by training in order to improve their personal fitness, train in environments similar to the competition, be aware of the symptoms of heat illness, and consume plenty of fluids (Plyley, Environmental Factors, 2006).

#### FACILITIES AND EQUIPMENT

Furthermore, high humidity can cause slippery floors which can lead to slips or the cancellation of games. Should the ball become slippery, there could be higher turnover rates and reduced shooting percentages.

#### MEASURING HUMIDITY

Relative Humidity is the percentage of water vapour in the air. Environmental heat stress is caused by ambient temperature, relative humidity, wind speed, and radiant heat. Since basketball is played indoors, wind speed and radiant heat (from the sun) are not applicable.

#### WET BULB GLOBE TEMPERATURE INDEX

Coaches can monitor the risk of heat illness by tracking Dry Bulb Temperature (the thermometer is exposed to the air but shielded from heat and humidity and Relative Humidity (American College of Sports Medicine, 1996, p. i).

#### THE EFFECTS OF HEAT AND HUMIDITY ON THE RISK OF HEAT ILLNESS



Heat stress can be calculated using the Wet Bulb Globe Temperature (W.B.G.T.) Index.

W.B.G.T. = 0.7 • Tempwet bulb + 0.2 • Tempblack bulb + 0.1 • Tempdry bulb

| W.B.G.T. (°C) | Risk Level |
|---------------|------------|
| >28°          | Very High  |
| 23-28°        | High       |
| 18-23°        | Moderate   |
| <18°          | Low        |

Since the Wet Bulb Temperature involves leaving a thermometer in a container of distilled water and the Black Bulb Temperature is measured using thermometer surrounded by a 6" black sphere, it is very inconvenient to calculate W.G.B.T. without equipment (American College of Sports Medicine, 1996, p. x). At a basketball game or tournament in the summer, coaches could monitor the temperature and humidity with a portable sensor or judicious review of weather forecasts.

#### HUMIDEX RATING

Canadian meteorologists created a Humidex Index to quantity how humid weather would feel if it were dry. A Humidex Index of 40 on a summer day means that the temperature feels like 40°C on a dry day although the thermometer only reads a lower value (Weather Network Canada, n.d.).

| Humidex | Risk Level           |
|---------|----------------------|
| 20-29   | Comfortable          |
| 30-39   | Some Discomfort      |
| 40-45   | Great Discomfort     |
| 46-53   | Dangerous            |
| >54     | Heat Stroke Imminent |

|          | HUMIDEX CHART    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| -        | 100              | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 48 | 50 | 53 | 55 | 58 |    |    |    |    |    |    |    |    |    |
| -        | <b>9</b> 5       | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 47 | 49 | 51 | 54 | 56 | 59 |    |    |    |    |    |    |    |    |
| -        | 90               | 28 | 30 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 48 | 50 | 52 | 55 | 57 | 60 |    |    |    |    |    |    |    |
| -        | 85               | 27 | 29 | 31 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 49 | 51 | 53 | 56 | 58 |    |    |    |    |    |    |    |
|          | 80               | 26 | 28 | 30 | 32 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 50 | 52 | 54 | 57 | 50 |    |    |    |    |    |    |
| 8.       | 75               | 26 | 27 | 29 | 31 | 33 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 53 | 55 | 57 |    |    |    |    |    |    |
| lity     | 70               | 25 | 27 | 28 | 30 | 32 | 33 | 35 | 37 | 39 | 40 | 43 | 45 | 47 | 49 | 51 | 53 | 56 | 58 |    |    |    |    |    |
| nid .    | 65               | 24 | 26 | 27 | 29 | 31 | 32 | 34 | 36 | 38 | 39 | 42 | 43 | 45 | 47 | 50 | 52 | 54 | 56 |    |    |    |    |    |
| h<br>L   | 60               | 24 | 25 | 27 | 28 | 30 | 32 | 33 | 35 | 37 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 57 |    |    |    |    |
| è -      | 55               | 23 | 24 | 26 | 27 | 29 | 31 | 32 | 34 | 36 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 |    |    |    |
| ativ     | 50               | 22 | 24 | 25 | 27 | 28 | 30 | 31 | 33 | 34 | 36 | 38 | 40 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 |    |    |
| Sel.     | 45               | 22 | 23 | 24 | 26 | 27 | 28 | 30 | 32 | 33 | 35 | 37 | 38 | 40 | 42 | 44 | 45 | 47 | 49 | 51 | 53 | 55 | 57 |    |
| <u> </u> | 40               |    |    | 24 | 25 | 26 | 28 | 29 | 31 | 32 | 34 | 35 | 37 | 39 | 40 | 42 | 43 | 45 | 47 | 49 | 51 | 53 | 54 | 55 |
|          | 35               |    |    |    | 24 | 26 | 27 | 28 | 30 | 31 | 33 | 34 | 36 | 37 | 39 | 40 | 42 | 43 | 45 | 47 | 49 | 50 | 52 | 54 |
|          | 30               |    |    |    |    |    |    | 27 | 28 | 30 | 31 | 33 | 34 | 36 | 37 | 39 | 40 | 42 | 43 | 45 | 47 | 48 | 50 | 52 |
| -        | 25               |    |    |    |    |    |    |    |    |    | 30 | 32 | 33 | 34 | 36 | 37 | 39 | 40 | 42 | 43 | 45 | 46 | 48 | 49 |
| -        | 20               |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 40 | 41 | 43 | 44 | 45 | 47 |
|          |                  | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
|          | Temperature (°C) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

The Weather Service of Environment Canada issues warnings when the Humidex index is uncomfortable or unsafe In Canada the area most affected by this combination of very high temperature and high humidity is southern Ontario and Quebec as moist tropical air pushes up from the Gulf of Mexico in the summer (Weather Network Canada, n.d.; Weather Network Canada, n.d.).

## DEHYDRATION

The human body is comprised of roughly sixty percent water. Water is used to cool the body, carry oxygen and nutrients to the working muscles, remove toxins from organs, cushion joints, and moisten skin (Beck, The power of positive drinking, 2009). Heat and humidity can adversely affect dehydration.

It is necessary to maintain a baseline hydration level for day to day training safety and performance of athletes (Casa, Clarkson, & Roberts, 2005, p. 115). A study of male high school basketball players reported that forty-two percent did not drink enough water (Casciano, 2008, p. 49).

When muscles are working, they produce heat and the body sweats to lower temperature. Sweating primarily expels water and sodium from the body. Acute fluid loss at a faster rate than fluids can be ingested leads to dehydration and the body will use water in the blood to replace required fluids. Consequently, blood volume can drop severely, causing the effects of Cardiovascular Drift, a gradually increasing heart rate that carries less oxygen in each stroke (Archer, 2009).

#### SWEAT LOSS DURING BASKETBALL

Basketball players will lose 1.6 litres per hour during competitions indoors with an ambient temperature of 20° C (Fowkes-Godek, Bartolozzi, & Godek, 2005, p. 208).

Most gyms are not air-conditioned. Several facilities have poor air circulation which contributions to high levels of humidity. During the spring club season and summer elite development programs or camps, the temperature in the building may exacerbate fluid loss due to sweat (compared to playing during the winter high school season).

When both the microclimate (the athlete) and the macroclimate (the environment) are above normal, athletes may suffer from heat stress, heat exhaustion, heat stroke. Coaches should be aware of the signs and symptoms of heat stress (Specialized Professional Services of the Occupational Health and Safety Branch, 2009).

#### THE EFFECTS OF DEHYDRATION

The entire process is inter-connected, as high body temperature also has the capacity to raise heart rate. Cardiovascular Drift occurs in basketball because of the length of the activity (60 to 90 minutes) and the possibility that athletes may be dehydrated.

Dehydration during exercise may reduce body weight (and blood volume) by 3-5%. The effects of excess heat and dehydration are inter-connected, as high body temperature also has the capacity to raise heart rate. Cardiovascular Drift occurs in basketball because of the length of the activity (60 to 90 minutes) and the possibility that athletes may be dehydrated. Dehydration during exercise may reduce body weight (and blood volume) by three to five percent (Coyle & González-Alonso, 2001, p. 91).

Without proper hydration, there is a progressive decrease of blood pressure throughout the body and stroke volume accompanied by a progressive increase in temperature and heart rate. A study, which consisted of two hours of moderate-intensity exercise, showed that the increase in core temperature and heart rate was directly related to the degree of dehydration (McGregor, Nicholas, Lakomy, & Williams, 1999, p. 895).

