Overview of Cycling Injuries: Results of a Cycling Club Survey

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Abstract: Participation in competitive bicycling has increased substantially over the past decade, and bicycle injuries have increased accordingly. Cycling has been reported in several studies to have higher rates of injury than other sports and recreational activities; accordingly, riders must be cognizant of the potential for injury and protect themselves appropriately. The purpose of the current study was to survey an established competitive Los Angeles–based road cycling team to determine the epidemiology of and circumstances for traumatic cycling injuries.

Participation in competitive bicycling has increased over the past decade as a form of exercise and leisure activity.1 An increase has also occurred in the number of bicycle accidents. An estimated 544,000 bicycle injuries occurred in 2009 in the United States.2 In the pediatric population, more than 300,000 children are examined annually for bicycle-related injuries; of these, 15,000 injuries result in inpatient hospital admission.3 In addition, 900 deaths annually are believed to occur from injuries sustained during bicycle accidents,4 of which approximately two-thirds occur in the pediatric population.5 Numerous potential injuries may befall riders. Many occur in the trauma setting, which produces a broad spectrum of injury. Simple falls onto pavement can produce minor injuries such as abrasions, contusions, and lacerations, whereas high-energy mechanisms can result in fractures, concussions, multisystem polytrauma, or death.6 Nontraumatic injuries also occur, ranging from overuse injuries, such as tendinitis, sprains, and strains, to compression neuropathies, such as cyclist’s palsy (a compression neuropathy of the distal ulnar nerve that may occur due to prolonged grip pressure on the handlebars) and erectile dysfunction.7,8 Other common injuries include knee problems, buttock pain, and neck or shoulder pain. In a study of 132 participants, Weiss9 reported that riders experienced buttock pain (32.8%), knee problems (20.7%), neck or shoulder pain (20.4%), groin numbness (10%), and palmar pain or paresthesias (10%).

The purpose of the current study is to survey an established competitive Los Angeles–based road cycling team to determine the epidemiology and circumstances of traumatic cycling crashes.

Materials and Methods
An e-mail questionnaire was distributed to all members of a local urban cycling club to determine the following information: cycling experience (years of cycling or racing), mileage and training activity, race activity, and previous involvement in road riding or racing crashes. All club members, irrespective of racing activity, received the survey. The epidemiology of the crashes and the setting in which they occurred were noted. Crashes deemed to have occurred while getting used to clipless pedals or other aspects of the learning curve for road cycling were excluded from analysis.

Results
Of the approximate 300 members in the cycling club, 29 (10%) responded to the survey. Median age was 42.7 years (range, 25-64 years), median years of riding was 13.9 years (range, 1-44 years), and median years in competitive racing was 5.3 years (range, 1-20 years), for a cumulative total of 403 years of riding experience.
and 153 years of racing experience. Respondents averaged 140 miles of riding per week (range, 25-275 miles). Thirty-seven percent rode exclusively solo, 20% rode exclusively in a small group, 29% rode exclusively in a large group, and the remainder rode in a combination of settings.

A total of 121 crashes that met inclusion criteria were reported, for an average of 4.2 crashes per rider (range, 0-15 crashes). Of these, 78 crashes occurred during training: 33 (42.3%) during solo riding, 18 (23.1%) in small groups, and 27 (34.6%) in large groups. The remaining 43 crashes occurred during races.

**Discussion**

Bicycle riding is a common form of recreation, fitness, and transportation. Ridership has increased from 62 to 65 million participants in 1981 to approximately 67 million in 1997. From a public health perspective, the cost associated with caring for injured bicyclists is significant. Data from a 2000 estimate noted that approximately $8 billion is spent annually in the United States in the care of bicycle crash victims.

Regarding factors that contribute to bicycle accidents, Kiburz et al surveyed active adult bicyclists to determine cycle use and accident patterns. Significant factors contributing to bicycle accidents included rider carelessness, bicycle malfunction, environmental factors, turns, and hills. Of the 492 respondents, 46% had been involved in an accident, with the cyclists at fault 58.7% of the time.

Kronisch et al surveyed participants in an off-road bicycle race and noted a 0.4% rate of significant injury (defined as an injury that prevented the rider from completing the event). Dannenberg et al prospectively evaluated the incidence of and risk factors for bicycle injuries among riders participating in the Cycle Across Maryland tour. The 1638 riders in the tour had a total of 198 injuries. Of these, 85 were traumatic (15.4 per 100,000 person-miles), 76 were due to overuse (13.7 per 100,000 person-miles), and 37 were due to other medical problems (6.7 per 100,000 person-miles).

The most commonly identified risk factors for overuse injuries were inexperience and lack of conditioning before riding, whereas inexperience and a history of racing were identified as risk factors for traumatic injuries.

Several studies have compared the injury rates for common sports and recreational activities. In terms of the absolute number of injuries per year sustained from common sports, Tan et al reported that bicycle riding had the highest absolute number of injuries per year (614,594 injuries), followed by basketball (597,224 injuries) and football (372,380 injuries). In-line skating resulted 95,129 injuries, and skateboarding resulted in 59,964 injuries. Conn et al evaluated the rate of injury per 1000 population in which injured patients sought formal medical attention for a similar group of activities.

Cycling placed second on the list, with 2.6 injuries per 1000 (95% confidence interval [CI], 2.1-3.1), behind only basketball, with a rate of 3.9 injuries per 1000 (95% CI, 3.3-4.5). Skating and skateboarding had an injury rate of 1.4 per 1000 (95% CI, 1.1-1.7). Among men, basketball was at the top of the list with 6.4 injuries per 1000, followed by cycling (4.6 per 1000). Among women, activities classified as exercising had the highest rate of injury (2.0 per 1000; 95% CI, 1.5-2.5), and cycling tied with water sports with the lowest injury rate (0.7 per 1000; 95% CI, 0.4-1.0). When these results were broken down by age, cycling was the most common cause of injury in the 5- to 14-year-old age group (8.3 injuries per 1000; 95% CI, 6.4-10.1) and was the fourth most common among adults older than 25 years (1.3 injuries per 1000; 95% CI, 0.9-1.8).

This study evaluated the prevalence of bicycle crashes across a group of Los Angeles–based cyclists; it was not designed to determine the incidence of such crashes, nor was it designed to evaluate specific injuries. Accordingly, comparison of injury rates of cyclists and other athletes cannot be made between the current study and the abovementioned studies.

A limitation of the current study was the low response rate to the survey (10%), which could introduce selection bias. An assumption cannot be made that the respondents reflect the entire group; however, they demonstrated an overall average of more than 14 years of riding involving more than 4 crashes per rider. This is consistent with previous work demonstrating a high number of cycling-related injuries.

**Conclusion**

The popularity of cycling is rapidly increasing. However, the injury rate is not insignificant; cycling has been reported in several studies to have higher rates of injury than other sports and recreational activities. This study demonstrated multiple crashes in this small cohort surveyed from an urban cycling club. As more Americans become more active in their later years, riders must be cognizant of the potential traumatic and overuse injuries that can be sustained during cycling.

**References**


4. Thompson D, Rivara F,


