



## **TUG OF WAR INTERNATIONAL FEDERATION**

World Outdoor Championships 2002

### **Research Report - Project 1**

### **EPIDEMIOLOGY OF INJURY**

Dr HJ van Heerden <sup>1</sup>

Dr C van Rensburg <sup>2</sup>

Institute for Sports Research

<sup>1</sup> Department of Biokinetics,  
Sport & Leisure Sciences

<sup>2</sup> Department of Sports Medicine

**University of Pretoria**

South Africa



## **INTRODUCTION**

The purpose of this study was to determine the epidemiology of injury among International Tug-of-War participants during the 2003 World Outdoor Championships.

The analysis aimed to:

1. Quantify the incidence (number) of injuries;
2. Identify the nature (type and site) of injuries; and
3. Identify potential aetiological risk factors (causes) of injury.

## **METHODS**

### **Subjects and Triage Protocol**

All participants competing during the two days of the International tournament competition were monitored prospectively, thus comprising a cohort 544 subjects from 68 teams. A Sports Medicine Practitioner and two Biokinetics Assistants manning the medical tent served as the on-site triage officers.

### **Definition of Injury**

For the purpose of this study an injury was defined as any condition sustained during competition that: i) necessitated the complete cessation of participation in the match; and/or ii) required treatment from the medical tent after the match. This definition was used rather than a more stringent time-loss from participation criteria, due to the brief duration of the competition. All injuries were recorded on a proforma designed specifically for the project.

### **Injury Incidence**

The incidence of injury was calculated in relation to exposure-time and thus expressed as injuries per puller-hours (p-hrs), i.e. the number of p-hrs as numerator and number of injuries incurred as denominator; where p-hrs was calculated as the product of the total actual duration of all matches and the number of competitors ( $n = 8 \times 2 \text{ team} = 16$ ) involved per match.

## **RESULTS**

### **Injury Incidence (Table 1)**

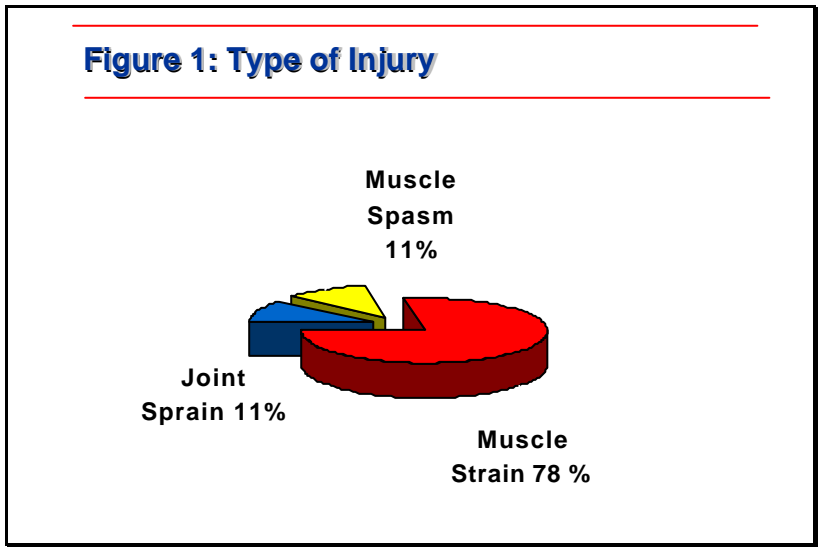
A total of 9 injuries were recorded for as many participants over the 2 days of the competition. Of these injuries, 6 were incurred by men and 3 by women. Four of the injuries occurred in the Men (M) 640 kg category, 2 in the Women (W) 560 kg category and the remaining 3 injuries in the W520 kg, M680 kg and M720 kg categories, respectively. The overall injury incidence was 1 injury per 209 p-hrs with a higher incidence of 1 injury per 140 p-hrs being recorded for women as opposed to men with 1 injury per 244 p-hrs. No injuries were recorded for male youth participants with a subsequent zero injury incidence per 102 p-hrs.

The highest incidence of injury in all participant categories was recorded in the W560 kg (1 injury per 86 p-hrs) followed by the M640 kg (1 injury per 105 p-hrs). In the men's competition the lowest incidence was in the M560 kg with 0 injury per 140 p-hrs, followed by the M720 kg (1 injury per 321 p-hrs) and the M680 kg (1 injury per 287 p-hrs). In the women's competition the injury incidence in the W520 kg (1 injury per 248) was far less than in the W560 kg (1 injury per 86 p-hrs).

