SPORTS INJURIES IN THE EU COUNTRIES IN VIEW OF THE 2004 OLYMPICS: HARVESTING THE INFORMATION FROM EXISTING DATABASES (PHASE II)

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FINAL REPORT

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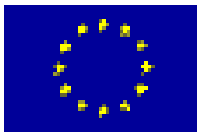


Athens, November 2002

"Sports Injuries in the EU countries in the view of 2004 the Olympics: Harvesting the information from existing databases"

(PHASE II)

Contents

Executive summary

The project "Sports Injuries in the EU Countries in View of the 2004 Olympics: Harvesting the Information from Existing Databases, proposed by the Center for Research and Prevention of Injuries among the Young (CE.RE.PR.I.) and approved for funding by DG SANCO, aims to address the problem of sports injuries among European Member States. The project is schematically divided into two phases:

- *Phase I:* The goals of the first phase of the project were to review the current knowledge in the field, ascertain the burden of sport injuries in EU member states and analyse the currently available information.
- *Phase II*: The second phase of the project was aiming to identify conditions that increase the risk for sports injuries and investigate the effectiveness of currently used prevention strategies.

During the first phase of the project the current knowledge in the literature was reviewed and an operational definition that could provide comparability of data was developed. The overall magnitude of the problem was assessed through a set of public health indicators. For instance, on the basis of the indicated rates, each year more than 700 individuals die in the EU from a sports injury whereas approximately 700.000 are hospitalised. Finally the profile of injuries was described through EHLASS data that were provided by the participating countries.

This report provides results from Phase II of the sports injury project that is aiming to:

- Fully exploit the potential of the former EHLASS to identify risk factors for sports injuries,
- Identify situation and conditions conducive to increasing risk taking with special emphasis given to the issue of performance enhancing substances,
- Assess the effectiveness of currently used injury prevention strategies, develop recommendations and identify gray areas that need clarification and further research, and
- Create a EU network of sports injuries experts.

In support of this effort, the potential and the possibility to utilize the former EHLASS sports injury data, as explored during phase I, were evaluated in order to identify risk factors for sports injuries. Analysis of the "free text" was performed aiming to elicit detailed information that is not captured in the coding system.

Situations and conditions that increase risk(s) for sports injuries with special emphasis on performance enhancing substances were identified through an anonymous questionnaire that was self-administered to 2650 tertiary education students in five EU countries and Israel.

The effectiveness of currently used prevention strategies for the prevention of sports injuries was assessed first on the basis of a literature review and subsequently by soliciting the fragmented and diverse EU experience on the subject from thirty two sports injuries experts.

The potential for the creation of a EU Network of Sports Injuries Experts was investigated and is responsive to recent recommendations of the partners meeting held in Paris (28/02/02).

"Free text analysis" revealed three additional injury prevention risk factors. They have been cited in the literature but had not been identified through the existing coding system. These include: 1) environmental factors, 2) personal equipment and 3) psychological factors. Additionally, suggestions were made to interviewers on how to write more accurate and useful reports for future analyses of free text descriptions, by providing specific examples and keywords (available in a newsletter electronic form).

Experts participating in the sports injury prevention survey expressed their opinion on several gray areas, based on their different background and working experience. By combining the different reports, several issues were identified where there was consensus and several others where additional research is recommended.

The doping survey showed that doping among tertiary education students is endemic, though not hyper-endemic, without striking variation among the participating countries. Men are more likely than women to make use of performance enhancing substances. Body mass index is positively associated with doping admission. The frequency of excess drinking of alcoholic beverages, coffee drinking, and to a lesser extent tobacco smoking is positively associated with doping.

Experts participating in the EU Network came from various disciplines, such as physicians, epidemiologists, statisticians, coaches, and athletic reporters. The EU added value from the creation of an expert's intranet will be: a) network can be the basic resource to identify experts in this field, b) strengthening the communication among prestigious experts in sports injuries prevention, c) collaboration in the development of sports injury prevention Research Agenda(s), and d) avoidance of duplication of work in the field of sports injuries prevention. A core inventory of experts in the field of sports injuries prevention has been implemented consisting of sixteen experts from four countries (see attached Newsletter for injuries prevention). Fifteen of those are also included in the electronic version of the inventory, the Internet Forum the Center for Research and Prevention Among the Young (CE.RE.PR.I) has developed, after their written consent. In this Internet site only members (with username and password) will be able to enter (login) and communicate with their peers. The Internet Forum is located at http://www.inhealth.gr/sip (temporary web address).

This project brought to light the fragmented and diverse EU experience regarding sports injury prevention and provided the basis for creation of a EU Network of Sport Injuries Experts that could facilitate collaboration in future sports injuries research activities. The Network could also be responsive in a timely manner to issues and concerns that require an immediate response. The results and findings of this project, presented in the printed and electronic newsletters, are available and will be distributed to interested individuals and groups. The knowledge derived from this project will help develop policies at the EU level and design more effective injury prevention strategies, programs and activities in the future that will help reduce the burden of sports injuries.

1. Introduction

"Sports for all: injuries and their prevention". This is the motto of a resolution passed by the European Union Sports Ministers in 1986. In its framework, there was a call for analyzing sports injuries throughout Europe and developing preventive strategies.

The project "Sports Injuries in the EU Countries in View of the 2004 Olympics: Harvesting the Information from Existing Databases (Phase II)", proposed by the Center for Research and Prevention of Injuries among the Young (CE.RE.PR.I.) and approved for funding by DG SANCO, aimed to address sports injuries throughout Europe.

The project consists of two phases. During the first phase of the project, current knowledge in this field and sources of epidemiological data were reviewed. A systematic analysis of sports injuries in relation to severity, frequency, duration, and populations at risk was performed. A set of indicators was developed and then approved by the participating EU member states and Israel in order to determine the overall magnitude of the problem. Specifically on the basis of the previously indicated rates, each year more than 700 individuals die in the EU from a sports injury, whereas approximately 700.000 are hospitalized. These estimates represent only the tip of the iceberg because each year more than ten million people have a sports injury requiring medical attention and more than five million contact the Accident & Emergency Department of a hospital. The cost of sports injuries is considerable. It is estimated to exceed ten billion Euros throughout the Union.

The second phase of the project aimed to analyze the collected data and develop recommendations for prevention. The information concerning situations that increase the risk for sports injuries was assessed along with the investigation of the currently used prevention strategies and their effectiveness. This evaluation is a prerequisite for developing policies at EU level and designing effective injury prevention programs.

For supporting this effort, the potential and the possibility to utilize the former EHLASS sports injury data, as explored during phase I, in order to identify risk factors for sports injuries were evaluated. The existing data, which are usually isolated or underutilized at national level, were analyzed. Inadequacies and deficiencies were identified. Draft estimates of sport activity specific risks were provided in order to

propose policy making prevention strategies aimed at reducing the incidence of sports injuries.

Situations and conditions that increase risk for sports injuries with special emphasis on performance enhancing substances were identified through an anonymous questionnaire that was self-administered to 2650 tertiary education students in five EU countries and Israel.

The effectiveness of currently used prevention strategies for the prevention of sports injuries was assessed first on the basis of a literature review and subsequently by obtaining the fragmented and diverse EU experience on the subject from thirty two sports injuries experts.

The project "Sports injuries in the EU countries in View of the 2004 Olympics: Harvesting the information from Existing Databases (Phase II)" proposed by the Center for Research and Prevention of Injuries among the Young (CE.RE.PR.I) and approved for funding by DG SANCO is aiming to addresses these issues.

2. Project Aims

Specific aims of the project are to:

1. Fully exploit the potential of the former EHLASS to identify risk factors for sports injuries
2. Identify situation and conditions conducive to increasing risk taking with special emphasis given to the issue of performance enhancing substances,
3. Assess the effectiveness of currently used injury prevention strategies, develop recommendations and identify gray areas that need clarification and further research, and
4. Create a EU network of sports injuries experts.

3. Methods and approaches

The approaches and the methods, which were used in the phase II of the project, are discussed in detail below:

3.1 Free text analysis – risk factors indicated by EHLASS
3.2 Survey for injuries prevention recommendations
3.3 Doping survey
3.4 Inventory of Sports Injuries experts
3.5 Internet forum-intranet for Sports Injuries experts

3.1 Free text analysis - risk factors for sports injuries indicated by EHLASS

The identification of risk factors for sports related injuries is a prerequisite for the design and establishment of appropriate prevention programs, which can then be specifically targeted.

- In phase II the adequacy and the limitations of EHLASS data to sufficiently capture sports injuries risk factors were evaluated based on the literature review that was performed in the first phase of the project. The literature review of risk factors indicated by EHLASS identifies the most consistent factors associated with the risk of sports injuries that can be extracted from EHLASS data.
- Information that is not captured by the coding system some times is included in the free text. Thus, free text could be a useful tool for providing additional details. Utilization of free text data in correlation with coded data will provide additional and useful information concerning the prevention of sports injuries and will enhance the value of the currently used surveillance system(s).

The primary goal of the study was to analyse the free text description aiming to capture detailed information, which is not captured in the coding system. The secondary goal of the study is to compare the currently coded information with the ones that are written for free text and to provide instructions for the interviewers for more objective use of free text.

The sports injuries data set that was retrieved from EHLASS database, for the year 1998 for Denmark, France and Greece for the year 1999 for Austria and for 2000 for Sweden, was broken down by age groups (children 5-14 years old and adults 15+ years old) and by type of sport. A qualified examiner read the free text description of a random sample of cases and then coded the free text according to the categories of the coding shown in the Table A (Coding description in Appendix A).In every instance the free text was classified according to the information provided, and mainly to the first factor that was related to the injury.

Information from free text was classified in two categories, product related injuries and human related injuries, respectively. The product related injury category was selected from the classification proposed by Austrian partners on the project "Preventive Product Safety". Human related category was divided into groups:

injuries where aggressive behavior was indicated and injuries where these conditions where not met.

Five countries out of the six with availability of EHLASS data participated in this phase of the project, namely Austria, Denmark, France, Greece and Sweden.

3.2 Survey for injuries prevention recommendations

Although a randomized controlled prospective trial would have been the best method for evaluating the effectiveness of an intervention program, this approach is difficult within the timeframe of the project. Consequently, a different approach on the evaluation of current prevention strategies, through the collection of opinions and experience that prevention experts could provide was considered. This approach could not be seen as the best available, but it is the most suitable method within the timeframe and the financial budget of the project.

An open-ended questionnaire (Appendix D) was developed based on review of the literature that had been performed in the first phase of the project. The questions were mainly focused on the grey areas between preventive measures of proven effectiveness and those for which there is weak evidence, for example:

Medical literature emphasizes the importance of the practice of medical screening prior to participating in sports for preventing sports injuries. The objective of the screening evaluation that includes a general health assessment, is to discover the conditions that may be life threatening or disabling, that may limit participation or that predispose to injury or sudden death. It is recommended that the examination be conducted six to eight weeks prior to the beginning of the season and at the beginning of each new level of competition. Also, the examination should be conducted using the station method with multiple examiners, one of whom should have specialized training in musculoskeletal disorders. [1-8]

There was no evidence regarding the protective effect of stretching procedures in reducing the risk for sports injuries.[9-13] Still, there are some opinions that stretching before exercise is the key for minimizing the risk of injury in sports events.[14]

There are many studies, which bring evidence that participating in boxing represents a threat to the health of athletes practicing this sport. [15-23] Despite wearing a headgear, the potential risk for diminishing neurocognitive functions is present. The American Academy of Pediatrics opposes this sport for children, adolescents and young adults. [24] However, there are also supporters of amateur boxing, who claim that participation in this sport might be useful in teaching self-defence techniques, discipline, strength, and agility while building self-confidence, character and courage.[25]

Studies have shown that wearing a bicycle helmet helps preventing head injuries resulting from bicycle accidents.[26-29] Helmet use has shown to reduce bicycle

related head injuries for cyclists of all ages involved and in all types of crashes, including those with motor vehicle. The results of the bicycle safety helmet campaigns, as well as mandatory laws were encouraging by successfully increasing helmet use and decreasing the incidence of bicycle head injuries.[30-36] However, despite the existence of a large body of evidence arguing the effectiveness of helmet use in preventing head injuries in cyclists and their beneficial effect for the population of cyclists, there are opinions against wearing a helmet in bicycling. [37-39]

Ice hockey is a sport, which has a high risk of cervical spine trauma. Studies have shown that a high proportion of youth hockey injuries are attributable to body checking.[40-42]

Goal posts are often associated with accidents in children who play football (soccer). [43]

Enforcement of safety measures by ensuring that athletes adhere to the rules of the game is very important because in many sports illegal play can be dangerous.

The survey tool was administered, personally or during a meeting, in a group of prominent scientists in the fields of (a) sports medicine and (b) injury prevention in six EU countries, namely Austria, Finland, Germany, Greece, Italy, Netherlands and Israel. Thirty-two experts (Appendix C) completed the questionnaire and their opinion regarding current issues in prevention of sports injuries was solicited for translating this evidence into recommendations. Partners from two countries (Finland and the Netherlands) commented on the questionnaire based on already elaborated work on the subject.

The national reports were combined and points where there was consensus or/and debates, on general and sports specific issues, are presented in the printed newsletter (Appendix E) created within the project.

3.3 Doping survey

In the last few decades the number of individuals participating in sports has increased considerably. Health authorities have encouraged this trend due to the widely recognized benefits of physical activity. Along with the increasing number of individuals involved in sport activities, however, sport injuries and the use of performance enhancing substances have emerged as crucial public health issues.

Doping is the presence of a substance in an athlete's bodily specimen, or the use or evidence of the use of any substance or method, that has the potential to enhance sport performance and which either poses an unnecessary risk of harm to athletes or is otherwise contrary to the spirit of sport.

Doping violates sports ethics and has serious implications on the physical and mental health of the athletes, including cardiovascular conditions, such as increased thrombogenicity and acute embolism, acute myocardial infarction, renal complications, rhabdomyolysis, infectious complications from the injection technique used in self administration, tendon and ligament ruptures, thyroid impairment, azoospermia, major mood disturbances and even increased premature death.

In order to ascertain the burden and the predictors of doping use in European Union Countries, six academic centers from European Union countries and Israel have undertaken the specific task of the Doping survey. Elite athletes are a highly visible but relatively small group, at high risk for using performance- enhancing substances. There is concern, however, that doping may be increasing among amateur athletes and even among young people who are physically active. Thus, the emphasis of this project was on non- professional athletes. In particular, the target population was students of tertiary education who were thought to be more likely to respond to an anonymous questionnaire covering an inherently sensitive issue.

The goal of the doping survey was to provide a crude estimate of the current rate of drug use among a sample of college and university departments among six European Countries. Secondary aims are a) identifying the sources, b) the reasons for taking these substances and c) evaluating the general knowledge and attitudes about performance enhancing substances among university students. This information is essential before any effective preventive measures for reducing the drug use can be implemented.

Following successive meetings, an anonymous self-administered questionnaire was developed (presented in the Appendix F), by the project collaborators from the six participating countries. The questionnaire focused on doping by prohibited substances, including androgens, anabolics, diuretics, beta-blockers, stimulants, unspecified hormones or unspecified prohibited substances. A question addressed whether the close friend of the responding individual has used a performance enhancing substance. Additional information concerned demographic, anthropometric and life style variables as well as intake of supplements and physical activity parameters of the responding individual. Physically inactive individuals were not eligible for the main analysis. The questionnaire was pilot tested among a group of students of the Athens Medical School. It was subsequently translated in the national languages of the participating countries and back translated in English to ensure consistency.

The questionnaire was self-administered during class time of the academic period 2001-02 to tertiary education students of Medicine, Pharmacy, Dentistry, Economy, Technology and Sports (Table 1 in Appendix G). The students in the first three categories were considered as bio-medically oriented. Because, only volunteers were asked to contribute to the study it is not possible to calculate exact refusal rates but in each of the participating centers less than 10% of the students in the classes that were invited did not return the questionnaire.

A uniform coding system was adopted and the data were computerized in Excel files. Initial analyses were performed through simple cross tabulations. Subsequently, odds ratio for doping by specified exposures were estimated through multiple logistic regression. The SAS statistical software was utilized.

