

Prevalence of Musculoskeletal Injuries in Professional Skaters

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Abstract: As a sport, skating is recognized as a unique combination of art and athleticism. Skating is popular all over the world, but it is a very demanding sport. Skating combines free skating elements performed in unison by a pair of skaters, with other elements performed together, such as lifts, throw jumps, and coordinated and common - axis spins. Skating injuries are typically acute in nature, ranging from small lacerations to bone fractures, and mainly involve the upper limbs. Sex and age have been suggested as potential injury risk factors in skating, as the risk of hospital admission for male skaters was found to be almost double that of female skaters, and several studies have found higher percentages of injuries in children and adolescents when compared with older populations. Experience has also been related to a higher risk of severe injuries, as more experienced skaters attempt riskier maneuvers at higher speeds. When comparing the disciplines of skating, injuries can be common in pairs skating followed by singles skating.

Keywords: Professional, skaters, musculoskeletal injuries, semi advance, advance, skating

1. Introduction

Skating is popular all over the world, but it is a very demanding sport. Because there are many indoor skating rinks, the skating season is continuous, with ongoing various major international competitions [1]. Skating includes four disciplines—singles men and ladies skating, pairs skating, with other elements performed together, such as lifts, throw jumps, and coordinated and common - axis spins, dancing [1]. Skating discipline a skater performs jumps, spins, and free skating movements [1]. With other elements performed together, such as lifts, throw jumps, and coordinated and common - axis spins [1].

Skating injuries are typically acute in nature, ranging from small lacerations to bone fractures, and mainly involve the upper limbs. The most common location of injuries for a skater can be seen in the foot. These injuries can often attributed to the boot. The next most commonly injured area can be the knee, although it is probably the most commonly injured region brought to the physician's attention. The hip and pelvis can also be injured area but can be the most challenging to rehabilitate. In skating, as in all sports, it is important to determine the cause of the injury and the associated biomechanical factors to create appropriate and comprehensive rehabilitation programs. Moreover, it is advantageous to maintain open communication with the athlete, coaches, parents, and the sports - medicine physical therapist to ensure that the athlete receives optimal care. [4]. Injuries sustained during physical activity, exercise, and sports activities are common in children and adolescents. While the majority of sport - related musculoskeletal injuries are secondary to repetitive overuse, patterns of injury can be modulated by growth and development and vary by age, gender, and type of sport or physical activity [5].

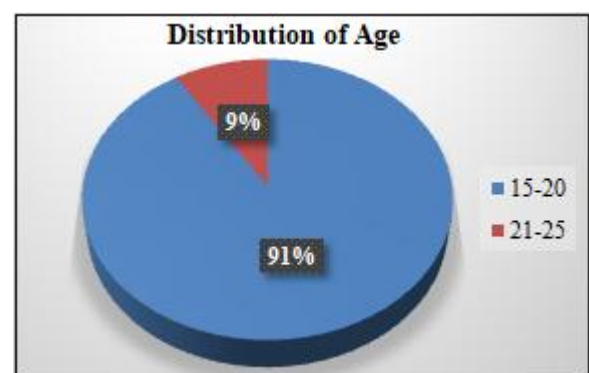
2. Materials and Methods

The study was started from October 2022 to April 2023. Based on the inclusion and exclusion criteria 270

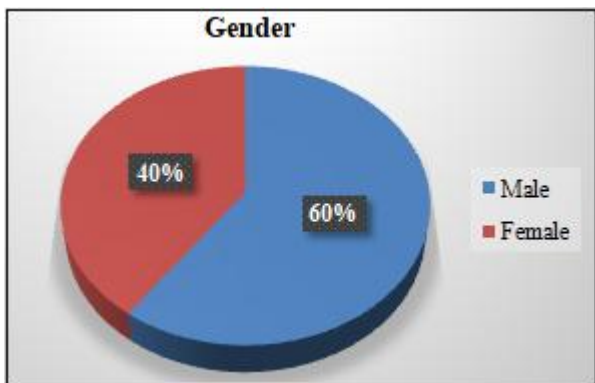
participants were recruited for the study. After explaining the informed consent form, demographic details, and the Self - made Questionnaire were taken by the participants. The results were calculated and a statistical analysis was done

3. Results and Discussion

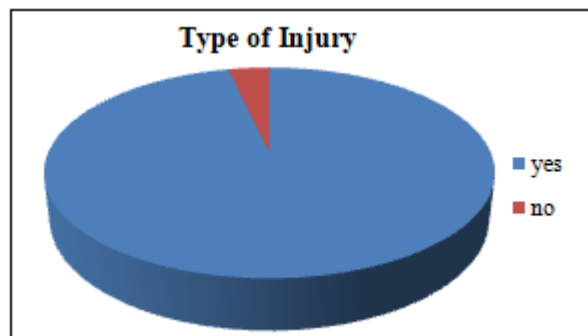
This is one of the few studies done to evaluate the common musculoskeletal injuries in the professional group of skaters. Majorly the results concluded from the analyzed data were different body parts were injured while practicing but the increased number of injuries were caused to ankle, followed by elbow, wrist with shoulder and hip respectively.



