ATVs: Injuries are part of the terrain

By Terry Stanton

CHILDREN ACCOUNT FOR A DISTURBING PROPORTION OF FOUR-WHEELER ACCIDENTS

Since all-terrain vehicles (ATVs) were introduced in the United States in the 1970s, their popularity and use have risen almost exponentially. Just as dramatic as the increase in use has been the number of injuries associated with ATV accidents.

The number of annual ATV-related injuries has increased from 10,100 in 1982 to 58,200 by 1992, and to more than 150,000 in 2007. The number of fatalities per year has also increased—9,000 in 1982 to 766 in 2007. More than a quarter of the total 10,281 deaths reported from 1982 to 2009 were children younger than 16 years.

These unsettling statistics are reported and reviewed in an article in the April 2011 issue of the Journal of the AAOS (JAAOS) by Jeffrey R. Sawyer, MD, and his colleagues at the Campbell Clinic, University of Tennessee.

The alarming increase in injury and mortality from the use of ATVs is attributable not just to increased use but to the production of larger, faster, and more powerful ATVs. The first ATVs typically had a 7-horsepower, 89 cc engine and weighed between 160 and 200 pounds; some modern vehicles have engines of more than 600 cc and 50 horsepower, weigh more than 400 pounds, and reach top speeds of more than 100 miles per hour.

The original ATVs were three-wheeled vehicles designed for farm use. In 1988, however, the U.S. Consumer Product Safety Commission imposed a 10-year ban on their use due to their dramatic injury rates. This was followed by a directive limiting the sale of adult-sized vehicles for use by children and providing for safety awareness and education programs. Since the development of four-wheeled vehicles and the expiration of the ban, the vehicles have become more powerful, with a corresponding rise in ATV-associated injuries in all age groups, especially in young riders.

Who’s at risk?
ATV injuries are most common in white men aged 18 to 30 years; they usually occur in rural areas, and 80 percent of injuries are to the driver rather than to a passenger. Although ATVs are used for work activities, injuries occur more frequently during recreational riding. Although only 15 percent of ATV riders are children, they account for 27 percent of ATV injuries and 28 percent of deaths.

Injuries are also increasing in persons older than 50 years. When older riders are injured, they have more frequent and more severe thoracic injuries, with longer hospital stays and more complications. All 50 states have ATV-related legislation, with considerable variation in scope; 31 states require helmet use; and 28 have minimum age laws. However, legislation has been ineffective in preventing ATV-related death and injury.

To further explore the issues covered in the JAAOS article and to gain the clinical perspective of a surgeon who sees patients with ATV injuries, AAOS Now spoke to Dr. Sawyer.

AAOS Now: In addition to this review article, you are conducting research on ATV injuries. What brought you to this subject?
Dr. Sawyer: This work all started when I came to Tennessee. I was struck by the prevalence of ATV-related injuries in children that I was seeing. What struck me was how common these injuries are, and how young the children are, and how little awareness parents have about the dangers of ATV use by children (Fig. 1). We’ve looked at this both locally and nationally over the past 4 years, which prompted the JAAOS article.

Our referral area in Memphis has about a 300-mile radius, and includes several rural communities. ATVs are more prevalent in the culture, and kids are outdoors more. So for a variety of reasons, more ATV injuries occur in the South.

The biggest factor is the power of the vehicles. They are much bigger and faster than initially. Now, they’re really motor vehicles, but they don’t have the safety features of automobiles. Nor are people required to take any kind of formal training to drive an ATV. It’s the worst of both worlds.

AAOS Now: You note that the mechanism of injury is revealing in regard to children.
Dr. Sawyer: The way the accidents occur is interesting, and we are studying this prospectively. The majority of accidents occur in roll-

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Table 1: American Academy of Orthopaedic Surgeons Recommendations for all-terrain vehicle safety

| Owners should be licensed on the basis of competence in vehicle use and safety hazards. |
| The minimum recommended age for operation is 16 years. ATVs 90 cc in size should not be operated by persons aged <16 years. |
| Operators should be required to wear safety equipment, including helmets. |
| ATVs should be used only during daylight hours. |
| Only one person should ride an ATV at a time. |
| An ATV should not be operated while the driver is under the influence of drugs or alcohol. |

ATV = all-terrain vehicle

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Fig. 1 A, Clinical photograph and B, intraoperative fluoroscopic image of a 2-year-old boy with a history of factor VIII deficiency who was riding an all-terrain vehicle with his mother when his foot was caught in the chain, amputating his first through fourth toes.