# SUBJECT 1: Injuries and Musculoskeletal Complaints in Football Referees

## 1. OUTLINE OF THE SUBJECT (see file Presentation of Medical Area)

The following manuscript is a summary of the original work by Bizzini *et al*. (Astrid Junge, Roald Bahr, Werner Helsen, Jiri Dvorak), who conducted a project founded by the FIFA – Medical Assessment & Research Centre (F-MARC). Four studies were realized: a) Swiss top referees, b) Swiss referees all levels, c) FIFA selection for the 2006 FIFA World CupTM, and d) FIFA selection for the FIFA Women's World Cup 2007.

Part b) will be discussed here, because it represents at best (in terms of referee's characteristics) the actual selection for the 2010 FIFA World CupTM.

## 2. OBJECTIVES OF THE SUBJECT

The presented information should improve your knowledge of the injury and complaint problems related to high-level football refereeing. You should be aware that you may also incur in an injury or have body complaints, and understand that the best cure is prevention.

## 3. OUTLINE OF THE CONTENTS

1 to 6 (see file Presentation of Medical Area)

# 4. DESCRIPTION OF THE CONTENTS

## 1. Why we Performed this Study?

There is a considerable amount of scientific literature on football, but few studies have focused on referees, despite their key role in this sport. Existing studies focus on the physiological demands and training of referees.

Considering the demands imposed on the cardiovascular and musculoskeletal systems, it is clear that the referee is exposed to a certain risk of injury during the game. Several epidemiological studies have focused on injuries in football players, but there is a lack of knowledge on the injury profile of the football referee.

## 2. What was the Aim of this Study?

The aim of the present study was to investigate both retrospectively and prospectively the injuries and musculoskeletal complaints of all referees and assistant referees selected for the 2006 FIFA World CupTM in Germany.

## 3. What we Did?

During the preparation camps for to the 2006 FIFA World CupTM in Germany, all 123 referees selected for the tournament completed a questionnaire on injuries and musculoskeletal complaints. During the tournament, the characteristics and consequences of all injuries and complaints incurred by the 63 officiating referees were documented.

How we analized the data?

All the data were coded in a systematic way (according to previous F-MARC studies), and then appropriate statistical analyses were conducted.

## 4. What we found?

Characteristics of the referees

All 44 MRs and 79 ARs selected for the 2006 FIFA World CupTM preparation camps participated in the retrospective part of the study. The referees had a mean age of 41 (SD 3.7, range 29-45) years, height 178 (SD 6) cm, weight 76 (SD 7) kg, and BMI 23.8 (SD 1.3, range 20.2-27.1) kg.m-2.

All 63 referees selected for officiating as MR or AR during the World Cup were included in the prospective study (= the 21 trios appointed for matches; the support group was excluded because of non-officiating matches). No differences between this group and the remaining 60 referees were observed in their characteristics.

Results- in general

More than 40% of the referees reported having incurred an injury and more than 60% having had musculoskeletal complaints during their career. About 20% of the group reported having suffered from musculoskeletal complaints in the last match. During the World Cup, fourteen referees (22%) incurred an injury and more than 30% had musculoskeletal complaints. The most common acute injuries were hamstring strains, calf strains, and ankle sprains, while the most frequent locations of complaints were the low back, hamstring and knee.

Results – in detail

*Retrospectively reported injuries*

A total of 58 injuries throughout their career were reported by 50 (40.7%) referees, without difference between MR and AR. 18 MRs (40.9% of all MRs) and 32 (40.5%) ARs. In both groups, the most prevalent diagnoses were calf strains and ankle sprains. Meniscus lesions of the knee were also frequent in MRs, and strains of the hamstrings, quadriceps and adductor muscles, in ARs (for details see Table 1).

***Table 1**. Injuries reported by referees during their career*

| *Injury ranking* | *Location and type of injury* |
|---|---|
| 1 | Hamstring strain |
| 2 | Calf strain |
| 3 | Ankle sprain |
| 4 | Adductor strain (* significant more in ARs) |
| 4 | Meniscus lesion |
| 5 | Anterior cruciate ligament tear & meniscal tear |
| 5 | Knee sprain |
| 5 | Achilles tendon total/partial tear |
| 6 | Anterior cruciate ligament tear |
| 6 | Groin strain |

*Injuries during the 2006 FIFA World CupTM*

During the World CupTM, fourteen (22.2%) referees incurred an injury during a match (6; 42.9%) or training (8; 57.1%) (for details, see Table 3).

In each group (MRs and ARs) there were three injuries during matches and four during training. However, this equated to a two-fold greater frequency of injuries in MRs (7; 33.3%) than ARs (7; 16.7%). None of the injuries caused any absence from officiating. However, 13 of the 14 injured referees had to reduce or modify their normal team training on the pitch for an average of 4.4 days (range 0 – 10). The treatment of these injuries required a total of 83 physiotherapy sessions, 56 electrotherapy applications, 51 massage therapy sessions, and 31 tapings.

*Retrospectively reported musculoskeletal complaints*

For a detailed description of the list of documentted musculoskeletal complaints, see Table 2.

None of the referees reported having incurred an injury during the last match, but nine (20.4%) MRs and 12 (15.2%) ARs stated that they had had at least one musculoskeletal complaint.

In relation to the previous 12 months, 25 (56.8%) MRs and 48 (60.8%) ARs reported having had some sort of musculoskeletal complaint due to officiating; the corresponding figures in relation to the entire career were 28 (63.6%) MRs and 49 ARs (62%). In both groups, the most prevalent locations for injury were the hamstrings, knee, calf and Achilles tendon. More than twice as many ARs as MRs reported low back pain.

