Original Article

Frequency of Stingers syndrome in different contact sports and its effect on return to play

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Objective: To find the frequency of stingers syndrome in different contact sports and its effect on return to play.

Methodology: This cross-sectional study was conducted at the University of Lahore from November 2019 to April 2020 on players of rugby, basketball, and hockey. It included 135 athletes between the ages of 18 and 40 years, of both genders with a minimum 1 year of sports experience. A Postseason questionnaire was used to obtain data. SPSS 25.0 was used for data analysis.

Results: Highest frequency of stingers was seen in athletes of rugby (n = 32; 71.1%) followed by basketball (n = 29; 64.4%) and hockey (n = 27; 60%). We found that 44.3% of all players had a history of stinger and 42 (35.6%) of them returned to play on the same day with the majority of symptoms resolving in less than 24 hours. Association of frequency of stinger with return to play was statistically significant ($p < 0.001$).

Conclusion: There is a high frequency of stingers in rugby, basketball, and hockey with greatest number of cases in rugby. Majority of the players return to play on the same day. A high association was seen between the occurrence of stingers and duration of return to play.

Keywords: Athletic injuries, brachial plexopathy, peripheral nerve injuries, sports medicine, stingers.

INTRODUCTION

A 'stinger', 'burner' or 'peripheral neurapraxia' are synonymous terms for the most common symptomatic upper extremity nerve injuries seen in full-contact sports.[1] It is a transient episode of a sharp, shooting, burning, electrical pain that runs down the length of the arm, and is accompanied with numbness, paresthesia, and muscle weakness of the affected upper extremity.[2] Stingers is most frequently observed and reported in American football but they also occur in other contact sports that risk trauma to the head and shoulder region at a high velocity.[3] These injuries are reported to occur in sports typified by a high level of contact such as wrestling, hockey, basketball, boxing, rugby, and weight lifting.[1, 4-6] Rugby was observed to have a greater incidence than other sports.[7] Over 50% of athletes who play collision sports report at slightest one episode during their careers and an incidence of 7.7% for an initial event.[8] A study estimated the incidence of stingers among American football players to be 50 – 65%, with recurrence rates as high as 87%.[9] Rubin reports 33.9% of high-school rugby players and 34% at collegiate level with a history of at least one occurrence.[3]

The pathophysiology of stingers remains ambiguous. A mechanism of injuries proposed includes tensile and compressive categories. Nerve root stretch caused by forced lateral flexion of the shoulder away from the head results in traction injury and a combination of neck hyperextension and ipsilateral flexion or a direct blow to the Erb's point results in compressive injury.[10] C5 and C6 of the brachial plexus or cervical nerve roots are involved.[11] They are exclusively unilateral and symptoms follow a dermatomal pattern. They rarely last over 1 or 2 minutes and resolve on their own within 24 hours without time lost from the game.[11,12]

Athletes experiencing a transient episode, return to play on the same day once the symptoms subside and normal strength, ROM, and sensation are regained.[13] Weakness of affected muscles rarely persists after the episode has passed, but is not uncommon and may develop later.[10] Predisposing risk factors for recurrent stingers are anatomic abnormalities of the cervical spine, equipment and technique issues, increasing age, overtraining, and the number of repetitive stresses.[14,15]Although stinger is a common phenomenon with high incidence in different sports, very few studies have been conducted in Pakistan about this condition. According to researcher's knowledge this is the first study to find frequency of stinger syndrome in athletes while playing basketball and hockey. This study can encourage further researches about proper guidelines for return to play after stinger syndrome.

METHODOLOGY

This cross-sectional, observational study was conducted at the University of Lahore (UOL) from November 2019 to April 2020. A total of 135 athletes divided into 45 sports players each in rugby, hockey, and basketball. Rugby players among the Pakistan Rugby Academy in UOL were also included. Approval was obtained from the institutional review board of UOL (letter number 784). All athletes were briefed on stingers and written consent was taken.

The sample size of 135 was calculated through Epitool at 95% confidence interval.[16] Non-probability convenient sampling technique was used. 45 players of each sport; basketball, rugby and hockey between ages of 18 and 40, of both genders with a minimum 1 year of sports experience were included. Athletes exhibiting bilateral extremity involvement, cervical radiculopathy, and acromioclavicular injuries were excluded.

For data collection, a modified postseason questionnaire was used which consisted of demographical data and questions related to the duration and severity of symptoms after an episode of stingers and time taken for athletes to return to play.[7] Factors responsible for injury and stinger's association with return to play were evaluated as a whole irrespective of sports.

Statistical Analysis: Data were analyzed on SPSS version 25. Chi-square test was performed to see the association of return to play in all sports with the frequency of stinger occurrence. $p < 0.05$ was considered significant.

