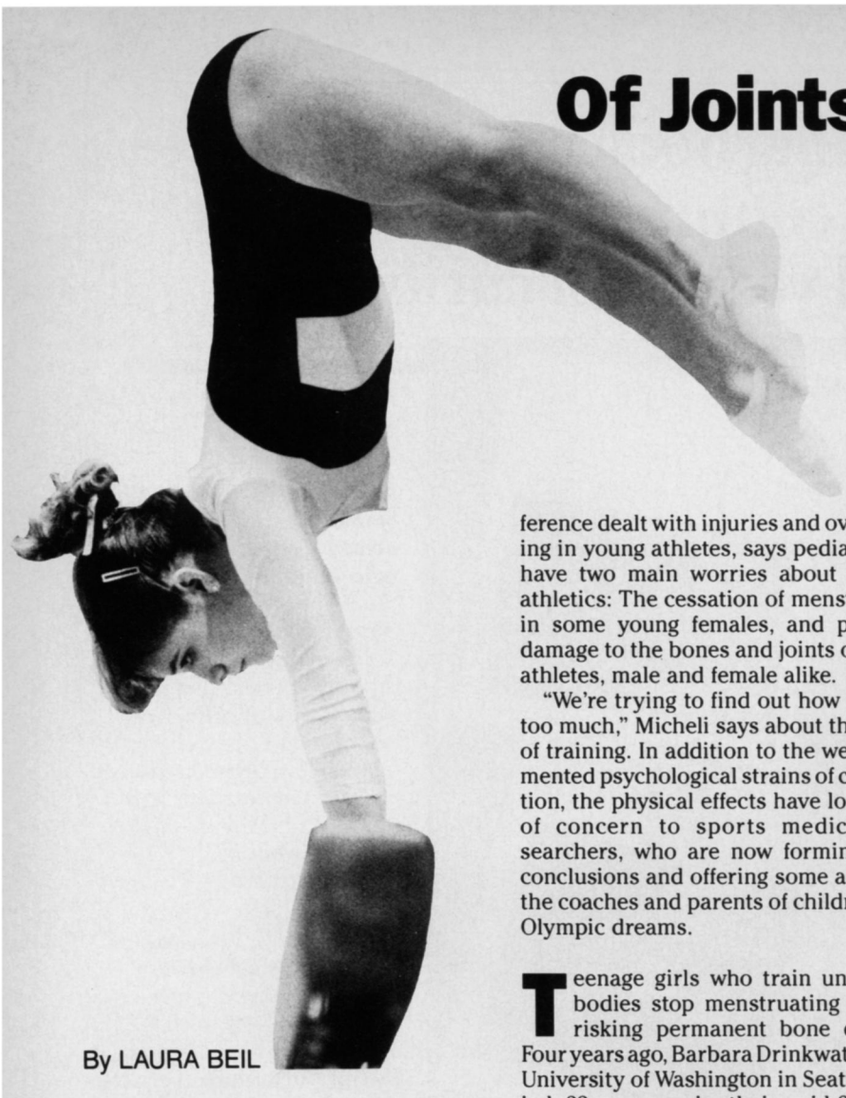
Of Joints and Juveniles



For some young Olympic hopefuls, all that training can be too much of a good thing

By LAURA BEIL

She was 14 when her grace on the balance beam and her lightning spins and twists from the lower to the upper parallel bar left Olympic judges with nothing to fault. Nadia Comaneci was a perfect gymnast, the darling of the summer games, and what's more, she was so *young*.

That was 1976, the year a bumper crop of adolescents in sweat-soaked leotards began spending mornings and afternoons at the gym, yearning for gold medals. "I think some people even called it 'The Nadia Syndrome,'" says Lyle Micheli, director of sports medicine at Children's Hospital in Boston. In the 12 years since, teenage athletes have become commonplace not only in gymnastics (where Mary Lou Retton took the 1984 gold at 16), but also in training for other demanding sports such as swimming and ice skating.

This week, more than 1,000 sports medicine researchers—among them physicians, psychologists and nutritionists—gathered in Seoul, Korea, for the 1988 Seoul Olympic Scientific Congress in anticipation of the summer games. Micheli, whose keynote address for the conference dealt with injuries and overtraining in young athletes, says pediatricians have two main worries about teenage athletics: The cessation of menstruation in some young females, and potential damage to the bones and joints of young athletes, male and female alike.

