

Research Article

Prevalence of Ankle Sprain in National Level Roller Skating Players in Karad.

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ABSTRACT

Background: Ankle sprains are one of the most common injuries in sports, particularly in activities that involve frequent and high-intensity lower limb movements, such as roller skating. This study aims to assess the prevalence of ankle sprains among national-level roller skating athletes in Karad, with a focus on identifying contributing factors, injury patterns, and preventive measures. Roller skating requires extensive use of ankle mobility and stability, which increases the risk of strain and injury, particularly among athletes pushing physical limits for competitive performance.

Materials and Methods: A validated questionnaire was prepared on google form and national level skating players filled this questionnaire. Prior to conducting the survey, the ethical committee approval was made. Players select according to inclusion and exclusion criteria. 72 players are participating in this study and result was obtained.

Result: prevalence of ankle sprain in national level roller skating players in male population is 70.9% and in female population is 29.1%. and 94.9% players noticed swelling, bruising over ankle after ankle sprain. 24.9% skating players aware about physiotherapy can help in managing ankle sprain and avoid further complications. But 75.9% players don't know that physiotherapist can cure ankle sprain and 87.2% players experience ankle sprain more than one time.

Conclusion: The high physical demands and rapid foot movements required in roller skating, the findings reveal a significant prevalence of ankle sprains among athletes, which may stem from factors such as repetitive motion, inadequate warm-up, poor technique, or uneven surfaces.

Keywords: ankle sprain, inversion and supination

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INTRODUCTION

Acute ankle sprain injury, is the most common acute sport trauma, accounting for about 14% of all sport-related injuries. Among them, 80% are ligamentous sprains caused by explosive inversion or supination. The aetiology of most ankle sprain injuries is incorrect foot positioning at landing – a medially-deviated vertical ground reaction force causes an explosive supination or inversion moment at the subtalar joint in a short time (about 50 Ms).[1]

