



RUNNING

A Pocket Resource Guide

ORTHOPEDICS & SPORTS MEDICINE



Welcome



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This Running Pocket Resource Guide is designed to provide educational information only to help parents educate children on the importance of physical activity. It is not the intention of the physicians or health care providers who contributed to this guide to provide specific professional medical advice or establish any professional relationship with any reader of this guide or any information contained therein. If any reader of this guide is experiencing any symptoms of ill health, please contact a licensed medical doctor to diagnose, treat and professionally address those medical needs before beginning any of the activities contained in this guide. No portion of this guide may be reproduced without the express written consent of Texas Children's Hospital.

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Chapter 1

GETTING A SAFE START

Prior to participating in any physical activity program, have your child evaluated by a physician.

Certain conditions may affect your child's physical activity program.

Notes:

CARDIAC CONCERNS

Children with a history of heart problems or a heart murmur need clearance from their doctor before participating. Those who faint, nearly faint, have chest pain or have an irregular heart beat during exercise cannot exercise until their physician clears them. In addition, children who have a parent or sibling who died from a heart problem before the age of 50 need clearance from their doctor before they participate.

MUSCULOSKELETAL ISSUES AND INJURIES

Injuries that have not been properly rehabilitated can be a risk factor for subsequent injuries as a child starts a running or other physical activity program. Injuries from a previous running program will happen again if the cause of the problem is not addressed. Be sure to have your child evaluated and diagnosed if he or she has any issues with previous injuries.

PRE-EXISTING MEDICAL CONDITIONS

If your child has a chronic condition such as asthma, diabetes or seizures, he or she may still continue to participate in physical activities under the guidance of a physician. The key is optimal management of these conditions to minimize their impact on physical activity and daily living.

OVERWEIGHT/OBESITY

Overweight and/or obese children should be allowed to walk and run as much as they can tolerate and should have unlimited access to water during training.

Chapter 2

FITNESS FOR LIFE (KEEPING A FITNESS JOURNAL)

Have your child keep a daily workout journal during the training program. The journal should include warm-up, selected physical activities, cool-down and time spent on each activity. Activities may represent those done in or out of school.

Activity:

To begin building endurance, have your child complete the following activities below at least three times during each week. Children should train in the manner they plan to compete in the race. For example, if they plan to run, they should follow the run column.

See this eight-week training schedule for race preparation.

WEEKS UNTIL RACE	RUN	WHEELCHAIR
8 WEEKS	1 min., 30 sec.	2 minutes
7 WEEKS	2 min., 45 sec.	3 minutes
6 WEEKS	3 min., 30 sec.	4 minutes
5 WEEKS	6 minutes	6.5 minutes
4 WEEKS	9 minutes	10 minutes
3 WEEKS	13 minutes	12 minutes
2 WEEKS	15 minutes	15 minutes
1 WEEK	18 minutes	18 minutes

Chapter 3

SAFETY

When beginning a running training program, safety is key. Follow these simple guidelines to make sure your child stays protected and minimizes the risk of injury.

Notes:

- Avoid running if the temperatures are too hot. Early morning walking/running may have a lower heat index in the summer than mid-day or afternoon running.
- Be aware that drivers may not be looking for walkers or joggers. Have your child wear white, bright colors or a reflector badge on his or her shirt.
- Your child should warm up by walking for two to three minutes before running.
- After warm-down, stretching is appropriate. Stretches should be held for at least 20 seconds and repeated two to three times.
- Children with special health care needs may require adaptations that can be developed with a physician, therapist and/or instructors. For instance, children with visual impairments may need to participate in activities with a partner. The partner can be given instructions about verbal directions or how to physically guide the child who is visually impaired.

Chapter 4

HEAT, HUMIDITY AND HYDRATION

As your child begins a training program, be sure he or she stays adequately hydrated.

Here are some practical ways of monitoring hydration and dietary tips to improve fluid balance.

Notes:

MONITORING HYDRATION

Bodies are about 65% water, and any rapid change in weight is due to changes in fluid balance. Monitoring weight before and after exercise is a practical and quick way of monitoring fluid loss during activity. This is known as a “sweat rate.” Drink 20 ounces of fluid for every pound lost (about the size of an average water bottle).

Another quick way to assess hydration is to monitor urine color. In general, urine should be clear or pale yellow. If urine looks like apple juice, you are likely dehydrated. According to the American College of Sports Medicine, the goal of drinking before, during and after exercise is to prevent weight loss of greater than 2% of total body weight during physical activity. Being well-hydrated can actually improve an athlete’s performance.

IMPROVING FLUID BALANCE

Fluids come from two main sources – fluids you drink and fluids you eat. The best hydration beverage is water, and if the duration of exercise is under an hour, plain water is preferred. Sports drinks are appropriate for exercise greater than an hour or salty sweaters.

