

Anthony S. Valentine

The Middle-Aged Marathon Runner

SUMMARY

Middle-aged runners form an appreciable number of those engaged in marathon running. They tend to have above average intelligence, high socioeconomic status, and better levels of aerobic fitness than sedentary members of the same age group. "Too much too soon" is the commonest cause of injury. Training before a marathon should last 18 months to two years. Middle-aged runners tend to experience fewer injuries than other marathoners. However, relatively minor complaints will be disastrous to them if they have to stop running. Injuries can occur from lack of warm up exercises, environmental factors such as weather, poor street lighting, carbon monoxide from car exhausts, etc. Some contraindications to marathon running are: poorly controlled diabetes, recent acute pulmonary disease, active rheumatoid arthritis, and recent cardiac conditions. Finishing a marathon involves both agony and ecstasy. (Can Fam Physician 1982; 28:941-945).

SOMMAIRE

Les coureurs d'âge moyen constituent un nombre appréciable des marathoniens. Ils ont un quotient intellectuel au-dessus de la moyenne, socio-économiquement sont mieux nantis et leur niveau de forme aérobique est supérieur à celui des personnes sédentaires de leur groupe d'âge. "Pousser trop loin trop vite" est la cause la plus fréquente des blessures. L'entraînement pré-marathon devrait se faire sur une période de 18 à 24 mois. Les coureurs d'âge moyen ont tendance à subir moins de blessures que les autres marathoniens. Toutefois, des plaintes relativement mineures leur sembleront catastrophiques s'ils doivent interrompre la course. Les blessures peuvent être causées par un manque d'exercices de réchauffement, des facteurs écologiques tels le climat, le faible éclairage des rues, le protoxyde de carbone des auto, etc. Parmi les contre-indications de courir un marathon on retrouve: le diabète mal contrôlé, une maladie pulmonaire aiguë récente, l'arthrite rhumatoïde active et les maladies cardiaques récentes. L'agonie et l'extase sont le lot de ceux qui terminent un marathon.

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THE MARATHON is probably the oldest documented race in the world. Pheidippides is supposed to have run the 240 km from the Bay of Marathon to Sparta on September 9th 491 B.C.¹ He did this journey in 48

hours in order to summon aid from the Spartans for the Athenians facing the Persian fleet. This superb runner is supposed to have jogged back to Marathon and taken part in the battle at which the Persians were defeated. Then, according to legend, Pheidippides jogged the 35 km back to Athens, uttered the words "Rejoice, we conquer!", collapsed and died.

When the first modern Olympic Games were held in 1896 a marathon race of 40 km was included. Louis Spiridon, a Greek, won in two hours, 58 minutes, 50 seconds.² The 1908 Games were held in London, England and the marathon was run over a

course of 26 miles, 385 yards, or 42 km, 195 metres—which is now the official distance of all certified marathon courses.

The winner of the 1972 Olympic marathon was an American, Frank Shorter, in a time of two hours, 12 minutes, 19.8 seconds. It was probably the influence of Shorter's win, together with the increased interest in physical fitness, which sparked the boom in marathon running that we now see.

Runners' World Annual for 1982³ lists many marathon races. The biggest is the New York marathon, with 14,000 runners, including 22-year-old

Albert Salazar who holds the world record for the distance—two hours, eight minutes, 13 seconds. There are records listed for all age groups from 13 years to 80 years. Middle-aged runners are arbitrarily defined as those aged 40-65. These people are defined as masters by the Canadian Track and Field Association.

Kavanagh⁴ also helped to popularize marathon running by training eight middle-aged men, who had all had a documented myocardial infarction, to run in the Boston marathon. All finished the race, each in his own good time, without serious adverse effects. While no one expects that all people who have had a myocardial infarction will be able to run in and finish a marathon, this study showed that by careful training and supervision, many people can come to a high point of physical fitness despite having had serious cardiac conditions.

Fortunately, most people who want to run in a marathon are in a reasonably healthy state to start with. In addition, they have usually been jogging from 20 km to 50 km a week. The number of middle-aged runners is considerable. In the 1981 National Capital Marathon held in Ottawa, 486 out of 2,205 runners (23%) who completed a questionnaire were over age 40.⁵ Most family doctors will therefore have several marathon runners amongst their patients.