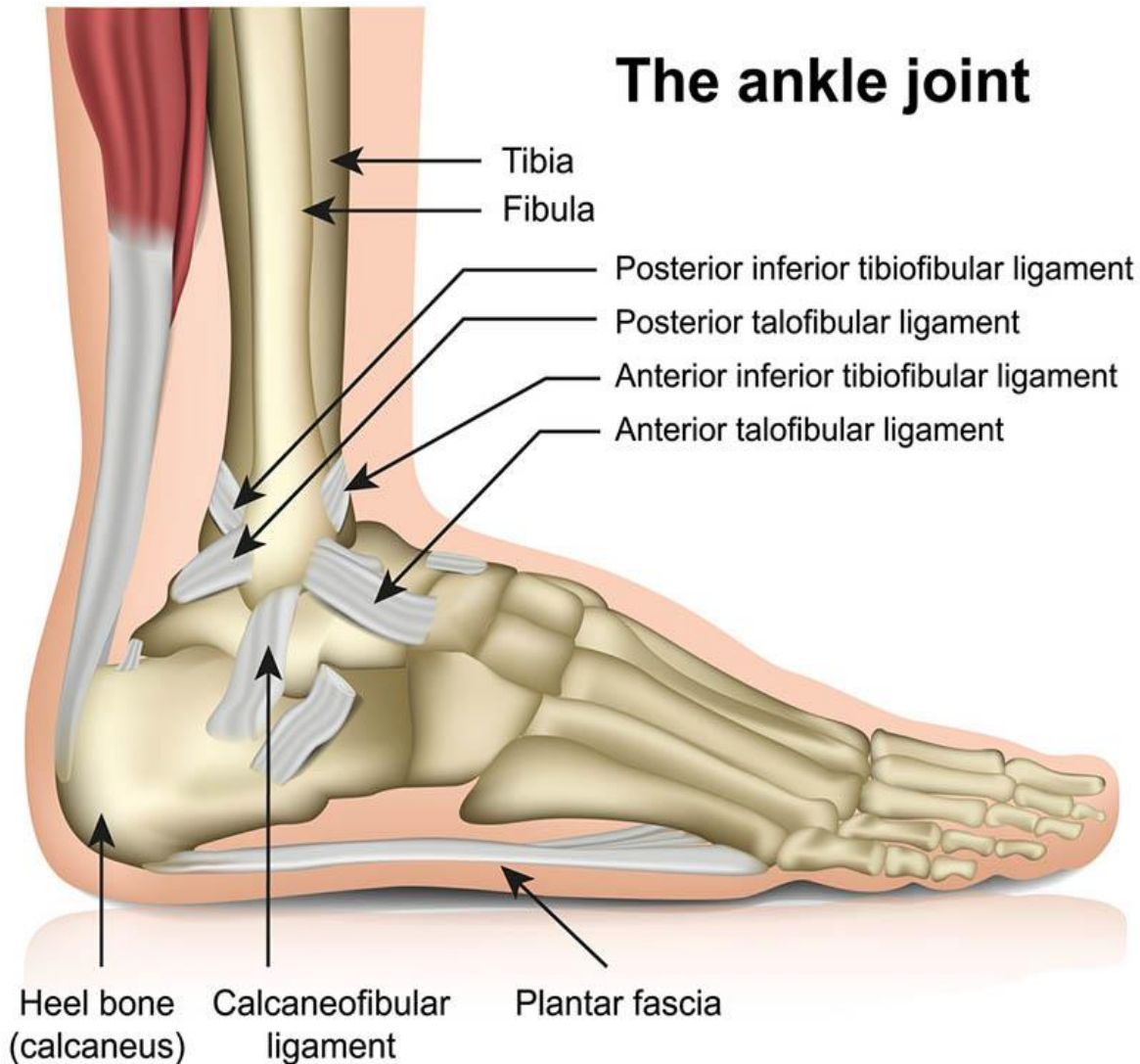
In sports injuries throughout the countries studied, the ankle was the second most common injured body site after the knee, and ankle sprain was the most common type of ankle injury.[2] Females were at a higher risk of sustaining an ankle sprain compared with males and children compared with adolescents and adults, with indoor and court sports the highest risk activity.[3]

Lateral ankle sprains (LAS) are among the most common sports-related injuries and the reinjury rate is very high.[4]

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High rates of acute ankle sprain recurrence are linked to the emergence of chronic ankle instability [5]. A moderate or severe sprain should require an athlete to wear an adequate orthosis for at least six months, and we advise that athletes with sprained ankles complete supervised rehabilitation before returning to practice or competition [6]. The subtalar joint is stabilized by its intrinsic and extrinsic ligaments, whereas the lateral and medial ligamentous complexes stabilize the ankle joint. Ankle sprains are typically associated with damage to these ligaments. [7]

The ankle joint is a synovial joint made up of the tibia (leg), fibula (leg), and talus (foot). It connects the foot to the leg and functions as a hinge joint, allowing the foot to flex dorsiflex and plantarflex.[7] Strong ligaments known as tibiofibular or syndesmotic ligaments aid to surround the tibia and fibula together. The talus is linked to this socket, which is known as a mortise, to form an ankle joint.[8]



<i>Sign/symptom</i>	<i>Grade I</i>	<i>Grade II</i>	<i>Grade III</i>
Ligament tear	None	Partial	Complete
Loss of functional ability	Minimal	Some	Great
Pain	Minimal	Moderate	Severe
Swelling	Minimal	Moderate	Severe
Ecchymosis	Usually	Not Common	Yes
Difficulty on bearing weight	None	Usual	Almost always

It is critical to distinguish between the kinematic changes associated with ankle and subtalar instability, as well as the

differences that occur following ligament sectioning. The Joint Coordinate System (JCS), the Helical Axis (HA), and the Euler

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angles are the three techniques that can be utilized to calculate the joint kinematics. [10]

