Incidence of injury in amateur rugby league sevens

T J Gabbett

OBJECTIVE ARTICLE


Rugby league is an international collision sport. The game is physically demanding, involving two teams of 13 players, competing in a challenging contest over two 40 minute halves.¹ During a typical rugby league match, players are involved in numerous physical collisions and tackles.¹ As a result, musculoskeletal injuries are common.² Several studies have documented the incidence of injury in professional rugby league players.²⁻⁴ More recently the incidence of injury has been reported in amateur rugby league players.⁵ Interestingly, most (70.8%) amateur rugby league injuries are sustained in the second half of matches, suggesting that fatigue contributes to these injuries.⁶ The finding that fatigue contributes to injuries in amateur rugby league players may be expected, given that amateur players have considerably lower aerobic fitness, speed, and muscular power, and considerably higher percentage body fat than professional players.²

Rugby league sevens tournaments have become increasingly popular as a spectator sport. A game of rugby league sevens consists of two teams of seven players competing on a full sized rugby league field. Consistent with conventional rugby league,² most game time is spent in low intensity activities—for example, static poses, walking, and jogging—interspersed with short bouts of high intensity activities—for example, sprinting and tackling.¹ However, while the duration of matches (usually 7–10 minute halves) is considerably shorter than conventional rugby league matches, a typical tournament requires players to compete repeatedly on the same day, thereby increasing the physiological demands and hastening the onset of fatigue.¹ These findings would suggest that amateur rugby league players competing in sevens tournaments could be particularly susceptible to injury. However, no study has documented the incidence of injury in rugby league sevens. The purpose of this study therefore was to investigate the incidence, site, and nature of injuries sustained in amateur rugby league sevens tournaments.

METHODS

The incidence of injury was prospectively studied in 168 amateur rugby league players (from 12 teams) competing in three amateur rugby league sevens tournaments. The tournaments were played at the end (September) of three consecutive seasons (1995, 1996, and 1997) and included teams that were unsuccessful in reaching the grand final of the regular competition. Four teams competed in each tournament. All players were aged 18 years or over, and they received no payment for either training or playing. The methods and cohort of players used in this study were identical with those described previously.⁶

Each team played three matches per tournament. A fourth match (grand final) was played by teams with the best performance during the preliminary rounds. Each match was 14 minutes long (seven minutes per half), except for the grand final, which was 20 minutes long (10 minutes per half). All matches were played on the same day. A single head trainer, employed to provide first aid coverage to all clubs in the tournaments, assessed all injuries. The head trainer held tertiary qualifications in exercise and sport science and was nationally accredited in injury prevention, assessment, and management. Although individual team trainers were permitted to enter the field freely during the course of a match, the head trainer was prevented from doing so unless summoned by the referee. Therefore, for the purpose of this study, an injury was defined as any pain or disability suffered by a player that was subsequently assessed by the head trainer during or immediately after a rugby league sevens match.¹⁰ Team trainers, coaches, and players were encouraged to consult the head trainer with all (including minor) injuries. All injuries sustained during matches were recorded regardless of severity. They were assessed and managed by established procedures.¹¹ Information recorded included the name of the injured player and the time, cause, anatomical site, and nature of the injury. Throughout the three tournaments, all teams were permitted a maximum of seven replacements, with no limit placed on the number of interchanges made during the match.

Injuries were classified according to the site: head and neck, face, thorax and abdomen, shoulder, arm and hand, knee, calf, ankle and foot, and “other”. Injuries were also described according to the type (nature): haematomas and strains, contusions, concussions, joint sprains, fractures and dislocations, lacerations, abrasions, and “other”. Contusions and haematomas were defined as injuries caused by direct contact to a body...
site resulting in local damage and bleeding to that site. Contusions were characterised by minimal pain, tenderness, swelling, and no restriction of motion. Haematomas were characterised by intense pain, tenderness over a wide area, pronounced swelling, and severely restricted range of motion.

Finally, injuries were classified according to the cause: tackles (being tackled or while tackling), hitting the ground, being struck by an opposition player, falling or stumbling, overuse, overexertion, or “other”.

**Statistical analysis**

Over the three rugby league sevens tournaments, 21 matches were played. Eighteen were 14 minutes (0.23 hours) long, and the remaining three were 20 minutes (0.33 hours) long. Therefore the average duration of matches was 14.4 minutes (0.24 hours). The overall injury exposure for all players was 70.56 playing hours at risk (7 players ⨉ 2 teams per match ⨉ 0.24 hours ⨉ 21 matches). Expected injury rates (tables 1 and 2) were calculated as described by Hodgson Phillips et al. A one sample $\chi^2$ test was used to determine whether the observed injury frequency was significantly different from the expected injury frequency. The level of significance was set at $p<0.05$.