Sports drinks are designed to rehydrate, provide energy (through carbohydrates), and replenish electrolytes lost through sweat. Sports drinks can be used before, during and after exercise, but have little value in the lunch box or at meal times.

Chapter 4 continued

Activity:

- Have your child estimate how much fluid is consumed in a gulp of water to estimate how many gulps of fluid he or she will need to take in during training.
- Set up a water station with cups or water bottles along the training route to practice drinking while exercising.
- During the training program, have your child keep a daily log journal tracking their fluid intake to ensure proper hydration.

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Chapter 4 *continued*

PREVENTION OF HEAT INJURY: Heat injury encompasses a wide range of effects on the body from too much heat and/or humidity and not enough hydration during physical activity. If not treated, this condition can become very serious.

- Drink two cups of water two to three hours before exercise.
- Stay in the shade as much as possible when not competing.
- The best fluid to drink during competition is the fluid your child has been drinking during training.
- Drink a half cup (two to three large gulps) of water every 20 to 30 minutes during competition.
- The colder the water, the faster it is absorbed.
- Drink even when not thirsty. Thirst will underestimate how much fluid is needed.
- **DO NOT TAKE SALT TABLETS.** They are unnecessary and may be dangerous.
- Wear loose-fitting clothing (i.e., cotton blend/light colored).
- Do not drink sodas, caffeinated or carbonated drinks or fruit juices during exercise.
- Water is the best drink unless the exercise is intense and greater than an hour.
- Start conditioning slowly before the training session begins.
- It takes 10 to 14 days of heat exposure (15 to 30 minutes in the heat each day) for your child's body to acclimate to the heat.

Heat Injury Symptoms

EARLY SIGNS

- Goosebumps on chest and upper arms
- Headache
- Unsteadiness or dizziness
- Nausea
- Muscle spasms or cramps
- Muscle fatigue
- Profuse sweating

If your child experiences these warning signs, he or she should stop physical activity, begin oral rehydration in a cool, shaded environment and consult a trainer or a physician.

LATE SIGNS

- Confusion
- Exhaustion
- Unconsciousness
- Dry skin
- Rising body temperature
- Vomiting

At this stage, the athlete is in extreme danger.

A doctor should be consulted and emergency measures begun. Emergency medical services (EMS) should be called for transportation to an emergency center. Remember that the effects of competing in hot weather are additive. This means that one is more likely to develop heat illness on the second or third day of competition if attention is not paid to drinking the necessary amounts of fluid during the first two days of competition.

Chapter 5

PERFORMANCE-BASED NUTRITION

For children, maintaining a balanced diet is critical to the health, growth and development, safety and success in their sport.

Eating the right kinds of foods at the proper time can provide sustained energy during activity and promote muscle recovery after strenuous exercise.

All athletes should make it a priority to eat regularly throughout the day.

Notes:

IS MY CHILD GETTING ENOUGH PROTEIN?

Protein is necessary to build and repair muscle and to boost the immune system. The need for protein in an athlete is increased, but many athletes over-consume protein and under-consume calories. The best sources of protein include lean meats (turkey or chicken, fish, sirloin), beans, eggs and low-fat milk, cheese and yogurt. Having protein at each meal helps children build and repair muscles.

ARE CARBOHYDRATES IMPORTANT?

Carbohydrates are primary fuel for active brains and exercising muscles. The best carbohydrate choices include whole grain breads, pasta and cereal, brown rice, peas, potatoes, beans and fruit. Other sources of carbohydrates include juice, soda, cookies and candy. These foods don't offer much nutrition to the athlete and are better reserved for an occasional treat.

Chapter 5 *continued*

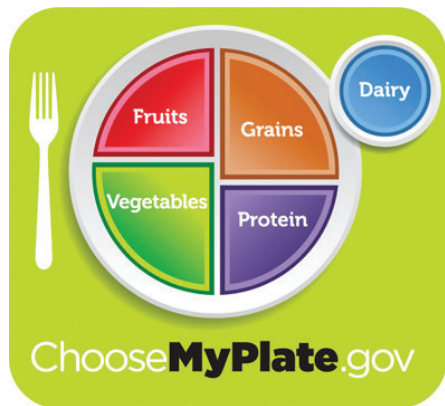


TIMING FOODS BEFORE AND AFTER EXERCISE

The right fuel at the right time influences how children feel, perform and recover. Choosing foods lower in fat and fiber will help reduce gastrointestinal distress.

BEFORE EXERCISE	MEAL TIPS	EXAMPLES
3-4 hours	Carbohydrate rich, low in fat, moderate protein	Pasta with meat sauce Eggs, toast and fruit
1-2 hours	Low fat and fiber	Sandwich and fruit
Less than 45 minutes	Mainly carbohydrate	Sports drink or carbohydrate gel Piece of fruit Graham crackers Granola bar
RECOVERY SNACK		
Within 30 minutes of stopping exercise	Carbohydrate rich, high quality protein	Low fat chocolate milk Cereal and milk Turkey cheese wrap

Chapter 5 *continued*



HOW SHOULD I PLAN MEALS FOR MY CHILD?