Some of the psychological features of these people have been investigated by Hartnung and Farge.⁶ They showed that middle-aged marathon runners and joggers had above average intelligence, a high socioeconomic status and were more imaginative and self-sufficient than the average. The runners tended to be somewhat introverted.

The same study showed that the marathoners had markedly better levels of aerobic fitness than sedentary men of the same age group. The 48 middle-aged marathon runners (who were by no means classified as elite runners) had V02 max which averaged 54.95 ml/kg/min. Non-marathon runners had average V02 max of 47.44 ml/kg/min. Costill⁷ states that Frank Shorter's V02 max is 71.4 ml/kg/min.

Several studies^{5, 8-10} have shown that men who jog and also those who run in marathons are in a low risk category for coronary artery disease in relation to such things as smoking,

weight and high density lipoprotein (HDL) cholesterol levels. Though these people may still suffer from myocardial infarctions, they are less likely to do so than the average person.

What Are the Risks?

When a patient comes to see his or her family physician about running in a marathon, the doctor should be aware of the above facts and about the risks involved in marathon running. Running in and finishing a marathon is a supreme test of the runner's psychological and physical fitness. It involves a very large commitment in time and energy as well as dedication to training.

For a middle-aged runner to start virtually from scratch and expect to be able to finish a marathon with only three or four months' training is asking for trouble. As the training distances increase and the pace of running becomes faster, so the number of injuries increase. "Too much, too soon" is the commonest cause of injury. As a rough guide, an ordinary person who wants to run a marathon should have 18 months to two years of jogging under his or her feet before starting to train for a marathon. The runner should not start training properly until he or she is running 32-40 km (20 to 30 miles) per week regularly.

The aim of the average middle-aged runner taking part in his or her first marathon will be just to finish the distance in reasonable shape. The time to do this will probably vary from three to five hours. There are various formulae about how much training is necessary to complete the 42.2 km. Roughly, race distance equals 3/7 of the weekly average mileage for six to eight weeks before the race. Therefore the runner needs to cover about 100-120 km a week for six to eight weeks. This is split into 10% on three days a week, 20% on each of two days a week and 30% on the sixth day. The seventh day the runner obeys the Third Commandment.¹¹ Training must start three to four months before the race and the weekly mileage should increase by 10% a week from 32 km a week to 110 km a week.

What Are the Injuries?

Tables 1 and 2 from Sheehan¹² show what parts of the body are in-

jured and which people are affected. Presumably middle-aged runners are injured less often because, being older and more mature, they are more aware of the potential dangers and less likely to push themselves. Even so it is noticeable that the further they run the more likely they are to be injured. Runners in a marathon are pursuing excellence in themselves and, as such, are "only a razor's edge from disaster".¹² Besides minor things such as subungual hematoma and blisters, and major injuries such as Achilles tendinitis and sprained knees, runners become stale and tired due to minor illnesses such as upper respiratory tract infections and also due to over-training.

Assessment

The potential marathoner who comes to see his or her family physician must be looked at as a whole person. As well as finding out about the distance, pace and type of running done by the patient, a general history of illnesses and lifestyle must be obtained. Because runners are so fit and positively addicted to running, many apparently minor complaints will appear almost as disasters if training has to ease off for a short while before a marathon. However, even Achilles tendon rupture, painful and serious as it is, is not as potentially dangerous as Hippocrates believed. He wrote: "This tendon if bruised or cut causes the most acute fevers, induces choking, deranges the mind and, at length, brings death."¹³ Experience at the Mayo Clinic,¹⁴ on the other hand, showed that early repair gives good results.

Prevention of injuries is therefore all important. This is done by the runner stretching and warming up properly for no less than five minutes, and preferably up to 15 minutes, both before and after the run. Examples of good stretching exercises are given in such magazines as *Canadian Runner* and *Runner's World*. The doctor should enquire about the runner's stretching habits and emphasize their importance.