3.4 Inventory of Sports Injuries experts - Who is Who among Experts in Sports Injury Prevention

The need for the creation of an EU network of sport injuries experts was emphasized and suggestions on how to create and utilize such a network were discussed in the 2nd meeting of project participants in Paris in 28th February 2002. Participating experts in the network could come from various disciplines, such as physicians, epidemiologists, statisticians, coaches, and athletic reporters.

Partners were asked to locate those involved in sports injuries prevention and sports medicine experts in their country. The experts could come from a variety of fields: academic institutions, medical professionals, sports trainers in professional and amateur level and in different sports, injury prevention organisations (governmental or not) etc. The most prominent professionals on sports injury prevention in each country are expected to be included in this inventory.

3.5 Internet forum-intranet for Sports Injuries experts

The need for the creation of an EU network of sport injuries experts and the EU added value from such a network was described in 2.4. The network could alternatively be based on the Internet in the form of an expert's Intranet. In this Internet site only members (with username and password) will be able to enter (login) and communicate with their peers.

Center for Research and Prevention of Injuries among the Young (CEREPRI) developed such an online intranet-forum at http://www.inhealth.gr/sip (temporary web address).

The intranet is based on "Snitz Forums 2000", a free product that is governed by the General Public Licence. It is an ASP (active server pages) based bulletin board system with complete web based administration. It offers unlimited forums and moderators. Moderators control individual forums. They may edit, delete, or prune any posts in their forums. Among the forum's features, of special attention are the email notification features, the "e-mail topic to a friend" feature, the personal profiles for each user, the built in AOL, ICQ and Yahoo web based messaging, and the search capabilities. The forum is hosted on Microsoft SQL Server.

4. Results

4.1 Free text analysis

4.2 Survey for injuries prevention recommendations

4.3 Doping survey

4.4 Inventory of Sports Injuries experts – Internet forum

4.1 Free text analysis

Introduction

Adequacy of EHLASS data to sufficiently capture sports injury risk factors was assessed. This effort is based on the literature review already performed in the first phase of the project, and is targeted for identifying the most consistent factors associated with risk of sports related injuries that can be extracted from EHLASS data.

The pre-coded questionnaire that is systematically completed in the EHLASS databases covers information on sociodemographic features, accident characteristics and nature of injuries. Based on information collected for the activity of the injured person during the time of accident, the general profile of sports injuries can be described. However, the limitations of EHLASS data should be considered. The main limitations can be summarized as follow:

- EHLASS database does not capture sufficiently all types of sports injuries. This is attributed to a) the majority of professional athletes seek medical care privately and b) a significant proportion of sports injuries are of minor severity and the injured persons are usually self treated.
- Registered cases represent mainly acute injury events rather than recurrent injuries.
- The number of persons who participate in sports activities as well as the time exposure is not available and therefore it is not possible to estimate incidence rates.
- The routinely completed pre-coded EHLASS questionnaire does not include specific parameters for sports injuries such as level of physical fitness, history of previous injuries, exposure time to sports activities, personal safety equipment used and existing field conditions.

It is well argued in the literature that a variety of factors that interact at the time of the accident are associated with sports injuries [1,2,3,4]. General agreement exists on the classification of the risk factors for sports related injuries into 2 categories:

1. *Intrinsic* (personal, host) risk factors, which are biological and psychological characteristics predisposing a person to injury.
2. *Extrinsic* (environmental) risk factors, which are related to the type of sport activity, the manner in which a sport is practiced, the environmental conditions and the equipment used [5,6,7,8,9].

The most important risk factors for sports injuries referred on the literature:

Intrinsic	Extrinsic
1. Age	1. Type of sport
2. Gender	2. Type of sport activity
3. Nutritional status	3. Level of play
4. Somatotype	4. Training
5. Commorbitity	5. Environmental
6. Previous injury	6. Equipment
7. Psychological factors	

Considering the above limitations, of the EHLASS database, could not provide estimations regarding the intrinsic risk factors, such as nutritional status, somatotype, commorbitity, previous injury and psychological factors due to lack of the respective information. Concerning the extrinsic risk factors, the level of play, training, environmental and equipment could not be also estimated. However, EHLASS can indicate the population at risk by means of age and gender as well as the differences on profile of injury by type of sports and the manner that sport activity is practiced.
The risk factors indicated by EHLASS coding system:

Intrinsic	Extrinsic
Age	Type of sport
Gender	Type of sport activity

Age

By examining the EHLASS data, the age group that is at increased risk for sports related injuries, especially for organized sports, is a group of young persons aged from 10 to 34 years old. This probably reflects the increased interest and

exposure of this group in sports activities. To be more specific, among children an increasing incidence with age up to 15 years old was reported in all countries, while among adults a sharp decline of injuries for persons older than 34 years was noticed.

Concerning the type of injuries for organized sports, it is worth noting that among children in all countries more than 50% in all injuries affect upper extremities, while on adults the majority of injuries occurred in organized sports were located on lower extremities. However, only speculations could be made about the underlying causes. Possibly, this may reflect the physiological immaturity of children that could lead to the difficulty of adjustment in sports movements and technique.

Gender

Overall higher injury rates of males compared with females were noticed, while on specific sports such as gymnastic or volleyball higher incidence of injuries in women was noticed. These differences could be attributed to the exposure to some specific sports.

Type of Sport

EHLASS data have shown that every sport has its own profile of injuries depending on the type of movements that are required. Among sports, the one with the higher incidence of injuries in most of the countries was football. High incidence of injuries was also noticed in ski alpine. This was more obvious in Austria, while for cycling and basketball a higher incidence for injuries was noticed especially in Greece.

Type of sport activity

Concerning the type of sport activity, comparisons of injury patterns for children enrolled in unorganized versus organized sports by type and injured body part was undertaken in several European countries. The results show that in most countries there is a higher preponderance of head and face injuries in unorganized sports. This finding was particularly evident for the Austrian data. On the other hand, for adults, a higher preponderance of fractures in unorganized sports versus organized sports was noticed and it was particularly evident in Austria. These findings cannot be interpreted at face value, however, unless the underlying exposure differences in the various types of sports will be taken into account.

Risk factors derived from the free text analysis

Table B (Appendix A) describes the five most frequent sports in each country that were analyzed by age group. The predominance of winter sports in Austria is an expected finding considering the tradition of this country in this type of sports. In the other countries the most frequent sports in adults and children were mainly ball games and especially football. The variability in the type of sport reported by each country limits the international comparison of data in each specific sport. However, in certain sports such as football, ski and basketball the combination of results is feasible (Tables:1a,1b, 2a, 2b, 3a, 3b in Appendix A). In certain sports namely bicycling, judo, rugby, horse riding, athletics and ice-hockey which were provided exclusively by each country, the combination of results was not feasible. In the above mentioned sports, the results are provided by each separate country (Tables: 4,5,6,7,8, in Appendix A).

Table 1a (Appendix A) presents free text analysis on football among children in five EU member states. Different results were provided by each member state. It seems that products are not a major contributor in football injuries. The products might be involved, however not causal and might be related to injury mainly due to proximity, for instance inappropriate ground or a stationary object cases; that imply not appropriate arena. Specifically, French and Greek participants remark that from free text analysis it seems that goalpost in children might be a dangerous stationary object in the field. A similar pattern with an excess of human behavior as a contributor was noticed among adults as presented in table 1b (Appendix A).

Table 2a (Appendix A) presents results for free text analysis on skiing injuries among children derived from Austria and France. Most injuries were no product involved, while in an average proportion of 15% product was related due to proximity. Table 2b (Appendix A) presents results for free text analysis on skiing injuries among adults derived from Austria and France. As reported on Austrian dataset, it seems that human factor contribute in a minor degree on injuries among children compared with adults. According to available free text skiing injuries does not seem to be related with products. However both and Austrian and French participants note that product such as ski sticks that might be defective or have problems with binding and consequently contribute to injury risk. Snow surface also

seems to contribute to injury risk, for instance French partners note that artificial piste for skiing can provoke burns when skiers fall.

Table 3a (Appendix A) presents results for free text analysis on basketball injuries among children derived for Denmark, France and Greece. In the majority of the cases there was no product involvement and there was no product causality identified. A small fraction of cases was ground related while human related factors in this contact sport account approximately as a crude overall rate for 6% of all cases reported. A similar pattern of free text analysis in basketball injuries among adults is presented in table 3b (Appendix A). However, it seems that in adults, human factor may contribute in a higher proportion compared with children (crude average: 20%).

Table 4 (Appendix A) present results for free text analysis on bicycling by Austrian partners among children and adults. The majority of events among children were non product related, while in adults most of cases were related to human factors. As mention by Austrian partners human factors that are mentioned in the free text by the interviewers on adults are mainly psychological ones such as “stress, in a hurry, not concentrating”.

Table 5 (Appendix A) presents results for free text analysis on horse riding among children and adults provided by Denmark partners. It seems that the certain sport on which there is also participation of the animal it is difficult to be examined with the specific coding. Horse is difficult to be considered as a product. Moreover with the unpredictability of animal behavior, it is probably not feasible to be examined by this coding. However, most cases among children were ground related while in adults’ cases where product related (but not causal) account for 43%.

Table 6 (Appendix A) presents results for free text analysis on judo among children and on rugby among adults provided by France partners. In most cases no product was involved. It’s worth noticing what French partners remark. Although both sports are combat sports, judo contact accidents are less numerous than those reported in rugby. They have classified “catch by the neck” (plaquage au cou) as an aggressive behavior in rugby.

Table 7 (Appendix A) presents results for free text analysis on athletics among children and adults provided by Greek partners. One out of four cases in both age groups was non product related. Most of the cases in both groups were product related due to proximity. Specifically in one out of three cases, inappropriate ground was

mentioned. Although athletics is not contact sport, human factor (aggressive and non aggressive behavior) was reported in 20% of cases.

Table 8 (Appendix A) presents results for free text analysis on ice hockey among children and adults provided by Sweden partners. Ice hockey generates the highest levels of human related injuries among the sports examined by Sweden partner; 55 percent of the children sports injuries and 66 percent of the sports related injuries among adults. However, quite large proportions of the injuries in contact sports also are product related. Especially in ice hockey they are *both* related to products and human behaviour (children: 40 %, adults: 49 %). The patient was tackled into the border, slashed by the stick etc.

4.2 Survey for injuries prevention recommendations

The survey tool described in 2.2 was administered, personally or during a meeting, in a group of prominent scientists in the fields of (a) sports medicine and (b) injury prevention in seven EU countries, namely Austria, Finland, Germany, Greece, Italy, Israel, and the Netherlands. Thirty-two experts (Appendix C) completed the questionnaire and their opinion regarding current issues in prevention of sports injuries was solicited for translating this evidence into recommendations. Partners from two countries (Finland and the Netherlands) commented on the questionnaire based on already elaborated work on the subject.

The answers, comments or suggestions they made on the topics highlighted in the questionnaire are presented below, first referring to general sports issues such as children in sports, preparticipation examination, psychology, climatological conditions, nutrition, stretching, warming up techniques, safety devices etc, and then proceeding to sports specific issues.

General issues

Children in sports *General comment*	**Austria**	For kids and youths it is important to provide them with harmonious, psychophysical opportunities for movement. Training should be for youths but not for children as children should want to do sports voluntarily, without the push from parents or trainers; they naturally like to move. Important for young athletes to play sports, for fun, without pressure, without too much competition; not important to win.
	Finland	No comment
	Germany	No comment
	Greece	Children should be encouraged to participate in sports. However, sports are just a game and children should not be pressured to perform. Sports injury prevention in children is the responsibility of parents, teachers, coaches, trainers, sports clubs and sports associations. Parents and the children should be aware of the hazards of sports injuries and also the limitations that might be evident in some children's somatotypes, which may prevent the child from developing into an elite athlete in a specific sport. Parents should also know that sports participation with proper training could not affect the final height of their child.
	Israel	Children and adolescents compete according to chronological age not according to biological age, which can be very different and increase the risk of injuries. Physical development may be ahead of mental development affecting motor skills and judgement. Coaches and sports instructors should be aware of inherent, intrinsic factors related to child growth and development (eg apophyseal and epiphyseal growth plates) that make children more susceptible to overuse type syndrome. Emphasis should be put on educating children and trainers for better performance. Children should never be forced to play a sport. They should never be pushed to win.
	Italy	Trainers of youth teams must have a specific psycho-pedagogical formation and be aware of physical problems and characteristics of children and adolescents.
	The Netherlands	No comment

How should we treat them?	**Austria**	Children learn very quickly, therefore one must not miss the opportunity to expose them to sports and movement, of all sorts. Sports for children have so many aspects; trainers must know about children's development, body development and thus adjust intensity, duration, and incorporate breaks.
	Finland	No comment
	Germany	No comment
	Greece	Proper technique of each sport should be emphasized. The danger of injuries is greater when there is minimum knowledge of the proper techniques involved in a specific sport.
	Israel	According to the specific injury Physical therapy, rest or Non-steroid anti inflammatory drugs Use the occasion for counselling on prevention Physical and mental health should be given priority for care and healing; prevention should be a priority Education and careful monitoring
	Italy	No comment
	The Netherlands	No comment
At which age should they start sports and at which age to play team sports?	**Austria**	Start sports at 4 or 5 years of age but only for fun, no technical training and competition. For team sports, also 4-5 years old, more fun with other kids, and important for social and psychological skills. Start sports training in puberty, for girls 11-14 years old and for boys, 12-15 years old. Then increase the training once adolescent: girls 14-17 years old and boys 15-19 years old.
	Finland	It depends from the type of sports activity. It may be early in activities with prevalent agility and flexibility. In power and strength activities not before 14 years of age. Team sports between 8 and 12 y.
	Germany	No comment
	Greece	Sports activities similar to games could start at the age of 4-5 years old, such as gymnastics and swimming while organized sports should start at the age of 11-12 years old.
	Israel	There was not consensus about the age of starting sports. However the age range suggested by the experts was relatively narrow: 5-6 for individual and 7-9 for team sports. There was also the suggestion that the starting age depends on the type of sport. Additional comments were that it depends on the child mental/physical maturity and capability Any adverse effects should entail the reassessment as to the appropriateness of the sport for the age group
	Italy	It depends from the type of sports activity. It may be early in activities with prevalent agility and flexibility. In power and strength activities not before 14 years of age. Team sports between 8 and 12 years old.
	The Netherlands	No comment
When do you think is the most suitable time for a ***Pre-Participation Examination?***	**Austria**	At 6 years old.
	Finland	Six to eight weeks before the child starts sports participation if there is family history of sudden death or abnormal symptoms
	Germany	No comment
	Greece	Every prospective sports participant should receive a PPE. The most suitable time is 6-8 weeks before participation
	Israel	The timing varied from 6-8 weeks to 2 weeks-3 months before starting sports activities. There was a suggestion to perform the PPE at the end of season, in order to counsel on best pre-season training and counselling on recovery from injuries.
	Italy	Six to eight weeks before the child starts sports participation
	The Netherlands	In The Netherlands, the PPE is performed once for every person and the contents of a PPE is general, i.e. the contents of a PPE is not sport-specific. A PPE will be more effective in preventing sports injuries when its content is sports-specific. In The Netherlands, the contents of a PPE is being revised at the moment. In addition, a PPE might be more effective when a person will also be examined after recovery from an injury or after a period of inactivity (due to illness, a sport injury or due to any other reason).

