Sports injury registration: the Fysion Blesreg system

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Fysion Blesreg is a new system on which sports assistants (trainers, masseurs, physiotherapists and physicians) can rely for quick and straightforward registration and retrieval of personalized injury data. Registration of injury data can provide a clear picture of the injury mechanism, which in turn can lead to effective preventive measures and a decline in sports injuries.

The two components of the Fysion Blesreg system are registration forms and computer software. Registration forms are filled out when the competition starts (zero form), and when injuries occur (team cards and players' cards). Data are collected for the individual (zero form), the sports activity (team card), and the cause, nature and treatment of the injury (player's card). All data are entered into the computer with an MS-DOS based computer program, and can in various ways be reported or graphically reproduced.

Keywords: Injury registration, computer, analysing injury

Holland, with a population of 14.9 m, has some 2.7 m cases of sports injuries every year¹. Over 1.7 m cases receive medical attention. Most sports injuries involve the ankle (23%) and the knee (14%).

Prevention has become the focus of attention in the fight against sports injuries. Nationwide campaigns have been launched to inform the public and to promote the use of a warming-up period and a gradually built-up training schedule. With many possible causes of sports injuries, prevention remains a highly complex issue, and preventive measures cannot be taken before the main causes have been determined. Schlatmann refers to the 'prevention sequence', meaning the determination of causes through registration of injuries, after which specific measures can be taken to prevent similar injuries in future. The final step is to assess the effectiveness of such measures, also through registration².

An early registration system was developed for the purpose of epidemic research by the National Institute for Health Care². This involved registration of all internal and external factors which led to sports

injury, together with its social and sports-related consequences. Another system, based on computer-read forms, was developed predominantly for the classification of services performed by sports medicine consultants³.

In cooperation with several sports unions and organizations, the author has developed the Fysion Blesreg injury registration system. Its simplicity and minimal need for computers make it an ideal resource for all medical staff of sports clubs and organizations.

Method

The Fysion Blesreg system is designed for the registration of sports injuries. For proper use of this system, the terms 'sports injury' and 'sports activity' must first be defined (Council of Europe, 1988)⁴.

A sports injury is one which occurs as a result of participation in sport and has one or more of the following consequences:

- a reduction in the amount or level of sports activity
- need for advice or treatment
- adverse economic or social effect.

Sports activity is a period in which a player performs his or her sport during a certain time with a certain intensity.

The system involves the registration of both pre-injury data (personal and anthropometric) and data during and after injury (circumstances, nature, treatment, after-care).

The data are collected with three injury forms and a computer program. The printed injury forms are filled out immediately after the injury has occurred, possibly even before the player is taken off the field. Subsequently, all data are entered into the computer.

Injury forms

1. The zero form

The object of the zero form is to collect data on all players involved as an aid for interpretation of injury data. Details of personal data, training, and level of performance and experience in the particular branch of sports are collected at the start of the registration period, and when changes occur in the team (Figure 1).

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Fysion Blesreg Zero-form

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Player number.....

Name :	Phone :-.....	Height : m.	Fatpercentage :....%
Address :	Date of birth : - - 19....	Weight : kg.	Date of measurement : - - 19
Zcode/City :	Profession :	M / F :	

Player position	Training (duration)	Training (frequency)	Players experience	Protection
☐ keeper	☐ < 1 ☐ 3,5	☐ less than 1x	☐ 0-2 years	☐ none
☐ fieldplayer	☐ 1 ☐ 4	☐ 1 x pro week	☐ 2-4 years	☐ shin protector
	☐ 1,5 ☐ 4,5	☐ 2 x pro week	☐ 4-6 years	☐ ankle brace
Level	☐ 2 ☐ 5	☐ 3 x pro week	☐ more than 6 years	☐ knee brace
	☐ 2,5 ☐ > 5	☐ 4 x pro week		
.....	☐ 3 hour	☐ more than 4 x		☐ other :.....

Figure 1 Fysion Blesreg injury card – zero form

Fysion Blesreg General (Team-card)

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Team	Event ☐ practice ☐ competition match ☐ trial match ☐ selection match ☐ cup match ☐ tournament	Date event : (from)-.....-19..... (until).....-.....-19.....	Assistance ☐ (sport)physician ☐ (sport)fysiotherapist ☐ (sport)masseur ☐
		City :	
		Opponent :	
		Number of injuries :	name :.....

Figure 2 Fysion Blesreg injury card – team card

2. Team card

The team card is always filled out whenever sports activities take place. Data registered include time, nature, attendance and circumstances of the sports activity (Figure 2).

