HYDRATION, DEHYDRATION, & REHYDRATION FACTS FOR HOCKEY PLAYERS

WHAT is...

- **HYDRATION:** "Hydration refers to the human body's ability to take in and maintain a steady level of water in its tissues and organs down to the cellular level. It describes a condition of fluid balance (water homeostasis) when adequate fluid levels are maintained" [4].
- **DEHYDRATION:** Dehydration is when the body loses too much water (and electrolytes) that is a result of excess sweating (during vigorous exercise). Dehydration occurs because more fluid is lost from the body than is taken in. [7].
- **REHYDRATION:** Replacing lost fluids into the body is of particular importance to athletes performing repeated bouts of exercise, and to those performing in sports lasting more than 50 min. Without proper hydration and rehydration an athlete's ability to perform is diminished. Water loss during and after exercise is reflected in a loss of body weight [8].

WHY is it important for hockey players to stay hydrated?

- Studies have proven that hockey players lose large amounts of sweat during practices and games and dehydrate by 1.5% of their body mass (BM) or greater [10].
- If a hockey player looses more than 2% (3lbs for a 150lbs player) or more of body weight through sweating, it has been shown to decrease performance (skating speed and distance covered, especially later in the game), increase core temperature, and increase fatigue [2][10].

THE ROLE WATER PLAYS ON LIFE, HEALTH & PERFORMANCE

- Water makes up about 60% of body weight. [7].
- Nutrition and HYDRATION play a large role in the training, adaptation, and preparation for competitions, and in the recovery from training and competition.
- Also, how well you adapt to, and recover from, one training session or competition often dictates how well you perform in the next training session or competition [5].

HOW DO HOCKEY PLAYERS BECOME DEHYDRATED?

- Vigorous exercise, such as hockey practice, games and off-ice training sessions, raises the body temperature (core and skin), which elicits heat loss in the body including skin blood flow and increased sweat secretion. Through sweating the body can lose a substantial amount of water and electrolytes, if not balanced these losses can negatively impact performance and health [1].
- In hockey a number of the factors that effect an athlete's dehydration are controlled like the temperature of the rink and the equipment needed to play the sport but nonetheless, there is still considerable variability that contributes to sweat rate.
- Individual characteristics (body weight, genetic predisposition, heat acclimatization state, metabolic efficiency) can all play a part in your hydration rate [1]. Your position, time on the ice and playing style can also impact your sweat rate. You need to create a hydration plan that suites your needs.

DEHYDRATION CAN LEAD TO...

WHEN: TIMING IS EVERYTHING!

***By the time you feel thirst you are already experiencing symptoms of dehydration, and for that reason thirst is not an indicator of when to drink water or a sport drink.**

BEFORE

BEGIN HYDRATED!

- At least 4 hours before a game, players should drink at least 2–3mL/ lb body weight (450mL for a 150lbs player) of water or sport beverage. This will allow enough time to optimize hydration and for excretion of any excess fluid [3].
- Consuming beverages with some sodium and/or small amounts of salted snacks or sodium-containing foods at meals will help to stimulate thirst and retain fluids [1].
- In one study 38% of elite junior hockey players STARTED the game dehydrated and an even greater number of the players were dehydrated after practice [5].

DURING

STAY HYDRATED!

- The typical sweat rate of athletes ranges from 0.5 to 2.0 L/h [5, 8]. This means, in order to maintain fluid balance and prevent dehydration, players need to ingest 0.5 to 2 L/h of fluid in order to offset weight loss. This requires frequent ingestion of 6-8oz of water or a carbohydrate (5-8%), electrolyte (CHE) sports drink every 5 to 15-min during exercise" [2].
- Studies have indicated that ingesting a CHE solution maintains body mass throughout a 70-min hockey scrimmage resulted in improved hockey performance, thermoregulation, and decreased fatigue as compared with drinking no fluid and dehydrating by 2% [10].
- One study demonstrated that despite abundant opportunities to hydrate during a hockey game, one-third of the players did not drink enough fluid to prevent sweat losses of 2% BM or higher [11].