Who should perform Pre-Participation Examination?	**Austria**	Doctors are best, but physical therapists, or gym teachers when the test is standardized.
	Finland	Paediatricians or sports medicine specialized doctors
	Germany	No comment
	Greece	Sports medicine doctors should perform the PPE, but if they are not available Pediatricians or Cardiologists can also perform the PPE. Orthopedics should also examine participants for the PPE.
	Israel	There was an agreement that a sports physician should do it, although family physician was also mentioned. One expert mentioned orthopedic surgeon and cardiologist as consultants
	Italy	Pediatricians or sports medicine specialized doctors
	The Netherlands	No comment
How often should this examination take place?	**Austria**	Regularly, about every 2 to 3 months. Once per year.
	Finland	At least 1 time/year at the beginning of the activity. Il must be repeated in case of relapsing injuries.
	Germany	No comment
	Greece	The examination should take place every year, before the beginning of the training period.
	Israel	Experts agreed that the examination should be done annually (one of the respondents suggested that in following seasons a questionnaire should be used instead, with follow-up as needed). There was also a suggestion that a special check up by an orthopaedist should be done in case an injury took place during season, the child has complains or is growing.
	Italy	At least 1 time/year at the beginning of the activity. Il must be repeated in case of relapsing injuries.
	The Netherlands	A PPE should be performed at least once for every person (before sports participation). And a person should also be examined after recovery from an injury or after a period of inactivity (due to illness, a sports injury or due to any other reason).
On whom should it be performed (what ages)?	**Austria**	At the start of training (11 years old for girls and 12 years old for boys). All school kids, 6-18 years old as it is easy to organize in the schools. Afterwards in sports clubs once a year.
	Finland	Those who have family history of sudden death or abnormal symptoms
	Germany	No comment
	Greece	Every prospective sports participant should receive a PPE
	Israel	There was agreement that it should be done for children participating in competitive sports. In addition there was a suggestion that it should include also children who participate in organized sports and that it should be encouraged for all kids.
	Italy	To every child who starts motor activity
	The Netherlands	A PPE should, at least, be performed to: children before sport participation commences; anyone who has recovered from a sports injury and whishes to participate in sports again; anyone who has been inactive for a period of time (due to illness, a sports injury or due to any other reason) and whishes to participate in sports again.
The PPE in the United States is performed at schools or in doctor offices. The athletes are asked questions regarding: Sexual activity, and health, smoking, eating disorders, personal/family use of alcohol. Do you think these questions should be part of the PPE?	**Austria**	All except sexual activity as this is too private and doesn't have to do with a general sports survey; should do this on a one-to-one basis with each individual and state reason why doing it.
	Finland	No comment
	Germany	No consensus among German experts, though slightly more agree with those questions.
	Greece	Agreement
	Israel	There was an overall agreement to include all these questions. It was suggested to add age of menstruation for girls. It was also suggested that depending on the population there might be modifications determined by the responsible medical staff .
	Italy	No comment

	The Netherlands	No comment
After the onset of injury, children should return to participation after an informed examination. Do not return to participation if there is persistent pain, stiffness or weakness suggestive of poor condition, or incomplete recovery. Delay return to strenuous activity, otherwise there is considerable risk of re-injury. Take the advice from your physician before you return to participation.	**Austria**	Agreement
	Finland	Agreement
	Germany	No comment
	Greece	Agreement
	Israel	Agreement
	Italy	A careful evaluation together with the trainer of the child of causes and mechanisms of the acute or overuse injury may be useful
	The Netherlands	A person should also be examined (a PPE) after recovery from a sports injury or after a period of inactivity (due to illness, a sports injury or due to any other reason) and whishes to participate in sports again.
Prevention of overuse injuries *should focus on:* *Appropriate training program and conditioning* *Correct use of properly fitted equipment and footwear* *Well kept playing surface*	**Austria**	For a certain sport, very important is the type of playing surface. For example, in soccer the fake grass causes many injuries. Safety stressed, personal protective equipment.
	Finland	The type, frequency, intensity and duration of training play a major role in the etiology of overuse injuries. Furthermore, excessive height, weight, muscle weakness, inflexibility, predisposing diseases and idiopathic or acquired abnormalities in the anatomy or biomechanics of the joints may predispose to a local overuse injury.
	Germany	No comment
	Greece	Orthopaedic abnormalities of individual that may predispose to overuse injuries
	Israel	There should be pre-season conditioning Avoid plyometric workouts for skeletally immature children (Open growth plates)
	Italy	Training must be differentiated according to the biological age (not the chronological one) of children and adolescents.
	The Netherlands	Based on both literature and experts'opinion it was concluded that sport shoes with good shock absorbers will probably have a positive effect on preventing overuse injuries in the foot. The effect of posture-corrective inlays in shoes on preventing overuse injuries is still to be conclusively proven, but should be recommended to athletes nonetheless.
Personal Psychology*: Aggressive behaviour has been found to play a role in injury pattern risk and this finding is more obvious in team sports.*	**Austria**	Yes, certainly. In soccer, the lower the league, the more aggressive; in that the lower the socio-economic status, the more aggressiveness. Has to do with the 'must win' mentality that the coach or parents place on players. Aggressiveness can have to do with injuries but I don't know the statistics about it, if it is proven scientifically. In ice hockey, American football, aggressiveness is 'part of the game' so one can play hard but fair or negatively with fouls and anger.
	Finland	There needs to be a greater focus on diminishing rough and violent contacts between athletes through changes in the game rules and strict officiating. For example, to avoid spinal cord injuries in ice hockey, aggressive checking, particularly from behind and near the rink boards, should be minimized by game rules. Aggressive stick use may also partly account for the high number of hand and wrist fractures in hockey players and should be controlled for.

	Germany	No comment
	Greece	Parental aggressive behaviour also has an effect on child's performance
	Israel	A lot depends on the coach, parents and what children are exposed in the media. Aggressiveness should not be tolerated.
	Italy	It's trainers duty to educate young athletes to direct aggressiveness within bound of the play rules.
	The Netherlands	No comment
Climatological Conditions *According to your experience, do climatological conditions increase injury risk?*	**Austria**	When it is cold the muscles need longer warm up time. When it is cold the muscles do not adequately warm up therefore injuries are more frequent. Need appropriate clothing for skiing or long-distance running. In extreme heat, for the heart, weakness could lead to injury.
	Finland	Climatological conditions can also alter playing surface (slippery)
	Germany	No comment
	Greece	The injuries that are mostly related with cold climatological conditions are muscles, ligament and tendon injuries. Climatologic conditions, such as rain or snow, can also affect the risk for injuries by altering the playing surface.
	Israel	There was agreement that there is effect of climatologic conditions on injury risk. Chill factor and dampness should also be taken into account in addition to temperature. Special consideration should be given to the head due to the significant heat loss. Dehydration, heat stroke, electrolyte loss, muscle cramps, muscle strain were quoted as resulting conditions
	Italy	Dehydration can reduce concentration and attention of the players. In cold climate warming up time must be prolonged
	The Netherlands	No comment
Sports arenas: *Would you suggest any specific modifications on sports arenas in order to be safer?*	**Austria**	In Austria there are safety standards/norms for all arenas, school facilities that must be fulfilled otherwise no one can train in them. What is a problem is that the facility owner has the power to decide when players can play on real grass and this is not fair. The trainer should decide this, as more injuries occur on fake grass.
	Finland	No comment
	Germany	No comment
	Greece	Appropriate padding into walls or poles should be added to prevent injuries from colliding; Proper lightening; Proper heating and cooling devices; Proper sound acoustics; No smoking in closed sports arenas
	Israel	Proper lighting, Proper first aid equipment, Emergency exits, Emergency phone systems, Padding of goal poles to prevent tibial fractures
	Italy	Indoor games (basketball, volleyball, etc.) are often carried out in too small structures
	The Netherlands	No comment
Safety devices: *Do you believe that safety devices are properly used in your country and in which frequency?*	**Austria**	In general, they are not being worn, although more so recently in inline skating at school. There the kids must wear them, but privately they do not. But also are safety devices rarely worn at school for ball sports
	Finland	No comment
	Germany	Mean frequency of use about 35% (range of answers 10-70% among German experts) The majority of German experts believe that it should become compulsory.
	Greece	There was general agreement that there is not enough use of safety devices and that the use increases if it is compulsory for the specific sport
	Israel	There was general agreement that there is not enough use of safety devices and that the use increases if it is compulsory for the specific sport
	Italy	In official games the 100% of the athletes utilize properly safety devices, during the training about 80% of them

	The Netherlands	No comment
Is there any difference in safety devices use among sports or between levels of competition?	**Austria**	Yes, for soccer and other ball sports, less worn and only worn in 'organized sports or competition.' Professionals always wear the safety devices versus hobby, amateur sports persons as the pros have higher risks (skiing for example) in all sports. Children helmets for ski is increasing, and rollerblading wrist guards used more as in ice skating.
	Finland	No comment
	Germany	No comment
	Greece	No comment
	Israel	There was disagreement regarding the level of use among higher levels, although most respondents thought that at higher levels there is also a lack of use.
	Italy	It depends from type of sports, according to different rules
	The Netherlands	In The Netherlands, the use of the following safety devices is obligatory: a bicycle helmet, but only for amateur cyclists in training and in races; a helmet with a face protector for goal keepers in field hockey; the use of safety goggles, knee protectors, elbow protectors, wrist protectors is not obligatory for any type of sport.
What are some other reasons why people use or don't use safety devices?	**Austria**	Don't use-because not 'cool', not seen regularly and therefore is not accepted by the peers. Also the parents don't want to invest so much money in a sport that is perhaps done once a week at school (therefore buy cheaper equipment which does not last, not good quality). Uncomfortable, helmet too sweaty or hot / the belief that 'I don't need it, never needed it before / lack of parent influence, responsibility.
	Finland	Reduced sight (goggles), weight (helmet), reduced movements of joints (for example knee)
	Germany	No comment
	Greece	No comment
	Israel	Cost; Lack of enforcement; Lack of awareness and knowledge; Appraisal of low susceptibility/feeling of invulnerability; Confort; Esthetics/Appearance; Peer views; Infringement in the ability to play
	Italy	Reduced sight (goggles), weight (helmet), reduced movements of joints (for example knee)
	The Netherlands	No comment
Would you recommend safety goggles in all contact sports, for instance basketball?	**Austria**	No.
	Finland	In one-eyed persons.
	Germany	No comment
	Greece	To reduce risk of eye injury which in higher in sports such as baseball, ice hockey, racket sports, goggles with polycarbonate plastic lenses and frames were recommended. If corrective glasses are worn then they should replace by protective goggles.
	Israel	There was no agreement in the use of goggles for contact sports
	Italy	Only in subjects with reduced sight or one-eyed persons
	The Netherlands	Sports with a high risk for an eye injury due to impact, are: racket sports (squash, badminton, tennis); sports, in which a bat or a stick is used (baseball, field hockey, cricket); sports, in which a large ball is used (soccer, rugby football, basketball); boxing, karate. In addition, the risk of sustaining an eye injury is present in swimming and ski-ing (due to UV-light).
Do you think that helmet use should be proposed in other sports?	**Austria**	For all boxing, judo, karate sports, for amateurs, not for professionals. Winter sports: skiing, ice skating, boxing, rollerblading
	Finland	Sometimes the use of protective devices may also lead to unexpected consequences. For example skiers wearing helmets may ski harder, closer to their limit and in worse conditions assuming that the helmet will protect their head when in fact their change in behavior leads to even greater risk of injury.
	Germany	No comment
	Greece	Head protective equipment should be used in many sports, especially in sports such as rugby football, cricket, cycling, climbing, winter sports, bicycling, horse riding, ice hockey, motorcycling.

	Israel	Opinions were divided: no, probably not, yes. The suggested sports were: Possible in soccer to prevent head injuries from heading the ball; Downhill skiing
	Italy	In American football not in the European (=soccer); in boxing
	The Netherlands	Helmet use is also used in/ should also be proposed in: inline skating, shorttrack speed skating, wrestling, goal keepers in field, hockey, American football, baseball, judo, ju-jitsu, karate
Nutrition *The nutritional intake before an activity can affect an athlete's performance*	**Austria**	There are many overweight kids therefore weight loss, weight control should be addressed. Also, for muscle cramps know the right minerals to give (magnesium, calcium, natrium, etc.). Agree, especially children must often drink as they don't sweat well, can't regulate body temperature as well, so when running it is important. Fruits and vegetables should be eaten! And for drinks, half juice (without sugar added) and half water mixed.
	Finland	Agreement
	Germany	No comment
	Greece	Agreement
	Israel	Drinking during the event and eating a balanced diet after the event replenishes the body needs. Depends on the climate, the type of sport and the athletic condition. Some studies show that athletes can safely eat close to competition time.
	Italy	Avoid sugars that increase insulinemia just before the game – provide fructose instead
	The Netherlands	No comment
Stretching *Do you believe stretching before exercising reduces the risk of injury in sports events, and if yes which specific types of injury?*	**Austria**	Yes, for all sports. It reduces the risk of injury for ligamentous tears and strains, muscle strains, tendon strains. One should always stretch and warm up.
	Finland	According to 2 well-organized randomized studies so far, stretching doesn't seem to have any positive effect on individual injury risk.
	Germany	No comment
	Greece	No comment
	Israel	There was general agreement that it does, although one of the experts stated that it depends on the person. Most important for this expert was a warming up period for the CV system and body parts to be exercised. The types of injuries recalled were: Stretching and tearing of muscles, Injuries to ligaments and tendons, Injuries to joints
	Italy	Muscle sprains and strains
	The Netherlands	Based on our study, it is still to be conclusively proven, whether stretch exercises are effective in preventing acute injuries. Based on the literature, there are indications that stretching might have a positive effect in preventing acute injuries. These effects have been shown on the level of the muscle and tendon, but it has not yet shown to result in a decreased amount of injuries. The experts' opinion on the effectiveness of stretching to prevent sports injuries is not unanimous; the literature is contradictory and can be interpreted in different ways. Based on the experts' opinion, it is plausible that stretching has a positive effect on preventing cumulative (overuse) injuries.
Warm up – Cool down: *Do you believe that warming up and cooling down can help to prevent injuries? Is it more valuable in some sports than in others?*	**Austria**	I think warm up is more important than cool down, but both important. When you warm up, you produce more gel flow in your joint capsules, make the joints more flexible.
	Finland	Avoid long standing sretching exercises when warming up, may increase injury risk.
	Germany	No comment
	Greece	No comment
	Israel	There is agreement that it can help. It was stated that the higher the intensity, the shorter the duration of the event, the more warm up will prevent injuries. Examples given were soccer, hockey and football.
	Italy	Warning up and cooling down are efficient from the metabolic point of view in all the sports. Prevention of injuries is more efficient in power and strength activities.

	The Netherlands	Based on our literature study, a sport specific warming-up, which at least consists of stretching exercises and an aerobic component (cycling, running) will probably have a positive effect on the prevention of acute injuries. Based on the experts' opinion it is plausible that a warming-up can be effective in preventing sports injuries. However, the warming up must be sport specific and the effect is dependent on various factors, including the type of activity/sport following the warming-up and the age and the level of physical fitness of the athlete. A warming-up is strongly recommended, especially for sports with an explosive nature (involving sudden movements) In our study, no literature was found on the effectiveness of a cooling-down to prevent sports injuries. Based on the experts' opinion, it is concluded that a cooling-down has a positive effect on preventing micro-traumata in the muscles. Athletes experience less muscle pain after having performed a cooling-down.