#### PHYSICAL SYMPTOMS OF DEHYDRATION

Athletes who are dehydrated may suffer from: excessive thirst, dry mouth, loss of appetite or nausea, muscle cramps, increased body temperature, increased heart rate, dark coloured urine, flushed or dry skin, and fatigue. At five percent dehydration, symptoms will intensify. It is necessary to get medical attention if the dehydration rate reaches ten percent or symptoms become severe (Casa, Clarkson, & Roberts, 2005, p. 118).

#### REDUCED ANAEROBIC PERFORMANCE

Studies involving soccer, which has a similar energy system profile to basketball, can substitute if no comparable basketball articles are available (Fox, Bowers, & Foss, 1993).

| ENERGY SYSTEM BREAKDOWN |
|-------------------------|
|-------------------------|

| Sport      | ATP-CP & LA | LA-O <sub>2</sub> | <b>O</b> <sub>2</sub> |
|------------|-------------|-------------------|-----------------------|
| Basketball | 60          | 20                | 20                    |
| Soccer     | 50          | 20                | 30                    |

In a trial involving repeated anaerobic shuttle run, players without fluids took longer to complete each run as the task continued. Furthermore, fifteen metre sprint times conducted after the last shuttle run were longer for the non-fluid control group. Those who drink a carbohydrate-free solution perceived less exertion as the activity wore on (McGregor, Nicholas, Lakomy, & Williams, 1999, p. 901).

#### SPORT-SPECIFIC CONSEQUENCES

In a study of male basketball players aged 17 to 28, dehydration led to impaired vigilance related attentional performance. Also, when dehydration passes a threshold of two percent, a progressive decline in basketball skills may occur (Ziv & Lidor, 2009, p. 561). Therefore, it is imperative for coaches to monitor their players for the symptoms of dehydration and encourage them to drink fluids.

#### HYDRATION SCHEDULE

Young basketball may experience "voluntary dehydration" because they do not ingest sufficient fluids. Coaches can encourage players to remain hydrated by permitting

personal water bottles and permitting players to step out of practice to get a drink when required. With at-risk athletes, coaches often need to supply water bottles themselves and could seek sponsorship (Coyle & González-Alonso, 2001).

Athletes should drink beyond thirst. By the time an athlete feels thirsts, dehydration has already affected the athlete's performance (Sports Nutrition Advisory Committee, n.d.). The recommended fluid intake for adult males is three litres daily (2.2 litres for females) and teenagers should drink 1.8 litres for girls to 2.6 litres for boys (Beck, The power of positive drinking, 2009).

It is necessary to replace all of the fluids during the game plus an additional thirty percent to account for losses in urine, respiration, and sweating (Fowkes-Godek, Bartolozzi, & Godek, 2005, p. 207). Athletes can weigh themselves before (after using the restroom) and after (before using the restroom) exercise and add fluid consumption to determine the activity-based fluid loss (Williams, 2009).

#### BEFORE THE GAME

The average person should ingest forty to fifty millilitres per kilogram of body weight. Twenty percent of that will come from food. Still, athletes must drink more to account for the fluids lost during activity.

#### HYDRATION SCHEDULE

| Time                     | Amount of Fluid                    |  |  |  |  |  |
|--------------------------|------------------------------------|--|--|--|--|--|
| Two hours before workout | 400 to 600ml. (14 to 22 oz.)       |  |  |  |  |  |
| During workout           | 150 to 350 ml. (6 to 12 oz.) every |  |  |  |  |  |
|                          | 15-20 min., depending on player    |  |  |  |  |  |
| After workout            | 475 to 650 ml. (16 to 24 oz.) for  |  |  |  |  |  |
|                          | every lb. lost due to perspiration |  |  |  |  |  |

Athletes should take small servings of fluid. Large amounts of fluid can lead to a "sloshing" feeling while running up and down the court. High carbohydrate drinks (over 8%) should be avoided because of potential digestive problems during the physical activity (Archer, 2009). Ingesting fluid before and at regular intervals during exercise delays fatigue and increases work capacity when heat stress occurs (Casa, Clarkson, & Roberts, 2005, p. 119).

#### DURING THE GAME

During exercise, intermittent consumption of sport drinks (or other carbohydrate solutions) appears to improve performance. A study of male adolescent basketball players showed that euhydration with a 6% carbohydrate solution improved both shooting skills and on-court sprinting compared to a placebo (Ziv & Lidor, 2009, p. 562)

Fluids consumed during the workout should not be refrigerated. If the drink is at room temperature, the body can begin absorbing fluids immediately. If the drink is chilled, the stomach must first heat the drink to the correct temperature, using additional energy and delaying the digestion process (Langley, Introduction, 2004).

AFTER THE GAME

All athletes and coaches should have plenty to drink after the game.

It is necessary to replace carbohydrates used as fuel during the game. In addition to a health snack like a banana, bagel, or Nutri-grain bar, athletes should consider high carbohydrate drinks such as milk or chocolate milk. Avoid the temptation for soft drinks or sugary fruit juices and drink water instead. A fruit juice drink (500ml) contains fifty games of sugar and a soft drink can (355ml) contains nine teaspoons of refined sugar plus artificial flavours, preservatives, and phosphoric acid (Beck, The power of positive drinking, 2009).

Athletes often wait until mealtime to fully replace water and electrolyte losses. Potassium, magnesium, and other minerals can be replaced by a balanced diet. During the regular season - when competitions are twenty-four hours apart - this is sufficient but during a training camp or tournament, additional fluid replacement is necessary (Casa, Clarkson, & Roberts, 2005, p. 118).

## COLD

Conversely, youth basketball players may play in cold gyms, especially during the winter high school season. The games are still played inside so nobody is at risk of hypothermia but there can be a concrete affect on performance. When individuals do not achieve thermal comfort, defined as "a condition of the mind which expresses satisfaction with the thermal environment (Parsons, 2003, p. 196)

Heat loss mechanisms include conduction, convection, evaporation, and radiation. A colder gymnasium can cause greater heat loss from conduction as vasoconstriction begins to hamper blood flow to the skin. Players should wear appropriate warm-up attire to trap warm air against the skin while waiting to play (Plyley, Environmental Factors, 2006). Cold temperatures will decrease stroke volume (Coyle & González-Alonso, 2001, p. 88). If the athlete remained in the cold environment for a long time, there could be a negative effect on maximal anaerobic power and maximal aerobic power (Ferretti, 1992, p. 185).

Non-shivering thermogenesis (muscle tensing, feelings of stiffness, and enhanced metabolism) will take over to generate some heat. Muscle stiffness may lead to an increased chance of injury, such as muscle strains (Plyley, Environmental Factors, 2006). Teams should practice proper warm-ups to avoid muscle strains. Developing flexibility throughout the season reduces the chance of injury.

Catecholamines, such as epinephrine and norepinephrine, are also released which can trigger the body's fight or flight response (Plyley, Environmental Factors, 2006). A lack of thermal comfort could result in significant distractions. Reduced perception and memory could adversely affect decision-making on the court (Parsons, 2003, p. 297).

Breathing exercises, pre-competition routines, and the Ideal Performance State can help an athlete compose themselves. Players should practice positivism and reframing to maintain attentional focus (Jensen, 2003, p. 29). If the cold temperature has contributed too low arousal, players may need to energize using positive self-talk, mental visualization, or other affirmations (Jensen, 2003, p. 95).

#### COMPRESSION SHORTS

Compression can increase muscle oxygenation, higher cardiac output, greater stroke volume. Increased venous function helps remove lactic acid, reducing recovery time. For explosive tasks, compression tights can help the muscle maintain its form and produce greater results. Compression clothing can reduced the effect of heat and cold on the body (Bringard, Denis, Belluye, & Perrey, 2006, p. 88).



Compression tights were popular in the N.B.A. in 2006 among players like Vince Carter and Dwyane Wade (Gombert, 2006).

After the Miami Heat won the National Basketball title in 2006, Dwyane Wade's black spandex leggings became very popular on the playground and in high school basketball games. Since David Stern banned the tights they have become less common. Now, players such as Kobe Bryant and others are wearing compression shorts with padding. A side benefit of these undershorts are that they prevent some of the bruises and contusions that make up about a quarter of all injuries (Akinbo, Odebiyi, & Adebayo, 2009).

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## Facility Factors

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## LIGHTING AND DEPTH PERCEPTION

Different gymnasiums are built differently. Some backboards are mounted directly against the wall; others are hung in an open area. Lighting may be dim or plentiful; some gyms even have large open windows that let in the sunlight. All of these factors change the conditions of the gym and force the players to adjust.







A variety of architectural details create different circumstances for players

Expert basketball players who aim at a target utilize three distinct phases in their shooting motion, beginning with a preparatory phase, then an impulse phase that initiates the motion, finishing with an error-correcting phase (Vickers, 1996, p. 342).

