The Basics of Injury Prevention
Vancouver Minor Hockey, Official's Meeting, Nov. 19, 2005

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Topics:

- At-home pre-game preparations
- Nutrition tips for athletes
- Proper hydration and maintenance during games/practices
- Warm-up and Cool-down
- Properly fitting equipment
- Practice basic hygiene and prevention of communicable diseases
- Conditioning for type of sport
- Proper at-home management of minor injuries
- Proper rehabilitation and time-off to recover from previous injury
- Development of skills and awareness of situations that may compromise safety

At-home Pre-game Preparations

- Pre-game meal.
- Pre-game hydration.
- Pre-game warm-up and stretching.
- Ensure all equipment is packed (and not broken).
- Prepare water bottle (with sports drink, etc), and post-game water bottle if necessary.
- Air dry your equipment and wash regularly.

Nutrition for Athletes

- Pre-game Meal:
  - Aim for **high-carbohydrate** foods (i.e. fruits, dried fruits, nuts, energy bars, yogourts, breads, etc.).
  - Avoid high-protein and high-fat foods 2-3 hours before game/practice.
    - It takes longer to digest and will feel "heavy" (saps energy and may lead to feelings of nausea/sick).
  - **Extra carbohydrates in meals the day before.**
- Post-game:
  - Easy to digest foods (bread, raisins, watermelon, fruit snacks, baked potato, rice, oatmeal, carb drinks, fruit smoothies, etc.).
  - To replenish used up energy stores.
    - Ideal example: at the rate of 1 bagel and juice (or the equivalent) every 2 hours for 6 hours.
  - High-protein foods after ~1-2 hours post-exercise.

Proper Hydration

- Pre-game:

- ~5-6 cups, 2-3 hours prior
- 2-3 cups just before

- During:
  - ~1cup/15mins
- Post-game:
  - As much as needed
- What to drink?
  - Sports Drinks
    - (Gatorade, Powerade, XS Sports Drink, etc.)
  - Do it yourself:
    - Half cup orange juice + 1-3 pinches of salt + rest of bottle is water.
    - Can experiment to see what you like
  - Nothing high in sugar (juice, pop, etc.)

Warm-up and Cool-down

- Warm-up:
  - Use of large muscles during warm-up, especially the primary muscles to be used in the particular sporting activity.
  - Work up a light sweat. The best way to warm up a body or warm up your muscles, is to do it internally (i.e. use muscles, get heart pumping).
- Pre-game stretching:
  - Not the same as post-game stretching.
  - Pre-game stretches can be two types: ACTIVE and PASSIVE
  - **Active stretches** help to prepare the muscles for activity. It moves the muscle through the full range of motion that will be required during the game/practice.
    - Can be done during on-ice warm-up before game
  - **Passive stretches** can be done at home prior to arriving at the rink.
    - See attached Hockey Canada Guide to Warm-up and Stretching
- Cool-down:
  - Progressive cool-down to encourage blood circulation
  - Promote the clearance and recycling of lactic acid that has built up in the muscles as a result of high intensity activity.
  - Low intensity, 10-15 minutes.
  - Make it fun
- Post-game stretching
  - The goal of post-game stretching is to re-lengthen a muscle that has been working (and shortening) for the past hour.
  - Muscles are still warm, take 10-15 minutes to stretch it out.
    - These are those traditional stretches that most people are familiar with. (See Hockey Canada Guide)
  - The last thing you want to do after a game or practice is to go home, shower, and slump onto the couch.

- See Hockey Canada Safety Program is attached. Please read. P 65-74.

Properly Fitting Equipment

- Make sure all equipment fits properly.
- Second-hand equipment

- Know what to look for when fitting equipment
- Ex: elbow pad length, shin pad size, glove cuff length, snug-fitting helmet.

Basic hygiene and prevention of communicable diseases

- See attached: **VMHA Health tips for the Team Bench**

- Stay home if you're sick
- Don't share water bottles
- Don't share mouthguards, etc.
- Wash equipment, jerseys, socks, etc.

Conditioning

- Fatigue makes an athlete more susceptible to injury.
  - decreases overall awareness,
  - technique breaks down,
  - body cannot physically respond as quickly
- Two types of energy systems in your body: AEROBIC and ANAEROBIC.
- Two aspects of training for each system: CAPACITY and POWER
- Aerobic System:
  - Supplies your body energy over extended periods of time. This is low to medium intensity.
  - It also helps to recharge and recycle used up energy molecules to be reused.
  - In hockey, a well-trained aerobic system makes you more efficient and helps you to recover faster in between shifts.
- Anaerobic System:
  - Supplies your body energy over short periods of time. This is high to maximal intensity.
  - It allows your to perform at a high intensity for up to 2 minutes.
  - Thus, the 45 second shift.

- How to get started?
  - Establish intensity of workout.
  - Intensity level measured by heart rate

  - STEP 1:
    - Take resting heart rate (measured in heart beats per minute).
      - Ex: Take pulse for 10 seconds, then multiple by 6 = resting heart rate over 1 minute
  - STEP 2:
    - Calculate: 220-age = for males, 226-age = for females.
  - STEP 3:
    - Calculate: (Answer for STEP 2) – (Answer for STEP 1) = Heart Rate Reserve (HRR)
      - Ex: Age 15, male, resting heart rate=75
        - (220-15) – 75 = 130 (HRR)

  - STEP 4:
    - When setting intensity, it is set as a % of HRR, then added to the resting heart rate.
      - Ex: "Run at 50% intensity for 5 minutes."

- 50% of 130 (HRR) = 65
- 65 + 75 (resting heart rate) = 140

THUS: run at a heart rate of 140bpm for 5 minutes.