Sports specific issues

Basketball	**Austria**	No, more aggressive if they know the players have mouth guards, and it is harder to breathe with one so it is counter-productive for this sport.
Do you believe that mouth guards should be worn? For children or adults only?	**Finland**	No comment
	Germany	No comment
	Greece	There was a general opinion that everybody should use mouth guards.
	Israel	There was a general opinion that everybody should use mouth guards, although one of the experts thought it should be used only by adults.
	Italy	Only for adults because of the anatomical -functional characteristics of first airways in children
	The Netherlands	Mouth guards will probably have a positive effect on preventing injuries and protecting teeth and mouth.
Do you think that appropriate footwear minimize the risk of ankle injury?	**Austria**	Yes, certainly. But many school kids do not have any as the parents think that one pair of sneakers is enough for all sports; don't want to pay for a special kind. Higher shoe support at the ankle to protect the ankle, ankle ligaments. Important for matches to wear, but for basic training, jogging, without team /contact sports than regular sports shoes, so that the muscles are not weakened.
	Finland	Yes, by advanced footwear the athletes retain maximal tactile sensitivity, thereby maintaining an awareness of foot position. Semirigid orthoses or air-cast braces have been found to have beneficial effect when recovering from the recent ankle injury.
	Germany	No comment
	Greece	Agreement
	Israel	Agreement
	Italy	Yes, but it must be associated with tapping.
	The Netherlands	Sport shoes with good shock absorbers will probably have a positive effect on preventing overuse injuries in the foot. The effect of posture-corrective inlays in shoes on preventing overuse injuries is still to be conclusively proven, but should be recommended to athletes nonetheless. The effect of high shoes and robust heel-caps in shoes on preventing injuries is still to be conclusively proven, but should be recommended to athletes nonetheless.
Do you think that posts and tableaus should be padded for children players in basketball?	**Austria**	Agreement
	Finland	Agreement
	Germany	No comment
	Greece	Agreement
	Israel	Agreement
	Italy	Agreement
	The Netherlands	No comment
In basketball, it has been noticed that elite athletes have more knee injuries compared to non-elite. Where do you attribute this discrepancy?	**Austria**	Professionals are systematically and regularly over trained, with lots of pressure in competitions. That is why so many play bandaged up. Also, professionals pass more, which requires quick and fast twisting of the body.
	Finland	Higher stress to the muscle-tendons-ligaments structures; altered loads and muscle strengthening; high speed of the play and increase of power.
	Germany	No comment
	Greece	No comment

	Israel	The discrepancy was ascribed to the physical nature and more violent play and the increased ability to "cut" on court.
	Italy	Higher stress to the muscle-tendons-ligaments structures; altered loads and muscle strengthening; high speed of the play and increase of power
	The Netherlands	No comment
Would you suggest any other measures for the prevention of basketball injuries?	**Austria**	Prevention should come from the trainer and coach, for regular orthopedical examinations, good muscle training equipment, bandaging, good shoes, and learn appropriate techniques when dribbling and passing so that not twisting so quickly. Also what about decreasing the playing time so that the duration of the game is not so long.
	Finland	Advanced footwear; Semirigid orthoses or air-cast braces when recovering from the recent ankle injury; Ankle disk training; Modifications of game rules.
	Germany	No comment
	Greece	Modifications of game rules; the safety of the athletes should be the first consideration. Calendar for sports events should be less demanding for elite athletes.
	Israel	Specific work for ankle stability and strengthening; ankle taping/bracing; Ankle strengthening and proprioception; Preventive finger taping on non-dominant hand; Glasses; Training in pivoting; Education; Less aggressive game
	Italy	Routine use of tapping; decreasing the physical component (power and strength) and improving the technical aspect.
	The Netherlands	No comment
Football *The use of kneepads or the use of shin guards is assumed to be effective in reducing leg abrasions, contusions and preventing fractures. Do you think that they should be proposed?*	**Austria**	Shin guards should be mandated at school, but knee pads no, as they interfere with movement. Shin guards always, by competition and training (in Austria, not worn by training). Not recommended for soccer, only indoor or non-grass fields where you can get 'burn' injury from sliding on the floor surface. Taping of ankles is very important.
	Finland	Shin are already compulsory and its use has been proved to be protective ; knee braces have shown a minor decrease in the rate of knee ligament injuries in athletes with earlier knee injuries, but not in overall injury rates or severity of the sustained injuries.
	Germany	No comment
	Greece	Although shin region fractures were noticed in significant proportion in previous years these were reduced after the obligatory use of shin guards.
	Israel	There was consensus that they should be proposed
	Italy	Shin are compulsory; kneepads guards are not allowed by the actual rules (excluding the goal-keeper)
	The Netherlands	Shin guards/ leg pads (made of hard material for sports like soccer; made of kevlar for speedskating/ shorttrack) will probably have a positive effect on preventing injuries and protecting teeth and mouth. These measures are strongly recommended to the athletes performing these types of sport. In general, based on literature and experts'opinion, it was concluded that the effect of knee pads (made of hard and soft material) on preventing injuries is still to be conclusively proven, but should be recommended to athletes nonetheless.
Do you believe that mouth guards should be worn in football? Children or adults only?	**Austria**	No.
	Finland	No.
	Germany	No comment.
	Greece	No.
	Israel	There was general agreement that they should be worn for both adults and children, although one of the experts expressed his doubts about it.
	Italy	No.
	The Netherlands	In general (based on the results of our study), the use of mouth guards is strongly recommended
Do you think specific rule changes in sports that involve collisions between players are necessary for reducing the injury risk?	**Austria**	Yes, rule changes are being slowly changed to promote fair play in Austria. Yes, for example in head butting, that no elbows by the head—that should be a yellow card/foul. Fouls from behind are now stronger already

	Finland	Yes, the use of protective devices should be combined with modifications of the game rules when ever possible.
	Germany	No comment
	Greece	No comment
	Israel	Experts agreed that there should be specific rules. One of them suggested automatic red cards for intentional injuries
	Italy	Yes : some rules are already put in practice as admonition (yellow card)for some fouls
	The Netherlands	No comment
Could you list some suggestions aiming to promote "fair-play" games?	**Austria**	Fair play rules and safety equipment to be worn during training as well as in competition. Fair play competitions, more points given for fair play / prize or award for best fair play.
	Finland	Teaching and education of game rules and etiquette, correct officiating.
	Germany	No comment
	Greece	No comment
	Israel	Educate about ethics in sports; Additional referees, umpires on fields; Collisions should be a foul; Penalties for aggressive play and collisions; Deducting points/score for penalties
	Italy	Youth teams trainers must teach the education while playing as well the respect of the antagonists and of the referee.
	The Netherlands	No comment
Do you think padded goal posts should be recommended only for children playing football (soccer)?	**Austria**	No, as I think there are very few injuries resulting from the goal posts, as it would make the sport less attractive.
	Finland	Agreement
	Germany	The majority of the German experts disagree that goal posts should be padded
	Greece	For children soccer goal posts should be padded.
	Israel	For all players.
	Italy	Yes only for children.
	The Netherlands	No comment
Would you suggest any other measures for the prevention of football injuries?	**Austria**	I would recommend regulations as to the surface surrounding the playing field. It should be soft surface ground around the perimeter of the field. Also, the fake grass is dangerous for soccer fields. Taping of ankles
	Finland	Ankle disk training; careful rehabilitation of injuries; advanced footwear; semirigid orthoses or air-cast braces when recovering from the recent ankle injury; teaching of game rules, correct technique, typical injury situations and how to act; teaching of 'fair play' behavior; rule changes if needed; correct officiating
	Germany	No comment
	Greece	No comment
	Israel	Education for players and coaches Pre-season, pre-participation exam (specially looking at ankle, knee, strength)
	Italy	Better care of playing fields
	The Netherlands	No comment
Gymnastics *Would you suggest other measures for the prevention of gymnastic injuries?*	**Austria**	Leather straps for the hands, to prevent calluses, anti-slip socks, equipment, proper fixed/anchored (goal) and stretching and warm-up
	Finland	Ankle disk training; careful rehabilitation of injuries; advanced footwear; semirigid orthoses or air-cast braces when recovering from the recent ankle injury; teaching of correct technique, typical injury situations and how to act; rule changes if needed
	Germany	No comment
	Greece	No comment

	Israel	Taping ankles; Training(short practice)/ number of hours of training/week; Good follow-up of general condition (nutrition, etc). Strength training of relevant muscles; Proper rehabilitation after injury
	Italy	No comment
	The Netherlands	No comment
Volleyball *Would you suggest other measures for the prevention of volleyball injuries?*	**Austria**	Muscle training, for the lower extremities, stretch and warm-up, taping of fingers for stability, important technique training/positioning
	Finland	Ankle disk training; careful rehabilitation of injuries; advanced footwear; semirigid orthoses or air-cast braces when recovering from the recent ankle injury; teaching of game rules, correct technique, typical injury situations and how to act; teaching of 'fair play' behaviour; rule changes if needed; correct officiating
	Germany	No comment
	Greece	Elbow pads can also protect you from elbow injuries during falls. Finger tapes can provide reduce the risk of finger injury.
	Israel	Proper pre-participation exam; Proper training; Finger taping (for blocking); Protective ankle braces; Proper rehabilitation therapy
	Italy	No comment
	The Netherlands	No comment
Boxing *The use of prophylactic helmets, unlimited lengths of hand bandage, and heavier gloves have not been effective in minimizing the occurrence of injuries.* *However do you think that it should be proposed?*	**Austria**	Yes
	Finland	Yes
	Germany	No comment
	Greece	Experts also noticed the need to protect the neck, and mentioned that use of prophylactic helmets, unlimited lengths of hand bandage, and heavier gloves have not been effective in minimizing the occurrence of injuries.
	Israel	Yes; Lower the weight of gloves.
	Italy	No comment
	The Netherlands	No comment
Ocular injuries are common and account for more hospitalizations than neurologic injuries. What measures can be taken to prevent these injuries?	**Austria**	Headgear could be thicker, to prevent better and come forward a little more.
	Finland	Softer gloves
	Germany	No comment
	Greece	No comment
	Israel	Exclude head blows; Protective glasses/shields
	Italy	No comment
	The Netherlands	No comment
What is your opinion about boxing and what measures would you suggest?	**Austria**	Experts from Austria do not agree themselves if it is a dangerous sport and poses a health threat.
	Finland	No comment
	Germany	Legal limitations; Regulation at the level of athletic organizations; Educational programs aiming to inform the parents, teachers, trainers about the danger posed to the health of athletes practicing in this sport
	Greece	Experts note that boxing is a sport that teaches self-defense, discipline, strength, and agility, however it should be practiced with care and with consideration of prophylactic measures

	Israel	It represents a threat to the health of athletes practicing. Regulation at the level of athletic organizations. Educational programs aiming to inform the parents, teachers, trainers about the danger posed to the health of athletes practicing in this sport. Ban the sport.
	Italy	It is a sport that promotes aggressiveness. It represents a threat to the health of athletes practicing.
	The Netherlands	No comment
If a child wanted to start boxing, at which age do you think is appropriate to get into the sport?	**Austria**	Puberty, 15 years old for passive training, meaning with a boxing bag, but not against an opponent.(1 expert); 18 years old (1 expert)
	Finland	Boxing is not appropriate for children; after the age of 18, as an adult, everyone can decide to start with this activity after being correctly informed about the risks
	Germany	Boxing is not appropriate for children; after the age of 18, as an adult, everyone can decide to start with this activity after being correctly informed about the risks
	Greece	Boxing is not appropriate for children; after the age of 18, as an adult, everyone can decide to start with this activity after being correctly informed about the risks
	Israel	NONE (2 experts); 18 years (1 expert)
	Italy	Boxing is not appropriate for children; after the age of 18, as an adult, everyone can decide to start with this activity after being correctly informed about the risks
	The Netherlands	No comment
Ice Hockey *There is some speculation regarding the association of helmets and full-face shields use with an increased risk of cervical injuries by promoting a more aggressive play or due to biomechanical alterations, which might take place during collisions. Comments:*	**Austria**	Still, must keep the helmet as it is protection against the ice surface, another player's stick. No increase in aggressiveness due to protective equipment as then fouled and that hurts the team to have a person down/ not related and no association between protective equipment and cervical injuries that I know of.
	Finland	In hockey a full-face mask is recommended for everyone, as the half face-visors can increase the risk of dental injuries. Aggressive behavior can be faced with game rules modifications and strict officiating.
	Germany	No comment
	Greece	No comment
	Israel	Responses were not consistent. They ranged from agree, Probably (must teach proper techniques, limit aggressiveness) to Disagrees (full face shields provide protection from needles high stick injuries.
	Italy	No comment
	The Netherlands	Based on experts'opinion it was concluded that in general, the use of protective devices may result in a different behaviour (both of the athlete himself and from the opponent), which may lead to a shift in the nature or location of injuries
Do you believe the interdiction of body checking in ice hockey for children younger than 15 years old is necessary for preventing cervical spine trauma?	**Austria**	No, as it is in all other contact sports allowed, and ice hockey is not so different, if one has the proper equipment (1 expert); Yes, maybe that is important as back injuries occur often, as checks are too hard, or at a wrong angle (1 expert).
	Finland	Yes
	Germany	No comment
	Greece	No comment
	Israel	*Yes, it would help*
	Italy	No comment
	The Netherlands	No comment

4.3 Doping survey

There were 2650 tertiary education students enrolled in the study but 477 students indicated that they have minimal interest or involvement in physical activity and these were not included in further analysis. Subsequent analyses rely on the 2173 students who reported at least a minimal interest or involvement in sports activities.

A total of 68 students (2.6%) reported having used, at least once, a physical performance-enhancing substance. Of those, 18 admitted using androgens and/or other anabolics, 6 other hormones, including growth hormone and erythropoietin, 20 stimulants of various types, 3 diuretics, 1 beta-blocker, whereas 20 students did not identify the specific substance. Table 2 shows the distribution of students with at least a minimal involvement in sports activities and, among them, those admitting doping by country of origin, gender, age, type of tertiary education and Body Mass Index (BMI), calculated as a ratio of body weight (in kilograms) over height squared (in square meters). There was no significant variation on the frequency of doping reporting among the six countries in the study. On the contrary, doping reporting was higher among male than female students, increased with age, was less common among students of biomedical schools and was higher among students with higher BMI; these four associations were all statistically significant.

Table 3 (Appendix G) shows the relation of doping reporting with the extent of involvement in sport activities. The frequency of doping reporting increases with increasing involvement in sport activities and the linear tend is statistically significant. Moreover, the frequency of doping reporting is more than twice as high among students who have participated in major international athletic events than among other students.

Table 4 (Appendix G) shows the distribution of students with at least a minimal involvement in sport activities and, among them, those admitting doping by major lifestyle variables. There are significant positive associations of doping reporting with tobacco smoking, coffee drinking and occasions of involvement in drunkness episodes. Students who reported that one of their friends was using doping were more than seven times more likely to admit that they have used doping at least once themselves. Last, students who were using nutritional supplements were more than four times as likely to report doping in comparison to students that did not use nutritional supplements.

In studies exploring predictors of risky behaviors, in this instance doping, control of confounding is not as crucial as in etiological research. Nevertheless, in Table 5 (Appendix G)we have evaluated the association of doping admission with each of the variables indicated in Tables 3-4 (Appendix G)after controlling for the basic socio-demographic variables shown in Table 2, that is country of origin, gender, age, type of tertiary education and Body Mass Index. With the exception of tobacco smoking (p=0.08) and weekly time spent in sports activities (p=0.31), the remaining factors retain their significant predictive value of doping admission. Of note are the high odds ratios with respect to dietary supplement use and having a friend who uses doping (4.1 and 8.3, respectively).

In Table 6(Appendix G), we have examined a possible predictive interaction between having a doping friend and use by self of dietary supplements without medical prescription. Being a dietary supplement user and having a friend who uses doping has a super-additive predictive effect. Thus, using supplements but not having a doping friend increases the odds of doping reporting 4.9 times, whereas having a friend reporting doping but not him/herself using dietary supplements increases these odds 10.6 times. Combination of these exposures, however, increases the odds of admitting doping to more than twice the level that would be expected by simple addition of the odds ratios corresponding to the individual exposure.

4.4 Inventory of Sports Injuries experts – Internet forum

A core inventory of experts in the field of sports injuries prevention has been implemented consisting of sixteen experts from four countries (Appendix E). Fifteen of those are also included in the electronic version of the inventory, the internet forum, after their written consent.

The internet forum is located at www.inhealth.gr/sip (temporary web address) and some basic functions are described below.

Registering to the forum

Registration is required for every task on this Forum. Only registered members can participate to this forum for security reasons. One can register either through an already registered member (colleague) or by sending to the administrator an email with the personal information (email, full Name, Address, Occupation, Institution, Relation to Sports Injuries Prevention). After the registration one will get full access to this forum and will be able to communicate with peers in the field of Sports Injuries Prevention, read topics and post new messages. The information provided during registration is not outsourced or used for any advertising by CEREPRI.

Moderators

Moderators control individual forums. They may edit, delete, or prune any posts in their forums. Any questions about a particular forum, should directed to the forum's moderator.

Cookies

These Forums use cookies to store the following information: the last time one logged in, the UserName and the Password. These cookies are stored on one's hard disk drive. Cookies are not used to track one's movement or perform any function other than to enhance the use of these forums. If cookies have not been enabled in the browser, many of these time-saving features will not work properly.

Active Topics

Active Topics are tracked by cookies. When one clicks on the "active topics" link, a page is generated listing all topics that have been posted since one's last visit to these forums (or approximately 20 minutes).