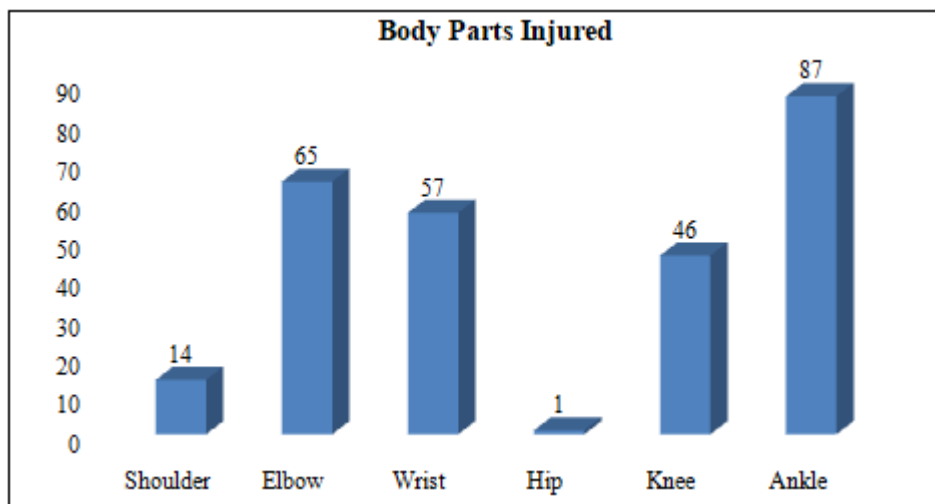
Graph 1: Distribution of Age.



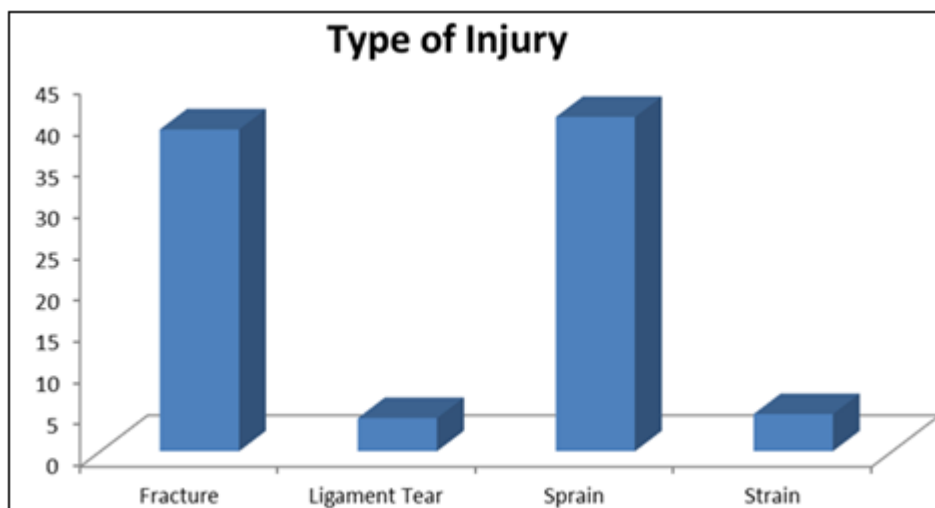
Graph 2: Distribution of Gender.



Graph 3: Type of injury caused.



Graph 4: Body parts injured



Graph 5: Type of injury caused.

