[ Editorial ]

Kids and Sports

Over the past year, a couple of clinical cases have raised my interest in the role sports and regular physical exercise plays in the growth and development of children. One case involved a talented young male basketball player, age 12 years, who presented with a large displaced osteochondritis dissecans defect, requiring operative treatment and a prolonged rehabilitation, ending his basketball career. The other was a highly competitive female soccer player, age 11 years, with a complicated anterior cruciate ligament injury. The cases were similar in that both kids were very good students prior to their injuries. Both kids came from stable home situations with supportive parents. Neither child, by report, had exhibited significant behavioral problems nor had either portrayed any evidence of problems to come. Both children deteriorated badly, both physically and mentally, after their injuries, becoming problematic at home and school with failing grades and suspensions. Their parents could hardly believe the course of events and found it very difficult to deal with the behavioral and academic problems; both eventually sought professional help, thankfully! Both kids essentially stopped all forms of exercise after injury and struggled with rehabilitation. It was pretty clear that they were depressed and lost their motivation to recover throughout their clinical course. I must admit that I’ve seen segments of these tragic scenarios before, but not quite as dramatic! Good kids and good athletes, stunned and shocked by an injury. Their physical vulnerability exposed as their mantle of indestructability was dashed. They were robbed of their identity when their athletic careers came to a screeching halt.

As an orthopaedic surgeon, I’ve often wondered about the psychological effects of musculoskeletal injury on children. Unfortunately, I also realize my own deficiencies in this aspect of sports medicine. No doubt recognizing vulnerable personalities initially after injury could have helped several of my own patients before they fell victim to temporary escapes from reality through drugs and alcohol. I’m very sad to say that some of those kids did not recover, as far as I know. I think a lot of teachers, administrators, parents, and yes, physicians, don’t recognize the central role that sports can play in the lives of children until something halts those activities. Recognition of the roles that athletics and exercise play in child growth and development has been reinforced recently in several interesting publications. Much critical research on the effects of exercise on brain development has been done in animals, particularly mice. With their relatively short life spans, it is much easier to detect the effects of various forms of physical stimulation or deprivation over the course of their lives. Work performed at the Salk Institute has shown that aerobically challenged mice show dramatic brain growth compared with sedentary mice. The hippocampus, which is the part of the brain associated with learning and memory, was twice as large in those that were exercised aerobically. Mice that exercised learned better, as evidenced by better performance on a spatial learning task: namely, a water maze. I would really like to know what would happen if the mice were injured acutely and couldn’t exercise suddenly. Would they deteriorate mentally and physically like the kids? The biology of injury in a physical sense appears to be better understood than the mental and psychological aspects.

As for the biology supporting neural development, aerobic exercise boosts levels of brain-derived neurotrophic factor, it stimulates neurogenesis, and stimulates the expression of genes that enhance brain plasticity, which is needed for the brain to change neuropathways. As for the behavior side of things, no doubt exercise affects mood and mood can affect behavior. To me, those are intimately related.

So exercise appears to play an integral role in the neural development of children but may be most important for those who struggle at home and at school. One of the groups that struggles the most is the attention deficit/hyperactivity disorder (ADHD) crowd, which appears to be growing in epidemic proportions in the United States today. The CDC now estimates that more than 10% of school-aged children carry this diagnosis, with more than 6% being medicated for this disorder. Exercise shows promise for addressing ADHD symptoms in children. In fact, moderately intense aerobic exercise appears to have positive effects on neurocognitive function and inhibitory control in ADHD. Unfortunately, the trend in many school systems today seems to be to downplay the need for physical exertion as teachers struggle to meet academic demands and standards. A recent study of 40 children aged 8 to 10 years, examined the effects of a 20-minute episode of treadmill running or reading. After the 20 minutes, test scores improved more for the kids who exercised than those who read. So, if
exercise is so important for kids, how much is enough? Both the National Institutes of Health and the President’s Council on Fitness, Sports, and Nutrition recommend 60 minutes or more a day of physical activity for children and adolescents aged 6 through 17 years. No doubt many children, in fact most—especially those not regularly involved in sports—do not exercise 60 minutes a day. Today’s children spend a lot of time online with features such as social media and in front of the television. Changing these socially accepted patterns of behavior and activity isn’t easy, especially for those who are physically challenged by injury, accident, or disability. However, after reading the details on exercise research mentioned today, it seems very worthwhile to try to change patterns of sedentary activity.

Years ago, my own dad gave me some parenting advice. He insisted that the best teenagers were physically tired at the end of the day. He believed that physical work and sports kept kids out of trouble. Looks like the benefits of physical activity reach much further than he knew.

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