Hazards

The environment itself has many hazards for the runner. Apart from carbon monoxide and carbon dioxide

from car exhausts, the runner could be hit by a passing car on a poorly lighted road. The weather is probably the most important environmental factor which can cause injury; in winter the dangers of slipping are great. Frostbite of the ears, face and hands, as well as the penis,¹⁵ has been reported. This danger is present when the wind chill factor is more than about 1700 watts per square meter. Multiple layers of light clothing plus a nylon wind breaker help to keep heat in. Men need an athletic support and the face should be covered with a mask. Application of vaseline to the face and ears helps reduce the risk of frostbite. Schaeffer et al.¹⁶ have discussed the dangers of possible cold injury to the lungs.

In the summer, of course, the opposite applies: the runner is in danger of acquiring heat stroke. Dawson¹⁷ showed that the color of clothing, at least with fairly light exercise, is not important. Studies from Australia, New Zealand, the U.S.A. and Canada¹⁸⁻²² have all documented the extreme dangers of running long distances when unacclimatized. The greatest hazard in running long distances is for the runner to become so dehydrated that he or she stops sweating and the core body temperature rises to a dangerous level. Runners in marathons should therefore drink at

least 250-500 ml every three to four km in a race, whatever the temperature.

The patient with the type of injuries shown in Tables 1 and 2 needs to be examined from the waist down, after a full history has been obtained. Apart from examining the actual site of the injury, the doctor should examine the feet for such deformities as pes planus, pes cavus and Morton's deformity, where the second toe is longer than the great toe. Differences in the lengths of the two legs should be looked for and the position of wear on the soles and heels of the patient's running shoes should be noted.

The commonest injuries are to the knee. Krissoff and Ferris²³ and Brody²⁴ go into great detail in a very lucid way about these injuries and many others.

There are four important syndromes which are due to lesions in and around the knee.

1. Patellar tendinitis.
2. Compression of the patella.
3. Subluxation of the patella.
4. Chondromalacia patellae.

All are manifestations of patella instability.

Patella tendinitis occurs when excessive strain is put on the patella tendon due to repeated violent movements such as occur in cross-country

running. Training runs where the marathoner runs across fields and rough roads can bring this on. Clinically there is pain over the patella which at first comes on only at the start of exercise and disappears as the runner warms up. Gradually the pain lasts longer and it is possible for the patella tendon to rupture completely. There is point tenderness over the patella and X-ray may show a stress fracture. Sometimes there is a history of abnormal pronation of the foot causing torsions of the tibia and femur. Treatment consists of ice to the tender area, quadriceps exercises, stretching exercises and correction of the abnormalities and malalignments of the foot and leg.

Patella compression syndrome has similar signs and symptoms to chondromalacia but the cartilage is normal. It is thought to be due to tightness of the vastus lateralis and treatment is particularly directed to strengthening of the other parts quadriceps femoris.

Subluxation of the patella is due either to the patella having to move in too shallow a groove on the femur, or to excessive pulling by the vastus lateralis. The patient complains of swelling, grating and stiffness around the knee joint. There may be associated foot abnormalities and even genu recurvatum. Treatment consists of quadriceps exercises and an elastic knee brace with a lateral felt buttress to stop the lateral subluxation. A cylinder cast may be necessary for four to six weeks. Then the runner starts slowly by exercising with an elastic knee support. Running should be slow to start with, and only on flat surfaces. Activity is gradually increased over six to eight weeks.

Chondromalacia patellae. This is the most feared injury of runners. It is due to wearing down of the cartilage on the under surface of the patella due to excessive and abnormal use. Cases may occur with femoral anteversion, excessive heel valgus and a varus heel-forefoot deformity. The cartilage fractures cause the irregularity. The patient complains of pain during and after running, made worse by hill running and even by climbing stairs. On examination there may be excessive lateral painful mobility of the patella. The knee will be swollen and there is tenderness over the bone. Contracting the quadriceps causes pain. X-ray may show a low lying patella and lateral

TABLE 1
Results of a Poll of Over 1000 Respondents,
Of Whom 60% Reported Prolonged Injuries¹²