Skilled individuals orient their gaze towards the basket sooner and maintain visual contact longer than less skilled participants. During the preparation phase, an expert moves their head much less and keeps their eyes fixed on the target much longer than the near expert (Vickers, 1996, p. 348).

Despite conventional coaching - which trains players to keep a constant eye on the basket - experts make no attempt to maintain focus as the shooting motion occurs. Early fixation on the target and the "Quiet-Eye" phase (the final fixation on the target from onset to the first observable movement) are two of the most critical elements for successful shooting (Vickers, 1996, p. 352). Since near experts have more head movement, they are more sensitive to changes in depth perception.



Expert shooters orient themselves towards the basket and then compute their shooting trajectory before initiating the shooting motion. A uniform rim height is critical (de Oliveira, 2007, p. 76).

Expert shooting employ a high trajectory when shooting to take advantage of physics. This allows the ball to fall as close to vertical as possible, avoiding contact with the rim or backboard (Fontanella, 2006, p. 23). When shooting, the angle of elevation is more of

a critical variable than the distance to the target so a basket that has been set at an unusual height can be problematic. A heightened basket gives the impression of being closer compared to a lower basket which seems further away.





A high arc increases the odds that the ball will pass directly through the hoop and not contact the rim (Fontanella, 2006, p. 23).

As light is reduced, a player is more likely to miss their shot (de Oliveira, 2007, p. 76).

Considering the angle of elevation, adjusted for a ten-foot basket, players will adjust their shooting motion, possibly with lackluster results. If the basket is not adjusted to the correct height, players may overshoot a lower basket and under shot a higher one (de Oliveira, 2007, p. 98).

Lighting is critical. In a darkened gym shooting percentage goes down from 67.7 to 42.6 percent. If the shooter is unaccustomed to the brightness (or lack thereof) in a new gym, they may be more frustrated. As the distance from the basket increases, accuracy in darkened conditions worsens. (de Oliveira, 2007, p. 76).

## EQUIPMENT

#### RIMS

Rims in collegiate and professional basketball should have a thirtyfive to fifty percent energy absorption range of total impact energy (Fédération Internationale de Basketball, 2006, p. 10). Given the backspin applied to a shot, the higher the energy absorption, the higher the chance that a shot will strike the basket ring and fall in. A hoop that does not absorb as much energy will likely cause shots to rebound away.

Every hoop has a different absorption rate. There is speculation that some rims are looser than others. For example, there is



The energy absorption rate can be adjusted using a crescent wrench and a bold located under the rim.

conjecture that the rims at Cameron Indoor Stadium at Duke University are looser than those at North Carolina's Dan Smith Center. Theoretically, a team that shot the ball from the outside would prefer looser rims since shots taken in the paint usually go directly through the hoop and do not need the help.

There is speculation that some arenas, like those used for National Collegiate Athletic Association Tournament games, are very tight, which might account for some upsets. The energy absorption rates of each hoop are supposed to be within 5% (Fédération Internationale de Basketball, 2006, p. 10) but there is no test for this at the local gym.

#### BACKBOARDS

Basketballs should rebound off of the backboard with a minimum rebounding height of fifty percent (Fédération Internationale de Basketball, 2006, p. 7). Most new backboards are constructed of tempered safety glass rectangles but some gyms may still use wooden or tempered plastic boards, some in the shape of fans. Experts understand how the ball caroms off the glass and adjust their shots accordingly. Wood absorbs more energy and may cause some bank shots to fall shot if the shooter is used to tempered glass.

A border should be painted on the backboard to outline the rim, 590 millimetres wide and 450 millimetres tall. The border should be fifty millimetres thick and applied in a contrasting colour (Fédération Internationale de Basketball, 2006, p. 7). Despite this requirement, not all high school gyms have these backboard squares. The absence can impact a shooter but there is no real penalty in the rules for the offence.





The ball rebounds off each backboard differently.

Some rims and backboards may also be in disrepair. A visiting team that does not know the facilities may be at an extreme disadvantage. Home teams practice on the equipment regularly and can choose which backboard that they want to shoot towards in the second half, a critical decision.

#### NETS

Over the years, teams have slowed down transition teams with new nets. The principle is that a new net slows down the ball, preventing a team from grabbing the ball after a made

field goal and starting the fast break. This tactic was frequently used against the 1989-90 Loyola Marymount team which is the highest scoring collegiate team of all time (Ostler, 2008, pp. 56-7). At the high school level, it is more likely that the nets are in disrepair due to negligence. Before games, teams should note how the ball falls through the hoop.

#### BASKETBALLS

The home team selects the game ball to be used for the game, contingent upon the approval of the referee. Unless the proposed ball is obviously damaged or deflated, it will be accepted. The ball can influence play because of its surface or size.

A ball with a smooth surface will be harder to handle than one with a newer pebble grain. When moisture gets on the ball due to sweat, it may become more slippery. Generally speaking, a worn ball will impair a more skilled team. Ballhandlers will lose their grip and turn the ball over more and outside shooters may not target their shots correctly.

Although a men's basketball should weigh twenty-two ounces, inflated to 7-9 pounds of pressure, the ball could be over or under inflated. A ball that is over inflated contains more air particles and retains more of its kinetic energy. When dribbled on the floor, the extra air particles allow the sphere to recover its shape and bounce. A ball that is under inflated contains less air particles; energy is loss due to friction and the ball bounces less high. A "dead" ball that is under inflated may affect a skill ballhandler (Clark J., n.d.).



Possible game balls range from a nice soft pebble-grain (left) to worn-down (right).

Coaches should ensure that teams practice with balls that reflect what they will employ in games. The teams' ballhandlers should test each game ball beforehand and challenge balls that will adversely affect the team.

## **COURT CONDITIONS**

#### COURT SIZE

There are multiple court sizes in the Greater Toronto Area. In the Toronto District School Board South Region, many gyms are small in order to suit the older buildings where they are located. In neighbouring areas, schools are newer and boast more modern facilities, including gyms which are large and brightly lit.

Coaches should install offensive and defensive systems that suit a wide variety of gyms, such as the Princeton High Post Offense or good Man-to-Man Defence. Teams should train throughout the season so that they always have good fitness levels.

| Large Gyms                 | Small Gyms                                    |
|----------------------------|---|
| More fast breaks           | Halfcourt games                               |
| Faster play                | Slow possessions                              |
| Continuous play            | More stoppages due to<br>fouls and violations |
| Greater fatigue            | Rough play                                    |
| Court spread out           | Players pack the paint                        |
| Room to dribble, pass, cut | Easier to help on defence                     |

#### FLOOR SURFACE

When players stop and change direction on different surfaces, they may have trouble planting their feet. The worst case scenarios are travelling violations, difficulties pivoting and possible slips and falls. Some courts are slippery because they are old and have not been refinished or because the floor has not been recently swept. All players should keep the soles of their shoes clean and replace worn shoes if necessary.





A new and clean court (left) is easier to play on than one which has been sanded down and not recently cleaned (right).

#### INJURY BREAKDOWN

Twenty-four percent of basketball injuries are due to falls which happen while dribbling or making a sudden turn. Since basketball demands a great deal of lower body activity (there are over one thousand distinct movements during a youth game, many of them running and jumping), 40.5 percent of injuries occur to the lower body (for example knees, legs, and ankles). 45.6 percent of injuries are sprains, with an emphasis on ankle sprains 46.8 percent of injuries take place in the offensive zone, likely due to hard cuts while moving without the ball or aggressive moves towards the basketball while dribbling. Another 29.1 percent of injuries occur in the key area, due to jumping or fighting for position (Akinbo, Odebiyi, & Adebayo, 2009).

The risk of injury can be increased by a slippery court that should be swept or refinished. Ankle injuries account for almost one-third of time missed on court (McKay, Goldie, Payne, & Oakes, 2001, p. 104). Although opponents have a significant effect on injuries, superior facilities can also reduce the risk of harm. Teams should have qualified training

personnel and certified coaches on hand. Also, players should adopt a routine with a proper warm-up and cool down for all training sessions and competitions. Sweeping the court beforehand and cleaning shoes reduces the chance of slips.

#### PAINTED LINES

Homecourt advantage is not solely dependent on noisy crowds and travel. Familiar visual cues increase spatial awareness, allowing an athlete to re-orient themselves quickly after a sudden change in position (Neave & Worfson, 2003, p. 270). I used to coach in a small gym that was very small and thus had a very unusual over and back rule (the line used for backcourt violations was not the halfcourt line but one of the volleyball lines).