Differences in Euler angles and JCS sequence lead to the same conclusion in detecting instability at the ankle and subtalar joint. As expected, the HA detected instability in plantarflexion at the ankle joint and in inversion at the subtalar joint.[10]

MATERIALS AND METHODOLOGY:

A cross-sectional study conducted in Karad near Chhatrapati Shivaji Maharaj stadium, Karad where national level roller skating players come for practice. The goal of this study was to find prevalence of ankle sprain in national level roller skating players in Karad. 79 skaters are given their consent to

participate in this study. This study was conducted as per inclusion and exclusion criteria. All male and female players between age of 10-20 years and participants with present and past history of ankle sprain and if there is signs of pain, swelling, brushing over the ankle.

Ethical committee give permission for conducting this study with ethical concern. The questionnaire has been validated in Marathi for better purpose. This questionnaire was based on prevalence rate of ankle sprain and awareness of is physiotherapist help in reducing ankle sprain risk. All data was collected and the assistance of statistician was used for data analysis. And result was made.

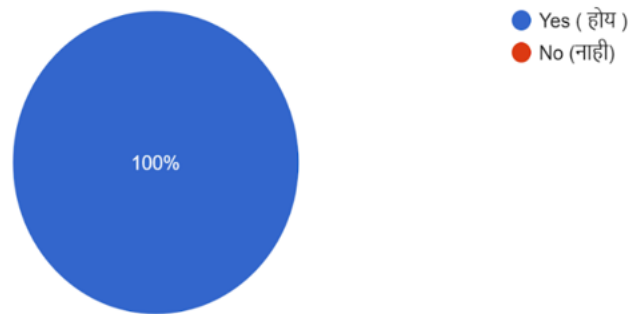
RESULT:

This study suggests that prevalence of ankle sprain in national level roller skating players in karad.

Figure no. 1

Are you willing to participate in this survey.

79 responses

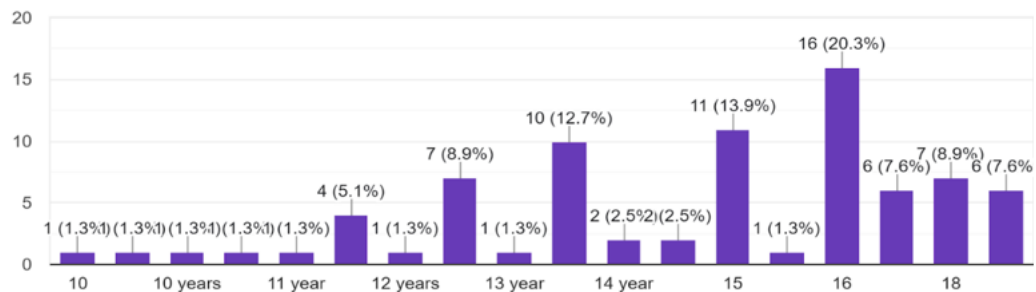


Interpretation:

This chart represents according to sample size total 79 participate involve in this study with 100%.

Figure no. 2

Age (वय)
79 responses

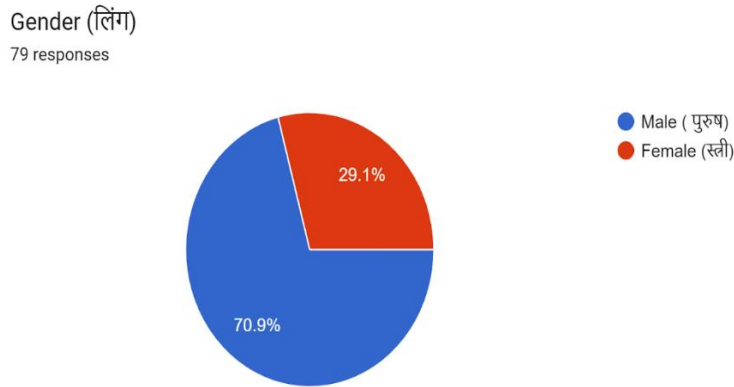


Interpretation:

This chart represents participates between age group of 10 – 20 years. Out of which age group of 15year and 16year players are more involved in this study.