Editing the Posts

Members may edit or delete their own posts at any time. By just going to the topic, where the post to be edited or deleted is located, and they will see an "edit" or

“delete” icon. Clicking on this icon edits or deletes the post. No one else can edit a member’s post, except for the forum Moderator or the forum administrator. A note is generated at the bottom of each edited post displaying when and by whom the post was edited.

Attaching Files

For security reasons, members may not attach files to any posts. However, they may cut and paste text into their post.

Searching For Specific Posts

Members may search for specific posts based on a word or words found in the posts, user name, date, and particular forum(s), by simply clicking on the "search" link at the top of most pages.

Editing the Profile

Members may easily change any information stored in their registration profile by using the "profile" link located near the top of each page. Simply identifying themselves by typing their UserName and Password and all of ther profile information will appear on screen. They may edit any information (except their UserName).

Signatures

Members may attach signatures to the end of their posts when they post either a New Topic or Reply. Their signature is editable by clicking on "profile" at the top of any forum page and entering their UserName and Password.

Notification by email when there are new posts

The Subscription feature allows members to subscribe to the entire Board, individual Categories, Forums and/or Topics. Members will receive an email notifying them of a post that has been made to the Category/Forum/Topic that they have subscribed to. There are four levels of subscription:

- Board Wide Subscription: if a member subscribes to an entire Board, he/she will get a notification for any posts made within all the forums inside that board.

- Category Wide Subscription: a member can subscribe to an entire Category, which will notify if there were any posts made within any topic, within any forum, within that Category.

- Forum Wide Subscription: if a member does not want to subscribe to an entire Category, he/she can subscribe to a single forum. This will notify the member of any posts made within any topic, within that forum.

- Topic Wide Subscription: more conveniently, members can subscribe to just an individual topic. They will be notified of any posts made within that topic.

To subscribe or unsubscribe from any level of subscription, one can use the "My Subscriptions" link, located near the top of each page to manage the subscriptions. Or one can click on the subscribe/unsubscribe icons for that Category/Forum/Topic he/she wants to subscribe/unsubscribe to/from.

5. Discussion

5.1 Free text analysis

5.2 Survey for injuries prevention recommendations

5.3 Doping survey

5.4 Inventory of Sports Injuries experts – Internet forum

5.1 Free text analysis

Before the interpretation of results, several limitations should be considered. It is difficult to provide a classification on product causality without assuming the risk of misclassification. Moreover, the possibility of bias from the interviewer should be taken into account. Having different examiners could lead to different interpretation of the free text, based on limited information.

However several conclusions can be drawn in the current dataset. The conclusions are divided in extrinsic factors- environmental factors (field arena, personal equipment) and intrinsic factors (psychological).

Extrinsic- Environmental factors

Field - arena

According to free text description it seems that *good maintenance of field* is important in prevention of sports related injuries. For instance playground where stones, holes, woods or even broken glasses were found was reported in a number of cases. On the other hand many falls were attributed to *slippery playground* mainly due to weather conditions.

Certain types of field such as artificial piste in ski or tatami might also contribute to injury risk. The first can cause burns when the skier falls the second might contribute to injury risk when it is defective.

Regarding arena equipment was found that *goalposts*, *baskets* on basketball and *volleyball net* might be dangerous. However, in the free text description no specific details of the structure of this equipment was provided. Stationary objects close to the arena such as *stairs* or *walls* can also contribute to injury risk.

Personal equipment

Regarding personal equipment several points were identified, especially for ski injuries. In particular *non -defective ski sticks*, *proper binding* in ski and *usage of sunglasses* are essential for avoidance of injuries.

Proper glasses (plastic ones) are also essential on contact sports and especially in ball games. In all sports *not properly tied shoelaces* were also reported in falls.

Intrinsic factors

Psychological factors

On adults psychological factors such as *stress*, *in a hurry*, *not concentrating* was noted. On contact sports *aggressive playing* was noted to be related with injury, especially among children.

Information provided by free text among participating counties

Several conclusions about the information provided by free text in each country can be drawn.

Austria

The Austrian EHLASS database has include variable asking if protective device was worn, but it is not often answered. However, it is still useful in order to identify product involvement differences if protective equipment had been worn. It seems that from prevention point of view it would provide additional information in those cases in which known protective equipment exists (eg. wrist guards when roller lading, helmet when riding a bike) the follow-up question: "if not worn, why not?"

France

In French dataset free text is not informative about the products and the circumstances. For instance, very often is found: "fall skiing", or "injury playing football". On the other hand in the same dataset, there is more information about medical data because the interviewer is generally a medical secretary.

Greece

Information regarding the ground is usually provided by free text in Greek dataset. In these cases conclusions regarding the appropriateness of the sports arena can be drawn. For instance information regarding the playground condition (shock absorbent capacity, if the playground is slippery or inappropriate) in case that are lacking from the coding could be provided on the free text by the interviewer. In Greek dataset, free text information on protective equipment usually is not available. However, this information could be also noted on the free text or added in the questionnaire, as it would provide the possibility to assess the effectiveness of currently used protective devices. Moreover, free text usually does not focus on points such as availability of protective products or products which are potentially defective.

Netherlands

Netherlands partners although they did not provide a free text dataset, agreed that free text can provide valuable information. However, it is worth noting that the situation of Emergency Departments in the Netherlands, makes impossible asking more detailed information than it is currently asked. Moreover, systems like EHLASS (LIS in the Netherlands) should provide basic data and that if more information is needed there is the alternative that the patients should be contacted (by telephone or postal questionnaire).

Classification

For a proper use of the present classification some clarifications are needed. Criteria for inclusions and exclusions should be discussed in more detail. For example:

- For the proximity cases, it is difficult to determine appropriate and inappropriate ground. For instance questions that arise from Austrian partners are: Is a mountain path considered appropriate ground for mountain biking? Or is a meadow appropriate for soccer? Swedish partners mention: When does a normally appropriate ground become inappropriate? Is a football field still appropriate when the rain has made it slippery or the cold has made it hard and frosty?
- Regarding "stationary object Swedish partners also mentioned: When does an object become stationary? Of course a wall, a tree and the border of an ice hockey rink are all stationary. But is equipment for gymnastics e.g. a horse, a balancing beam or flying rings stationary?
- Another point that was mentioned by participants is that difficulty faces the distinction of intentional and not intentional injury on the coding that was proposed for sports injuries free text. How to distinguish between rough but fair play and aggressive behaviour? Often the free text description tells about the injury event, e.g. the patient has been tackled, but not so often about the preceding situation and the intention of the competitor. Austrian partners add that this variable should be removed as EHLASS system is addressed to unintentional type of injuries.
- Difficulties also are presented on certain sports such as equestrian, which were described by Denmark partners. It seems that in this type of sport where animal is also involved the implementation of the certain classification is probably not adequate and further modifications should be made.

Structure of free text

All partners agreed that length of 120 characters in free text is sufficient length. However, increasing the size of free text description does not reassure improvement of the quality. All participants agree that free text could provide additional information if it is structured and if instructions are given to interviewers.

Austrian partners propose that in order to receive useful information that could generate prevention strategies, the interviewers should focused on two main areas:

- CAUSE of accident (fits into the circumstances of the injury)
- HOW the victim believes the accident could have been PREVENTED (fits into use of preventive measures‘ but is not only use of equipment, for example, if the road surface had been in good condition)

French partners proposed two separate zones for free texts describing for the first the circumstances of the accident and for the second giving information on the product when a product is involved.

- A variable scoring the apparent degree of product involvement in the accident : (sure, probably, etc.)
- A specific variable for distinguish the agressive behavior.

Swedish partners note that it is possible to improve the information in the free text by better instruction on the injury questionnaire. For example by questions and examples like:

- How did the injury occur? Explain as detailed as possible.
  E.g. Fell from a swing, hit the back of the head in a concrete frame.
  Slipped with clogs on a wet spot on the bathroom floor.
- Was there any product causing the injury or being involved in the injury event. Name or describe the product.
  E.g. Kitchen knife, lawn mower, cycle handlebar, household ladder, screwdriver, jogging shoes.
- Was the product-involved defect in any way? How?
- Did you use any personal protective equipment at the time of event? What kind, e.*g. helmet, life jacket, etc*

Combining the above suggestions:

- How did the injury occur? Explain as detailed as possible the circumstances under which the accident took place.
  E.g. Fell from a swing, hit the back of the head in a concrete frame.
  Slipped with clogs on a wet spot on the bathroom floor.
- Was there any product causing the injury or being involved in the injury event. Name or describe the product.
  E.g. Kitchen knife, lawn mower, cycle handlebar, household ladder, screwdriver, jogging shoes.
- Was the product-involved defect in any way? How?
- Could you indicate in what degree the product involved in the accident (sure, probably, etc.)
- Did you use any personal protective equipment at the time of event? What kind, e.*g. helmet, life jacket, etc*
- How do you think that the accident could have been prevented (fits into "use of preventive measures" but is not only use of equipment, for example, if the road surface had been in good condition)

Key words

According to the results of the analysis a set of key words can be provided. These key words can give information that are written on the free text but is not coded.

Austrian partners proposed the following key words

1. circumstances of injury: cause, environmental conditions
2. human related factors: fatigue, inattention, distracted, stressed
3. product-related factors: defective, maladapted use, lack of experience with product
4. animal related factors: type of animal
5. use of preventive measures: protective equipment, high level of awareness of surroundings

Greek partners proposed the following key words.

1. defective product

2. inappropriate ground, appropriate ground
3. inappropriate light, appropriate light
4. appropriate, non appropriate footwear
5. aggressive behavior
6. slippery ground
7. risky behavior
8. use of protective devices

6. Examples of not useful and useful of free text:

For better understanding a set of not useful and useful examples was provided by each participating country.

Austria

Not useful

Riding bike on sidewalk, fell to the side

Volleyball, ball on hand

During a ball game, ankle rolled

Basketball, due to game fell on concrete

During tennis playing acute pain in arm

Useful

Mountain biking, rode on a stone, braked too much with the front brakes and thus fell

Biking on a wet road, startled by a car, braked with the front brakes and therefore skidded

Beginning skier, skis crossed, fell, bindings did not release

Skiing, ran into someone one who wanted to pass, did not see the person, as it was the last run-very tired, binding came off

Soccer competition, wanted to take the ball away from opponent, but ball taken back with a strong kick on (victim's) foot, foot twisted externally

Denmark

Not useful

During gymnastics, hit toe

During football, hit finger against grass

During football, hit shoulder/arm

Hand hit during handball

Hurt 3 fingers by ball

During basketball, pain in finger

Got 3-4 cm scratch below the eyebrow during football match

During football, lesion of the shank.

During football, a finger was bent backwards

Useful

Fell 1.5 meter down from bars, hit wooden floor by the face and chest.

During football stepped down in a hole. Ankle was dislocated.

During football got a stroke against the chest; fell backwards.

During football tackled, fell and hurt the wrist.

Slipped at the grass during football play. Put out his hand; heard a loud crack.

During basketball landed in a wrong way and twisted the foot.

Played basketball and jumped. When he hit the ground, he twisted the foot. Distortion of the ankle.

France

Not useful

Fall playing basket

Fall playing football

Fall skiing

Football accident

Playing handball

Injure at handball

Useful

Was mown by a skier

Pushed against a post to the basketball

Twisting fingers by playing basketball

Fall by skiing on an artificial piste

Injure with the wrist-strap of ski (dragonne en français)

Injure with a ski lift

Shock against goal in the football

Greece

Not useful

Fall during playing basket

Fall from the bike

Fall during gymnastics

His ankle rolled during basket

The ball hit him on the arm

Useful

Biking, slippery ground, fall from the bike

During basketball, twisted on a hole and twisted his ankle.

During basketball the ball hit him on the face, his glasses broke and hit him on the face

5.2 Survey for injuries prevention recommendations

Experts participating in this survey expressed their opinion on several gray areas on sports injuries prevention, based on their different background and working experience. There have been examples that even experts from the same country could not agree over a specific topic. However by combining the different reports, several points could be pointed out that where there has been a consensus and several other where research must continue in order to be clarified. Identifying debated issues is also of great importance in order to set future research goals. (See Appendix E for the newsletter for sports injuries prevention)

Preparticipation Exam (PPE).

There was **consensus** over:

- PPE should be given to anyone willing to participate in sports activity
- PPE should be performed 6-8 weeks before sports participation every year
- After the onset of injury, one should return to participation after an informed examination and ***debate*** over:
  - Who should perform PPE (pediatricians, cardiologists, sports medicine physicians, orthopedics)?
  - Should universal standards for PPE be adopted?
  - Could PPE be performed in schools and if yes by whom?
  - Should questions regarding sexual activity, smoking, eating disorders, and personal/family use of alcohol be part of the PPE?

Children in sports

There was **consensus** over:

- Children and adolescents should compete according to biological age not according to chronological age, which can be very different individually and increase the risk of injuries. Also physical development may be ahead of mental development affecting motor skills and judgment/
- Emphasis should focus on educating children, parents and trainers about the hazards of sports injuries and the measures to prevent injury.

- Trainers of youth teams must have psycho-pedagogical background and be aware of physical problems and characteristics of children and adolescents.
- Children should not be pressed to perform-win, and not follow strict training programs
- The age children can start sports depends on the type of sports activity:
    - Sports activities similar to games (for fun) could start at the age of 4-5 years old, such as gymnastics and swimming
    - Team sports can start between 8 and 12 years old
    - Power and strength activities should not be performed before 14 years of age.

Prevention of overuse injuries

There was **consensus** over:

- Attention should be given to idiopathic or acquired abnormalities predisposing to injuries
- Appropriate training program and conditioning is essential for prevention of overuse injuries
- Training must be differentiated according to the biological age (not the chronological one) of children and adolescents in order to avoid these type of injuries
- There should be pre-season conditioning
- Correct use of properly fitted equipment and footwear (sport shoes with good shock absorbers will probably have a positive effect on preventing overuse injuries in the foot. The effect of posture-corrective inlays in shoes on preventing overuse injuries is still to be conclusively proven, but should be recommended to athletes nonetheless)
- Well kept playing surface play important role in the prevention of overuse injuries

Psychology

There was **consensus** over:

- Aggressive behavior has been found to play a role in injury pattern risk and this finding is more obvious in team sports
- There needs to be a greater focus on diminishing rough and violent contacts between athletes through changes in the game rules and strict officiating
- “Fair play” represents a measure for primary prevention of sports injuries

and ***debate*** over:

Suggestion to promote "Fair Play" :

- educate about ethics in sports; the important role of the media
- more points given for fair play / prize or award for best fair play
- additional referees
- modifications of the game rules whenever possible:
    - Collisions should be a foul
    - Penalties for aggressive play and collisions,
    - Deducting points/score for penalties

Climatological conditions

There was **consensus** over:

- In high ambient temperature and humidity:
    - clothing should be white coloured, lightweight, and loose fitting; new fabrics with SPF exist
    - fluid breaks should be offered at least every 45 minutes, and entitled to unrestricted amounts of fluids to help prevent dehydration (Isotonic, no sugar)
    - dehydration can reduce concentration and attention of the players
- In low ambient temperature:
    - protective clothing should be worn for prevention of hypothermia and local frostbites
    - additional warming up is needed
    - attention should be given to possible altered playing surface (slippery)

Safety devices

There was **consensus** over:

- Legislative changes – the use of safety devices increases when it is compulsory
- People may be unwilling to use safety device because of:
    - cost
    - lack of enforcement
    - lack of awareness and knowledge
    - appraisal of low susceptibility/feeling of invulnerability

- discomfort
- esthetics / appearance
- peer views
- reduced sight (goggles), infringement in the ability to play

and ***debate*** over:

- Should protective goggles be worn in all contact sports?
  - only in subjects with reduced sight or one-eyed persons
  - in racket sports, sports, in which a bat or stick, or a large ball is used, in boxing, karate, swimming and skiing (due to UV-light).
- Should the use of head protective device be proposed to more sports than those that already require such a protection?
  - inline skating, short track speed skating, goal keepers in field hockey, baseball, soccer, combat sports (boxing, karate, wrestling)
- Sometimes the use of protective devices may also lead to unexpected consequences. For example skiers wearing helmets may ski harder, closer to their limit and in worse conditions

Nutrition

There was **consensus** over:

- Pre-Competition Nutrition:
  - the nutritional intake before an activity can affect an athlete's performance
  - avoidance of high protein or high fat foods on the day of the event in order to avoid stress to kidneys and long digest time. Foods that are easily digestible are more appropriate.
  - meals high in carbohydrates are preferable
  - solid foods should be eaten 3-4 hours before an event, and liquids should be taken 2-3 hours before
  - avoid carbohydrates/drinks within one hour of an event.
  - fluids should be taken on a regular basis
- During/Post Competition Nutrition
  - Due to lost of body fluids in the form of sweat, water or sports drinks should be taken at least every 10-20 minutes

Stretching

There was ***debate*** over:

- Stretching before exercising reduces the risk of injury in sports events, as far as tearing of muscles, ligaments, tendons and joints injuries are concerned
- Stretching does not seem to have any positive effect on individual injury risk
- It is plausible that stretching has a positive effect on preventing cumulative (overuse) injuries

Warming up, Cooling down

There was **consensus** over:

- Warming up and cooling down can help to prevent injuries
- All warming up and cooling down exercises should be sport specific
- Cooling-down has a positive effect on preventing micro-trauma in the muscles. Also helps athletes to experience less muscle pain

Basketball

There was **consensus** over:

- Appropriate footwear to minimize the risk of ankle injury
- Posts and tableaus should be padded for children players
- Semi rigid orthoses or air-cast braces when recovering from recent ankle injury
- Ankle disk training; ankle taping/bracing
- Preventive finger taping on non-dominant hand
- Protective glasses should be worn
- Training in pivoting should be included in training program
- Education, and improving the technical aspect
- Modifications of game rules; the safety of the athletes should be the first consideration
- The calendar for sports events should be less demanding for elite athletes
- Attention to the court's condition before playing. Outdoor courts should be without holes, rocks, and other hazards. Boundary lines should not be close to walls or fences

and ***debate*** over:

- Should mouth guards be worn?
    - yes both for children and adults
    - only for adults because of the anatomical -functional characteristics of the airways in children
    - no, more aggressive behavior if they know the players have mouth guards, and it is harder to breathe

Football

There was **consensus** over:

- Shin guards should be worn always (training and competition)
- Ankle taping and ankle disk training can prevent ankle injuries
- Advanced footwear (semi rigid orthoses or air-cast braces when recovering from the recent ankle injury)
- Goal posts should be padded only for children playing football
- Better care of playing fields is needed for prevention injuries
- Regulations as to the surface surrounding the playing field
- Teaching of game rules, correct technique, typical injury situations and how to act
- Specific rule changes in football are necessary for reducing the injury risk

and ***debate*** over:

- Knee braces have shown a minor decrease in the rate of knee ligament injuries in athletes with earlier knee injuries, but not in overall injury rates or severity of the sustained injuries
- The use of mouth guards in football is debated, though the majority doesn't agree.

Volleyball

There was **consensus** over:

- Elbow pads protect from injuries during falls
- Proper training on falling techniques
- Finger taping (for blocking)
- Protective ankle braces
- Important is technique training/positioning

Gymnastics

There was **consensus** over:

- Anti-slip socks, equipment, proper fixed/anchored
- Taping ankles
- Leather straps for the hands, to prevent calluses
- Teaching of correct technique, typical injury situations and how to act
- Good follow-up of general condition (nutrition, etc)
- Strength training of relevant muscles

Ice hockey

There was **consensus** over:

- A full-face mask is recommended for everyone, as the half face-visors can increase the risk of dental injuries
- Aggressive behavior can be faced with game rules modifications and strict officiating:

Boxing

There was **consensus** over:

- Even though the efficacy in injury prevention is debated the use of prophylactic helmets, unlimited lengths of hand bandage, and heavier gloves should be proposed.
- In order to prevent ocular injuries these measures could be taken: exclude head blows, protective glasses/shields, protective helmet
- Boxing is not appropriate for children; after the age of 18, as an adult, everyone can decide to start with this activity after being correctly informed about the risks

and ***debate*** over:

- Regulations should be made so that only technical strikes are allowed
- Regulation at the level of athletic organizations should be adopted
- Educational programs aiming to inform the parents, teachers, trainers about the danger posed to the health of athletes practicing in this sport.

5.3 Doping survey

The use of performance enhancing substances in sports has been linked to serious adverse health effects. Among professional athletes there are strict anti-doping regulations, although the problem persists (World Anti-doping Agency, 2002). Comparatively less information exists about doping among amateur athletes, but recent studies indicate that the use of performance enhancing substances is not uncommon and may be increasing. Most of these studies were conducted in North America and northern Europe and the majority of them focused on high school students. The converging evidence from these studies is that the prevalence of ever use of performance enhances substances is not negligible, occasionally coming up to 15%. Moreover, several studies suggest that doping is frequently part of a broader constellation of personality characteristics that include high risk behaviors and substance abuse.

This investigation has some unusual features, including its international nature, the use of a standardized common protocol and the coverage of countries in most of which doping among amateur athletes has not been previously investigated. The results indicate that doping among tertiary education students is endemic, though not hyper-endemic, without striking variation among the participating countries. Men are more likely than women to make use of performance enhancing substances as shown in most previous studies. Body mass index is positively associated with doping admission, although the data do not allow an inference as to whether doping increases BMI or those with higher BMI are more inclined to use performance enhancing substances. Frequency of excess drinking of alcoholic beverages, coffee drinking and, to a lesser extent, tobacco smoking are all positively associated with doping. These findings are compatible with those reported from several other populations and adjacent age groups, although the strengths of the respective associations may vary. There are also highly significant positive associations of doping with use of supplements and with having a peer who uses doping. Indeed, the latter two factors interact in a super-additive way. On the positive side, being a student of a bio-medically oriented school reduces the likelihood of doping, which suggests that increased familiarization with the health risks of doping, does reduce the likelihood of this risk behavior.

It has been suggested that performance enhancing substances may represent a gate leading to a more general substance abuse but our data, as well as those of other investigators, suggest that dietary supplement use may direct young people towards an ethos of chemically conditioned physical performance and well-being.

Dietary supplement industry is frequently unregulated; as a consequence, an abundance of supplement products of dubious value, content, and quality are now available around the world. Many supplement products contain substances that are prohibited in sports e.g. ephedrine.

Although the participation rate in this investigation was very high, it is still possible that the small proportion of non participants included a high fraction of individuals who use doping. This would lead to an underestimation of the true prevalence of doping in the study population. Indeed, when referring to their peers, usually the closest friend, the study participants reported a very high frequency of doping. However, prevalence of ever doping should not be acquainted with regular doping. Experimentation is a characteristic of youth and many of those who have tried doping may have decided that it is not worth the risk.

The temptation of using drugs and supplements as shortcuts to improving athletic performance or even to enhance appearance is very seductive to young people, who are eager for quick results and have little concern for long-term consequences. The results of this study indicate that doping in the general population of young adults is not uncommon in any of the participating countries. In fact, given the relative size of the physically active individuals in the population at large and the number of professional athletes, doping in the general population may be, in absolute terms, as sizeable a problem as it is among the professional athletes. Moreover, there was evidence that supplement use increases the risk of doping and some hopeful indication that knowledge of the health risks of doping may reduce its prevalence, as has also been reported by other investigators. However, historically, future health risks have never completely discouraged the risk taking behavior of the young. The battle against doping should be launched at several levels with emphasis on health issues as well as on sporting principles and on the need of personal freedom from chemical conditioning.

5.4 Inventory of Sports Injuries experts – Internet forum

In the internet forum experts can easily exchange opinions on several issues on sports injuries prevention, by using the advanced automated interface of the forum. The forum structure itself can be reorganized according to experts' proposals in order to become more convenient and useful.

The internet forum as it is designed offers the means to an advanced electronic network of experts working on the same ground. The contents of the forum have to be added by the experts themselves. The forum is just the tool. It is a challenge to see if it will turn out to be a vital part of the injury prevention society contributing to the better communication of the experts and to future collaborative research.

6. Conclusions and Recommendations

The beneficial aspect of sports for health can now no longer be seriously questioned. On the other hand the burden of sports injuries both in economic and social terms demands that this type of injury be controlled and or reduced. With the recognition of the benefic role that sports play in personal and social life, the exposure to sports activities is likely to increase. In this perspective, the prevention and control of sports injuries is essential.

The knowledge of risk factors related to sports injuries, situations and conditions increasing the risk for injuries is essential for choosing the intervention targets.

Regarding doping issue, it is important for the Public Health professionals to collect information regarding a) the prevalence of use, b) reasons for taking these substances and c) attitudes, knowledge, and/or beliefs of this certain age group of individuals. Data retrieved from the doping study can provide health departments, public health officials, and policymakers with the necessary information, before the implementation of preventive measures.

This project as entitled, brings into light the fragmented but diverse EU experience regarding sports injury prevention. Working to this project was a unique opportunity for experts in this field to join forces, exchange experiences and produce policy recommendations for injury prevention and control in the European Union. Specifically the EU added value from the creation of an expert's network is: be: a) network can be the basic resource to identify experts in this field, b) strengthening the communication among prestigious experts in sports injuries prevention, c) collaboration in the development of sports injury prevention Research Agenda(s), and d) avoidance of duplication of work in the field of sports injuries prevention.

The results and findings of this project, presented in the printed and electronic newsletters are available and can be used by any interested party, including Dr. Kostas Parisis, Director of Health Services of Organization Committee of Olympic Games of Athens 2004 SA and international Injury Prevention Bodies or Organizations.

The knowledge derived will help develop policies at the EU level and design more effective injury prevention strategies, programs and activities in the future that will help reduce the burden of sports injuries both is social and economic terms.

7. Appendices

A. Tables for “Free text” analyses

B. Free text description: Training package for interviewers

C. The participating experts in the sports injuries prevention survey

D. Questionnaire for the sports injuries prevention survey

E. Newsletter for Sports Injuries Prevention

F. Questionnaire for doping survey

G. Tables for Doping analyses

H. Scientific publications and presentations

I. References

Appendix A – Tables for “Free text” analyses

Table A: Coding description

	Product related		Explanation of coding
	Product causality unlikely		
1		1.No product involved	In this category are included cases where no product is involved (i.e. simple fall, overextension)
2		2.No product causality identified	In category 2 are included cases where product is involved but not with causality (i.e. hit by the ball in category 2a)
		a. product involved but not causal	
		b. product involved but not defective	product defective
3		3.Product related due to proximity	In this category are mainly included cases which are ground related or situations where a stationary object was in the arena
		3.1 ground related	
		3.1a appropriate ground	
		3,1b inappropriate ground	Cases which is obvious that the ground was not appropriate for the specific sport (ie cement in basketball).
		3.2 stationary object	Cases such as hit in a stationary object. A hurdle or a bench near the arena or on a wall near the arena or on the basket during basketball).
	Product causality likely		
4		4.Product potentially defective	For instance broken equipment
5		5.Product usage maladapted	Equipment not used properly, not tight right boots of ski or roller skates
6		6.A safety design solution is available	
7		7.Product causality is other, specified	
	Product causality unknown		
8		8.Product identified but description inadequate to enable a judgment	Other that you cannot code it in one of the previous categories
Total			
	Human related		
9		Aggressive behavior	In these cases are included cases where is mentioned that were due to human aggressiveness. (hit, push by a player intentionally)
10		Related to human factors not due to aggressiveness	Cases which are human related but no aggressiveness can be identified.
Total			

Table B. The top five sports where injuries were reported in each country, by age group

	Austria	Denmark	France	Greece	Sweden
Children 5-14 years old	1. Bicycle riding	1. Football	1. Football	1. Basketball	1. Football
	2. Cross-country skiing	2. Handball	2. Basketball	2. Football	2. Snow board
	3. Downhill/alpine skiing	3. Gymnastics	3. Ski	3. Volleyball	3. Gymnastics
	4. Ball games*	4. Horse Riding	4. Judo	4. Athletics	4. Ice hockey
	5. Football	5. Basketball	5. Handball	5. Tennis	5. Handball
Adults 15+years old	1. Bicycle riding	1. Football	1. Football	1. Basketball	1. Football
	2. Cross-country skiing	2. Handball	2. Ski	2. Football	2. Floor ball (indoor bandy)
	3. Downhill/alpine skiing	3. Gymnastics	3. Rugby	3. Volleyball	3. Motor cycling
	4. Ball games*	4. Horse Riding	4. Basketball	4. Athletics	4. Ice hockey
	5. Football	5. Basketball	5. Volleyball	5. Tennis	5. Handball

*Ball games: Handball, Volleyball, Basketball

Table 1a. Distribution of free text analysis in five EU countries on football among children (5-14 years old)

		AUSTRIA Football		DENMARK Football		FRANCE Football		GREECE Football		SWEDEN Football	
Product related		n	%	n	%	n	%	n	%	n	%
Product causality unlikely											
	1.No product involved	**1**	**2.0**	**30**	**26.6**	**60**	**60.0**	**23**	**10.1**	**28**	**24.3**
	2.No product causality identified	**0**	**0.0**	**14**	**12.4**	**19**	**19.0**	**59**	**25.9**	**32**	**27.8**
	product involved but not causal	*0*	*0.0*	*14*	*12.4*	*19*	*19.0*	*59*	*25.9*	*32*	*27.8*
	product involved but not defective	*0*	*0.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.0*
	3.Product related due to proximity	**5**	**10.2**	**27**	**24.0**	**11**	**11.0**	**74**	**32.5**	**45**	**39.1**
	ground related									*39*	*33.9*
	appropriate ground	*5*	*10.2*	*23*	*20.4*	*0*	*0.0*	16	7	*37*	*32.2*
	inappropriate ground		*0.0*	*1*	*0.9*	*6*	*6.0*	46	20.2	*2*	*1.7*
	stationary object		*0.0*	*3*	*2.7*	*5*	*5.0*	12	5.3	*6*	*5.2*
Product causality likely									0		
	4.Product potentially defective	**1**	**2.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0**	**0**	**0.0**
	5.Product usage maladapted	**1**	**2.0**	**1**	**0.9**	**0**	**0.0**	**0**	**0**	**2**	**1.7**
	6.A safety design solution is available	**0**	**0.0**	**1**	**0.9**	**0**	**0.0**	**0**	**0**	**0**	**0.0**
	7.Product causality is other, specified	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**9**	**3.9**	**4**	**3.5**
Product causality unknown											
	8.Product identified but description inadequate to enable a judgment	**0**	**0.0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**3.5**
Sub total		*8*	*16.3*	*73*	*64.6*	*90*	*90.0*	*165*	*72.4*	*115*	*100*
Human related											
	Aggressive behavior	**0**	**0.0**	**31**	**27.4**	**1**	**1.0**	**25**	**11**	**2**	**3.3**
	Related to human factors not due to aggressiveness	**41**	**83.7**	**9**	**8.0**	**9**	**9.0**	**38**	**16.7**	**59**	**96.7**
Sub total		*41*	*83.7*	*40*	*35.6*	*10*	*10.0*	*63*	*27.7*	*61*	*100*
Total		49	100	113	100.0	100	100.0	228	100	150	100

Table 1b. Distribution of free text analysis in five EU countries on football among adults (15+ years old)