3. Player's card

The player's card is filled out whenever injuries occur. Data registered here involve nature, cause, direct consequences, first aid and further treatment of the injury (Figure 3).

Computer program

With the Fysion Blesreg computer program, injury data can be stored in the computer. They can be retrieved, adjusted, removed, printed out or graphically reproduced whenever required (Figures 4, 5 and 6).

The program requires IBM-compatible hardware programmed in MS-DOS, including a printer for printing out data and graphics and, optionally, a mouse. With its 350 kb memory the whole program is contained in one disk, but for maximal speed and memory the use of a hard disk is recommended. There are several safety checks on the entered data. For security purposes the computer is linked to a special key, and every user receives his or her own PIN code.

The Fysion Blesreg system is fully menu-operated. The program can therefore be used without having to enter any special commands. Through a large number of options one can select the function required (Figures 7, 8, 9 and 10).

Beneficiaries

The Fysion Blesreg system is designed for all physical assistants in sports clubs and organizations. Coaches, masseurs, physiotherapists, physicians and managers are all likely to benefit from the many different aspects of this program.

The coach can compare causes of injury and draw his conclusions regarding training methods and competition level. He can discuss the information with his medical assistant and, if necessary, change his training schedule (course, intensity, frequency).

The medical assistant, usually a masseur or physiotherapist, can refer to the computer to assess a player's physical health. The information on the nature and the cause of the injury enables him to give first aid, provide for further treatment and take preventive measures for future injuries.

The physiotherapist or physician attending an injured player can base his therapy, consultation and evaluation on his knowledge of the circumstances in which the injury occurred. Also, if specialist help or first aid in hospital is needed, he can produce an injury card to help an accurate diagnosis and quick evaluation.

The Managing Board can obtain a clear picture of the number of injuries and assess the effectiveness of their policy on sports injuries.

The player receives optimal medical attention, since his attendant has all relevant information on his patient's medical history directly available and can base his treatment on this information. Even if the player's own attendant is absent, his replacement can quickly review the player's medical record and supply him with the best help.

Fysion Blesreg Individual (player card)

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Name :		Team :		Date :-.....-19.....	
Field position injury occurred ☐ none ☐ 1 (keeper) ☐ 2 (defence left) ☐ 3 (defence right) ☐ 4 (midfield left) ☐ 5 (midfield right) ☐ 6 (attack left) ☐ 7 (attack right) ☐ 8 (penalty area)		Event ☐ practice ☐ competition match ☐ trial match ☐ selection match ☐ cup match ☐ tournament		Time injury occurred ☐ warming up ☐ first half ☐ second half ☐ extra time ☐ cooling down
Consequence of injury ☐ discontinued playing ☐ after treatment continued to play			
Floor surface ☐ grass ☐ artificial grass ☐ gravel ☐ synthetic ☐ concrete		Conditions floor surface ☐ no comments ☐ uneven ☐ wet ☐ dry ☐ frozen		Temperature ☐ less than 0 °C ☐ between 0 and 10 °C ☐ between 10 and 20 °C ☐ more than 20 °C	
☐ other:.....		☐ other :.....		Shoe type ☐ studs screw-on ☐ studs permanent ☐ no studs Number of studs ☐ 6 ☐ 10 ☐ 13 ☐ 8 ☐ 12 ☐ 14	
☐ other:.....		☐ other :.....		☐ other :.....	
Tape, bandage or brace in injured area ☐ none ☐ tape ☐ bandage ☐ brace		Injury occurred before ☐ no ☐ < 1 month ago ☐ 1-3 month ago ☐ 3-6 month ago ☐ 6-12 month ago ☐ > 12 month ago		Injury mechanism with contact ☐ opponent ☐ own player ☐ player material ☐ accommodation ☐ other :.....	
Injury mechanism without contact ☐ twist/turn ☐ stumble/fall ☐ overuse ☐ unknown ☐ other :.....					
Nature of injury ☐ wound ☐ contusion ☐ sprain ☐ rupture ☐ inflammation ☐ fracture ☐ luxation ☐ other :.....		Location of injury ☐ head ☐ upper arm ☐ wrist ☐ thorax/ribs ☐ hip/buttock/groin ☐ neck ☐ elbow ☐ hand ☐ stomach ☐ upper leg ☐ shoulder ☐ lower arm ☐ fingers ☐ back ☐ knee ☐ lower leg ☐ ankle ☐ foot ☐ other :..... ☐ right ☐ left			
First aid ☐ I.C.E. ☐ cold ☐ other :.....		Further care (person) ☐ no further care ☐ selftreatment sportsmen ☐ surgeon ☐ physician ☐ physiotherapist ☐ sportsmasseur ☐ trainer ☐ other :.....		Further care (instance) ☐ no further care ☐ club ☐ doctors office ☐ physiotherapeutic office ☐ hospital ☐ other :.....	
Absence of training ☐ none ☐ 1 day ☐ 2-7 days ☐ 1 week until 1 month ☐ 1-3 month ☐ 3-6 month ☐ more than 6 month					

