



REVISED IMMDA ADVISORY STATEMENT ON CHILDREN AND MARATHONING: HOW YOUNG IS TOO YOUNG?

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This statement was unanimously approved at the IMMDA Spring Meeting: March 21, 2009 in Barcelona Spain.

This paper was editorially prepared for publication by an IMMDA committee of Stephen G. Rice, M.D., Ph.D., M.P.H., FAAP, FACSM (Chair), Lewis G. Maharam, M.D., FACSM; Pedro Pujol, M.D., FACSM, W. Bruce Adams, M.D. and Tracy Sundlun.

ADVISORY STATEMENT:

Competitive marathon running should be reserved only for those individuals who have reached their eighteenth birthday.

Introduction

Over the past twenty years, the world has continued to witness, with ever accelerating speed, the erosion of children having the opportunity to savor their enjoyment of childhood and adolescence. Our society persists in its drive to have children grow up quickly and become immersed in the adult world - where they will

spend the vast majority of their years. This is done in virtually every phase of their young lives, often by caring parents and communities, without a true understanding of the developmental and emotional needs of childhood and adolescence.

Justification for such thinking stems from the notion that "Life is competitive, life is 'a race'. We must start early on that path to ultimate success." Examples of such misconceptions, myths and inappropriate expectations begin almost from birth, progress through infancy and early childhood, and culminate in adolescence. They are seen in areas of learning, eating and physical activity. And so it remains with the belief by some that running competitively in a marathon race of 26.2 miles is a sensible and appropriate activity for those youngsters less than eighteen years of age.

Children are not small adults. Their anatomy and physiology are developing and not fully mature; their psychological and emotional development is also incomplete. Despite these concepts which are intuitively understood in the broadest sense, in practice, and especially in athletic pursuits, these distinctions are forgotten or ignored.

The initial IMMUDA advisory statement issued in 2001 (and published in 2003) stimulated discussion about what criteria should be used to pass judgment on the appropriateness of physical activity for those under eighteen years of age (1-4). Currently, there is no scientific evidence that supports or refutes the safety of children who participate competitively in marathons. One side questioned, given the long distance of the race and stressful nature of the training regimen, why it would be appropriate to encourage and sanction such competition when these individuals would soon reach their eighteenth birthday and be free to race as often as they like; the other side insisted that

only evidence-based facts of physically detrimental harm should preclude these youths from the opportunity to compete in a marathon.

Another phenomenon that has arisen since the initial IMMUDA statement is the concept of participating in challenging physical activity to raise money for charity and by at-risk youth for the purpose of building character through accomplishment. The beneficial purpose may be enhancing self-esteem, social, fund-raising, academic, personal achievement and/or motivational in nature. In some cases, the challenging physical activity is completing the 26.2 mile marathon course. The intent here is not to race with the “marathoners”, but to participate in the activity and with few exceptions complete the distance in a "participatory pace" of approximately 4.5 hours or slower. Under adult supervision, these participants are organized in groups for both their training and on the day of the event to ensure the safety of their athletes and to limit their competitive urges (5).

This revised statement will review the prior and more recent medical literature in regard to whether there are physical, physiological, emotional and developmental issues and evidence which should play a major role in determining the policy regarding young athletes running in full length marathons.

Background

The American Academy of Pediatrics’ Council on Sports Medicine and Fitness (COSMF) has published various statements in recent years regarding reasonable guidelines for youth participation in physical activity to encourage a healthy lifestyle and to prevent childhood obesity. Three such statements published by the American

Academy of Pediatrics (AAP) in 2000, 2005 and 2006 address the benefits of physical fitness and activity in schools and the community (6-8). A key point of all three statements is that positive health related behaviors acquired in childhood are more likely to be carried into adulthood (6-10). Thus, aerobic distance running for fitness as a child and adolescent can clearly be beneficial to one's health as an adult (6-8, 11). However, such fitness can be attained without ever approaching the rigors of training and distance covered in preparing for and running in marathons (12).