"We're trying to find out how much is too much," Micheli says about the rigors of training. In addition to the well-documented psychological strains of competition, the physical effects have long been of concern to sports medicine researchers, who are now forming some conclusions and offering some advice to the coaches and parents of children with Olympic dreams.

Teenage girls who train until their bodies stop menstruating may be risking permanent bone damage. Four years ago, Barbara Drinkwater of the University of Washington in Seattle studied 22 runners in their mid-20s, and concluded that the loss of menstruation brought on by extensive exercise results in brittle bones that usually come only with old age. In the Aug. 2, 1984 NEW ENGLAND JOURNAL OF MEDICINE, she attributed this problem—which amounts to premature osteoporosis—primarily to a lack of the estrogen needed for bones to absorb calcium.

She stressed that exercise itself normally strengthens bone, and that this condition was a result of a very intense training regimen. While all the runners in the study exercised almost the same amount of time each day, those who stopped menstruating ran about 42 miles a week; those who didn't averaged 25.

A handful of separate studies later confirmed Drinkwater's findings, and she has continued to follow those same athletes, seven of whom have since resumed menstrual cycles. Now at the Pacific Medical Center in Seattle, Drinkwater says some women who resume menstruation do replenish lost bone mass over several months, suggesting the condition is at least partially reversible. Still, some effects linger. "They are plateauing at a level [of bone strength] significantly lower than their age group," she says.

Excessive exercise may be too simple an explanation for why some female athletes lose bone mass. The problem probably involves a host of additional factors, including nutrition, rate of weight loss, psychological stress and the regularity of cycles before menstruation ceases. Drinkwater says these individuals often resume menstruating if they put on a few pounds or slack off on exercise. "But," she notes, "it's very hard to get top-notch athletes to consider either of those."

Even if young women do not exercise to the point of losing their menstrual cycles, they still may wear out cartilage or damage growth plates that sit just beyond the joints. Each sport has its own particular menace: Gymnasts risk back and wrist injuries, runners and cyclists can suffer knee problems, weightlifters strain joints in the arms.

Physical anthropologist Robert Malina of the University of Texas at Austin says that, contrary to rumors about too much exercise stunting growth, the overall growth rate of young athletes in training is not slowed by intensive exercise. "When you treat them as a group, which is the only way you can treat them, young athletes grow as well as nonathletes," he says. In an upcoming book, *Youth, Exercise and Sport* (Benchmark Press, Indianapolis, 1989), Malina cites a long-term German study of female teenage athletes participating in different sports that shows no significant difference between chronological age and normal skeletal age. After 4.2 years, the skeletons of the gymnasts in the study advanced on average 4.1 years. The bones of figure skaters aged 4.0 years after 3.5 had passed.

In fact, more evidence indicates that exercise *enhances* children's growth, says Steven Fleck, an adviser on resistance training with the U.S. Olympic Committee. Problems arise only when young athletes push themselves to the point of overuse injuries, he says.

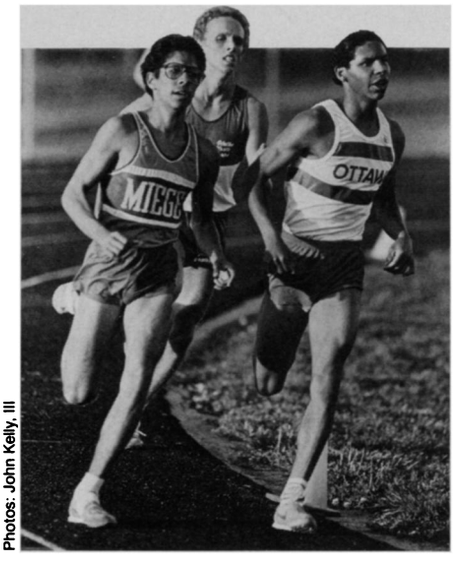
According to Malina, those who do suffer long-term damage are mostly young, female gymnasts. "I do think it's a real problem, but for a small number of

cases," he adds.

When asked about intensive training, researchers repeatedly mention gymnastics, with its emphasis on speed combined with intricate movement, as having a high incidence of overuse injuries for young teenagers. Micheli says frequent shocks to the growth plate of the wrist can cause the two bones in the forearm to grow unevenly. Back injuries also are common, Malina says.