The lines on the gym at the University of Toronto (left) are bold and contrast with the light hardwood floor, in comparison to the Field House (right) which uses synthetic blue and green surfaces.

On a court with lines which are faded or do not sufficiently contrast with the court, a visiting team may commit several unnecessary violations. Coaches should go over the peculiarities of each gym ahead of time to avoid an ill-conceived turnover.

## CANADA'S GEOGRAPHY

Canadian coaches must deal with athletes throughout the country. In Ontario, elite basketball athletes may be based in Toronto and other cities throughout the province or preparatory schools in the United States. Luckily, there are always talented and committed players to coach in the Greater Toronto Area. Coaches can also use technology to manage a semi-centralized program and stay in regular contact with the players (Scott, 2010, pp. 18-9).

Young basketball players go to recreation centres looking for camaraderie and competition (Haerens, Craeynest, Deforche, Maes, Cardon, & De Bourdeaudhuij, 2009, p. 8). Ontario Basketball has created Regional Training Centres throughout the province where athletes convene on a bi-monthly basis. The return of many high profile athletes from American colleges, such as Sam Hill (Cornell to Toronto), Henry Bekkering (Eastern Washington to Calgary) and Simon Farine (Wisconsin-Green Bay to Dalhousie), have shown that Canadian Interuniversity Sport is a viable option for basketball athletes.

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## Psychological Factors

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National Coaching Institute

Task 5 (Environmental Factors)

Toronto, Ontario, Canada July 2010

## NOISE

Noise can be very disruptive on the basketball court. Like most sports, the two main areas where this disruption is felt on the hardwood are communication and concentration. Basketball is a fast-paced team sport where players must execute over one thousand distinct actions per game. Although each player performs those movements independently, the greatest success is achieved when the entire team works in concert.

#### COMMUNICATION

Players must communicate with each other and with coaches. Common basketball tactics include two on two strategies like a screen and roll or drive and kick where the offence reads the reaction of the defence and adapts. It is paramount to call events like a double-team or an open player loudly and clearly because a signal which is not received (or even delayed momentarily) may result in a missed opportunity.

Young players are learning skills so they cannot always keep their heads up to see the entire court. Steve Nash may be an expert who can see openings all over the court - some before they occur - but this level of ability is difficult to attain. Oral communication is important in case a teammate is not looking. Enthusiastic spectators can totally disrupt a squad's teamwork.

An extreme example of this interference is the vuvuzela, a South African instrument that is traditionally used to summon distant people to meetings and is now blared constantly during soccer matches. A single vuvuzela can produce a tuneless 131 decibel sound that can inflect permanent hearing loss on bystanders within two metres of the blast. During South Africa's soccer games, ninety thousand spectators armed with vuvuzelas have wreaked earsplitting havoc (York, 2010).

Bryan Robson, manager of the Thailand national team, stated that the noise made it "very difficult" to communicate with players. Marcus Tulio Tanaka, a Japanese defender added that "you can't hear what your teammates are saying." Hand signals have limited effectiveness across the length of the soccer pitch or the basketball court; Robson adjusted by calling players over to the sidelines to give instructions and Tanaka said that it was necessary to walk up to teammates in order to speak with them.

Dutch manager Bert van Marnijk said that it was "almost impossible" to coach his players over the drone (York, 2010). The message may have gotten through but not without a significant cost of time and effort.

I have witnessed noise impact a basketball game in many ways: a spectator at Collège Français rang a cowbell like he was Will Ferrell and gave migraines to many, potbangers at Laurentian University created a chaotic atmosphere in the gym, and trumpets played by fans sitting behind the visiting bench required the team to hold timeout huddles in the centre of the court.

**BODY LANGUAGE** 

In a normal conversation, communication is based primarily on body language, then tone of voice, and lastly the words selected. When words are eliminated and tone of voice obfuscated, body language becomes even more important. Coaches should emphasize eye contact, leaning towards a player, and an open body position to communicate effectively (Mehrabian, 2009, p. 182).



#### EYE CONTACT

Coaches should always get the attention of players and look them in the eye when communicating important information.



In the huddle, John Wooden made explicit eye contact to communicate his message (Clarkson R., 1972).

TONE OF VOICE

Even though the exact words may not be audible, tone of voice is still communicated. A coach's tone should always be positive and encouraging when speaking to players, referees, or officials. Keep an eye on the big picture.

Sometimes, those involved in a sporting contest hear what they want to hear. During a game at the University of Western Ontario during the 2002-03 season, Interim Head Coach Mike Dodig was frustrated with the performance of the Varsity Blues and wished to signal a timeout. The coach had been riding the referees for the length of the game and David Jirik mistook Dodig's reaction for criticism of the officials.

```
Jirik: Do you want one?
Dodig: Of course I want one.
Jirik: Really?
Dodig: Yes!
```

At that point, Jirik assessed a technical foul to the University of Toronto coach. A misunderstanding became a bigger deal than it should have because of the crowd noise.

#### CONCENTRATION

Basketball games are played in an enclosed area where spectators can interact with athletes. Some games may be played in an arena, with noise levels as loud as 120 dB (Plyley, Air and Noise Pollution, 2009), or a gymnasium, which can have noise levels between ninety and one hundred dB. Sound in a raucous gym has the same decibel value as a factory or jackhammers and spectators have been known to creatively generate noise that is very disruptive because it is both loud and intermittent (Tao, 1997).

Noise can adversely affect basketball players, especially when they are at the free thow line and all eyes are fixed upon them. Spectators seem to be unconsciously aware of the fundamentals of making sound offensive to the ear. They increase and decrease the volume of their noise, combine different calls and instruments, and increase the barrage if they feel that a certain player is particularly perturbed.

Like any other stressor, noise can trigger the body's "fight or flight" response. Bodily functions are accelerated and may be governed by the hormonal effects of adrenaline and cortisol. Noise can increase breathing, heart rate, and blood pressure while altering the body's metabolism. Those who are accustomed to low noise can be severely disturbed by noise during competitions (Plyley, Air and Noise Pollution, 2009).

Although the noise of a game only lasts a couple of hours at a time, the effect of the stress can linger much longer.

#### FINE MOTOR SKILLS AND DECISION-MAKING

Under stress, people pay too much attention to their individual actions, which disrupts fluidity and reduces the performance of a complex fine motor skill. This is especially true of athletes with less experience. When novice golfers are put under pressure, they become less accurate (Hutchison, Taking your time - a 'choking' hazard, 2009).

When sounds of a soccer game were played as miniature golf players played, fine motor skills and attentional focus were reduced, compared to when irrelevant noise was played (Molander & Bäckman, 1990, p. 58). During the second-half of a competitive game, tired or fatigued players may be more disturbed than those who are in fit or well-rested (Plyley, Air and Noise Pollution, 2009).

Stress, including stress caused by noise, reduces the quality of decision-making. People consider multiple options but do not carefully evaluate each choice. A person who can make thoughtful and reasoned decisions at one moment may not do so under stress because they do not seek and weight relevant evidence (Baron, 2000, p. 215).

#### OFFICIATING

Referees often rely on sound to call the game. Sometimes a foul call is made because the referee hears the sound of a hand slapping a wrist. At other times, a player who is unable

to signal for a timeout with his hands will audibly ask for one. In F.I.B.A. rules a coach must call timeouts through the scorer's table and this communication is difficult in a noisy environment. If these sounds are unheard, a critical play may unfold differently.

In a noisy environment, referees call about fifteen percent less fouls and show twice as much uncertainty. Even experienced referees may not have the coping skills to handle the vociferous cheering of partisan spectators. Aside from increased uncertainty, the main impact of noise during competitions is a reduction in fouls called against the home team (Nevill, Balmer, & Williams, 2002, p. 269).

#### TRAINING STRATEGIES

Coaches can prevent these miscues by making clear and concise communication a team habit in games and practices. Players should always call for the ball, defenders should always talk and indicate all shots and screens, and teammates should announce what their comrades cannot see. When the communication is not loud or instantaneous, the practice should be stopped and the issue addressed. If necessary, players can grab each other by the jersey to move each other into position but this is not as efficient as a quick shout.

Basketball drills should always be completed at game intensity. Successful and productive drills should include fine motor skills performed at high speed and an element of decision-making (Pasquali, 2010). Practices should develop the coping skills needed to deal with noise as much as other mental training areas.

Noise often jars basketball players because the loud confines of a gym during an away game are the opposite environment from which most teams practice. During a typical training session, one can hear the squeaking of sneakers, the bouncing ball, and a coach giving instructions but there is little background noise. Coaches could consider strategy employed by NFL football teams before playoff games. The Minnesota Vikings used earplugs and speakers playing loud crowd noise to prepare for a recent game in the Louisiana Superdome (Evans, 2010).