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Figure no. 3

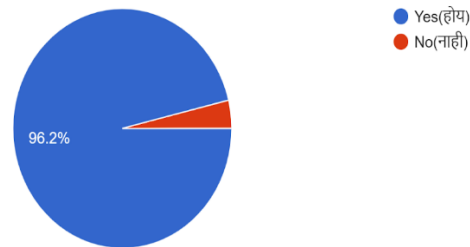


Interpretation-

This chart represents demographic data of collected samples of skaters. Seventy Nine participants were approached with hundred per cent feedback to the questionnaire.

Figure no. 4

1. Did you ever fall on your foot or sprained your ankle while skating? (स्केटिंग करताना तुम्ही कधी पायावर पडलात किंवा घोट्याला मोच आली आहे का?)
79 responses

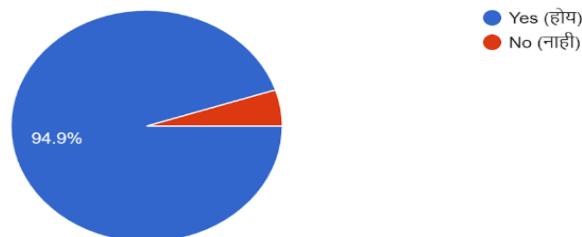


Interpretation:

This chart represents Eighty six skaters fall on foot while skating. This chart show players are prevalent to sprain ankle while playing.

Figure no. 5

2. Did you feel pain in your ankle after the fall? (पडल्यानंतर तुम्हाला तुमच्या घोट्यात वेदना जाणवली का?)
79 responses



Interpretation:

This chart represents 94.9% players experiences pain over ankle after fall.

Figure no. 6

3. On a scale of 1 to 10, how much would you rate the pain you experienced in your ankle? (1 ते 10 च्या स्केलवर, तुम्ही तुमच्या घोट्याच्या दुखण्याला किती रेट कराल?)

77 responses

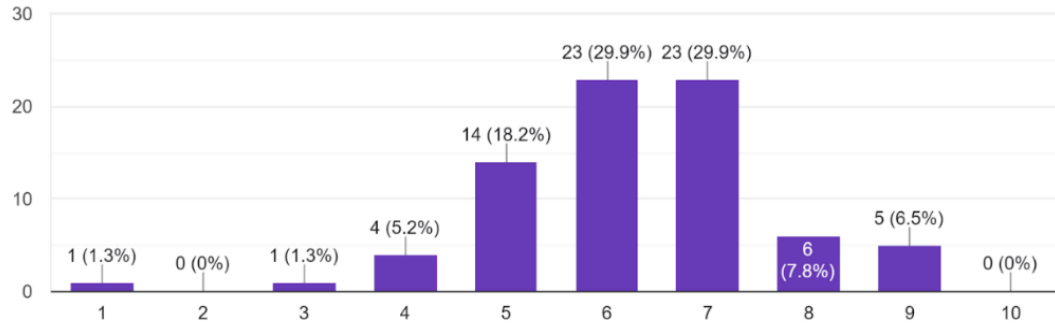
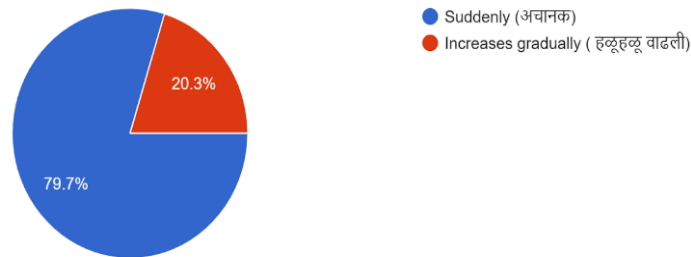


Figure no. 7

4. If yes, did the pain occur suddenly or did it increases gradually with time? (जर होय असेल तर वेदना अचानक उद्भवली का ती हळूहळू वाढत गेली?)