When foods are chosen by a few basic principles, the plate becomes an ally in the prevention of chronic illness and a strategy to improve performance. The principles are simple: choose a plate rich in colorful produce, whole grain carbohydrates and lean protein.

- About half of children's plates should be fruits and vegetables, which are 90% water, and can help prevent dehydration.
- Whole grain carbohydrates such as whole grain pasta, brown rice, oatmeal and 100 percent whole wheat bread should occupy one-fourth of the plate. These high fiber foods contribute to a sense of fullness and aid in weight management. If your child doesn't like whole grain foods, consider ways to increase the fiber in foods they already eat. For example, add oatmeal to pancake mix, combine white and brown rice together, or replace half the white flour in a recipe with whole wheat flour.
- Lean protein should be approximately one-fourth of the plate and should be consumed at each meal and snack. Protein is often overlooked at breakfast. Some protein suggestions for breakfast include flavored Greek yogurt, eggs or Canadian bacon.

Visit kidseatright.org and choosemyplate.gov for meal-planning ideas.

Chapter 6

PROPER RUNNING GEAR

It's important that children understand the importance of wearing proper running shoes and gear as they directly affect both comfort level and performance.

Activity:

Have your child place his or her wet foot in the middle of a dry towel so the impression of the foot will appear. Then, he or she will be able to identify his or her foot type.



- 1 The “flat” or pronator foot type has a low arch and an imprint that looks like the entire sole of the foot. While running, a person with a flat foot usually strikes on the outside of the heel and rolls inward excessively.
- 2 The “normal” or neutral foot type has a normal-sized arch and an imprint that shows the forefoot and heel connected by a wide band. While running, a person with a normal foot lands on the outside of the heel, then rolls slightly inward to absorb shock.
- 3 The “high-arch” or supinator foot shows a very narrow band connecting the forefoot and heel. This foot type is not an effective shock absorber.

Chapter 6 *continued*

PROTECTION

Protecting your child's skin with sunscreen is essential at all times, regardless of the weather. Even if the sky is cloudy and overcast, UVB sun rays can still damage your skin.

Children who use walkers or wheelchairs may want to wear gloves to reduce the risk of developing blisters on their hands.

Notes:

COLD WEATHER CLOTHING

Layering allows children to adjust to changes in weather as well as changes in body heat generated. The deepest layer should allow sweat evaporation and the outer layer should be water/wind resistant. Middle layers should be designed for warmth and insulation. A hat will also protect against heat loss from the head.

WARM WEATHER CLOTHING

White-colored shirts are preferred during hot weather as they do not absorb as much heat. Cool/thin clothes that have breathable material allow the body to cool quickly.

SHOES

It is best for children to tie their shoelaces each time they put shoes on their feet. Most running shoes will last six to nine months or 300 to 500 miles. The main types of shoes are:

- Motion control
- Stability
- Cushioned

The best running shoe is the one that fits well, feels comfortable and is built to support the differences in people's feet.

- Those with a "flat" or pronator type foot need stability or motion control shoes.
- Those with neutral and high-arched feet need cushioned shoes.

Chapter 7

THE CARDIOVASCULAR SYSTEM

The cardiovascular system is responsible for pumping blood and delivering nutrients throughout the body as well as removing gaseous wastes.

These organs are at the heart of training. It's important to learn to monitor their output.

Notes:

Cardiorespiratory endurance will improve in response to a running training program. Numerous cardiovascular adaptations occur in response to training, including:

- Heart size will increase due to hypertrophy of cardiac muscles and increased size of the heart chambers due to increased blood volume.
- This hypertrophy of the cardiac muscles means that the heart is stronger and can pump blood more effectively. In other words, cardiac output increases.
- Because the heart beats stronger, the number of contractions per minute (the heart rate) will be lower after a training program compared to before the training program. Specifically, in a sedentary person, the resting heart rate will decrease during the initial phase of a training program by an average of one beat per minute for each week in training.
- The number of small blood vessels (capillaries) to muscles involved with training will increase, resulting in greater blood flow and oxygen delivery to those muscles. This results in the person being able to exercise for a longer period of time.
- Resting blood pressure typically goes down to 11 mm Hg (systolic) and 8 mm Hg (diastolic) in border line hypertensive or hypertensive people after an aerobic training program.
- Children with a heart or blood pressure problem should consult with a physician and get approval for participation or proper restrictions on physical activity.