Knee	23.2%	Hip	7.9%	Ankle	6.7%
Shin	14.6%	Thigh	7.5%	Arch	4.2%
Achilles	12.4%	Calf	7.0%	Groin	2.2%
Forefoot	8.3%	Heel	7.0%		

TABLE 2
Result of a Poll of Over 1000 Respondents

	Injury Rate	Years Running	Injury Rate
Age			
<19 years old	72%	<5	63%
>40 years old	57%	5-9	52%
Sex		>9	56%
Female	90%	Racing	
Male	60%	Yes	65%
Mileage		No	27%
>50 miles/wk	73%	Surface	
<25 miles/wk	34%	No difference between hard surface and soft, but more minor problems with hard.	

patella tilting or displacement. Treatment establishes functional control of the foot; isometric and isotonic exercises together with straight-leg raising with graduated weights using the last 15 degrees of extension. Ice and anti-inflammatory drugs, together with tincture of time, cure the condition eventually.

Soft tissue injuries of the knee such as popliteal bursitis, pes anserinus bursitis and Hoffa's disease (inflammation of the patella fat pad) can all be eventually cured by local treatment, easing up on the pace and distance of running and patience from both the physician and the runner.

Hamstring strain can be painful and is best dealt with by stretching the muscles and strengthening the quadriceps. Long distance runners have a great tendency to overdevelop the hamstrings at the expense of the quadriceps; they should be encouraged to walk up flights of stairs two at a time to help strengthen the latter muscles.

Back and hip injuries can be dealt with in the normal way but "shin splints" and the so-called anterior compartment syndromes need the usual measures of rest, ice and attention to the causative factors. These should be differentiated from true intermittent claudication, especially in the middle-aged group of runners. Careful examination of the peripheral pulses, plus the knowledge that in shin splints the tenderness is marked over the tibia, should help. Stress fractures of the tibia need a bone scan rather than an X-ray for early diagnosis.

The foot and ankle give great trouble to runners, as Subotnik²⁵ has shown. The foot is an extremely complex part of the body; normal feet stand up surprisingly well to the amount of use and abuse by marathoners. Plantar fasciitis, Morton's metatarsalgia (due to a neuroma of a digital nerve) and stress fractures are quite common in runners. These injuries seem to appear just as the runner is increasing the amount of training in preparation for a marathon. Well fit-

ting shoes are essential and they should be fitted by a knowledgeable salesperson.

Contraindications

Contraindications to exercise, particularly marathon running, can be divided into non-cardiac and cardiac.²⁶ Among the former are poorly controlled or uncontrolled diabetes mellitus. Many people who have this condition can run marathons provided they are well-controlled and are well aware of how to take appropriate amounts of insulin and carbohydrate to compensate for the special effort of running.²⁷

A second contraindication is any recent acute pulmonary disease. People with chronic obstructive pulmonary disease would probably not be able to run marathons. An exception is the asthmatic who can take an appropriate bronchodilator before the race.

Active rheumatoid arthritis, active gouty arthritis, and osteoarthritis of the hips, knees, ankles and feet are all contraindications to marathon running. Low back pain may or may not prevent a runner from taking part in a race. A previous spinal fusion does not seem to prevent a person from finishing the distance.

Cardiac contraindications to patients running marathons include a history of a myocardial infarction in the previous year, congestive heart failure, aneurysms of the heart or blood vessels, and angina pectoris. People with multifocal ectopic beats and those who have pacemakers should not run long distances and the same applies to those with cyanotic congenital heart disease.

Recent upper respiratory infections and influenza-like illnesses should be thought of as relative contraindications because of the danger of myocarditis and pericarditis from virus infections. Hypertension should be well-controlled before allowing someone to train and run in a marathon. There are two problems here. Those on diuretics have a tendency to be permanently a little dehydrated, so it is vital for them

to make sure that they take in adequate amounts of water while training and racing. Those hypertensives on beta blockers which slow the heart are in the same position as people with pacemakers since it is most difficult for them to race their pulse rates sufficiently to increase the cardiac output. All these people probably need stress tests and very careful assessment before even starting to train for a marathon, let alone running in one.