RESULTS

There were 135 athletes with a mean age of 22 ± 3.63 years and a mean experience in sports of 5.33 ± 4.34 years. There were94 (69.6%) males and 41 (30.4%) females. Players aged 20 – 23 had larger number of occurrences. However, older and younger athletes experienced stingers as well. The frequency of stinger was more prevalent in rugby, followed by basketball and hockey (Table 1). 88 (65.2%) of all athletes experienced an episode of stingers and 47 (34.8%) experienced none. Amongst these, 49 (55.7%) felt a stinger only once that season and 39 (44.3%) had more than one episode. In all females, 26 (63.41%) reported an episode whereas 15 (36.5%) reported none.

Most frequent symptom was numbness in the upper extremity seen in 55 (40.7%) athletes and tingling in 45 (33.3%) athletes, both of which lasted for less than 1 day. The most severe and long-lasting symptoms of more than 6 days were prolonged neck and burning pain as causalgia, in a total of 8 athletes (3.0, 3.2% each).

Table 1: Descriptive statistics for experience of stingers in different contact collision sports.

Experience of Stingers	Hockey (f/%)	Rugby (f/%)	Basketball (f/%)
Yes	27 (60)	32 (71.1)	29 (64.4
No	18 (40)	13 (28.9)	16 (35.6)
Total	45 (100)	45 (100)	45 (100)

Table 2: Number of days taken for athletes to return to their game in respective sports.

Return to Play (No. of Days)	Hockey (f/%)	Rugby (f/%)	Basketball (f/%)
None	18 (40.0)	13 (28.9)	17 (37.8)
Same day	15 (33.3)	15 (33.3)	12 (26.7)
1-7 Days	10 (22.2)	9 (20.0)	13 (28.9)
7-14 days	0 (0)	7 (15.6)	2 (4.4)
More than 14 days	2 (4.4)	1 (2.2)	1 (2.2)
Total	45 (100)	45 (100)	45 (100)

Table 3: Association between frequency variable and return to play variable (all sports).

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	135.000a	4	.000
Likelihood Ratio	175.721	4	.000
Linear-by-Linear Association	80.759	1	.000
N of Valid Cases	135		

Most players returned to work sane day (Table 2). Pearson chi-square test resulted in a $p < 0.001$ for all sports which shows a high association between the frequency of stingers and return to play, showing that a high frequency of stingers impacts the duration of the number of days to return to play (Table 3).

DISCUSSION

The current study found 65.5% of all athletes experienced at least one stinger that season, with a recurrence rate of 44.3%, which was in line with a

previous study reporting 50.3% of players sustaining at least one stinger in their career,[12] with recurrence rates as high as 50 – 87%.[6] Having one stinger increases the risk of having another by three times. Prior history is a risk factor for reoccurrence.[12] A positive history influenced the incidence of stingers in this study.A previous study on male rugby players conducted by Kawasaki et al showed that 33.9% of all athletes had an incidence of stingers.[7] Hartley et al reported its occurrences in basketball and hockey.[6] This study showed a high frequency of stinger in both basketball and hockey. Ahearn et al reported most players experiencing less than 24 hours out from the competition.[11]

Over half of stinger episodes resolve in one day and result in almost no time loss from the game.[9] In another study, average days of time loss was 2.9 days, 79.3% of the players did not lose any time from playing and were able to return to play in less than 24 hours.[7] Similarly, 48% of the players in this study returned to play on the same day with symptoms lasting for 24 hours.

Previous studies have shown significant correlations between sports experience and risk of injury with its prevalence increasing with the number of years played.[13,14] However, in this study number of years, and gender was not found to affect the injury rate. Players with a year or two of experience had a higher frequency of stingers in the season. This could be due to intrinsic factors such as improper technique, level of skill, or careless play in the learning stages.[7] Majority of episodes were felt during practice in this study, largely because of failure to warm up before play.[4]

Kawasaki et al reported the most common symptom to be transient numbness lasting 1 – 2 days with mild, residual weakness remaining for up to 6 weeks following an isolated stinger in rare but severe cases.[7] In this study, prolonged weakness in grasping was mainly observed in hockey players, weakness of elbow flexion in basketball players and weakness of shoulder elevation in rugby players. Players with prolonged symptoms reported undergoing physical therapy for aiding the recovery process.

Since stingers are widely unknown, they are under-reported and are overlooked as injuries that would not require rest or time off from the game.[4] The majority of the players in this study were reluctant to report this as an 'injury' as the symptoms resolved rather quickly, or denied feeling a stinger to seem fit for the game. Limitations of the study are the presence of a recall bias, a single seasonal survey, and the study's lack of generalizability due to its small sample size.

CONCLUSION

There is a high frequency of stingers in all rugby, basketball and hockey with greatest number of cases in rugby. Majority of the players return to play on the same day. A high association was seen between the occurrence of stingers and duration of return to play.

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