Figure 3 Fysion Blesreg injury card – player's card

Fysion injury registration

Main menu Individual General File Quit	File TEST
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Use
 Create
 Delete
 Combine
 Return

Figure 4 File-function of the computer program

Fysion injury registration

Main menu Individual General File Quit	File TEST
--	--------------

Individual
 Input
 Report
 Search
 Change
 Graph
 Return

Figure 5 Available options when entering the individual card

Fysion injury registration

Main menu Individual General File Quit	File TEST
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General
 Input
 Report
 Search
 Change
 Return

Figure 6 Available options when entering the general card

Fysion injury registration

General
 Team : A
 Event : Practice
 Date event (until) : 28.06.91
 Date event (from) : 28.06.91
 City event : Amsterdam
 Opponent : None
 Number of injuries : 2
 Assistance : Physiotherapist
 Name assistance ... : J. V. de Bruijn
 Comments : Last training this season!

Figure 7 Data of the general form as displayed on the screen

Fysion injury registration

Individual
 Name: S. Keizers Team: A Date: 28.06.91

Field position Event Direct consequence Floor surface Environment temperature Shoe type Number of cluds Tape, bandage or brace Injury occurred before Injury mechanism Nature of injury Location of injury First aid Further care Absence of training	2 (defence left) 1st half of a practice Discontinued playing Grass, dry Between 10 and 20°C No cluds 6 No Yes, 6–12 months ago Stumble/fall Luxation Shoulder left Bandage Surgeon, hospital 1–3 month
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1/1

Figure 8 Data of the individual form as displayed on the screen

Fysion injury registration

Search
 Name
 Team = 1st team
 Date
 Field position injury
 Time when = 1st half
 Tijd in what = game
 Direct consequence
 Floor surface
 Conditions surface
 Temperature
 Shoe type
 Number of studs
 Tape/bandage/brace
 Injury occurred before
 Injury mechanism
 Nature of injury
 Location of injury
 First aid
 Further care (person)
 Further care (instance)
 Absence of training

Condition
 Equal =
 Not equal #
 Greater than >
 Less than <
 Contains \$

Figure 9 The search function as displayed on the screen

Figure 10. Graph function of the individual form. This graph shows the nature of the injury

Different versions

In the first instance this system was designed for team sports. At this stage there are several different versions for soccer, handball, volleyball, korfbal, hockey and basketball. Their distinctive features concern the player's position, floor surface and footwear. Since the basic principles remain the same, Fysion Blesreg can easily be transformed for all branches of sports.

Prospects

In the near future the existing versions will be further improved and extended. In cooperation with the sports unions new versions will be developed. Particular attention will be given to those sports where most injuries are due to excessive strain. Additionally, this registration system may find its way into the business and public sectors.

Discussion

To obtain unambiguous, reproducible injury registration, the various terms used must be strictly defined. Fysion Blesreg has, therefore, derived its definitions from the official Dutch guide on first aid, *Het Oranje Kruis Boekje*⁵. Thus, trainers and masseurs, physiotherapists and physicians can all make use of the system and interpret data others have entered. Determination of the nature of a sports injury, however, remains the task of experts, and most initial diagnoses will later be adjusted or confirmed by a physician or a first aid centre. Fysion Blesreg, therefore, includes an option to make additions or adjustments to data previously entered.

In this registration system the gravity of a sports injury must be judged from its nature and direct consequences. There are no data entered on presumed length of follow-up. This has deliberately been omitted, since the date of full recovery can only be established some time after the injury has occurred. Full recovery is a disputable concept. Has full recovery been achieved when the player can join the training sessions again, or does full recovery imply that he can play an entire match without needing braces or bandages? This is a matter for further discussion.

Fysion Blesreg is, in first instance, a registration program. Data can be reproduced in graphics. Their interpretation, however, and the drawing of conclusions remains a task for experts, since there is often multiple interaction of causes.

The Fysion Blesreg program costs fl.550 (first copy), fl.125 (additional copies) (approximately £215 and £38).

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