74 responses



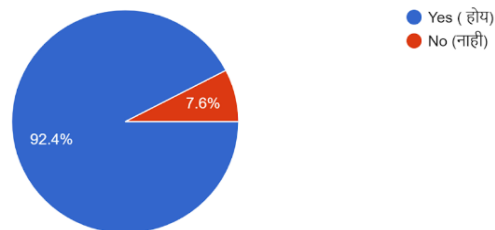
Interpretation:

This chart represent in some players pain increases gradually or suddenly. In this study 79.7% players sudden pain after ankle sprain and 20.3% players experience gradually increase in their pain.

Figure no.8

5. Have you noticed any swelling, bruising (skin discoloration) over the ankle? (घोट्यावर सूज, जखम (त्वचेचा रंग खराब होणे) तुमच्या लक्षात आले का?)

79 responses

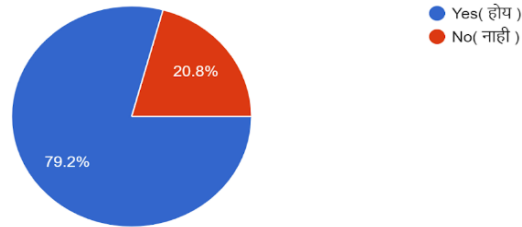


Interpretation :

This chart represent After spraining ankle total 92.4% skating players noticed swelling, bruising over the ankle.

Figure no. 9

6. If swelling was present have you applied ice on it? (जर सूज आली असेल तर तुम्ही त्यावर बर्फ लावला आहे का?)
77 responses

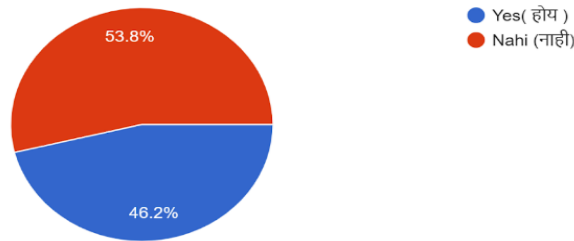


Interpretation:

This chart represents 79.2% players having knowledge About in the presence of swelling ice application over swelling play first role treatment. and 20.8% players have not applied ice immediately after ankle sprain.

Figure no. 10

7. Did you know that it is called as ankle sprain?(तुम्हाला माहित आहे का की याला घोट्याच्या मोचन म्हणतात?)
78 responses

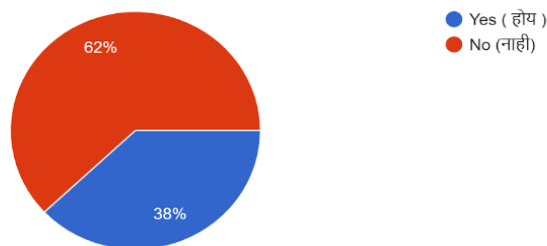


Interpretation:

This chart represents out of 100% participants 53.8% players have no knowledge about ankle sprain but 46.2% players known about ankle sprain.

Figure no. 11

8. Do you know that ankle sprain if not treated properly, can persist for a long time(chronic) & can have severe complications? (तुम्हाला माहित आहे का की...ाळ टिकू शकतो (तीव्र) आणि गंभीर गुंतागुंत होऊ शकते?)
79 responses

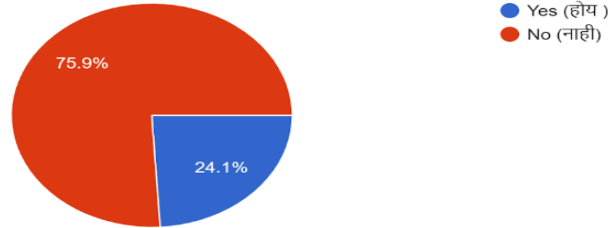


Interpretation:

This study represents that 38% players know the complications of ankle sprain if it can be not treated properly. And 62% players have no idea about complications of ankle sprain.