**Table 2.** *List of the body parts for the documentation of complaints*

| *List* | *Location of complaints* |
|---|---|
| 1 | Head |
| 2 | Neck |
| 3 | Low back |
| 4 | Hip |
| 5 | Groin |
| 6 | Adductors (inner thigh) |
| 7 | Quadriceps (front thigh) |
| 8 | Hamstrings (back thigh) |
| 9 | Knee |
| 10 | Patellar tendon |
| 11 | Calf |
| 12 | Achilles tendon |
| 13 | Ankle |
| 14 | Others (shin splints, heel pain, plantar fascitis) |

*Musculoskeletal complaints during the 2006 FIFA World CupTM*

During the World CupTM, 22 (34.9%) referees were treated in connection with 30 musculoskeletal complaints (Table 4), without difference between ARs and MRs. The treatment of these musculoskeletal complaints required a total of 116 physiotherapy sessions, 81 massage therapy sessions, 40 electrotherapy applications, and 6 tapings.

The most frequent complaint was low back pain (33.3%), followed by complaints involving the calf (16.7%) and Achilles tendon (10.0%). The majority of referees suffering from low back pain during the World CupTM (60%) had reported this symptom previously. Two referees (MR10 and AR24) treated because of knee pain had already undergone surgery on the same knee. Also, two of the three referees suffering from Achilles tendon pain (AR18, AR19) had had the same complaint during the previous 12 months. In total, 60% of the complaints treated during the World CupTM were not related to any injury or complaint reported in the retrospective questionnaire.

## 5. Some Discussion Points

The locations and types of injuries reported by the FIFA referees were also similar to those reported by the Swiss referees (F-MARC studies). Hamstring strains, calf strains, and ankle sprains accounted for more than 60% of all reported injuries throughout the referees' careers. Muscle strains and ligament sprains are also the injuries most commonly documented for football players. However, football players are on average 15 years younger than international referees; *Arnason et al.*, found that increased age and previous hamstring strains were the main risk factors for hamstring strains in footballers.

More than 64% of the referees reported having had some sort of musculoskeletal complaint during their career. In examining musculoskeletal complaints, the main areas affected were the hamstrings, knee, calf, Achilles tendon and low back. During the 2006 FIFA World CupTM, all acute injuries and musculoskeletal complaints of referees were documented prospectively. Six match injuries and eight training injuries were recorded. Though none of these resulted in absence from officiating, all except one injured referee had to reduce or modify their training regimen.

During the 2006 FIFA World CupTM tournament, one third of the 63 officiating referees presented musculoskeletal complaints. The relative distribution of the complaints was similar to that reported retrospectively, except that low back pain was

reported more frequently in the tournament. 60% of the referees presenting with low back problems had already reported this complaint in the retrospective questionnaire, confirming the well-known recurrent nature of low back pain.

## 6. What we can conclude from this study?

Even though all the referees who suffered an injury during the 2006 FIFA World CupTM were — after optimal medical and therapeutic care — still able to perform in the tournament, these data clearly show that the referee and his assistants are also exposed to a relatively high risk of injury during the match.

Considering the injury profile, the prevalence of associated musculoskeletal complaints, and the high physiological demands of refereeing, it appears that injury prevention programs should be developed and integrated into the fitness training routine of the referee.

The impact of this study on the RAP 2010

A Medical Area was established within RAP, with a special focus on injury prevention.

A basic injury prevention program was developed and implemented during the first seminar in Las Palmas (February 2008). The goal is to further develop a specific injury prevention program both for referees and assistant referees.

## 5. ACTIVITIES

a) Read the contents of subject 1
b) Complete the self-evaluation exercise

## 6. BIBLIOGRAPHY

**Castagna C, Abt G, D'Ottavio S (2007).** Physiological aspects of soccer refereeing performance and training. Sports Med. 37(7):625-46. Review.

**Bizzini M, Junge A, Bahr R, Helsen W, Dvorak J.** Injuries and musculoskeletal complaints in referees and assistatnt referees selected for the 2006 FIFA World Cup TM. Retrospective and prospective survey.

**Br J Sports Med.** Provisional acceptance, April 2008

## 7. SELF-EVALUATION EXERCISE

1) The available scientific literature on football
   a) focus on injuries of the referees
   b) focus only on football players
   c) also focus on the physiology and training of the referees
   d) is not existing!

*Answer: c*

2) During their career, how many referees (in %) stated to have suffered at least one injury?
   a) none (0%)
   b) 10%
   c) 20%
   d) 40%

*Answer: d*

3) The most frequent types of acute injury were:
   a) hamstring strains, calf strains, neck strains
   b) calf strains, ankle sprains, elbow fractures
   c) ankle sprains, calf sprains, hamstring strains
   d) thoracic muscles strains, hamstring strains, ankle sprains

*Answer: c*

4) During their career, how many referees (in %) stated to have suffered at least from one musculoskeletal complaint?
   a) 40%
   b) 60%
   c) 20%
   d) 30%

*Answer: b*

5) The most common body location fro musculoskeletal complaints was:

a) low back, chest, head
b) low back, knee, neck
c) low back, hamstring, shoulder
d) low back, hamstring, knee

*Answer: d*

6) During the last World Cup, 22% of the referees had an injury. How many (in %) of them were able to officiate matches?

a) 80%
b) 70%
c) 100% (all of them)
d) 75%

*Answer: c*

7) Injury prevention programs for referees are

a) not necessary in general
b) not necessary for me
c) good only for the young referees
d) important complements in the training routine

*Answer: d*