Chapter 7 *continued*

HOW IS YOUR CHILD'S HEART RATE? (PER MINUTE)

- Excellent (70-79)
- Good (80-89)
- Above average (90-99)
- Average (100-105)
- Below average (106-115)
- Poor (116-129)
- Very poor (Greater than 130)

Activity:

Have your child guess his or her heart rate for 15 seconds and fill in the chart. Then, have your child place his or her index and middle finger on his or her neck or wrist. Count how many beats he or she feels in 15 seconds and fill in the chart. Multiply by four to get his or her heart rate per minute, fill in the chart and compare to the ranges to the left.

Guess what your own heart rate will be for 15 seconds and fill in the chart. Then, place your index and middle finger on your neck or wrist. Count how many beats you feel in 15 seconds and fill in the chart. Multiply by four to get your heart rate per minute and fill in the chart. Your heart rate should be lower than your child's.

	Child	Parent
15 second heart rate (guess)		
15 second heart rate (actual)		
Heart rate per minute (guess)		
Heart rate per minute (actual)		

Chapter 8

THE MUSCULOSKELETAL SYSTEM

The musculoskeletal system describes your muscles, bones and how they interact via joints, ligaments and tendons.

Training programs can often lead to soreness as these muscles start to fatigue.

Activity:

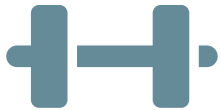
Discuss why muscles get sore during the onset of or change in exercise or physical activity.

What happens to sore muscles when an individual continues to exercise or participate in physical activity?

Ask your child to list the names of each family member living in your household, including yourself. Log the number of times each person can squeeze a ball before fatigue sets in.

Name	Number of times ball squeezed	Comments

Chapter 8 *continued*



Medical Notes:

- Muscles and bones adapt to running training by becoming stronger as long as the training is gradual and at an appropriate weight-bearing load for the person. If the running program is too long, too fast or increases the training volume too fast, muscles and bones can be injured in the form of strains and stress fractures.
- Weight-bearing exercise can cause bones to be stronger. Muscles involved in running will have more small blood vessels (capillaries) flowing into the muscles as an adaptive response to exercise. This means the muscles can do more work (e.g., running faster and longer) after an effective running training program.
- While a child is recovering from an injury, stretching, strengthening, endurance and balance exercises specifically for rehabilitating the injury should be performed. Exercise to maintain general cardiopulmonary fitness should be done. Riding an exercise bicycle during physical education class is often a good way to improve cardiovascular fitness and make the legs stronger while letting overused injuries of the lower extremities recover. These exercises could be done during physical education class if the child is unable to participate in the training plan for that day.
- Lower extremity muscles may increase in size in response to a running training program. For children who use wheelchairs, upper extremity muscles will increase in size.

Chapter 9

THE METABOLIC SYSTEM

Exercise has a direct effect on the glucose, insulin, muscle and blood lipids in a body.

Being physically fit can lead to more energy and avoid health challenges such as type 2 diabetes mellitus.

Notes:

- Type 1 diabetes mellitus (T1DM) has been referred to as “juvenile onset” diabetes mellitus, as it usually begins in childhood or adolescence. In T1DM, not enough insulin is produced; therefore, glucose does not enter the cells of the body as easily as it normally would. This causes the blood sugar level to be high, and the person can develop life-threatening ketoacidosis.
- Type 2 diabetes mellitus (T2DM) traditionally has been called “adult onset” diabetes mellitus because it was seen primarily in adults. However, more children and teenagers are being diagnosed with T2DM. This is because obesity has increased among children and teens, and obesity causes insulin resistance. In T2DM the insulin level is elevated, yet the cells of the body are resistant to insulin (hence the term “insulin resistance”) resulting in high blood sugar levels. Usually these patients do not develop life-threatening ketoacidosis.

T2DM increases a person's risk of heart attack, stroke and kidney failure.

The more physically active a person is, the less likely he or she is to have T2DM.

Evidence suggests that increased physical activity can prevent or delay the onset of T2DM.

Physical activity tends to improve glucose control in people with T2DM.

Chapter 10

REST AND SLEEP

Getting adequate amounts of sleep affects your child's life and training program.

A well-rested child has improved memory, metabolism and overall health.

Notes:

REST

- Before race day, take two to three days per week without running to allow your child's body to recover.
- Participating in other physical activities can maintain and build fitness while decreasing injuries.

SLEEP

- Teenagers need approximately nine hours of sleep per night.
- Prolonged naps during the afternoon hours can interrupt restful nighttime sleep.
- Sleep hygiene means avoiding naps and getting eight to nine hours uninterrupted sleep at night.

Chapter 11

RACE PREPARATION

- Check weather forecast
- Prepare proper clothing
- Get plenty of sleep
- Mental preparation
- Pack a race day bag
- Warm-up and stretch
- Pre-race nutrition and fluid

Notes:

ARE YOU READY TO RUN?





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