Figure no. 12

9. Do you know that physiotherapy can help in treating ankle sprain & avoid further complications?
(तुम्हाला माहीत आहे का की फिजिओथेरेपी घोट्याच्या मोचव...करण्यात आणि पुढील गुंतागुंत टाळण्यास मदत करू शकते?)
79 responses

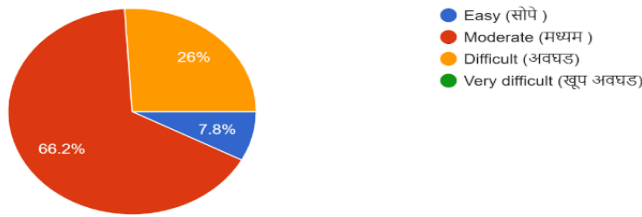


Interpretation:

This chart represents 24.1% players aware about physiotherapy can help in managing ankle sprain and avoid further complications. But 75.9% players don't know that physiotherapist can cure ankle sprain.

Figure no.13

10. How difficult was it to bear weight & walk with the sprained ankle? (मोचलेल्या घोट्याने वजन उचलणे आणि चालणे किती कठीण होते?)
77 responses

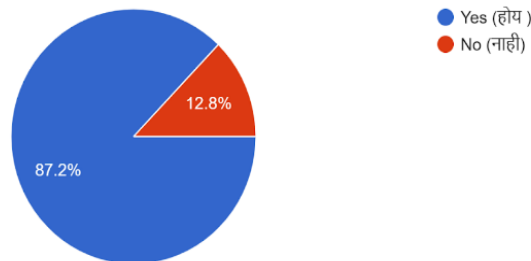


Interpretation:

This chart represents after sprained ankle 66.2% players have moderate difficulty while walking and 7.8% players not find any difficulty while walking.

Figure no. 14

11. Have you experienced ankle sprain more than 1 time? (तुम्हाला 1 पेक्षा जास्त वेळा घोट्याच्या मोचचा अनुभव आला आहे का?)
78 responses



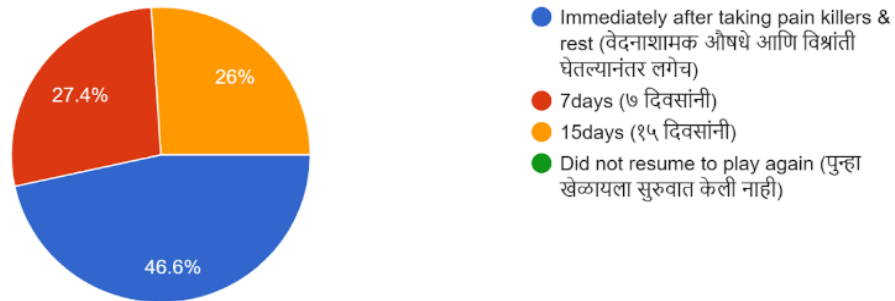
Interpretation:

This chart represents 87.2% players experience ankle sprain more than one time.

Figure no. 15

12. After how many days post ankle sprain did you resume skating?(घोट्याच्या मोच नंतर किती दिवसांनी तुम्ही स्केटिंग पुन्हा सुरू केले?)

73 responses



Interpretation:

This chart represents acute ankle sprain is might be curable if it is treated properly.in this chart 46.6% players are symptoms free immediately after taking pain killers and rest and 27.4% players are free from symptoms after 7 days.

DISCUSSION:

This is survey study aimed to find prevalence of ankle sprain in national level roller skating players in Karad. In this study males 70% and females 27.5% skaters are prevalent to ankle sprain. Ankle sprain injury is the most common acute sport trauma. among them 80% are ligamentous sprain caused by explosive inversion or supination. roller skaters are prevalent for ankle sprain but not yet any study has conducted. Somewhat similar study has conducted and it concluded that there is less prevalence of ankle sprain and its different specialty's role in Sixty-two (58.5%) athletes had a history of sprain and 15 athletes (14.2%) reported history of recurrent sprain in at least one extremity [4]

The incidence of ankle injury and ankle sprain was high in court games and team sports, such as rugby, soccer, volleyball, handball and basketball. This systematic review provides a summary of the epidemiology of ankle injury in sports.[2] but not yet any study has conducted for skaters.