Debriefing the performance, especially the fine motor skills and decision-making of each player, can help prevent repeated errors. Athletes and coaches should review the performance after the emotional arousal of the situation has dissipated but while the memories are still fresh (Halden-Brown, 2003, p. 182). Video or statistical aids can help athletes see how they reacted to noise.

## HOME AND AWAY

#### INTRODUCTION

Playing at home is as strong a predictor of team success as player performance (Greer, 1983, p. 252). Teams may enjoy greater homecourt advantages for a number of reasons,

including a high altitude, unusually boisterous fans, or an inexperienced squad (Harville & Smith, 1994, p. 22).

In Ontario, the impact of altitude is minimal so this section will focus on the effect of enthusiastic fans on both teams and the referees and team experience. The homecourt advantage is most pronounced in an enclosed space, such as an arena or gymnasium. The support is mostly attributable to the social support of the audience (Greer, 1983, p. 252).

#### **EXPERIENCE**

When Ricky Romero pitched in Angels Stadium recently, he invited over two hundred friends to the game. The Blue Jays pitcher, who grew up in nearby East Los Angeles, asked his guests to wear black in contrast to the red worn by Anaheim fans and sit on the right field line, where a left-handed pitcher faces as he warms up. Teammates and coaches believe that Romero was a little carried away by the moment and allowed adrenaline to overcome his focus.

Toronto coach Bruce Walton said "when you get caught up wanting to have a good outing for your family, at times it can take a little bit of focus away from what you're really trying to do which is get hitters out and make your pitches." Romero had trouble during his rookie season settling down early in games and his hometown supporters may have contributed to an outing that seemed more typical of 2009 than 2010.

The second year pitcher admitted that he had problems with adrenaline and controlling his emotions early in games during his rookie year. Romero has said that he always has adrenaline before games and usually can settle down and gain his attentional and emotional focus within the first few innings, although that was not the case for his first start at home (Griffin, 2010). An athlete who does not respond appropriately to the atmosphere of playing at home can suffer some of the negative effects of adrenaline (Clarkson, 1999, pp. 8-9).

On the other hand, staff ace Shawn Marcum nearly ignores friends and family when he visits Kansas City. He only left a small number of tickets and carried a no-hitter into the seventh inning. Marcum explained that he wanted to stay focused on his job, adding that "A lot of people don't realize we have to pay for those tickets too. Other than that everybody was pretty good about letting me focus on my job (Griffin, 2010)."

#### AROUSAL

During the 1988 Olympics, figure skater Elizabeth Manley was inspired by the electric and noisy atmosphere created by the hometown Calgary crowd. She said that she felt "as though she was riding on the wings of the crowd's ovation" and believed that she was "actually flying (Clarkson, 1999, p. 147)."

If a group of supporters, such as the Cameron Crazies at Duke University, is capable of sustained cheering throughout the match (only half of all crowds are capable of this; most

react to specific plays), their influences increases (Greer, 1983, p. 255). In fact, Duke's excellent success over the years is partially attributed to their strong homecourt advantage, which ranks highly on both objective and subjective scales (Harville & Smith, 1994, p. 25).



Duke fans distract North Carolina's inbound play. (Lecka, 2008).

The emotional arousal of playing at home can raise testosterone levels for junior hockey players to 185pg/ml, a three-fold increase (compared to 135pg/ml for visiting team, which is slightly more than double normal levels). This could be due to a primal design to defend one's territory. Increased testosterone leads to more aggression, which is a competitive advantage. The effect has also been seen in British soccer players (Hutchison, Hometown does have its advantages, 2010).

Visiting teams have strong perceptions of opponents' home court advantage and play

cautiously by attempting fewer long distance shots or driving to the basket less often (Sampaio & Janeira, 2003, p. 46). Coaches must be passionate and encourage their squad to play aggressively.

#### OFFICIATING

Referees are impacted by the noise and favour the home team. In a noisy stadium, football referees call 15.5% less fouls against the home team and slight more fouls against the visitors (although this increase is not significant). Basketball officials have also been observed to call less fouls against star players at home (Nevill, Balmer, & Williams, 2002, p. 269).

Even experienced referees are subconsciously influenced by crowds in order to favour the home team. As an officiating career progresses, referees develop mental training techniques to keep their focus in stressful situations. Seasoned referees remain cognizant of the effect that an individual player's reaction can have on the crowd and they may choose to act differently and not assess a penalty to the home squad (Lane, Neville, Ahmad, & Balmer, 2006, p. 245).

Referees may also call more fouls because visiting players are more frustrated in may commit more fouls because of this aggression. Coaches should understand this situation and be careful not to overact (Greer, 1983, p. 259).

#### TRAINING STRATEGIES

An athlete's reaction to a stressful situation is determined by the hormone which is released. Adrenaline, a defensive "flight" fuel, is triggered fear and anger and can incease

heart and respiration rates, widen air passages, and increase blood pressure and muscle tension. Noradrenaline, an aggressive "fight" fuel is triggered in response to a competitive situation and can increase heart rate and muscle activity, in addition to improving alertness and reaction time (Clarkson, 1999, pp. 8-9).

As an athlete experiences these emotions and receives feedback on how they have handled themselves, their performance will improve.

At home, the social support of spectators can increase arousal during task performance. Experienced players are less affected by loud cheering. The arousal triggered during games only elicits correct responses for well-learned task (Greer, 1983, p. 254). Coaches should emphasize mental training skills, such as visualization and the Ideal Performance State to prepare for and mitigate crowd reactions.

Coaches should teach players how to ignore the social factors of crowds in order to feel more under control. Positivism - the focus on actions, not consequences - should be utilized to alleviate fear of failure is quite common. As part of teaching the team life lessons, coaches should help players manage their frustrations in difficult environments (Dorfman, 2000, p. 170).

Sport provides opportunities for actualization through self-extension and achievement. The existentialist doesn't believe that a practice failure is the end of the world because he holds the event in perspective. During competition, players may over-analyze their performance because of the grandeur of the stage or the stress of socialization

Successful athletes understand that while man receives proof of who he is and affirmation on the court, it is an ongoing process. Only players can truly judge their selfactualization, not coaches, teammates, opponents, or fans

Playing on the road can be difficult for multiple reasons. There may be an antagonistic environment when playing in the opponent's building, officials favour the home team, and routine can be disrupted by new facilities or travel. On the road, spectator booing and raucous fans are among the most frequent sources of anxiety for players, especially those who are inexperienced. Razzing and jeering can have a detrimental effect on the performance of fine motor skills (Greer, 1983, p. 254).

The high A-state anxiety for visiting players triggers frustration which may lead to more foul calls (Greer, 1983, p. 259). A test like the Competitive States Anxiety Inventory II may help identify whether this somatic anxiety is present; relaxation and breathing techniques, along with a stretching routine can help. The stressful atmosphere of a loud stadium results in task irrelevant cognitions, which impair the performance of fine motor skills (Greer, 1983, p. 258).

Even elite hockey players in the Stanley Cup Finals have difficulty playing on the road. During overtime of Game 3 of the 2010 finals between Chicago and Philadephia, Glen Healy said: "Now here's the danger of playing on the road. At times you feel like you're out-played. You feel the energy in the building and it's harder to skate." Coaches may need to mirror the personality that they want their team to assume.

## TRA VEL

In the Train to Train stage, a regional team in Ontario will not travel by air to different time zones so the effect of jet lag will be minimized. However, teams will travel to tournaments throughout the province and navigate the MacDonald-Cartier Freeway in cars and vans. There is a greater disadvantage for basketball teams who travel more than three hundred and twenty kilometers (Neave 270). This is a consideration since many teams in Toronto may travel to Ottawa (401 km) or Windsor (364 km) for tournaments during the year. Countless basketball coaches conduct their seasons without taking the strain of these trips into account (MacKay, 2010).

Negative symptoms from travelling include fatigue, disorientation, headaches, "travel weariness", and dehydration (Waterhouse, Reailly, & Edwards, 2004, p. 950). If individuals do not feel in peak conditions, they will perform below standards during competition, training, and other important tasks. The effects of "travel weariness" may not be significant for one person but they can accumulate when a team of twelve players is concerned (Wothen & Wade, 1999, p. 282).

#### ONE-PERCENT FACTOR

Travel disruptions include sleep loss, altered meal schedule, and the interruption of routine. These minor disruptions prior to performance could lead to a lack of attentional focus when performing high performance sport. When athletes do not get enough sleep, immediate effects include central nervous system and cognitive functional processes of the brain. Some confusion and physical inability may occur (Underwood, 2010, p. 33).