Conclusion

Terry Fox showed that it is possible, given sufficient courage, determination and motivation, to run marathons despite very severe handicaps. Fortunately most people do not have to run a marathon daily for months on end, as Terry did. Those who train for and run a marathon to finish, whether in two hours or five hours, have a kinship with each other. The marathon, whether it be held in Athens, Boston, Montreal or Winnipeg, has an emotional impact on all those taking part. When the runners have finished they are in agony from muscle cramps and tiredness because they have used up all their liver glycogen. They are also in ecstasy, which can be explained as the effect of the endorphins produced by the brain as response to the pain of running. To my mind it is a spiritual experience which transcends the pain and suffering of the running. When I have finished a marathon I rejoice, as did Hilary and Tensing, when they had conquered Mount Everest. ●

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Indications and clinical uses

Prophylaxis of iron and folic acid deficiencies and treatment of megaloblastic anemia, during pregnancy, puerperium and lactation.

Contraindications

Hemochromatosis, hemosiderosis and hemolytic anemia.

Warnings

Keep out of reach of children.

Precautions

The use of folic acid in the treatment of pernicious (Addisonian) anemia, in which vitamin B₁₂ is deficient, may return the peripheral blood picture to normal while neurological manifestations remain progressive.

Oral iron preparations may aggravate existing peptic ulcer, regional enteritis and ulcerative colitis.

Iron, when given with tetracyclines, binds in equimolecular ratio thus lowering the absorption of tetracyclines.

Adverse reactions

Nausea, diarrhea, constipation, vomiting, dizziness, abdominal pain, skin rash, headache.

Symptoms and treatment of overdose

Signs of toxicity from folic acid have not been observed even with doses several times higher than the usual therapeutic levels.

Ingestion by infants and young children of doses of ferrous sulfate in excess of 2 gm may cause death and ingestion of 1 mg could be considered toxic. Iron poisoning is rare in adults. Therapy should be instituted immediately.

Symptoms: The clinical effects of ingesting toxic doses of iron occur in four phases. The first phase begins with abdominal pain, nausea, and vomiting, about 30 to 60 minutes after ingestion. Irritability, pallor, and drowsiness appear, along with frequent black or bloody diarrhea.

Symptoms of acidosis and cardiovascular collapse may become prominent; coma and death ensue within 4 to 6 hours in about 20% of children taking large doses of iron. The second phase consists of a period of improvement, with subsidence of the initial symptoms spontaneously or in response to treatment. This period, lasting 8 to 16 hours, may herald the onset of progressive improvement. Often, however, it is followed by the third phase of progressive cardiovascular collapse, convulsions, coma, and a high mortality about 24 hours after ingestion. Finally, a fourth phase of gastrointestinal obstruction from scarring of the stomach or small intestine may occur weeks or months after the initial episode of iron intoxication.

Treatment should be instituted by giving milk immediately and vomiting induced. Eggs and milk should then be fed (to form iron protein complexes) until it is possible to perform gastric lavage. Gastric lavage with a 1% solution of sodium bicarbonate, to convert the iron to a less soluble form, should be administered within the first hour after ingestion of iron. An enema is administered to remove iron from the lower bowel. If an iron-chelating agent such as Desferal is available, it should be utilized. Peripheral vascular collapse should be combatted including early replacement of body fluids and electrolytes. Additional measures include use of oxygen and vasopressor substances to help combat shock. The use of barbiturates or paraldehyde may be required to control convulsions.

In combating iron toxicity of children, the most important measure is its prevention. This can be accomplished by warning mothers to keep iron preparations out of reach of children, who are usually attracted by the sugar coating of pills that look like candy, and the use of "childproof" closures. Tests have shown that the coloured tablets are more attractive to children and likely to prove a greater temptation.

Dosage and administration

Prophylaxis: One tablet daily throughout pregnancy, puerperium and lactation. To be swallowed whole at any time of the day regardless of meal times.

Treatment of megaloblastic anemia: During pregnancy, puerperium and lactation; and in multiple pregnancy: two tablets, in a single dose, should be swallowed daily.

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Product Monograph supplied on request.

Reference

1. Course in Drug Therapy Sponsored by McGill University Department of Pharmacology and Therapeutics March 31 and April 1, 1977.

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