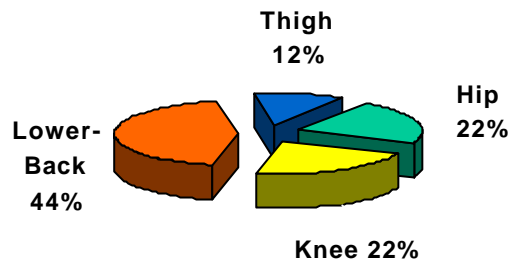
<b>TABLE 1: INJURY INCIDENCE -</b>	
Overall	1 injury per 209 puller-hours
Men	1 injury per 244 puller-hours
Women	1 injury per 140 puller-hours
Youth	0 injury per 102 puller hours
M 720 kg	1 injury per 321 puller-hours
M 680 kg	1 injury per 287 puller-hours
M 640 kg	1 injury per 105 puller-hours
M 560 kg	0 injury per 140 puller-hours
W 560 kg	1 injury per 86 puller-hours
W 520 kg	1 injury per 248 puller-hours

**Nature of Injury**

The major injury type (Figure 1) were muscle strains (78%) followed by an equal occurrence of muscle spasms and joint sprains (11%). The lower back (44%) most common site of injury (Figure 2) followed by the hip (22%) and knee (22%), with equal involvement, and the thigh (12%).



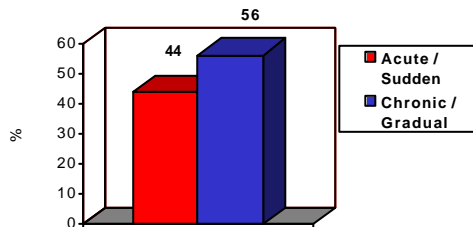
**Figure 2: Sites of Injury**



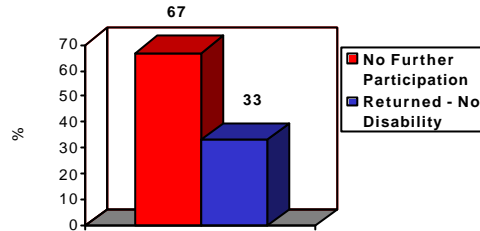
### Onset and Severity of Injury

The majority of injuries had a gradual (56%) as opposed to an acute (44%) onset (Figure 3). The majority of injuries (67%) were of sufficient severity to disqualify further participation in the specific match during which they were incurred. In 33% of the cases the injuries were of minor severity allowing a return to the match / competition with disability.

**Figure 3: Onset of Injury**



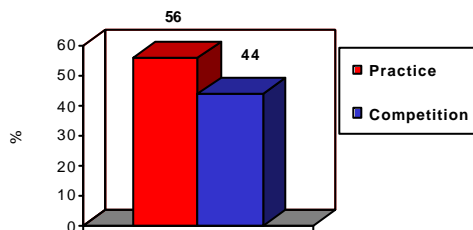
**Figure 4: Severity of Injury**



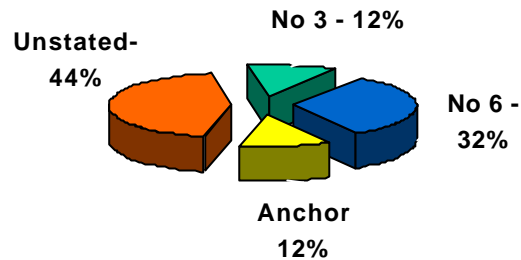
### Aeotiological Risk Factors

The majority of injuries were incurred during live opposed pulls practice (56%) as opposed to competition (44%) (Figure 5). A large proportion of injuries (44%) appear to have been incurred by participants pulling towards the back of the rope at position 6 (32%) and at anchor (12%) (Figure 6).

**Figure 5: Activity During Injury**



**Figure 6: Position on Rope**



## CONCLUSIONS AND RECOMMENDATIONS

The only other published<sup>1</sup> epidemiological data on injuries incurred during Tug of War is a retrospective survey conducted four years earlier during the 1998 World Outdoor Championships. In that study it was reported that injury rates in males (32%) and females (37%) had similar injury rates but that an increased injury risk may be present in female participants. Strains and sprains comprised more than 50% of the injuries and the back (42%) was the most commonly injured site of injury.

Further research with a prospective study conducted over the duration of a season, perhaps also studying Indoor Tug of War, may show a different injury profile. However, the following injury profile for a brief two-day International tournament competition can be concluded from this study and can be used to caution and prevent injury risk:

- The exposure-based injury incidence results show that:
  - a) The injury risk is greater for women than for men. This corresponds with findings of the 1998 World Outdoor Championships.<sup>1</sup>

- b) Although the possibility of underreporting cannot be completely excluded, the injury risk during tournament competition generally appears to be low. This is particularly so for the Men 560 kg and Youth 560 kg category.
- Injuries that do occur are of gradual (chronic) onset but relatively severe in nature typically disqualifying further participation in the match or practice. This corresponds with a number of individual case reports of relatively serious injuries at various intervals in the literature during the past decade.<sup>2-6</sup>
  - Lower-back muscle strains are the most common site and type of injury. This corresponds with findings of the 1998 World Outdoor Championships.<sup>1</sup>
  - Live opposed practice pulls appear to pose a greater risk for injury than matches during competitions.
  - Competitors pulling towards the back of the rope appear to be at greater risk for injury.

## SELECTED REFERENCES

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