#### DEHYDRATION

While sitting in a vehicle, players can become dehydrated and stiff. Staying hydrated by drinking plenty of water and making regular stops so that everyone can move around is essential. Travelling can occur during long flights or drives (over four hours) to tournaments or training camps. Try to consume 500ml of fluid every three to four hours. Avoid the temptation of sugary soft-drinks on the flight and purchase additional water bottles after passing security (Williams, Planning for Healthy Athletes, 2009).

Dehydration during a flight can lead to fatigue and a poor performance during practice or the first game. In a study of male basketball players aged 17 to 28, dehydration led to impaired vigilance related attentional performance. Also, when dehydration passes a threshold of two percent, a progressive decline in basketball skills may occur (Ziv & Lidor, 2009, p. 561). Coaches should monitor their players for the symptoms of dehydration and encourage them to drink fluids. Water should be served with every meal (Cleary, 2005, p. 59).

#### NUTRITION

While traveling, it may be difficult to eat properly. Athletes may not be able to prepare healthy food that they enjoy or they may be tempted to eat unhealthy snacks while traveling or at competitions. Symptoms of under-fuelling include low overall energy, poor performance, lack of concentration, irritability, and slower recovery time (Williams, Energy Needs of the Athlete, 2008). Planning and following routines can reduce underfuelling during road trips.

Athletes may not like the "healthy" choices that have been prepared and want to have comfort foods. Consequently, they do not eat enough of the "healthy" choices. Coaches, nutritionists, and athletes should work together to find menu items that are healthy and attractive to the team members. Players should also avoid eating late at night when they are tired; this increases the temptation of eating fast food or a convenience food, which are high in fat and sodium. Student-athletes should bring plenty of familiar snacks with them on road trips and to tournaments.

#### HEALTHY SNACKS

Food for sale at sporting events or in convenience stores is usually high in sugar, sodium, and saturated fats. Many Canadians consume too much sodium at it leads to hypertension and increased risk of heart attack, stomach cancer, kidney disease, asthma, and osteoporosis. It is found often in the preservatives used for processed foods. Children and youth who consume too much sodium also drink more and tend to drink more sugary drinks and cola (Weeks, 2009). Athletes who consume excessive sodium are more prone to dehydration.

Basketball players need to maintain a certain level of blood glucose in order to participate in practices and competitions. While the blood glucose level of collegiate athletes does change much during the season, certain athletes were found to be prone to large fluctuations in their blood sugar level, possibly due to an erratic eating schedule. This can lead to poor physical performance and a lack of mental focus (Croom, 2005).

Some have said that: "Soda loading works. But don't make the National Championships the first time that you soda load (Plyley, Environmental Factors, 2006)." Athletes should be consuming complex carbohydrates early in the day and after competition, not high-sugar soft drinks.

#### FREQUENCY OF GAMES

More so than miles travelled, days since the last game affect visiting professional basketball teams. This is especially evident for teams playing back-to-back games on the road. As the season progresses, the accumulated game frequency adversely affects win production (Nutting, 2009, p. 13)

At the high school and club level, this could be a factor when one team plays a tournament the weekend before and an opponent does not or when a club team comprised of many players from the same high school team plays a game or two in the days leading up to a tournament. At the tournaments, there is an advantage when a team plays a game without sufficient recovery time relative to their opponents. Coaches can mitigate this factor by following an appropriate training to competition ratio (3:1 for teams in the training to train stage) and ensuring enough players are part of the playing time rotation.

#### **IDEAL PERFORMANCE STATE**

Routines can be significantly disrupted by travel. Home teams have higher winning percentages in the absence of rowdy crowds, an effect attributed to the familiarity of the facility and the comfort zone that it creates (Hutchison, Hometown does have its advantages, 2010). Visiting teams face greatly reduced preparation times (Wothen & Wade, 1999, p. 279).

Sometimes teams practice a certain way at home but are thrown for a loop when they find facilities different from what they expected. Coaches can prepare for a future trip by gradually adopting their routine over time. For example, a team that constantly performs dynamic stretching using the entire basketball court can perform the same stretches standing on the spot (Stein, 2010). Those who find that working out earlier in the day helps clear their mind need to make it a "must do" activity on their schedule, otherwise it will fall by the wayside next to other activities during a busy trip itinerary (Storm, 2010).

#### COST

Whilst travelling can serve as a unifying team experience that is remembered for many years, the teambuilding and life skills lessons do not come cheap. Sport in Canada is highly correlated to family income level. Youth in the lowest and second-lowest quintiles in terms of household income have a participation rate of forty-four percent, compared with sixty-eight and sixty percent in the highest and second-highest quintiles respectively (Clark, 2005).

High fees can discourage some good athletes from participating. Teams that travel extensively must fundraise and look for sponsorships to keep costs affordable. The Forest Hill Collegiate Institute Senior Boys Rugby team successfully generated community support for a trip to England by selling calendars to parents and neighbourhood residents. The calendars were numbered and each month, there was a lottery for prizes that had been donated. Another community team, Toronto Mission, partially subsidized a trip to Italy with a banquet and poker night for team supporters.

Modifying the perception of the availability of sports in the community would increase the participation rate. However, there is a clear delineation between objective and perceived availability so a coach must not only devote time and effort to fundraising but also promotion (Pins, Oenema, van der Horst, & Brug, 2009).

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# 4

## Conclusion

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## PLANNING

#### **BACKWARDS DESIGN**

As some with significant experience in business and education, I often turn to those fields to help with my coaching. Stephen R. Covey said: "To begin with the end in mind means to start with a clear understanding of your destination. It means to know where you're going so that you better understand where you are now so that the steps you take are always in the right direction." Teaching current emphasizes the expectations that all students should meet and assessment is designed to meet those objectives (Covey, 2004, p. 92).

If a coach has expectations about the environmental conditions at a major meet, training to perform despite those conditions should be an integral component of planning. Given the difficulties posed by climate, gym, and psychological factors, the coach should determine the level of performance that the athletes must reach. Planning should incorporate learning experiences and assessments for the athletes. Athletes should demonstrate proficiency by achieving long-term and short-term objectives. This design will enable athletes to understand what they will encounter and how to succeed (Hammond, 2007).

#### INITIATION, ACQUISITION, CONSOLIDATION, REFINEMENT

#### Initiation • Introduce general fundamental concepts

Athletes in the Train to Train stage can learn general concepts about adapting to the environmental factors (MacKay, 2010). It is not necessary to explain each factor in great depth but a brief outline of the relevant factors and their effect is appropriate.

#### Acquisition • Teach the specific actions that exemplify that concept

Players should learn specific mental training strategies to cope with environmental factors, such as breathing and visualization exercises. The impact of the environment on the performance can be mitigated with proper routines for rest and nutrition. All players should understand the importance of proper hydration.

**Consolidation** • Incorporate the specific actions into existing knowledge Preparing for environmental factors should be a part of planning so that all team members develop positive habits. Coaches should be cognizant of the example that they set and model the way at all times.

Refinement• Assess performance and identify areas for improvementCoaches should always monitor how their players adjust to environmental factors and use<br/>360° Assessment to make the players stakeholders. Team debriefing sessions, self-<br/>evaluation forms, and one-on-one interviews are all methods for coaches to get feedback<br/>from players and communicate how they can improve performance.