The incidence of ankle injuries in the general population is 1 in 10000 per day, but this number increases to 5.23 in athletes, with up to 9.35 ankle injuries per 10000 athletes during competition [2,3]. Ankles are the most common site of sports injuries; lateral ligament sprains account for 76.7% of injuries followed by fractures at 16.3% [4,5]. High incidences of sprains were seen in team sports such as soccer and rugby, which necessitate quick directional changes while running. [11]

As skaters are prevalent for ankle sprain. As many times, when skaters are not paying attention to the game and the speed of skating is high, the skaters fall down and the leg rolls inside so it put stress on ankle and skater can get an ankle sprain. This

study focuses on the national level roller skaters. Although further study is can be done to characterize the epidemiology and risk factors of Ankle sprain.

In this study, we examined the prevalence of ankle sprain injuries among national-level roller skating athletes in Karad. Roller skating is a high-speed sport requiring quick direction changes, balance, and endurance, which often puts substantial strain on the ankle joints. Given the unique biomechanics involved in roller skating, including lateral movements and jumps, the ankle joint is highly susceptible to sprain injuries.

The results of our research indicate a significant prevalence of ankle sprain among the studied population, with many athletes reporting multiple incidents of sprains during their careers. This prevalence is consistent with studies conducted on athletes in similar sports that involve rapid lateral movement, such as basketball, tennis, and gymnastics, where the ankle joint is frequently at risk.

Possible Contributing Factors: Several factors could contribute to the high prevalence of ankle sprain injuries observed in this study:

1. Biomechanical Demands: Roller skating requires stability during quick direction changes. The rapid sideways movement and impact upon landing from jumps place stress on the ankle's ligaments, especially the lateral ligaments, which are more prone to injury.
2. Lack of Adequate Support: Many roller skates, while providing speed and flexibility, may not offer adequate ankle support, which could contribute to instability and make sprains more likely, especially during high-impact landings.
3. Training and Conditioning: The physical conditioning of the athletes, particularly in relation to their ankle strength and stability, may impact the prevalence of sprains. Proper conditioning could reduce injury, but a lack of targeted training to reinforce the ankle may increase susceptibility.

4. Previous Injury History: Athletes with a history of ankle sprains are more likely to experience future sprains. This pattern was observed in the study, with a significant number of participants reporting multiple ankle injuries.

Comparison with Other Sports:

Compared to other high-risk sports, roller skating appears to have a comparable or even higher incidence of ankle sprains. Studies on sports such as basketball and soccer have also identified the ankle as a commonly injured site, with mechanisms similar to those in roller skating, namely rapid lateral movement and high-impact forces. However, roller skating's unique requirements may heighten these risks, given that athletes are often in constant motion and may lack immediate support structures to cushion the impact.

Implications for Injury Prevention:

The findings suggest that targeted injury prevention strategies are crucial for reducing the prevalence of ankle sprains in roller skating athletes. Strategies may include:

1. Strength and Conditioning Programs: Focused training on ankle strength, proprioception, and stability could help athletes build resilience against sprains. Exercises such as balance training, plyometrics, and resistance training for the lower limbs may be beneficial.
2. Enhanced Equipment Design: Developing roller skates with better ankle support could help mitigate the risk of sprains, particularly for athletes engaged in high-speed competitive events.
3. Proper Warm-up and Stretching: A structured warm-up routine, emphasizing ankle mobility and flexibility, could potentially reduce the likelihood of injuries.
4. Rehabilitation for Previous Injuries: For athletes with a history of ankle sprains, structured rehabilitation focusing on restoring full strength and stability is essential to prevent re-injury.