In another such statement in June 2001 titled "Organized Sports for Children and Preadolescents", the AAP committee outlines clear recommendations for childhood involvement in organized sports (13). The overall suggestion is to set reasonable goals for the child including acquire basic motor skills, increase physical activity levels, learn social skills to work as a team, learn good sportsmanship and have fun. One could contend that marathon participation could meet many of these goals. However, in this same statement, the AAP committee implies that sporting activity should be geared to meet the developmental level of children and adolescents in regard to their physical abilities, cognitive capacities, initiative and interest (13,14). This is not possible for a child marathoner, but may be within the realm of older adolescents. Emotional burnout, however, is a real phenomenon that can have the exact opposite effect of that intended by participation. Children who approach marathon running in a competitive manner may develop feelings of failure and frustration when the demands, both physical and cognitive, exceed their internal resources to meet their goals.

Two clinical reports published by the AAP COSMF in July 2000 and June 2007 address intensive training, sports specialization in young athletes, overuse injuries,

overtraining and burnout (15,16). These statements warn against early specialization due to negative psychological effects. Most athletes report elite-level competition to be a positive experience, but early specialization leads to less consistent performance, more injuries, and shortened sports careers than those who specialize after puberty (16, 17).

In their statement on *triathlon* participation by children in 1996, the AAP Committee on Sports Medicine and Fitness recognizes that children younger than 18 years require shorter distances of competition and specific guidelines to protect children from harm in competitions designed for adults (18). The AAP statement clearly delineates safety precautions to be followed in designing such a competition. Their recommendations state that triathlons for children and adolescents, like all other activities, should be specifically designed to meet their needs and provide "safety, fun and fitness rather than competition." The distances for each of the three events are significantly below those used by adults; further, there are distance categories for those aged 7 to 10; those aged 11 to 15, and those aged 15 to 19. The AAP statement outlines safety guidelines, including: tapering events in accordance with weather conditions, requiring a pre-event swim test, requiring an appropriate number of lifeguards for the swim, holding the swim in pools of appropriate temperature water rather than in open waters, closing off the bicycle course to motor vehicles, mandating bicycle helmet use, providing adequate fluids during and after competition, preparing to handle medical problems or emergencies, and screening all athletes prior to competition (18). These recommendations underscore the concept that it is appropriate and necessary to provide clear guidelines and modifications for participation by a child in an "adult" event.

The AAP COSMF 2007 clinical report on overuse injuries addresses endurance running and specifies several parameters that the training regimen must follow for an adolescent to safely prepare for long distance running events (16). These include a gradual increase in total weekly mileage (which should be less than 35-40 miles per week). Proper environmental conditions and adequate hydration must be maintained, including careful attention to the ambient temperature and humidity. Attention must be paid to prevent over-participation. The AAP recommendation was that “there is no reason to disallow participation of a young athlete in a properly run marathon as long as the athlete enjoys the activity and is asymptomatic.”

Until recently, the scientific data indicated that children had decreased ability to withstand climatic heat stress (19-24). New research indicates that youth do not have less effective thermoregulatory ability and insufficient cardiovascular capacity compared to adults during exercise in the heat, when adequate hydration is maintained. (25-27) Failure to maintain adequate hydration levels can place the young runner at risk for dehydration and heat illness, especially when running competitively over a long distance and generating an increased metabolic heat load for several hours.

Overuse Injuries to the Musculoskeletal System

Long distance running places high mechanical loads on the skeleton, both from ground reactive forces associated with gravity and muscle contractions. While walking, an individual is confronted with a ground reactive force equal to one's body weight. While running, however, these gravitational forces increase to between three and six times body weight, depending on whether one runs on flat surfaces or hilly terrain and

also on the length of one's stride (especially when going downhill). A runner will land on each leg between 750 and 1000 times per mile, again depending on stride length.

The majority of injuries suffered by marathon runners are overuse injuries (28-33). It is well established that overuse injuries are of multi-factorial etiology, and many of these common risk factors for overuse injuries exist among both children and adults.

Risk factors unique to the growing child are numerous. It is well known that stress fractures, a distinct overuse injury, are a function of the number of repetitions and amount of applied force per repetition (28, 31-33). Clearly, a child with shorter stride length subjects himself to more repetitions of impact to cover the same distance as an adult. Immature articular cartilage is more susceptible to shear force than adult cartilage and predisposes children to osteochondritis dissecans (34, 35). It has also been shown in studies by Stulberg and Harris that injuries to the growth plate from repetitive trauma are possible etiologic factors in adult onset arthritis of the hip (34, 36, 37). Children are also prone to injury at apophyses such as the tibial tubercle, resulting in Osgood-Schlatter disease, and the calcaneus, resulting in Sever's disease (34, 38). A final characteristic of children that predisposes them to overuse injury is the asynchrony of bone growth and muscle-tendon elongation. During periods of rapid growth, bone growth occurs first with delayed muscle tendon elongation and resultant decreased flexibility (34, 39).