| <b>Ce</b><br>Env | ntral East Boys M.D<br>vironmental Factors | . <b>P. Team 2010</b><br>s Training Calendar                                 | J                       | uly 2010  |      | <b>Goals:</b> Prepare for heat, noise, and different gym conditions in a 13 week program |            |   |  |
|------------------|--|--|-------------------------|---|------|--|------------|---|--|
|                  | SUNDAY                                     | MONDAY   | TUESDAY                 | WEDNESDAY   | THUR | RSDAY  | FRIDAY     | SATURDAY  |  |
|                  |  |  |                         |   |      | 1  | 2          | 3   |  |
|                  |  |  |                         |   |      |  |            |   |  |
|                  |  |  |                         |   |      |  |            | Practice  |  |
|                  |  |  |                         |   |      |  |            | C Hydr. & Nutr.   |  |
| F                |  |  |                         |   |      |  |            |   |  |
|                  | 1  | 5  | 6                       | 7   |      | 8  | 0          | 10  |  |
|                  | 7  | 5  | 0                       | /   |      | 0  |            | Exhibition  |  |
|                  | PREP Climate                               | Practice   |                         | Practice  |      |  |            | Game  |  |
| Т                |  | P Playing Away   |                         | C Training in Heat  |      |  |            |   |  |
| E                |  | Env. Self-Assess.  |                         | C Hydr. BenchM.   |      |  |            | Video Analysis  |  |
| F                |  | P Ment.Train.Tech.   |                         |   |      |  |            |   |  |
|                  | 11   | 12   | 13                      | 14  |      | 15   | 16         | 17  |  |
|                  |  |  |                         |   |      |  |            |   |  |
|                  | PREP Psych.                                | Practice   |                         | Practice  |      |  | Tournament | Tournament  |  |
| T                | D.F., D., Mak                              | $2(0^{\circ})$ Assessments   |                         | F Adapt. Shooting   |      |  |            |   |  |
|                  | P Ex. Dec. Mak.                            | 360° Assessment  |                         | C Fatigue Migmt.  |      |  |            |   |  |
| F                | 10   | P Dec. Mak. Strat.   |                         | 0.1   |      |  |            | 0.4   |  |
|                  | 18   | 19   | 20                      | 21  |      | -)-)   |            | -2/1  |  |
|                  | PREP Climate                               |  |                         | — -   |      |  | 23         | 27  |  |
| _                | Tournamont                                 | Dractico   |                         | Practico  |      |  | 23         | Dractico  |  |
| I T              | Tournament                                 | Practice   |                         | Practice  |      |  | 23         | Practice  |  |
| F                | Tournament                                 | Practice   |                         | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2   |      |  | 23         | Practice<br>F Effect.Warm-Up  |  |
| E<br>F           | Tournament                                 | Practice C Sport-Spec.Agil.  |                         | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2   |      |  | 23         | Practice<br>F Effect.Warm-Up<br>C Training Assess.  |  |
| E<br>F           | Tournament 25                              | Practice C Sport-Spec.Agil. 26   | 27                      | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2<br>28   |      | 22   | 30         | Practice<br>F Effect.Warm-Up<br>C Training Assess.<br>31  |  |
| F                | Tournament<br>25                           | Practice<br>C Sport-Spec.Agil.<br>26<br>Exhibition                           | 27                      | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2<br>28   |      | 22   | 30         | Practice<br>F Effect.Warm-Up<br>C Training Assess.<br>31<br>Practice  |  |
| F                | Tournament<br>25<br>PREP Facilities        | Practice<br>C Sport-Spec.Agil.<br>26<br>Exhibition<br>Game                   | 27                      | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2<br>28<br>Practice   |      | 22   | 30         | Practice<br>F Effect.Warm-Up<br>C Training Assess.<br>31<br>Practice<br>Taper Next Week                                   |  |
| F<br>T           | Tournament<br>25<br>PREP Facilities        | Practice<br>C Sport-Spec.Agil.<br>26<br>Exhibition<br>Game                   | 27                      | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2<br>28<br>Practice<br>P How to Travel                      |      | 29   | 30         | Practice<br>F Effect.Warm-Up<br>C Training Assess.<br>31<br>Practice<br>Taper Next Week<br>F Prep for OSG                 |  |
| T<br>F           | Tournament<br>25<br>PREP Facilities        | Practice<br>C Sport-Spec.Agil.<br>26<br>Exhibition<br>Game<br>Video Analysis | 27<br>PlayerReportCards | Practice<br>C Clim.Cop.Skills<br>C Beep Test #2<br>28<br>Practice<br>P How to Travel<br>Env. Self-Assess. |      | 29   | 30         | Practice<br>F Effect.Warm-Up<br>C Training Assess.<br>31<br>Practice<br>Taper Next Week<br>F Prep for OSG<br>P CSAI-II #2 |  |

LEGEND

Planning NotesI Training Emphasis • E Evaluation Dates • F Feedback Given • PREP Preparation EmphasisEnvironmental FactorC Climate Factors • F Facility Factors • P Psychological Factors

## ASSESSMENT

#### ASSESSMENT FOR LEARNING

At the outset of the season, players know what is expected of them. The Midget Development Program hopes to succeed in the following areas:

- Physical Development of Players
  - Long Term Athlete Development Training
  - o Improvement in Fundamental Skills at Game Intensity
- Mental Development of Players
  - Increased Leadership Skills
  - Decision Making under Pressure
- Self-Actualization, Personal Satisfaction, and Enjoyment of Players
- Competitive Success (Ontario Summer Games 2010)
- Coaches' Professional Development

Performance is a function of the people involved and the environment (Martens, Vealey, & Burton, 1990, p. 14). Coaches should not develop tunnel vision and focus solely on the people on their team. Environmental factors can affect Long-Term Athlete Development, the Performance of Fundamental Skills, Decision Making under Pressure, and Competitive Success.

**Climate Factors:** To maximize Physical Development of Players, coaches should assess the team's training during hot and humid weather using benchmark tests like the 20m Leger Test and a Sport-Specific Agility Test. Players should refine their Climate Coping Skills as the season progresses. It is also to monitor Hydration Benchmarks throughout the campaign. Fatigue Management can help identify athletes at risk of injury or illness, identify athletes at risk of overtraining, and track the aches and pains of training (Scott, 2010, p. 18).

**Facilities Factors:** Facilities - including equipment - can impact the performance of fine motor skills and harm the competitive success of the team. Coaches should know what to expect ahead of time and prepare their team to perform well in that environment. For good Quality Control, teams should monitor their normal stats and analyze how they might change in different environments.

In order to accurately remember environmental factors and successful coping strategies, coaching could keep a journal of the climate in the area, the condition of the court, and any other information, such as restaurants that provided healthy food in the area. The coach should focus on objective facts and avoid the temptation to be subjective, such as assuming causation or organizing events in a narrative so that they fit a preconceived set of rules (Taleb, 2010, p. 73).

**Psychological Factors:** Obviously, evaluating the Mental Development of Players entails the assessment of Competitive Anxiety, which can be aggravated by noise, playing at

#### Conclusion

home or away, and travelling. The Competitive States Anxiety Inventory-2 (Martens, Vealey, & Burton, 1990, p. 177) test can divide this anxiety into cognitive and somatic anxiety so that a coach can provide each player with appropriate mental training strategies. Over time, competitive anxiety should lessen.

#### ASSESSING PREPARATION

It's not possible to assess preparation against all eventualities but it is possible to assess preparation in general (Taleb, 2010, p. 204). "Trial and error means trying a lot." When deciding what should be a point of emphasis, coaches should consider the idea of ranking beliefs not according to their plausibility but by the harm they may cause. Knowing that you cannot predict does not mean that you cannot benefit from unpredictability (Taleb, 2010, p. 200).

#### ENVIRONMENTAL FACTORS AND STATISTICS

The Four Factors (Oliver, 2004, p. 63) that contribute to winning basketball games are:

- Effective Shooting Percentage 40%
  - roughly calculates the number of points from two and three point shots per total field goal attempts
- Turnovers 25%
  - expresses the number of turnovers for each team possession
- Offensive Rebounding 20%
  - number of offensive rebounds out of total available rebounds
- Free Throws Attempts 15%
  - o number of free throw attempts relative to field goal attempts

**Climate Factors:** Fatigue lowers shooting percentage, increases the number of turnovers, and discourages driving to the lane to take fouls. Late in games, dehydration affects decision-making under pressure and attentional focus.

**Facilities Factors:** Lighting and depth perception, backboards, rims, and basketballs can affect shooting percentage. The court and basketball affect the number of turnovers.

**Psychological Factors:** Referees may not call fouls against the home team. Also, an anxious person may shoot poorly or feel too nervous to attack the basket. Visiting team win when they miss less three point shots and secure more defensive rebounds (Sampaio & Janeira, 2003, p. 45).

#### 360° ASSESSMENT

Players require frequent forthright feedback. It's not a criticism of the player but of the performance. Players should also participate in 360° assessment periodically. On the other hand, players need to know what they do well and receive opportunities to do it during games and practices. Coaches should identify positive and negative trends early; inviting players into the process offers another set of eyes.