**RESULTS**

Over the three rugby league sevens tournaments, 20 injuries were recorded, with an overall incidence of injury of 283.5 (95% confidence intervals (CI) 173.2 to 436.6) per 1000 playing hours. In the 1995, 1996, and 1997 tournaments the numbers of injuries were 4 (20%), 5 (25%), and 11 (55%) respectively (table 1). All of the injuries sustained were new. The overall injury exposure for each tournament was 23.52 playing hours at risk. The most common sites of injury were the knee (56.7 (95% CI 15.4 to 145.2) per 1000 hours, 20%) and face (56.7 (95% CI 15.4 to 145.2) per 1000 hours, 20%) (fig 1). Some 40% (113.4 (95% CI 48.9 to 223.4) per 1000 hours, 15%) of the injuries sustained were to the lower limb (knee, 56.7 (95% CI 15.4 to 145.2) per 1000 hours, 20%; ankle and foot, 42.5 (95% CI 8.8 to 124.1) per 1000 hours, 15%; calf, 14.2 (95% CI 0.4 to 79.1) per 1000 hours, 5%). Injuries to the upper limb (42.5 (95% CI 8.8 to 124.1) per 1000 hours, 15%) were less common ($\chi^2 = 5.3$, df = 1, $p<0.05$).

Figure 2 shows the nature of injuries sustained. Contusions were the most common type (113.4 (95% CI 48.9 to 223.4) per 1000 hours, 40%), followed by joint sprains (85.0 (95% CI 31.2 to 185.3) per 1000 hours, 30%) and lacerations (56.7 (95% CI 15.4 to 145.2) per 1000 hours, 20%) ($\chi^2 = 9.5$, df = 4, $p<0.05$). Of the 20 injuries sustained, none were muscular haematomas or strains.
Injuries in amateur rugby league sevens

Most (198.4 (95% CI 108.3 to 333.3) per 1000 hours, 70%, $\chi^2 = 31.5, df = 4, p<0.001) injuries occurred in physical collisions and tackles (being tackled, while tackling, direct contact with ground, or struck by opposition player), with no differences found between tackled (70.9 (95% CI 23.0 to 165.2) per 1000 hours, 25%) and tackling (70.9 (95% CI 23.0 to 165.2) per 1000 hours, 25%) players. Overuse injuries were uncommon (14.2 (95% CI 0.4 to 79.1) per 1000 hours, 5%) (fig 3).

An increasing injury incidence was observed over the first (99.2 (95% CI 12.0 to 358.1) per 1000 hours), second (198.4 (95% CI 54.0 to 507.9) per 1000 hours), third (347.2 (95% CI 139.2 to 715.2) per 1000 hours), and fourth (694.4 (95% CI 278.5 to 1430.5) per 1000 hours) matches played during the tournaments ($\chi^2 = 9.2, df = 3, p<0.05$) (fig 4).

DISCUSSION

This study found that contusions were the most common type of injury sustained. This finding differs from results of previous studies, which found that muscular injuries (haematomas and strains) were the most common type of injuries sustained by conventional rugby league players. Indeed, it is not uncommon to observe several defenders effecting tackles in conventional rugby league, with the common goals of preventing the attacking player from offloading the football, and rolling the attacking player on his back (“turtling” attackers). Given the expected differences in defensive strategies, it is not surprising to observe different injury sites between rugby league sevens and conventional rugby league players.

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FIGURE 4 Time of injury in rugby league sevens.

![Figure 4](http://www.bjsportmed.com)

Although rugby sevens tournaments have been shown to have short periods of high intensity activity, the poor aerobic fitness of amateur rugby league players would reduce recovery between these high intensity bouts and increase fatigue. In addition, it would be expected that the ability to recover from matches played repeatedly throughout the day would be diminished in amateur players. Although results from more matches are required to confirm the present findings, they suggest that a sound level of aerobic fitness is required to perform optimally and avoid injury in amateur rugby league sevens tournaments.

Given the high incidence of injury in rugby league sevens compared with conventional rugby league, the present findings question the value of rugby league sevens tournaments. Although rugby league sevens tournaments have become increasingly popular as a spectator sport, the benefits associated with competing in them may outweigh the risks. There is recent evidence that injuries sustained while participating in conventional amateur rugby league are associated with significant direct and indirect costs. Indeed,
Take home message

This study found a high incidence of injury in amateur rugby league sevens players. The incidence of injury increased significantly with the playing of successive matches. Fatigue may contribute to injuries in amateur rugby league sevens players.

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