For the safety of young runners, it is imperative that the training program and its progression be followed closely and monitored carefully. From injury surveillance data conducted on high school athletes in Seattle over a fifteen year period, the activity with the highest rate of injuries was girls cross-country; this injury rate was statistically significantly higher than the other known "high risk sports" of football, wrestling and

gymnastics (40-45). Boys cross-country also had a surprisingly high rate of injuries, placing fifth overall (behind girls cross-country, football, wrestling and girls soccer). Distance running among adolescent boys and girls is thus associated with a relatively high rate of injury. For these athletes, the competitive distance is no more than 3 miles (41-44). Thus, training to run in a marathon, which is more than eight times the usual cross-country competitive racing distance, is an inappropriate activity for young persons.

Numerous studies on the epidemiology of distance running have been published since 2001. Overuse injuries continue to predominate and there is increasing rate of injury with increasing weekly mileage. A research study was presented at the 2008 AAP National Convention and Exposition (annual meeting) involving Students Run LA, one of the groups that has been promoting marathon participation as a physical activity challenge for at-risk youth (46). Over 100 runners aged 11 to 15 participated. About 1/3 were in Tanner stages 1 and 2, another third in Tanner stage 3 and another third were fully mature at Tanner stage 5. The mean daily run distance was 3.4 miles, the mean weekly mileage was 12.7 and the mean days of running per week were 3.8 days. The mean longest run was 12.6 miles +/- 7.9. More than half of the runners reported pain with running (51.5%); more than 90% of those who had previously experienced pain with running were painful again. Those who ran less than 12 miles per week reported no pain; those running more than 16 miles per week reported pain in significant numbers. Similarly, those whose longest runs were less than 12 miles reported no pain. Their recommendation was to limit mileage to 12 miles per week and to not exceed 4.5 miles on any daily run.

Newspaper articles about injuries in cross country running sprouted up after the Seattle high school injury surveillance study was publicized in the lay press in 1993 (47). Several of these featured stories about injuries to young promising cross country runners, whose careers were cut short because of recurrent significant overuse injuries. Among orthopedic surgeons, some have expressed concern that athletes encouraged to do intensive running prior to skeletal maturity may be predisposed to degenerative diseases of the joints and cartilage as adults (47).

Thus among young athletes, especially under 16 years of age, preparing to race in a marathon is ill advised. In the youthful population, more is not better; there is ample time to increase one's mileage and personal goals when athletes begin college competition at approximately age eighteen.

Psychological Considerations

Many athletes involved in intensive competitive athletic endeavors (which by its very nature marathon participation is) experience emotional burnout and loss of self-esteem, losing interest in the very activity that dominated their childhood and early adolescent years.

Much attention has been given to the issue of psychological effects of marathon running on child participants in the lay press. NBC Nightly News profiled a family during a summer 1988 broadcast (48), with five children (ages 6-16 years), all of whom participate in distance running, with training that includes running seven days per week. This family has been often used in the lay press in arguments for and against youth participation in marathons (49, 50). Reports of this family and other families claim that

the running regimen is the child's idea, and that each child truly enjoys this activity. Society, however, accepts the concept that below certain ages, a child is incapable of giving true consent. Heretofore, races have been "sanctioning" these activities by allowing children to compete in marathons, thus providing an avenue of encouragement for this behavior. The fact that marathon record times for children in age groups below 10 and between 10 and 13 exist only serve to fuel the desire to compete and better that record.

Competitive marathon running is a serious activity, one that is generally recognized as stressful to all who engage in it. Subjecting children to the stresses of competitive marathon running and training is not healthful. If race directors choose to allow certain select underage runners to compete, there should be no special recognition for their performance. At a minimum, there should be no reporting category for runners under 18 years of age. A runner's time could be included in the complete list of finishers as long as no age is attached to any name on that list (5).

Female Athlete Triad

Participation in certain sports predisposes female athletes to developing the female athlete triad (51). This triad consists of three interrelated conditions: disordered eating, amenorrhea, and osteoporosis, and is directly associated with intense athletic training (52-55). Sports which place athletes at higher risk of developing this condition include those in which: (a) thinness is emphasized, such as gymnastics, figure skating, diving, synchronized swimming and ballet; (b) those in which leanness is believed to improve performance, such as long distance running, swimming and cross country skiing;

and (3) those in which weight classification exists, such as wrestling, martial arts and rowing (51). Competitive marathon participation clearly is an activity which can lead to the female athlete triad.