		AUSTRIA		DENMARK		FRANCE		GREECE		SWEDEN	
Product related		Football		Football		Football		Football		Football	
Product causality unlikely		n	%	n	%	n	%	n	%	n	%
	1.No product involved	**0**	**0**	**152**	**41.5**	**65**	**65**	**118**	**35.2**	**75**	**41.2**
	2.No product causality identified	**0**	**0**	**24**	**6.6**	**10**	**10**	**24**	**7.2**	**45**	**24.7**
	product involved but not causal	*0*	*0*	*24*	*6.6*	*9*	*9*	*24*	*7.2*	*45*	*24.7*
	product involved but not defective	*0*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0.0*
	3.Product related due to proximity	**39**	**8.0**	**54**	**14.7**	**5**	**5**	**64**	**19.2**	**47**	**25.8**
	ground related										
	appropriate ground	*38*	*7.8*	*48*	*13.1*	*0*	*0*	*30*	*9*	*41*	*22.5*
	inappropriate ground	*1*	*0.2*	*3*	*0.8*	*3*	*3*	*21*	*6.3*	*3*	*1.6*
	stationary object	*0*	*0.0*	*3*	*0.8*	*2*	*2*	*13*	*3.9*	*3*	*1.6*
Product causality likely											
	4.Product potentially defective	**1**	**0.2**	**0**	**0.0**	**0**	**0**	**0**	**0**	**0**	**0.0**
	5.Product usage maladapted	**3**	**0.6**	**3**	**0.8**	**0**	**0**	**0**	**0**	**0**	**0.0**
	6.A safety design solution is available	**0**	**0.0**	**0**	**0.0**	**0**	**0**	**0**	**0**	**0**	**0.0**
	7.Product causality is other, specified	**0**	**0.0**	**0**	**0.0**	**0**	**0**	**1**	**0.3**	**2**	**1.1**
Product causality unknown											
	8.Product identified but description inadequate to enable a judgment	**0**	**0.0**	**0**	**0.0**	**0**	**0**	**2**	**0.6**	**13**	**7.1**
Sub-total		***43***	***8.8***	***233***	***63.6***	**80**	**80**	***209***	***62.4***	**182**	**100.0**
Human related											
	9.Aggressive behavior	**0**	**0.0**	**99**	**27.1**	**2**	**2**	**29**	**8.7**	**3**	**1.9**
	10.Related to human factors not due to aggressiveness	**445**	**91.0**	**34**	**9.3**	**18**	**18**	**97**	**29**	**153**	**98.1**
Sub-total		***445***	***91.0***	***133***	***36.4***	***20***	***20***	***126***	***37.6***	**156**	***100***
Total		**488**	**100.0**	**366**	**100.0**	**100**	**100**	**335**	**100**	**300**	**100**

Table 2a. Distribution of free text analysis in Austria and France on skiing among children (5-14 years old)

		AUSTRIA		FRANCE	
		Skiing		Skiing	
Product related		**n**	**%**	**n**	**%**
Product causality unlikely					
1	**1.No product involved**	**57**	**71.25**	**72**	**72**
2	**2.No product causality identified**	**0**	**0**	**0**	**0**
	product involved but not causal		*0*	*0*	*0*
	product involved but not defective		*0*	*12*	*12*
3	**3.Product related due to proximity**	**14**	**17.5**	**13**	**13**
	ground related				
	appropriate ground	*14*	*17.5*	*0*	*0*
	inappropriate ground	*0*	*0*	*4*	*4*
	stationary object	*0*	*0*	*9*	*9*
Product causality likely					
4	**4.Product potentially defective**	**3**	**3.75**	**0**	**0**
5	**5.Product usage maladapted**	**0**	**0**	**0**	**0**
6	**6.A safety design solution is available**	**0**	**0**	**0**	**0**
7	**7.Product causality is other, specified**	**0**	**0**	**0**	**0**
Product causality unknown					
8	**8.Product identified but description inadequate to enable a judgment**	**0**	**0**	**0**	**0**
Sub-total		**74**	**92.5**	**97**	**97**
Human related					
9	**9.Aggressive behavior**	**0**	**0**	**0**	**0**
10	**10.Related to human factors not due to aggressiveness**	**6**	**7.5**	**3**	**3**
Sub-total		**6**	**7.5**	**3**	**3**
Total		**80**	**100**	**100**	**100**

Table 2b. Distribution of free text analysis in Austria and France on skiing among adults (15+ old)

		AUSTRIA		FRANCE	
		Skiing		Skiing	
Product related Product causality unlikely		**n**	**%**	n	%
1	**1.No product involved**	**0**	**0.0**	**73**	**73**
2	**2.No product causality identified**	**2**	**0.7**		**0**
	product involved but not causal		*0.0*	*0*	*0*
	product involved but not defective	*2*	*0.7*	*9*	*9*
3	**3.Product related due to proximity**	**108**	**38.0**	**10**	**10**
	ground related		*0.0*		*0*
	appropriate ground	*108*	*38.0*	*0*	*0*
	inappropriate ground		*0.0*	*4*	*4*
	stationary object	*0*	*0.0*	*6*	*6*
Product causality likely					
4	**4.Product potentially defective**	**8**	**2.8**	**0**	**0**
5	**5.Product usage maladapted**	**3**	**1.1**	**1**	**1**
6	**6.A safety design solution is available**		**0.0**	**0**	**0**
7	**7.Product causality is other, specified**		**0.0**	**0**	**0**
Product causality unknown					
8	**8.Product identified but description inadequate to enable a judgment**		**0.0**		**0**
Sub-total		**123**	**43.3**	**93**	**93**
Human related					
9	**Aggressive behavior**	**0**	**0.0**	**0**	**0**
10	**Related to human factors not due to aggressiveness**	**134**	**47.2**	**0**	**0**
Sub-total		**134**	**47.2**	**7**	**7**
Total		**380**	**133.8**	**100**	**100**

Table 3a. Distribution of free text analysis in Denmark, France and Greece on basketball among children (5-14 years old)

		DENMARK		FRANCE		GREECE	
Product related		**Basketball**		**Basketball**		**Basketball**	
Product causality unlikely		n	%	n	%	n	%
1	**1.No product involved (i.e. overextension, strain, sprains)**	**29**	**42.0**	**60**	**60**	**24**	**7**
2	**2.No product causality identified**	**27**	**39.1**	**35**	**35**	**165**	**47.8**
	product involved but not causal (i.e. ball)	*27*	*39.1*	*32*	*32*	*165*	*47.8*
	product involved but not defective	*0*	*0.0*	*0*	*0*	*0*	*0*
3	**3.Product related due to proximity**	**9**	**13.1**	**3**	**3**	**93**	**27**
	ground related						
	appropriate ground (i.e lawn)	*6*	*8.7*	*0*	*0*	*14*	*4.1*
	inappropriate ground (i.e. cement, asphalt)	*0*	*0.0*	*0*	*0*	*69*	*20*
	stationary object	*3*	*4.4*	*3*	*3*	*10*	*2.9*
Product causality likely							
4	**4.Product potentially defective**	**0**	**0.0**	**0**	**0**	**1**	**0.3**
5	**5.Product usage maladapted**	**0**	**0.0**	**0**	**0**	**0**	**0**
6	**6.A safety design solution is available**	**0**	**0.0**	**0**	**0**	**0**	**0**
7	**7.Product causality is other, specified**	**0**	**0.0**	**0**	**0**	**7**	**2**
Product causality unknown							
8	**8.Product identified but description inadequate to enable a judgment**	**0**	**0.0**	**0**	**0**	**1**	**0.3**
Sub-Total		**65**	**94.2**	**95**	**95**	**291**	**84.3**
Human related							
9	**Aggressive behavior (i.e. pushing)**	**2**	**2.9**	**1**	**1**	**24**	**7**
10	**Related to human factors not due to aggressiveness (i.e. accidental collision)**	**2**	**2.9**	**4**	**4**	**30**	**8.7**
Sub-Total		**4**	**5.8**	**5**	**5**	**54**	**15.4**
Total		**69**	**100.0**	**100**	**100**	**345**	**100**

Table 3b. Distribution of free text analysis in Denmark, France and Greece on basketball among adults (15+ years old)

			DENMARK		FRANCE		GREECE	
	Product related		**Basketball**		**Basketball**		**Basketball**	
	Product causality unlikely		n	%	n	%	n	%
1		**1.No product involved (i.e. overextension, strain, sprains)**	**37**	**56.1**	**58**	**58**	**141**	**28.2**
2		**2.No product causality identified**	**14**	**21.2**	**21**	**21**	**0**	**0**
		product involved but not causal			*21*	*21*	*92*	*18.4*
		product involved but not defective	*14*	*21.2*	*0*	*0*	*0*	*0*
3		**3.Product related due to proximity**	**0**	**0.0**	**4**	**4**	**0**	**0**
		ground related						
		appropriate ground (i.e lawn)	*3*	*4.6*	*0*	*0*	*22*	*4.4*
		inappropriate ground (i.e. cement, asphalt)	*0*	*0.0*	*1*	*1*	*67*	*13.4*
		stationary object	*1*	*1.5*	*3*	*3*	*16*	*3.2*
	Product causality likely							
4		**4.Product potentially defective**	**0**	**0.0**	**0**	**0**	**0**	**0**
5		**5.Product usage maladapted**	**0**	**0.0**	**1**	**1**	**1**	**0.2**
6		**6.A safety design solution is available**	**0**	**0.0**	**0**	**0**	**0**	**0**
7		**7.Product causality is other, specified**	**0**	**0.0**	**0**	**0**	**0**	**0**
8	**Product causality unknown**	**8.Product identified but description inadequate to enable a judgment**	**0**	**0**	**0**	**0**	**19**	**3.8**
Sub-total			**55**	**83.4**	**84**	**84**	**358**	**71.6**
	Human related	**9.Aggressive behavior (i.e. pushing)**	**6**	**9.1**	**0**	**0**	**25**	**5**
		10.Related to human factors not due to aggressiveness (i.e. accidental collision)	**5**	**7.6**	**16**	**16**	**117**	**23.4**
Sub-total			**11**	**16.7**	**16**	**16**	**142**	**28.4**
Total			**66**	**100.0**	**100**	**100**	**500**	**100**

Table 4. Distribution of free text analysis on bicycling among children (5-14 years old) and adults (15+ years old) in Austria.

		Bicycle riding In children		Bicycle riding In adults	
Product related		n	%	**n**	**%**
Product causality unlikely					
1	**No product involved**	**84**	**82.4**	**0**	**0**
2	**No product causality identified**	**0**	**0.0**	**1**	**0.526**
	product involved but not causal		0.0	0	0
	product involved but not defective		0.0	1	0.526
3	**Product related to proximity**	**10**	**9.8**	**47**	**24.74**
	ground related	*0*	*0.0*		*0*
	appropriate ground	*10*	*9.8*	*47*	*24.74*
	stationary object	*0*	*0.0*		*0*
Product causality likely			0.0		0
4	**Product potentially defective**	**3**	**2.9**	**19**	**10**
5	**Product usage maladapted**	**1**	**1.0**	**3**	**1.579**
6	**A safety design solution is available**	**0**	**0.0**	**0**	**0**
7	**Product causality is other, specified**	**0**	**0.0**	**0**	**0**
Product causality unknown					
8	**Product identified but description inadequate to enable a judgment**	**0**	**0.0**	**0**	**0**
Sub-total		**98**	96.1	**71**	37.37
Human related					
9	**Aggressive behavior**	**0**	**0.0**	**0**	**0**
10	**Human factors not due to aggressiveness**	**3**	**2.9**	**106**	**55.79**
Sub-total		**3**	2.9	**106**	55.79
Total		**102**	100	**190**	100

Table 5. Distribution of free text analysis in horse riding among children (5-14 years old) and adults (15+ years old) in Denmark

			Horse Riding In Children		Horse Riding In Adults	
	Product causality unlikely		n	%	n	%
	1	**1.No product involved (i.e. overextension, strain, sprains)**	**3**	**4.6**	**5**	**6.0**
	2	**2.No product causality identified**	**15**	**22.9**	**36**	**42.9**
		product involved but not causal (i.e. ball)	*5*	*7.7*	*10*	*11.9*
		product involved but not defective	*10*	*15.2*		
	3	**3.Product related due to proximity**	**40**	**61.5**	**26**	**31.0**
		ground related				
		appropriate ground (i.e lawn)	*37*	*56.9*	*37*	*44.1*
		inappropriate ground (i.e. cement, asphalt)	*0*	*0.0*	*0*	*0.0*
		stationary object	*3*	*4.6*	*2*	*2.4*
	Product causality likely					
	4	**4.Product potentially defective**	**3**	**4.6**	0	0
	5	**5.Product usage maladapted**	**0**	**0.0**	**0**	**0.0**
	6	**6.A safety design solution is available**	**0**	**0.0**	**0**	**0.0**
	7	**7.Product causality is other, specified**	**0**	**0.0**	**0**	**0.0**
	Product causality unknown					
	8	**8.Product identified but description inadequate to enable a judgment**	**4**	**6.1**	**4**	**4.8**
Sub-total			**65**	**100.0**	84	100.0
	Human related					
	9	**9.Aggressive behavior (i.e. pushing)**	**0**	**0.0**	**0**	**0.0**
	10	**10.Related to human factors not due to aggressiveness (i.e. accidental collision)**	**0**	**0.0**	**0**	**0.0**
Sub-total			**0**	**0**	**0**	**0**
Total	**Total**		**65**	**100.0**	**84**	**100.0**

Table 6. Distribution of free text analysis in judo among children (5-14 years old) and rugby among adults (15+ years old) in France

	Product related		Judo in Children		Rugby in Adults	
	Product causality unlikely		n	%	n	%
1		**1.No product involved**	**77**	**77**	**52**	**52**
2		**2.No product causality identified**				**0**
		product involved but not causal	0	0	1	1
		product involved but not defective	0	0	0	0
3		**3.Product related due to proximity**	**0**	**0**	**1**	**1**
		ground related				0
		appropriate ground	0	0	0	0
		inappropriate ground	0	0	0	0
		stationary object	0	0	1	1
	Product causality likely					0
4		**4.Product potentially defective**	**6**	**6**	**0**	**0**
5		**5.Product usage maladapted**	**0**	**0**	**0**	**0**
6		**6.A safety design solution is available**	**0**	**0**	**0**	**0**
7		**7.Product causality is other, specified**	**0**	**0**	**0**	**0**
	Product causality unknown					0
8		**8.Product identified but description inadequate to enable a judgment**	**0**	**0**	**0**	**0**
Sub-Total			**83**	**83**	**54**	**54**
	Human related					0
9		**Aggressive behavior**	**1**	**1**	**3**	**3**
10		**Related to human factors not due to aggressiveness**	**16**	**16**	**43**	**43**
Sub-Total			**17**	**17**	**46**	**46**
Total			100	100	100	100

Table 7. Distribution of free text analysis on athletics among children (5-14 years old) and adults (15+ years old) in Greece

	Product related		Athletics -children		Athletics -adults	
			n	%	n	%
	Product causality unlikely					
1		**1.No product involved (i.e. overextension, strain, sprains)**	**54**	**26.6**	**5**	**25**
2		**2.No product causality identified**	**0**	**0.0**	**0**	**0**
		product involved but not causal (i.e. ball)	11	5.4	1	**5**
		product involved but not defective	0	0.0	0	**0**
3		**3.Product related due to proximity**	**100**	**49.3**	**13**	**65**
		ground related				**0**
		appropriate ground (i.e lawn)	19	9.4	4	**20**
		inappropriate ground (i.e. cement, asphalt)	64	31.5	6	**30**
		stationary object	17	8.4	3	**15**
	Product causality likely					**0**
4		**4.Product potentially defective**	**0**	**0.0**	**0**	**0**
5		**5.Product usage maladapted**	**1**	**0.5**	**0**	**0**
6		**6.A safety design solution is available**	**0**	**0.0**	**0**	**0**
7		**7.Product causality is other, specified**	**0**	**0.0**	**0**	**0**
	Product causality unknown					**0**
8		**8.Product identified but description inadequate to enable a judgment**	**7**	**3.4**	**2**	**10**
Sub-total			**162**	**79.8**	**20**	**100**
	Human related		**0**	**0.0**		
9		**Aggressive behavior (i.e. pushing)**	**27**	**13.3**	**0**	**0**
10		**Related to human factors not due to aggressiveness (i.e. accidental collision)**	**14**	**6.9**	**0**	**0**
Sub-total			**41**	**20.2**	**0**	**0**
Total			**203**	**100**	**20**	**100**

Table 8. Distribution of free text analysis on ice hockey among children (5-14 years old) and adults (15+ years old) in Sweden