- During exercise, your body automatically adjusts your heart rate for how hard you are running/performing.
  - If you've been running for 3 minutes at a steady speed, check your heart rate, and if it is only at 120, then you need to increase your speed.

- Aerobic Capacity:
  - technically limitless (i.e. you can jog at a snail's pace all day long)
- Aerobic Power:
  - The goal is to become more efficient
    - (i.e. run at a faster steady speed, at the same heart rate.)
  - Time yourself for an 1 km run (2.5 times around a track).
    - Set goals to beat that time each time you go for a run.
    - We want a steady speed; not sprint one lap and jog the rest.
  - Heart rate range for aerobic power training = **55-85% of HRR.**
  - Ideally, perform 5-10 repetitions (i.e. 5-10kms) each time.
  - Rest time between each repetition is equal to time for run.
    - (i.e. 4 minutes to run 1 km = 4 minutes rest, 5-10 km total
- Anaerobic Capacity:
  - Perform sprints that last 20-120 seconds.
  - **"All-out" each time.**
  - Choose a maximum speed for that interval time
    - (i.e. you can run harder and faster for the 20s sprint than for the 60s sprint).
    - 4-8 repetitions, 1-2 sets.
  - Rest time between repetitions is 2-3 times the interval time
    - (i.e. 20s sprint ☾ 40-60s rest),
    - 5-7 minutes between sets.
- Anaerobic Power:
  - Perform sprints that last 5-20 seconds.
  - **"All-out" each time.**
  - 4-8 repetitions, 3-5 sets.
  - Rest time is twice the sprint time
    - (i.e. 10s sprint ☾ 20s rest),
    - 3-5 minutes between sets.
- Age-group emphasis: (from Hockey Canada Safety Program, 2005)
  - 9-12 year olds = motor coordination and skill development.
  - 13-16 year olds = development of aerobic conditioning and muscular endurance.
  - 17-20 year olds = development of aerobic, anaerobic, and muscular strength and power.

- The Hockey Canada Safety Program is attached. Please read. P. 62-64.

At-home Management of Minor Injuries

- What happens when you sustain an injury?
  - Chemicals are automatically released within the body, which initiate an inflammatory response.

- The inflammatory response leads to swelling (aka: *edema*)
- Discolouration (bruising) usually follows due to the damaged blood vessel wall
  - Blood cells rush out of the damaged blood vessel and into the space between the muscle cells (aka: the *interstitial space*)
- These blood cells (aka: *plasma solids*) are now considered debris in the interstitial space
  - Unable to return back to the damaged blood vessel the plasma solids die as a result.
  - The accumulation of debris is called a *hematoma.*
- This hematoma (like a dam of dead cells) blocks nutrients and new blood vessels from entering the damaged area.
  - Prevents clearing out of the debris, thus, delaying the healing process.

- ↓ **the amount of edema** = ↓amount/size of the hematoma = ↓time for body to rid of hematoma = ↓time for body to heal.

- **R.I.C.E.R.**
  - **R**estricted Movement: immediate mvt is good (but only up until pain)
  - **I**ce:↓ pain, ↓spasticity, ↓local blood flow
  - **C**ompression: ↓edema by attempting to equalize hydrostatic pressure (i.e.↓fluid/blood from exiting capillary)
  - **E**levation: assist in draining fluids away from injury site
  - **R**eferral

- Inflammatory phase: ~3 days post-injury
  - NO HEAT, NO MASSAGE to injured area during inflammatory phase.
  - Anti-inflammatories (if needed)
- Once inflammatory phase is over:
  - Can apply heat and massage, to encourage circulation to region and promote clean up of the hematoma.
    - 4 minutes cold, 1 minute warm… continue cycle for 20-30 minutes each session.
      - How? For leg/ankle injury… dip leg in pool for 4 minutes, dip leg in hot-tub for minute.

- **Who cares?**
  - Healing by second intention:
    - Healing occurs with block of scar tissue = lax joints = easier to reinjure.
  - Myositis Ossificans:
    - As the dead cells of the hematoma are cleaned up, the new cells repairing the area can develop irregularly and become bone.
    - Limits range of motion, leads to greater potential for future injuries.

Proper Rehabilitation and Recovery-time

- A injured area of the body is likely to be re-injured for the rest of your life (ex: sprained ankle, groin muscle strain).
- Insuring that an injury is completely healed, that the joint/area has **full strength** and **full range of motion**, will minimize the occurrence of re-injury.

- ***This includes **physiotherapy** sessions and a **physician's approval to return to play.**

Development of Skills and Awareness

- Development of skills:
  - Puck handling with head up.
  - Ability to stop and turn on both sides.
  - Ability to control your speed and stay under control at high speeds.
  - Learn how to see the ice and what to look for.
  - Experience on what to do when handling the puck under pressure.
- Situations that may compromise safety on-ice:
  - Be aware of what's around you (players, boards, bench, net, etc.)
  - How to play the puck on the boards.
  - How to approach a puck on the boards.
  - How to see a hit coming.
  - How to take a hit.
  - How to protect yourself without injuring someone else.

Sources:

www.hockeycanada.ca
Hockey Canada Safety Program: Emergency Action Plan, Hockey Safety Person Tips, Injury Prevention Techniques. Accessed November 2005.

Nanci S. Guest, Presentation on Nutrition for Health & Fitness, January 2005.
www.powerplayweb.com

www.thinkfirst.ca
ThinkFirst-SportSmart Concussion Education and Awareness Program

www.vmha.com/safety_person.htm
Vancouver Minor Hockey Association Website
Health Tips for the Team Bench