Prevalence of Hyperextended Knees among District Level Football Players in and around Kolhapur City Using Goniometry

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Abstract- Background- Hyperextended knee refers to a condition where the knee bends forward past the locking position. Although high-impact events can exacerbate it, congenital defects are the main cause, and athletes who have these predisposing characteristics run the risk of suffering injuries to their lower limbs. Hyperextension injuries often occur during moments of extreme physical exertion or unexpected collisions. A player sprinting at full speed may suddenly change direction to evade an opponent, only to land awkwardly and hyperextend their knee. Alternatively, during aerial challenges for the ball, players may collide mid-air, leading to uncontrolled landings that place excessive strain on the knee joint. Methodology-97 healthy volunteers between the ages of 20 to 35 years participated in this study. In order to measure knee hyper-extension among participants, goniometer was used. Result-97 participants, 27 had knee hyperextension. 25 among them were having bilateral knee hyperextension whereas the remaining 2 had unilateral knee hyperextension. Conclusion- From the study it was cleared that prevalence of knee hyperextension is low in the football players of Kolhapur city with the prevalence rate of 28% among the selected participants.

Keywords- Knee joint, hyperextended Knee, football players, range of motion.

INTRODUCTION

Hyperextended (genu recurvatum) knee is a common injury in athletes. In this condition the knee extends beyond the normal anatomical range. ^[1] The normal range of hyperextension of knee is operationally defined greater than 5 degrees. ^[2] Genu recurvatum deformity may either be congenital or acquired. Acquired deformity can be due to cerebrovascular accident, infection, secondary to any trauma or neuromuscular diseases like polio, cerebral palsy, neuromuscular dystrophy. The commonly associated symptoms with this deformity include pain, leg-length discrepancy (LLD), muscular weakness, reduced range of motion(rom), decreased endurance to control movements, display deviations in the gait pattern, poor proprioceptive control over terminal knee extension and instability.

Other problems that may also occur are impairment of the quadriceps mechanism, stretching along with the laxity of the posterior capsule-ligamentous structure of the knee, 1/2 patella altar. ^[3] repetitive micro-trauma and abnormality in loading and unloading of the knee joint. ^[1] Hyperextended knee problems also lead to various injuries and increase in the risk of fall in elderly people. The most frequently injured ligaments are the posterior cruciate ligament (PCL) and the anterior cruciate ligament (ACL). The consequences of the injuries of the knee with the intrinsic and extrinsic risk factors are significantly the concern causes for the physiotherapist. The stress of loading takes place at the anterior structures of the knee joint and the tendons of the patella^[1]

The lower limb muscles especially the gastrocnemius and the hamstrings get weakened and are recommended to be a possible cause of the hyperextension of the knee. The main causes of genu recurvatum are weakness and spasticity of the extensors of the knee and weakness of the flexors of the knee. Running is a common aerobic exercise having higher risk of overuse injury other than walking, swimming or cycling ^[4] The individuals involved in the athletic endeavors should have the

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awareness of the normal position of the knee during the performing activities in order to protect the structures of the knee joint.^[2] Treatment for this injury typically involves rest, ice, compression and elevation of the affected leg as well as physical therapy to improve range of motion, strength, and stability in the knee.

The knee is found to be one of the most frequently injured joints in football players. ^[4] This problem occurs when an athlete gets hurt and their knee extends excessively backward, or knee hyperextension. Under these conditions, treating the issue can frequently be challenging, and patients may have severe handicap. It's critical to distinguish this issue from individuals who may have suffered a growth plate damage as children and now have bone issues with recurvatum, as well as from those who have polio or other muscular disorders that cause their quadriceps to be so weak that they exhibit extreme knee hyperextension. The most frequent cause of these injuries is an extended knee blow, some injures of the primary knee structures or perhaps just the structures on the back of the knee. ^[5]

Therefore, studying the prevalence of hyperextension of the knee in football players is important for both injury prevention and improving athletic performance and hence the above study was conducted.

METHODOLOGY

Ethical clearance was obtained from Research Ethics Committee of D.Y. Patil Education society Kolhapur. 97 participants were screened based on inclusion and exclusion criteria.