AFTER

GET REHYDRATED!

- To properly replenish the fluids lost, athlete's need to consume at least 700mL of water for every pound lost [2].
- Rehydration beverages and salty foods at meals/snacks will help replace fluid and electrolyte losses during games and practice [3].

Environment Factors:

Heat & Humidity

• Hot, humid environments increase the risk of dehydration dramatically, so it is imperative that an athlete takes extra precautions before starting a training sessions and be well hydrated, continue to take fluids through out the session and after the training session. Since hockey is played indoors, air temperature is not usually an issue for games or practice but dryland training during the summer often occurs outdoors where temperatures can be warm.

Cold

• NHL rinks are mandated to be kept at 58 degree Fahrenheit or 14.5 degrees Celsius, so cold temperature is not an issue but if any training happens on outdoor rinks athletes need to maintain a good hydration plan regardless of the reduced desire to drink fluids or feeling they are not sweating enough to warrant hydrating ever much in the cold environment.

Equipment

• One of the biggest factors that impacts hockey players ability to maintain hydration through the sweat loss due to the insulated equipment needed to play the game. While the rink is usually cool, a player's body core can reach high temperatures because of gear and the intensity the game is played at.

Altitude

• Beyond the fluid loss associated with exercise, when traveling to events at higher altitude (>2500m/ 8200ft), player should ensure they are taking in 3-4L/day to stay hydrated [3].

GOOD SOURCES OF WATER RICH FOODS[9]

About 80% of the water the average person needs is replaced by drinking liquids. The other 20% is found in food. Below are some foods and the percentage of water that they contain:

- iceberg lettuce, 96%
- cucumber, 96%
- tomato, 94%
- spinach, 92%
- squash, cooked, 90%
- cantaloupe, raw, 90%
- 2% milk, 89%
- oranges, 87%
- carrots, 87%
- apple, raw, 86%
- cottage cheese, 76%
- potato, baked, 75%
- banana, 74%
- macaroni, cooked, 66%
- turkey, roasted, 62%
- steak, cooked, 50%
- cheese, cheddar, 37%

ARE YOU HYDRATED?

If you answer "YES" to any of these questions you may not be adequately hydrated:

- Am I thirsty?
- Is my urine a dark yellow color?
- Is my body weight noticeably lower than yesterday?

Determine Sweat Rate to Estimate Fluid Needs:

Sweat Rate (L/h) = weight loss + fluid intake / duration of exercise (hrs)

"Typical" sweat rate = 1-2 L/h [Smith]

*If a 150lbs player losses more than 3lbs (2%) during a practice or game, his/ her optimal performance will likely be compromised.

Hydration Chart

1		Good
2		Good
3		Fair
4		Dehydrated
5		Dehydrated
6		Very dehydrated
7		Severe dehydration

WHAT TO AVOID

Energy Drinks

- While many of the energy drinks on the market claim to improve performance, drinks such as Red Bull or Vitamin Water do not facilitate hydration as well as a well-balanced sport drink. When shopping for a sport drink ensure the produce included some carbohydrates (5-8%) and electrolytes. Sugar (in a sport drink) is great when your body needs it, but to be avoided when not needed. DRINK WATER

Alcohol

- It should be noted that while teams and players often celebrate after games with alcoholic beverages, it is important to counter the dehydrating effects of alcohol to top of the dehydration from hockey.

Artificial Flavors & Colors

- Many sport drinks contain artificial flavors and colors, and studies show some side effects, such as hyperactivity [12], from the two. While they are not directly accociated with sport performance it is good to avoid them when possible.

REMEMBER: EVERY ATHLETE IS UNIQUE, SO YOUR HYDRATION PLAN SHOULD BE TOO!