The study was concluded by taking 270 participants with professional level of practicing into consideration results were obtained. The graph no.1 is represented the distribution of age considering into two groups as 15 - 20 and 21 - 25 with 91% and 9% respectively. A study state that adults, who participate actively in physical exercise involving high risk of trauma or injury. [9] Rodríguez - Rivadulla A, is higher percentage of young adults getting injuries then adults. [3] Skaters are often young athletes involved in environment focused on skating. [5]

The graph no.2 and the corresponding pie diagram gives a

full distribution of gender of the total 270 participants included overall. There is higher number of male subjects then females as 161 and 109 respectively. The pie diagram then represents the distribution in percentage i. e males have a total of 60% and females cover the other 40% giving it a total of 100%. Skating is a well - known sports practiced in by both females and males skaters across world. [10]Males suffer more from serious injuries due to their habits of skating outdoor, in more dangerous locations and wearing less safety equipment's than females. Long term monotonous physical load with increasing intensity and insufficient energy intake appears to injury in young female

skaters.^[13] Therefore indicates more male participants than females.^[3]

The graph no.3 now explains about any musculoskeletal injury occurred to the participants in the last 6 months/1 year. A total of 238 participants had undergone a musculoskeletal injury with a percent of 88.1% and the other 32 participants were not injured while practicing which gives a total of 11.9%. Sbarbati A state that to improve their performance skaters have raised the bar with more complex jumps, spins and lifts, which have likely contributed to increased injury risk^[6]. While the majority of sport - related musculoskeletal injuries are secondary to repetitive overuse, patterns of injury can be modulated by growth and development and vary by age, gender, and type of sport or physical activity^[5]. The body parts which were injured while practicing by the 270 participants in the last 6 months to 1 year. A rise in injuries were seen related to the practice and were observed^[3]. In this observational study the highest percentage of body parts injured was the ankle/foot (n=87) with a total of 32.2% which included 55 males and 32 females in total a study stated that foot /ankles tendinopathy and ligament injuries are more developed as high number of overuse condition/injuries including bone stresses unequal forces, balance alteration and fractures^[6]. It is also known that skating boots are less flexible and may lead to poor flexibility causing more injuries^[7]. Mostly ankle injuries are a result of repetitive pushing motions or landing leading to micro fractures or sprains^[7]. A study stated that lower extremity injuries were most common in both group of skaters followed by upper extremity^[10]. The more injured body part which was injured was elbow (n=65) with 24.1% of graph., including 37 males and 28 females, and also wrist (n=51) also has an injury percentage 21.7% followed by 33 males and 24 females. It is seen that upper extremity injuries are frequent, due to participants falling on an outstretched arm which again was concluded by some studies^[6]. The knee (n=46) region is also injured in about 17% of population with a total of 26 males and 20 female population in it as the repetitive knee flexion motion mostly causes conditions such as patellar tendonitis and general anterior pain, also during spins or jumps knee can undergo various forces like twisting, rotational forces and cause micro and multiple trauma^[7]. Shoulders (n=14) with 5.2% having 10 males and 4 females. The hip (n=1) being the least with 4% of injury percentage having only 1 female who was injured as sometimes an overuse and compensatory forces cause pain and micro trauma after a sudden fall^[9].

Adults who participate actively in physical exercise involving high risk of trauma or injury^[3]. Injury distribution pattern seems to reflect the unique biomechanics of skating was stated by Kroncke, Erica L MD^[1]. Hunter J. State that most injuries tend to occur from a loss of balance leading to fall, in more recent times due to failed tricks^[16]. The classification was done as sprains (n=109) were the highest number of injury that was noted with a total of 109 participants with 40.4% of graph having 56 males and 53 females. A study has suggested that jumps, take off and other bilateral skating moves in addition to landing and slides can contribute to development to their injuries^[6]. Fractures (n=105) were the second highest injuries noted in participants with 38.9% of graph, which included 69 males

and 36 females which were injured. Strains contributed with a 4.8% of graph with 13 participants in which 7 were males and 6 were females, getting this type of injury as tendons are overstretched and allow forces on muscles^[7]. Ligament tear and injury was experienced (n=11) participants out of 270 with concluding the graph with 4.1% with a total of 6 males and 5 females. A study states that injuries are typically acute in nature ranging from laceration to fractures and mainly involve lower limb injuries^[6]. A study suggests that skating techniques also involve jumping, and direction changes that include rotational movements in the knee, a pattern typically associated with ligament and meniscus injuries^[12]

4. Conclusion and Acknowledgement

Statistical analysis was performed after entering data in Microsoft Excel. The participants responded through the self-made questionnaire. The obtained data from the participants was organized in master chart, various tables along with graphs and pie diagrams were derived from the statistical analysis for easy interpretation of results. This study concluded that, there was a high prevalence of musculoskeletal injuries in professional skaters of semi - advance and advance stages with increased number of injuries found in ankle (32.2%), which was followed by the elbow (24.1%) then wrist (21.1%) with shoulder (5.2%) and the hip (4%) respectively.

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