Inclusion Criteria-Football Players between the age group 20-35 years old, district level Football participants playing for 5 or more than 5 years and players who are willing to participate.

Table 3: Variables

Exclusion criteria- Participants having malalignment of knee joint, pathological diseases or recent trauma and fracture related to knee joint, having avulsion of bone, with abnormal gait pattern and Congenital hyperextension of knee joint.

The purpose of the study was explained to the participants. The duration of the randomized controlled study was from October 2023 to March 2024. By simple random sampling, participants were included and a written consent was obtained from all. The students underwent complete history and physical examination. The degree of joint hypermobility was scored by Goniometry using a goniometer. Data was analysed using SPSS 22 version and entered in the form of tables.

RESULTS

Table 1: Age of participants

Variable	Mean	SD
Age	26.40	3.38

In Table no 1. among the included 97 participants, the mean age was found to be 26.40 with the SD of 3.38.

Gender	No. of Participants	Percentage
Female	5	5%
Male	92	95%
Total	97	100%

Table 2: Gender of Participants

Table no 2. classifies the Gender of included participants which shows that among the 97 (100%) participants 5 (5%) were females and 92 were males (95%)

Variable	Mean	SD
Duration of Practice	8.81	2.91
Knee Flexion Right (in degrees)	137.14	7.37
Knee Flexion Left (in degrees)	137.05	7.38
Knee Extension Right (in degrees)	2.41	3.59
Knee Extension Left (in degrees)	2.29	3.56

The above Table no 3. explains about the descriptive statistics of the duration of practice, ROM right and left knee flexion and extension that is the mean duration of practice for the participants was 8.81 years (SD = 2.91). The average degree of knee flexion was

Table 4: Result

Grand Total

Result

NS

r the participants was 8.81 years rage degree of knee flexion was for the right knee and 2.29° (SD = 3.56) for the left knee.

25

2

97

In the above Table no.4, out of the total 97 participants, 72% did not show hyperextension, 26% had hyperextension in both knees, and only 2% exhibited hyperextension in the right knee specifically.

B/L KNEES HYPEREXTENDED

RT KNEE HYPEREXTENDED

DISCUSSION

In the above study, the age range of the participants (20 to 35 years) is notable, as this demographic is typically characterized by high physical activity levels and participation in competitive sports.

Also, the previous studies demonstrated that hypermobility is more common in younger adults. ^[6] Understanding the prevalence of hyperextension within this age group can help identify potential risk factors associated with the condition, such as previous injuries, training intensity, biomechanical factors, and genetic predispositions. Identifying the condition in early stage becomes very important in athletes to avoid the major injuries.

In the above study, both the genders were included to be gender biased, but from the collected data it was cleared that in Kolhapur city there are more number of male football players as compared to females. Previous studies have shown that the females playing football or engage in athletic activities are more prone to go for ligament laxity due to many factors leading to hyperextension of knee joint. A contradictory study was done on "the proportion of lower limb running injuries by gender, anatomical location and specific pathology: a systematic review" in 2019, by peter Francis et al.^[4] which aimed at determining the lower limb proportion of running injuries by its anatomical location and specific pathology in both male and female runners. The study concluded by showing the result of knee injury predominantly in female runners

and more evenly distributed injuries of knee shank and ankle foot complex in males which is completely opposite to the above conducted study and obtained results.

26%

2%

 137.14° (SD = 7.37) for the right knee and 137.05°

(SD = 7.38) for the left knee. In terms of knee

extension, the average degrees were 2.41° (SD = 3.59)

CONCLUSION

The study of 97 football players aged 20 to 35, using goniometer measures to establish knee range of motion, revealed that 27 of them had hyperextension of the knee. This indicates a low prevalence rate of around 28% in the sampled population. The findings highlight the importance of managing knee hyperextension among football players, which can impair performance and raise the risk of injury. Strategies emphasizing training, rehabilitation, and injury prevention are crucial to offset the effects of knee hyperextension and promote musculoskeletal health in this cohort.

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