References

1. Exercise and Fluid Replacement [2007], Position Statement of the American College of Sports Medicine, http://www.acsm.org/access-public-information/position-stands

2. Kreider, R.B., Wilborn, C.D., Taylor, L., Campbell, B., Almada, A.L., Collins, R., Cooke, M., Earnest, C.P., Greenwood, M., Kalman, D. S., Kersick, C.M., Kleiner, S.M., Leutholtz, B., Lopez, H., Lowery, L.M., Mendel, R., Smith, A., Spano, M., Wildman, R., Willoughby, D.S., Ziegenfuss, T.N.(2010). ISSN Exercise and Sport Nutrition Review: Research and Recommendations, J. Int. Soc. Sport Nutrition, 7,7. http://www.jissn.com/content/7/1/7

3. Nutrition and Athletic Performance [2009], Joint Position Statement of the American College of Sports Medicine, the American Dietetic Association, and the Dietitians of Canada, http://www.acsm.org/access-public-information/position-stands

4. Frey, R. J., & Atkins, W. A. (2013). Hydration. In K. Key (Ed.), The Gale Encyclopedia of Diets (2nd ed., Vol. 1, pp. 605-609). Gale. Retrieved May 20 2015, from http://go.galegroup.com.ezproxy.library.uvic.ca/ps/i.do?id=GALE%7CCX2760100167&v=2.1&u=uvictoria&it=r&p=GVRL&sw=w&asid=876f76408f235e186cb03bc63693571f

5. Smith, H. (2015) Practical Sport Nutrition for Elite Minor Hockey Players (PowerPoint Presentation) Gatorade High Performance Hockey Summit, May 5th, 2015. Calgary, Alberta.

6. Herring, S. et al. (2013) *Selected Issues for Nutrition and the Athlete: A Team Physician Consensus Statement,* Medicine and Science in Sports & Exercise. Volume 45 (12), 2378-2386

7. Davidson, T. (2013). *Dehydration*. In K. Key (Ed.), The Gale Encyclopedia of Diets (2nd ed., Vol. 1, pp. 273-275). Gale. Retrieved May 20th, 2015 from http://go.galegroup.com.ezproxy.library.uvic.ca/ps/io?id=GALE%7CCX2760100082&v=2.1&u=uvictoria&it=r&p=GVRL&sw=w&asid=45ae981330adabf8e9b212a7e66e32e2

8. Kent, M.(2006). *Water Replacement*. In The Oxford Dictionary of Sports Science & Medicine. : Oxford University Press. Retrieved May 20. 2015, from http://www.oxfordreference.com.ezproxy.library.uvic.ca/view/10.1093/acref/9780198568506.001.0001/acref-9780198568506-e-7770.

9. Bastin, S. (1994) *Water Content of Fruits and Vegetables*. University of Kentucky. Retrieved May 25, 2015 from https://www2.ca.uky.edu/enri/pubs/enri129.pdf

10. Linseman, M. et al. (2014) *Maintaining hydration with a carbohydrate–electrolyte solution improves performance, thermoregulation, and fatigue during an ice hockey scrimmage*. Department of Human Health and Nutritional Sciences, University of Guelph. Retrieved May 25th, 2015 from www.nrcresearchpress.com by UNIV VICTORIA on 05/24/15

11. Logan-Sprenger, H., Palmer, M., Spriet, L. (2011) *Estimated fluid and sodium balance and drink preferences in elite male junior players during an ice hockey game*. Department of Human Health and Nutritional Sciences, University of Guelph. Retrieved May 29, 2015 from www.nrcresearchpress.com by Canadian Science Publishing on 05/24/15

12. Kanarek, R. (2011) *Artificial food dyes and attention deficit hyperactivity disorder*. Nutrition Reviews Jul 2011, 69 (7) 385-391;, Retrieved May 29 2015 from http://onlinelibrary.wiley.com.ezproxy.library.uvic.ca/doi/10.1111/j.1753-4887.2011.00385.x/epdf

Photo Credits

Banff Hockey Academy Banner: http://www.banffhockey.ab.ca

Hockey Rink: stock photo from www.dreamtime.com

Dehydration Chart from Practical Sport Nutrition for Elite Minor Hockey Players (PowerPoint Presentation)

Hydration Chart from www.totalcontrolprogram.com