Young gymnasts may face the most danger when they strain young joints at particularly vulnerable times. In the July 1988 CLINICS IN SPORTS MEDICINE, Micheli writes that, whatever the sport, most injuries to young athletes in training occur during growth spurts, which stretch the muscles and tendons anchored at the elbow, knee and ankle, reducing their normal flexibility.

To be safe, coaches should watch for times of accelerated growth, easing training programs during those periods, Micheli cautions. Growth spurts are more frequent in 11- to 13-year-old girls and 13- to 16-year-old boys, and can be detected by a physician or an experienced coach. Sometimes the tightening of joints is obvious: "If a kid who used to be able to touch their toes suddenly can't get halfway to their knees, you know the joints have lost flexibility."



Photos: John Kelly, III

Nadia Comaneci came back to the Olympics in 1980. She was a little bigger then, performing superbly until a fall from the bars pulled down her ratings. At the same time, an 8-year-old Massachusetts girl was getting the first taste of a sport she would later crave. Dawn Lynde was flown to Texas in 1986 for training with elite gymnastics coaches. For two years, she practiced six to eight hours every day, until an agonizing shoulder-joint injury forced her off the mats. Last July, she and her dreams came home to Greenfield for good. For each Nadia, there are hundreds of Dawns.

It is ironic when the exercise that may leave some young athletes with pains and limps is the same that improves the health of others and propels a few to the Olympic games. The obvious advantage to training is that "young athletes are much more physically fit than other kids in their class," observes Paul Dyment, chief of pediatrics at the Maine Medical Center in Portland and chairman of the American Academy of Pediatrics Committee on Sports Medicine. According to a 1985 study sponsored by the President's Council on Physical Fitness and Sports, 40 percent of school-age boys under 12 and 70 percent of all school-age girls could do no more than one pull-up.

Those who can do not just pull-ups, but back flips and double axles, must heed their bodies' warning signs to avoid irreversible damage, says Dyment. "There's always a point [at which] if you keep on going, you could develop a permanent disability," he says.

So the youth of the United States are a paradox. "Most of our kids aren't getting enough exercise," laments Micheli, "except for a few who may be getting too much." □

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The Honey Bee — James L. Gould and Carol Grant Gould. Presents these fascinating creatures as animals of surprising complexity that are able to produce food, communicate and even dance. Traces humans' relationship with honey bees from prehistoric times to the present. Describes the intricate life cycles of both individual bees and colonies. Examines the elaborate communication systems that regulate the activities of the bee colony members that may number as many as 60,000. Sci Am Bks (W H Freeman), 1988, 239 p., color/b&w illus., $32.95.

The Media Lab: Inventing the Future at MIT — Stewart Brand. The Media Laboratory at MIT, a unique interdisciplinary center, is based on its director's conviction that the whole gamut of communications media — television, books, telephones, recordings, newspapers, magazines and film — is being transformed by computers. The lab is concerned with electronic communication technologies and, according to the preface, how humans connect, how they are connecting faster and wider with new technology and how they might connect better. Much of the book is a tour of some of the lab's research; the rest is concerned with "the media lab of the world," discussing how the new communications technologies will affect the world. Originally published in hardback by Viking Press in 1987. Penguin, 1988, 285 p., color/b&w illus., paper, $10.

On Human Nature — Edward O. Wilson. A work about science and about how far the natural sciences can penetrate into human behavior before being transformed into something new. Examines the reciprocal impact that a truly evolutionary explanation of human behavior must have on the social sciences and the humanities. Originally published in hardback in 1978. Harvard U Pr, 1988, 260 p., paper, $8.95.

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Space Science in the Twenty-First Century: Imperatives for the Decades 1995 to 2015 — Space Science Board. This National Research Council report covers six major subject areas — astronomy and astrophysics, fundamental physics and chemistry, life sciences, mission to planet Earth, planetary and lunar exploration, solar and space physics — in individual volumes plus an overview volume. These reports set forth the scientific opportunities in space research and its applications in the years 1995 to 2015. Natl Acad Pr, 1988, 7 vols., 72-143 p. each vol., paper, each vol. $12, 7-vol. set $67.