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The Role of Age as a Risk Factor for Pickleball-Related Injuries

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Abstract

Pickleball is a popular sport that includes players from many different demographics. The popularity has resulted in not only increases in participation but also in activity related injuries. The purpose of this study was to identify risk factors along with potential mechanisms for injuries related to pickleball and identify effective countermeasures. Methods included the identification of pickleball related injuries from a US National Emergency Room database (NEISS). A narrative section of the database was used to identify and categorize potential mechanisms of injury. Results indicated that the types and mechanisms of injury relate to three specific age groups: younger, middle age, and older players. Injuries to younger players under the age of 26 are likely the result of misuse of sport equipment. Middle aged players from 26 to 50 sustained injuries more related activity overuse. However, there were more concerns with players over 50 years of age with a great percentage resulting in cardia arrest or symptoms leading to more severe cardiovascular conditions. While pickleball activity should be encouraged as it is a beneficial form of physical activity, there should be specific age-group interventions to reduce injury. It should be highly recommended that doctors approve the activity for individual at risk for heart conditions and supervision for adults in that age group.

Keywords

Physical Activity, Cardiac Arrest, Epidemiology, Pickleball, Injury

1. Introduction

Pickleball has become a massively popular recreational sport recently with 8.9 million players [1]. As defined by the Pickleball USA [2] website: Pickleball is fun, social and friendly! The 2023 report from SFIA & Pickleheads [1] also notes

an increase of 25,000 courts will be needed to meet the current demand for the sport. The study also identifies the average age of the pickleball player as 35 but the sport is also very popular among younger and older people. As the increase in the sport is expected, it would be important to assess current injury outcomes and determine risk potential and prevention countermeasures for players to get the most out of the sport and minimize injury and down days from the activity. Recent studies have highlighted the epidemiology of injury from pickleball [3] [4]. However, the growth of the sport in recent years requires another look to determine populations most prone for injury risk. The purpose of this brief report is to present the current epidemiology of pickleball related injuries and discover the most common mechanisms for injury. Finally, it would be important to interpret and present future prevention strategies to keep players playing.

2. Methods and Materials

Data for the study were obtained from the National Electronic Injury Surveillance System (NEISS) operated by the US Consumer Product Safety Commission [5]. The NEISS collects data from a sampling of 100 US emergency departments [6]. All records associated with the product code 3235 (Other ball sports (activity/apparel/equipment) for 2022 were selected for analysis. Only one year of analysis was used to determine current injury trends from the increased popularity of the sport. The data contained injuries from other types of sports and the narratives were reviewed for the term "pickleball". Only records that contained "pickleball" were included in the final database for analysis. The NEISS includes data on age, gender, race/ethnicity, location of incident, injury diagnosis, injury disposition (one coded field), involved body part (one coded field), and alcohol/drug use. The Age variable was recorded to the following age groups: 1 - 25, 26 - 50, and 51 - 100. The rationale for the age groups was based on several factors including the environment, age-related factors and predisposition for specific types of injuries. The narrative was also reviewed to determine the mechanism for injury. Odds ratios and 95% confidence intervals were calculated for helmet use and the outcome of a concussion or head injury. The included *weight* variable was used to provide US estimates for injury occurrence.

3. Results

Upon reviewing the narrative from the NEISS data for the injury code 3235, it was determined that there were 296 records that were identified as "pickleball-related" injury incidents from US emergency rooms for 2022. Using the weight variable projected the number of emergency room visits from pickleball-related injury in 2022 to 17,416 injuries. The results presented that close to 87% of all injuries reported were from participants over age 50. The most common diagnosis was for fractures at 30% followed by sprains at 17% and internal organ injury (7.2%). There were 29% of cases that did not state the diagnosis for the injury. As far as body region most impacted, the upper trunk (17%) was the most

common location followed by lower trunk (10%) and then head (10%). One of five injury cases were treated and admitted for hospitalization. Most of the hospital admissions were for cardiac arrest with the other 25% admitted for fractures. Of the 296 records there was one recorded death due to cardia arrest. No reports recorded alcohol use from the related incidents. Table 1 highlights the mechanism of injury with the bolded percentages indicating the mechanism most noted for each age group.

4. Discussions

Pickleball health events from this study disproportionately affected older age groups. While we do not have denominator data on the number of people who play pickleball by age group, this disparity could be explained in that it may be a more popular activity among older age groups. Pickleball may be enticing to both older age groups, as well as those who may not be physically fit, as it may be deemed a less strenuous activity. This may explain the relatively high proportion of injuries and cardiac events occurring during this activity. Pickleball involves short bursts of quick movement. While habitual physical activity reduces the risk of coronary events, short bursts of anaerobic activity among persons who are untrained and susceptible to heart disease may invoke a myocardial infarction [7].

Middle aged and older adults are encouraged to begin physical activity, even if they are untrained. Benefits of beginning a physical activity program later in life include delay and/or improvement in chronic diseases, reduced functional limitations, positive mental health, and reduced risk of premature death [8].

However, guidelines have been promoted to encourage preparticipation screening for cardiovascular disease prior to beginning a physical activity program. The most recent guidelines from the American College of Sports Medicine are based on the participants' current level of physical activity, known underlying diseases, and anticipated exercise intensity. While these guidelines are more liberal

Table 1. Mechanism of injury by age group: (% w/Mechanism, % in Age Group).

	Age 1 - 25	Age 26 - 50	Age 51 - 100
Fall/Trip (%)	86 (1%, 14.7%)	439 (5.2%, 43.8%)	8048 (**93.8%,** 48.8%)
Activity/Overuse	75 (1.7%, 12.8%)	377 (8.5%, 37.6%)	3988 (**89.8%,** 25.5%)
Hit By Object	358 (**49%,** 61.3%)	17 (2.3%, 1.7%)	356 (48.7%, 2.3%)
Syncope	0 (0%, 0%)	18 (1.9%, 1.8%)	914 (**98.1%,** 5.8%)
Cardiac Arrest	0 (0%, 0%)	151 (5.7%, 15.1%)	2507 (**94.3%,** 15.3%)
Heat Exhaustion	65 (100%, 11.1%)	0 (0%)	0 (0%)

Bold indicates age group with highest percent injuries within each specific mechanism. Underline indicates the mechanism with the highest percentage of injuries within the specific age group.

than prior guidelines, they may not fully encompass those at-risk who play pickleball. Future research should examine the characteristics of adults who play pickleball and compare and contrast them to those who may begin a different form of activity, such as walking, jogging, or bicycling. If sedentary, at-risk, individuals are embarking on pickleball, which requires short bursts of more intense movement, they may be at-risk for both cardiac events and the types of injuries found in the current study. While pickleball may be marketed as a family friendly game, the reality may be that participants are putting themselves at-risk for injury and cardiac events, without the physiological benefits of a more sustained physical activity program.

This study was limited by the nature of the NEISS data. While we analyzed the narrative text entries describing each incident, the narratives are sometimes too general and do not provide complete information regarding the circumstances surrounding the injury event. Severity of injuries is likely higher with this data set, as the NEISS only captures injuries treated in ED's, not injuries treated elsewhere or those not seeking treatment. NEISS provides a single diagnosis code. If multiple diagnoses are present, the most serious is listed as the principal diagnosis. Therefore, secondary diagnoses are excluded from our analyses. Lastly, because we do not know the number of people who participated in pickleball or for what length of time, exposure data is void. Accordingly, it is impossible to estimate the true incidence of injuries or events.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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