## Environmental Factors PLAYER SELF-EVALUATION FORM

| <ul> <li>NAME DATE / / #</li> <li>Environmental Factors influence the outcomes of games but remain outside the control of players. Players can only prepare for how they will adapt to their environment.</li> <li>Basketball's Environmental Factors relate to Climate, Facilities, and Psychological issues.</li> </ul> |                      |               |              |               |                    |  |  |  |  |
|---|----------------------|---------------|--------------|---------------|--------------------|--|--|--|--|
| HOW WOULD YOU RATE YO   | our Personal P       | REPARATION    | FOR ENVIRC   | DNMENTAL FAC  | ORS?               |  |  |  |  |
| NEEDS IMPROVEMENT   | SATISFACTORY         |               | GOOD         | EXCE          | LLENT              |  |  |  |  |
| HOW WOULD YOU ARE THE   | TFAM'S PREPAR        | ATION FOR FI  |              | ITAL FACTORS? |                    |  |  |  |  |
|   | SATISEACTODY         |               | COOD         | EVCE          |                    |  |  |  |  |
|   | SAIISFACTORT         |               | GOOD         |               |                    |  |  |  |  |
| HOW DO ENVIRONMENTAL  | . FACTORS AFFEC      | CT YOUR PERF  | ORMANCE?     |               |                    |  |  |  |  |
| DON'T KNOW  | NOT AT ALL           | Α             | LITTLE BIT   | A GRE         | AT DEAL            |  |  |  |  |
| WHAT ARE SOME OF THE BI   | <b>GGEST THREATS</b> | TO YOUR SUC   | CESS?        |               |                    |  |  |  |  |
| Climate Factors   | Heat •               | Humidity • Co | old          |               |                    |  |  |  |  |
| Facilities Factors  | Lighting             | • Equipmen    | t • Court Co | onditions     |                    |  |  |  |  |
| Psychological Facto   | rs Noise •           | Plaving at Ho | me • Plavinc | Away • Travel |                    |  |  |  |  |
| WHAT IS YOUR OPINION OF THE FOLLOWING COPING STRATEGIES FOR THE ENVIRONMENT?  |                      |               |              |               |                    |  |  |  |  |
| - Dra Campatitian Daut  |                      |               |              | SOMEWHAT      | VERY               |  |  |  |  |
| • Pre-Competition Rout  | ines N               |               | JI USEFUL    | EFFECTIVE     | VALUABLE           |  |  |  |  |
| Ideal Performance Sta   | ate N                | /A NO         | OT USEFUL    | SOMEWHAT      | VERY               |  |  |  |  |
|   |                      |               |              | EFFECTIVE     | VALUABLE           |  |  |  |  |
| Mental Visualization  | N                    | /A NC         | OT USEFUL    | SOMEWHAI      | VERY<br>VALLIARI F |  |  |  |  |
|   |                      |               |              | SOMEWHAT      | VERY               |  |  |  |  |
| <ul> <li>Breathing Exercises</li> </ul>   | N.                   | A NC          | DT USEFUL    | EFFECTIVE     | VALUABLE           |  |  |  |  |
| Debriefing Performan  | ces N                |               | OT LISEFUI   | SOMEWHAT      | VERY               |  |  |  |  |
| e Debhening renorman  |                      |               |              | EFFECTIVE     | VALUABLE           |  |  |  |  |
| Warm-Ups/Cool Down  | ns N                 | /A NC         | DT USEFUL    | SOMEWHAI      |                    |  |  |  |  |
|   |                      |               |              | SOMEWHAT      |                    |  |  |  |  |
| Nutrition/Hydration   | N                    | A NC          | DT USEFUL    | EFFECTIVE     | VALUABLE           |  |  |  |  |
|   | iaction              |               |              | SOMEWHAT      | VERY               |  |  |  |  |
| <ul> <li>Non-verbal Commun</li> </ul>   | ICation N            |               | JI USEFUL    | EFFECTIVE     | VALUABLE           |  |  |  |  |
| <ul> <li>Immediate Feedback</li> </ul>  | < N                  | /A NO         | OT USEFUL    | SOMEWHAT      | VERY               |  |  |  |  |
|   |                      |               |              | EFFECTIVE     | VALUABLE           |  |  |  |  |
| Adaptation/Problem  | Solving N            | /A NC         | OT USEFUL    | SUIVIEWHAI    | νεκγ<br>ναι μαρί γ |  |  |  |  |
| ARE THERE ANY OTHER SPE   | CIFIC COPING T       | ECHNIQUES TI  | HAT YOU WO   | DULD SUGGEST? |                    |  |  |  |  |

Thanks,

this assessment is a step towards future success.

## TEACHING PROBLEM SOLVING

Successful athletes need to think during games like successful students must think at school. A basketball coach cannot stop a game every time there is a sub-optimal outcome. Players who are generally prepared will be able to handle climate, facilities, and psychological factors. If players think and adjust, they can use their intelligence, creativity, and teamwork to overcome environmental factors. Coaches can enable thinking among players by incorporating these elements into their philosophy:

#### 1) DEVELOP AWARENESS

Many practices do not even include the idea of environmental factors; there is an assumption that every situation will be identical. Coaches should inform players about the environmental conditions that they will face, how to handle them, and the importance of routines. Understanding the competitive anxiety process helps players understand feelings of arousal, manage stress, and minimize threats (Martens, Vealey, & Burton, 1990, pp. 3-10).

#### 2) PRESENT OPTIONS AND TEACH COPING SKILLS

Let players know what is available. The best way to run a play depends on each individual person and the environment. When players know the different options, they are more able to adjust. Constant adaption is critical to defeating environmental factors. Coaches can assess general coping skills and create a squad that can handle adversity (Taleb, 2010, p. 204).

#### 3) ENCOURAGE COMMUNICATION

Playing smart is complementary to playing together. Insist that players talk to each other on the court and illustrate various methods of doing so, both verbally and non-verbally. Suggest foul-line huddles during games as an excellent way for the team to stay on the same page. When teams work together, they can share information about environmental factors, like the equipment or the officiating, and overcome it together.

#### 4) THINK THROUGHOUT THE SEASON

Debriefing performances throughout the season allows players to be part of the assessment process (Halden-Brown, 2003, p. 182). Memories are costly to store - in terms of time and effort - and often change over the years (Taleb, 2010, p. 67). To ensure improvement and the team becomes closer to its goals, assessment should use objective tools and keep accurate records.

#### 5) CONGRATULATE PLAYERS FREQUENTLY

People can only do their best so players should be congratulated when they do their best, even if the outcome is less than desirable (Wooden, 1999, p. 2). Players should receive instant feedback, especially when they demonstrate exception problem-solving skills. Congratulate players who do what is best for that situation, stop drills to present more information, and remain flexible at all times.

## TEACHING RESILIENCE

The recent World Cup has proven to be an excellent opportunity to showcase resilience (or lack thereof). Asamoah Gyan may have missed a penalty shot over the net because of the high altitude or the defective Jabulani ball but he still needed to compose himself, take control of the situation, and score another penalty minutes later.

Resilience allows individuals to persevere in the face of adversity. Sport and play helps youth experience "to experience social competence, empathy, caring, problem-solving skills, critical and creative thinking, task mastery and a sense of purpose and connectedness" for the rest of their lives (Henley, Schweizer, de Gara, & Vetter, 2007). Self-efficacy is strongly related to exercise behavior. In many ways, we are how we play -- and vice-versa (Horn, 2002, pp. 108-9). Athletes who can handle tough circumstances, realizing that they control the situation become people who overcome adversity later on.

#### 1) MODELLING THE WAY

In the Quarter-Final match against the Netherlands, the Brazilian team experienced some misfortune and collapsed, from the coach out. Victim of a handful of poor officiating decisions and an own-goal, Brazilian coach Dunga banged the plexiglass behind his bench and marched along the sideline in frustration. Soon, the players began to complain and give up on more and more battles for loose balls, eventually losing the game.

Coaches must lead by example, mirroring the personality than they want their team to show. If the court is different from expectations and shots are not falling, the coach should remain calm and adjust tactics. If the officials are intimidated by the home crowd and making questionable calls, the coach should be confident and reasonable.

#### 2) CREATE A TEAM ATMOSPHERE

Players should always feel that they are part of something greater. Players from an atrisk environment don't need help losing but need role models (Sialstis, 2009). In the huddle (at home or on the road), every team member should understand that they depend on each other in order to succeed.

#### 3) REFRAME THE SITUATION

Reframing a situation allows athletes to see the situation from a different perspective and see opportunities amidst threats. Every situation contains several openings (Jensen, 2003, p. 29). The climate may be hot and tiring but both teams are equally fatigued. The gym may be loud and threatening but it is also a chance to achieve self-actualization goals.

#### 4) REASSURE AND RECOGNIZE

Perceived threats can trigger fear of failure/feelings of inadequacy, social evaluation, and external control/guilt (Martens, Vealey, & Burton, 1990, p. 79). Players need only feel threatened by a new situation - like a hot and humid climate or travelling for the first time - for performance to be impaired. Coaches should always support players and reassure them understand that the situation is beatable. When an athlete makes a good effort to overcome a situation, such as ignoring noise and taking leadership on the court, they should be recognized for their efforts, irrespective of the result.

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#### Conclusion

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"The block of granite, which was an obstacle in the path of the weak, becomes a stepping stone in the path of the strong." - Thomas Carlyle