Approaches of Other Organizations

The sport of tennis confronted similar issues during the mid-1990s regarding the age at which athletes should be allowed to compete in professional tournaments. Such regulations were initiated because of the burnout problems of Jennifer Capriati and the impending rise of Venus and Serena Williams. The USTA limited the ages and number of tournaments the participants could engage in. The results have been quite positive. Jennifer Capriati personally shook off her "lost years" to return to championship form and the Williams sisters, forced to conform to restricted opportunities as children, are still dominant forces in the women's tennis game today, nearly fifteen years later. The actions of the USTA were implemented after seeking expert medical opinions regarding the physical, mental and developmental nature of potential problems associated with unrestricted professional competition by young girls.

Non-Competitive Participants

The development of challenging physical activity by at-risk youth for the purpose of building character through accomplishment poses an interesting dilemma for race directors. These adult organizers are seeking to have the opportunity for their at-risk youth to "share the physical space" of the marathon race course with the competitors on race day (but in a non-competitive manner). But promising to provide adult supervision

and by ensuring that no one seeks or receives any formal recognition for their performance, and with few exceptions complete the 26.2 mile distance in a "participatory pace" of approximately 4.5 hours or slower (about 10 minutes per mile or slower); these adult organizers are seeking a waiver from the existing recommendation that youth under 18 should not be permitted to participate in a marathon (5). Evidence provided in a prior section was conducted on a sample of the Students Run LA population. That data showed that those who ran more than 12 miles per week were at increased risk of painful running and that those whose longest run was greater than 16 miles were likely to experience pain. The slow running pace is less likely to produce high levels of metabolic heat load and subsequent heat illness; the slower pace is also designed to produce less stress on the lower extremities, but the total load of 26.2 miles may create a significant number of proud but "sore" individuals. It would be wisest to try to get the organizers to refocus their challenge to a safer activity, such as a half marathon distance, since the data support that 12 to 13 miles is a distance that is likely to be safe for nearly everyone (but perhaps that reduces the nature of the character building "challenge") (46).

Conclusion

Adults and parents are often called upon in our society to set limits and guidelines for precocious and demanding children. This is done when establishing ages for voting, military service, operating a motor vehicle, drinking alcohol and smoking cigarettes (4).

It is in the overall best interests of our children to make competitive participation in a full marathon an adult activity, reserved only for those 18 years of age and above.

Ample numbers of opportunities exist after eighteen years of age to participate in this exhilarating experience of competitive marathon running.

It is conceivable that given proper biomechanics and anatomy, a quality progressive training program, and appropriate maturity and cognitive level, a long distance runner can have a safe and positive experience from competitively participating in marathons prior to eighteen years of age. This special individual would be the exception and not the rule. Examples of such individuals do exist, but serve to demonstrate that decisions rendered regarding participation are not designed with the "exception to the rule" as the critical parameter.

What harm would be inflicted on an adolescent denied the opportunity to run in a full 26.2 mile marathon (especially when opportunities to run half-marathons or 10 mile races would remain available)? Even so, for the perfect adolescent preparing for competitive marathon racing, the race director must ensure that the young athlete is following the prescribed training program precisely (including adequate sleep, nutrition, menstruation, rest from running, graduated increase in mileage), is enjoying himself or herself, is getting along well with parents and peers, is experiencing no painful symptoms, and knows how to maintain proper hydration during the race (not under-drinking or over-drinking)(2-4).

Special supervisory arrangements must also be made when minors are part of mass participation events, particularly in case of injury requiring medical attention. Who is responsible for these minors on race day? It is well established in American society that a group event involving youth under 18 years of age, adult chaperoning and supervision is mandatory; for those over 18, they are responsible for their own behavior

and safety. As this statement is advisory in nature, IMMMDA race directors are not bound to follow its core recommendation.

Further, permitting non-competitive youth participants to share the race course with competitive marathon racers is a decision that each race director should consider individually. With proper training and proper supervision by their organization, these youth do not appear to be at undue risk. However, data from the adult running population that completes the course in over 4.5 hours indicate that hyponatremia and other life-threatening conditions are possible in this population.

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