CONCLUSION:

The study on the prevalence of ankle sprain among national-level roller skating players in Karad reveals a significant incidence of this injury within the sport. Roller skating, due to its demands for high-speed movements, frequent direction changes, and impact stresses, poses considerable risk to the ankle joint, particularly in competitive athletes. Our findings suggest that ankle sprains are a common issue, often recurrent, and may impact performance and longevity in the sport. Key contributing factors to this prevalence include the sport's unique biomechanics, insufficient ankle support in some skate designs, and possibly inadequate strength and conditioning of the ankle joint. Additionally, athletes with a history of ankle injuries show increased susceptibility to re-injury. To reduce the high incidence of ankle sprains among roller skaters, targeted injury prevention strategies are recommended. These include focused training programs to improve ankle strength and stability, better design of skating equipment to provide enhanced ankle support, and structured rehabilitation protocols for athletes with previous sprains. Implementing these measures could significantly reduce the occurrence of ankle sprain injuries, allowing athletes to maintain peak performance while reducing downtime due to injuries.

REFERENCES:

- Fong DT, Chan YY, Mok KM, Yung PS, Chan KM. Understanding acute ankle ligamentous sprain injury in sports. *Sports Med Arthrosc Rehabil Ther Technol.* 2009 Jul 30;1:14. doi: 10.1186/1758-2555-1-14. PMID: 19640309; PMCID: PMC2724472.
- Fong DT, Hong Y, Chan LK, Yung PS, Chan KM. A systematic review on ankle injury and ankle sprain in sports. *Sports Med.* 2007;37(1):73-94. doi: 10.2165/00007256-200737010-00006. PMID: 17190537.
- Doherty C, Delahunt E, Caulfield B, Hertel J, Ryan J, Bleakley C. The incidence and prevalence of ankle sprain injury: a systematic review and meta-analysis of prospective epidemiological studies. *Sports Med.* 2014 Jan;44(1):123-40. doi: 10.1007/s40279-013-0102-5. PMID: 24105612.
- Halabchi F, Angoorani H, Mirshahi M, Pourgharib Shahi MH, Mansournia MA. The Prevalence of Selected Intrinsic Risk Factors for Ankle Sprain Among Elite Football and Basketball Players. *Asian J Sports Med.* 2016 May 23;7(3):e35287. doi: 10.5812/asjms.35287. PMID: 27826402; PMCID: PMC5098135.
- Herzog MM, Kerr ZY, Marshall SW, Wikstrom EA. Epidemiology of Ankle Sprains and Chronic Ankle Instability. *J Athl Train.* 2019 Jun;54(6):603-610. doi: 10.4085/1062-6050-447-17. Epub 2019 May 28. PMID: 31135209; PMCID: PMC6602402.
- Thacker SB, Stroup DF, Branche CM, Gilchrist J, Goodman RA, Weitman EA. The prevention of ankle sprains in sports. *The American journal of sports medicine.* 1999 Nov;27(6):753-60.
- Diaz T. Anatomy of the Ankle and Subtalar Joint Ligaments. Complexities Involving the Ankle Sprain, An issue of Foot and Ankle Clinics of North America, E-Book. 2023 May 4;28(2):201.
- Anatomy of Ankle Sprain by [Dr. Anuj Chawla](#) at February 23, 2021
- Beynon BD, Renström PA, Alosa DM, Baumhauer JF, Vacek PM. Ankle ligament injury risk factors: a prospective study of college athletes. *Journal of orthopaedic research.* 2001 Mar;19(2):213-20.
- Choisne J, Ringleb SI, Samaan MA, Bawab SY, Naik D, Anderson CD. Influence of kinematic analysis methods on detecting ankle and subtalar joint instability. *Journal of biomechanics.* 2012 Jan 3;45(1):46-52.
- James JJ, Al-Dadah O. Ankle injuries in athletes: A review of the literature. *World Journal of Meta-Analysis.* 2021 Apr 28;9(2):128-38.