		Ice hockey children (N=107, n=107)		Ice hockey adults (N=269, n=100)	
Product related					
Product causality unlikely		n	%	n	%
1	**1. No product involved**	**7**	**7.7**	**7**	**8.4**
2	**2. No product causality identified**	**26**	**28.6**	**38**	**45.8**
	2A. Product involved but not causal	*26*	*28.6*	*38*	*45.8*
	2B. Product involved but not defective	*0*	*0.0*	*0*	*0.0*
3	**3. Product related due to proximity**	**48**	**52.7**	**34**	**41.0**
	3.1. Ground related	*16*	*17.6*	*11*	*13.3*
	3.1.A. Appropriate ground	*15*	*16.5*	*11*	*13.3*
	3.1.B. Inappropriate ground	*1*	*1.1*	*0*	*0.0*
	3.2. Stationary object	*32*	*35.2*	*23*	*27.7*
Product causality likely					
4	**4. Product potentially defective**	**0**	**0.0**	**1**	**1.2**
5	**5. Product usage maladapted**	**2**	**2.2**	**0**	**0.0**
6	**6. A safety design solution is available**	**0**	**0.0**	**1**	**1.2**
7	**7. Product causality is other, specified**	**6**	**6.6**	**0**	**0.0**
Product causality unknown					
8	**8. Product identified but description inadequate to enable a judgment**	**2**	**2.2**	**2**	**2.4**
Sub-total		91	100.0	83	100.0
Human related					
9	**9. Aggressive behavior**	**1**	**1.7**	**1**	**1.5**
10	**10. Related to human factors not due to aggressiveness**	**58**	**98.3**	**65**	**98.5**
Sub-total		59	100.0	66	100.0
	Only product related	**48**	**44.9**	**34**	**34.0**
	Only human related	**16**	**15.0**	**17**	**17.0**
	Both product and human related	**43**	**40.2**	**49**	**49.0**
Total		**107**	**100.0**	**100**	**100.0**

Appendix B - Free text description: Training package for interviewers

Appendix C - The participating experts in the sports injuries prevention survey

Austria	Martin Jorde	Sports Trainer	Questionnaire administered personally (15/2/02
	Christian Zoidl	-	Questionnaire administered personally (21/1/02)
Finland	Jari Parkkari	MD, Tampere Research Center of Sports Medicine, President Urho Kaleva Kekkonen (UKK) Institute for Health Promotion Research, Tampere Finland	Jari Parkkari commented the questionnaire (4/4/02) based upon the review article "Is it possible to prevent sports injuries? Review of controlled clinical trials and recommendations for future work" by Parkkari, Kujala, Kannus
	Urho M. Kujala	MD, Unit for Sports and Exercise Medicine, Institute of Clinical Medicine, University of Helsinki, Helsinki, Finland	
	Pekka Kannus	MD, Accident and Trauma Research Center, UKK Institute and Department of Surgery, Tampere University Medical School and University Hospital, Tampere, Finland	
Germany	Heribert Glöser	Represents ARAG Sports insurance where about 80% of the German sports club members and 10% of the German alpine skiers are insured.	Questionnaire administered personally
	Heinz Hundeloh	Head of the Department "Gemeindeunfallversicherungsverband Westfalen-Lipe", Muenster, chief representative of the BUK, the umbrella organisation where all the German pupils and students are insured.	Questionnaire administered personally
	Klaus Wehmeyer	Chief representative of the VBG insurance, where all germen professional sportsmen and -women are insured	Questionnaire administered personally
	Bernd Herbeck	Chief physiotherapist of the German Olympic team. He participated in 5 Olympic games. He also cares for several other German top athletes and team sports players.	Questionnaire administered personally
	Heinz Lohrer	Dr. med, Orthopedic surgeon, chief of the sports medicine institute in Frankfurt nearby the German Sports Federation (DSB) Chief physician of the German gymnastics federation (DTB - Deutscher Turnerbund). In his institute he cares for German top athletes of all kind of sports.	Questionnaire administered personally
	Gert - Peter Bróggemann	Biomechanist, Professor, Dr. Institute for Biomechanics, Deutsche Sporthochschule Köln. Member of the executive council of the international society of biomechanics.	Questionnaire administered personally
	Thomas Henke	Sports scientist and biomechanist. Elaborates together with the ARAG sports insurance preventive measures for all kind of sports. Chair of Sport medicine Ruhr University Bochum	Questionnaire administered personally
Greece	Argyris Mitsou	Associate Professor of Orthopedics, MD	A meeting was held on 17/11/01 in Athens. Assoc. Professor Eleni Petridou and her colleagues facilitated the meeting
	Asterios Deligiannis	Professor of University of Thessaloniki, MD	

	Kostas Parisis	Director of Health Services of Organization Committee of Olympic Games of Athens, 2004 SA, MD, Orthopedic, Doctor of National Basketball Team	
	Kostas Voukalis	MD, Orthopedics	
	George Abatzidis	Professor of Athletic Injuries, MD	
	Peter Safos	Orthopedic of Olympiakos basketball team, MD	
	George Safos	Orthopedic of Olympiakos basketball team, MD	
Israel	Na'ama Constantini	MD, Director, Rubstein Center for Sport Medicine Sciences and Research, Wingate Institute for Physical Education and Sports.	The information was gathered through the self-administrated questionnaires. Information was analyzed and summarized following the format of the original questionnaire
	Gideon Mann	MD, Senior Lecturer, Tel Aviv University	
	Rob Meislin	Orthopedic consultant, Wingate Institute	
	Jack Hakoun	MD, Sports Physician. Director- Toronto Center for Sports Medicine	
	Rachel Dankner	MD, MPH, Researcher, Gertner Institute	
Italy	Alberto G. Marchi	MD Head Pediatric Emergency Department	A meeting was organized at Trieste Burlo Garofolo Institute to discuss the document on prevention of sports injuries. (12/2/02)
	Gianni Messi	MD Pediatric Emergency Department	
	Daniela Di Bello	MD, Orthopedic	
	Francesco Fortunato	MD, Cardiology and Sports Medicine Spec., President Regional C.O.N.I. Sports Medicine Federation, Doctor of Trieste Basketball Team	
	Auro Gombacci	MD, Cardiology and Sports Medicine Spec., Director Regional Centre C.O.N.I. Sports Medicine	
	Giorgio Crocetti	MD, Sports Medicine Specialist, Regional C.O.N.I. Sports Medicine Federation, Doctor of Trieste Football Team.	
	Ingrid Vriend	Consumer Safety Institute, Amsterdam.	Questionnaire commented by Ingrid Vriend, (March, 2002). Based on the research report: Effectiveness of measures to prevent sports injuries (2001).
	Hoofwijk M P.C. den Hertog		

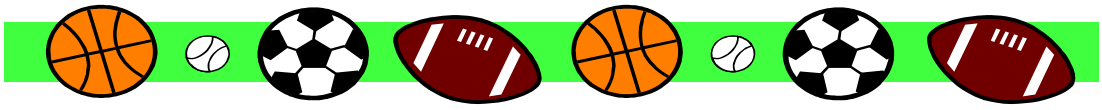
Appendix D - Questionnaire for prevention of sports injuries survey

Development of Recommendations to Prevent Sport Injuries

Sports Injuries in the EU Countries in View of the 2004 Olympics

CE.RE.PR.I

Center for Research and Prevention of Injuries among the Young
Department of Hygiene and Epidemiology
Medical School of Athens University



Development of Recommendations

Introduction

A randomized controlled prospective trial would have been the best method for evaluating the effectiveness of an intervention program, although this approach is difficult within the timeframe of the project. Consequently, a different approach on the evaluation of current prevention strategies, through the collection of opinions and experience that prevention experts could provide was considered. This approach could not be seen as the best available, but it is the most suitable method within the timeframe and the financial budget of the project.

Objective

The opinions of the experts regarding the current issues in prevention of sports injuries are solicited for translating this evidence into recommendations for prevention strategies of sports injuries.

Method

An open-ended survey tool is developed to be sent to those involved in sports injuries prevention and sports medicine experts. The survey will be administered internationally by a group of 10 collaborators.

Prevention experts and practitioners will be asked for their opinion on sports safety Practitioners will be asked for their opinion on improving sports safety and any additional knowledge that would assist in improving safety. The questions are mainly focused on the gray areas between preventive measures of proven effectiveness and those of which there is weak evidence.

Researchers and practitioners in sports safety will be brought together in a roundtable discussion where they could answer the prepared questionnaire. The results will be collated, analyzed and key issues will be identified.

Expected results

The issues raised in the roundtable, the discussion and any conclusions will be recorded. The contribution of the experts is an effort to clarifying the issues in the field and will help in developing recommendations for the prevention of sports injuries.

Instructions

Please read the following suggestion or question and complete them with your comments based on your experience. There is no right or wrong answer. Please be honest in your responses. Space for overall assessment is provided at the end of the form.

Recommendations

Statistics

Sports help children to develop a long life focused on fitness, to learn about teamwork and fair play, and develop self-confidence, but playing a sport also entails the risk of injury. According to European Home and Leisure Accidents Surveillance System, sports injuries represent a considerable problem. Over 40.000 children aged 5-15 years old per year in Netherlands and 200.000 in UK are treated in hospital emergency rooms for sports injuries. The higher frequency of sports injuries is noticed among boys than among girls. As children grow older there is an increasing frequency of sports injuries. Sports injuries are not only common but also of considerable severity since about one third of them, as a crude overall average, are fractures at various parts of the body. As a crude overall average, about 4% of all children injured during sports require hospitalization.

Why Children are at Risk:

There are several issues that distinguish children and adolescents from their adult counterparts, which may predispose young athletes to acute and overuse injuries.

- Children's physiologic response in exercise is different compared to adults.
- Children do not only develop physically but also mentally.
- They express a different pattern of sport behavior and this may predispose these young athletes to increased risk. The participation of children in unsupervised competitive games can create an environment where their need to win; causes them to forget the appropriate technique and develop occasionally aggressive behavior therefore increasing the likelihood of injuries.
- Inappropriate pressure to perform, along with an aggressive training program can be a major cause of overuse injury. Children should not be pressured to win, as above all sports are fun.
- Adolescents often feel invulnerable, they like to experiment and take risks, and shifting from desiring their parental approval to peer acceptance.
- Adolescents, particularly the younger ones, often are unable to envision even remote possibilities of injury.
- It is essential that training programs take into account physical and psychological immaturity of adolescents, so that young athletes can adjust to their own body changes and benefit from sports participation.

Please comment (add, delete or change)

_____
_____
_____
_____

How should we treat them?

_____
_____
_____

At which age should they start sports and at which age to play team sports ?

_____
_____
_____

Prevention of Sports Injuries

Pre-Participation Examination (PPE) issues ***(American Academy of Pediatric Policy Statement on PPE, Appendix 1):***

1. **Health examination prior to sporting activity as a routine medical practice.**
2. **Evaluation of the ability to perform a specific sport.**

Certain medical conditions increase the risk of sports related injuries or affect safety in sports participation. The pre-participation physical examination is a sine qua non as it offers the opportunity to assess the child readiness to compete safely and effectively. **Six to eight weeks** before your child starts sports participation advise your doctor.

When do you think is the most suitable time for PPE?

_____
_____
_____

Who should perform it?

_____
_____
_____

How often should this examination take place?

_____
_____
_____

To whom should we perform it?

_____
_____
_____

Do you believe some specific modifications to the questionnaire comprised in the PPE ***aiming to raise the comfort level of the athlete filling in this form*** **are necessary for the questions regarding:**
sexual activity and health;
smoking;
eating disorders;
personal/family use of alcohol.
other. Please, specify _____
Comments

_____
_____

Re-injury:

After the onset of injury, children should return to participation after an informed examination. Do not return to participation if there is persistent pain, stiffness or weakness suggestive of poor condition, or incomplete recovery. Delay return to strenuous activity, otherwise there is considerable risk of re-injury. Take the advice from your physician before you return to participation.

Comment :

_____
_____
_____

Prevention of overuse injuries should focus on:

- Appropriate training program and conditioning
- Correct use of properly fitted equipment and footwear
- Well kept playing surface

Comment :

_____
_____
_____

Personal Psychology:

Aggressive behaviour has been found to play a role in injury pattern risk and this finding is more obvious in team sports.

Comment :

_____
_____
_____

Climatological Conditions

Although climatological conditions have not been proven to be a risk factor for sports injuries, it is generally admitted that environmental temperature may cause health problems: being either cold or too hot. Beware of the weather condition.

In high ambient temperature and humidity:

- Take care that clothing is white colored, lightweight, and loose fitting new fabrics with SPF exist.
- Fluid breaks should be offered at least every 45 minutes, and entitled to unrestricted amounts of fluids to help prevent dehydration. (Isotonic, no sugar)

Exposure to cold temperature:

- Take care to wear protective clothing to prevent hypothermia and local frostbites.

According to your experience, do climatological conditions increase injury risk?

_____
_____
_____

Sports arenas:

Make sure that sports arenas and playing surfaces are properly maintained to avoid the occurrence of sports injuries. Appropriate padding should be added to prevent injuries from colliding into walls or poles.

Would you suggest any specific modifications on sports arenas in order to be safer?

Comments:

_____
_____
_____

Safety devices:

Make sure that you wear the appropriate equipment for each sport.

- Safety should be your first consideration when purchasing equipment, rather than cost or appearance.
- Make sure that equipment is fitted properly.
- Replace it or repair it immediately if any problems are noted or after expiration date.
- Safety devices should be worn in training as well as during competition.
- Make sure that your children wear the appropriate protective equipment in all practices.
- To reduce risk of eye injury which in higher in sports such as baseball, ice hockey, racket sports, it is recommended to wear goggles with polycarbonate plastic lenses and frames.

Do you believe that safety devices are properly used in your country and in which frequency?

_____
_____
_____

Is there any difference in safety devices use among sports or between levels of competition?

_____
_____

_____

What are some other reasons why people use or don't use safety devices?

_____
_____
_____

Would you recommend safety goggles in all contact sports, for instance basketball?

_____
_____
_____

Head protective equipment is required in many sports such as rugby football, cricket, cycling, climbing, winter sports, bicycling, horse riding, ice hockey, motorcycling. Do you think that helmet use should be proposed in other sports?

_____
_____
_____

Nutrition

Proper hydration and good nutritional practices are also very important for the athletes' health and safety. Young athletes need plenty of fluids before, during and after sports events to stay hydrated (and avoid overheating). Drink adequate amounts of fluids, even if you do not feel thirsty, and it is preferable to drink small amounts of water frequently. A balanced diet with the right combination of carbohydrates, proteins, and fats give enough energy for top performance while playing.

Pre-Competition Nutrition:
The nutritional intake before an activity can affect an athlete's performance

- Avoid high protein or high fat foods on the day of an event to avoid stress to kidneys and long digest time.
- Meals should be high in carbohydrates.
- Solid foods should be eaten 3-4 hours before an event, and liquids should be taken 2-3 hours before.
- Limit foods to easily digestible foods
- Avoid carbohydrates/drinks within one hour of an event.
- Fluids should be taken on a regular basis

During/Post Competition Nutrition:

- Due to lost of body fluids in the form of sweat, water or sports drinks should be taken at least every 10-20 minutes.

Comments:

_____

Stretching

Athletes perform better after a warm up and a good warm-up reduces the risk of injury. *The cooling down exercises* performed at the end of the training, are the opposite of the warm-up exercises, allowing the body to adjust slowly from a strained position to a rest position. *Stretching exercises* also contribute to muscle warm-up and they counteract the adaptive shortening of muscle that occurs with strength training. Stretching before exercise and after strength endurance is recommended as a way of warming-up and cooling down.

The efficacy of stretching exercises in prevention of sports related injuries are controversial. A number of studies evaluated this issue, and their results support the evidence that stretching before exercise does not reduce the overall risk of sports injuries. In spite of this, it remains a widely used technique in sports and physiotherapy.

Do you believe stretching before exercising reduces the risk of injury in sports events, and if yes which specific types of injury?

Warm up – Cool down:

Do you believe that warming up and cooling down can help to prevent injuries? Is it more valuable in some sports than in others?

Basketball injuries

Statistics

Basketball is a contact sport characterized by a high frequency of twisting and cutting movements. While in children most injuries are contusion bruises, and abrasions, 1 of 5 injuries involves fractures. Again 20% of injuries due to basketball reported in the Accident and Emergency departments of European Hospitals are distortions and dislocations. Regarding the location of injuries among children almost half of them are located in the fingers, and 1 in 6 in the ankle joint.

According to your experience, which is the most frequent type of injury occurring during basketball? (Please note the five most frequent in a decreasing order in elite and non-elite athletes.)

Elite	Non-elite

Children	Adults

How could we prevent basketball injuries?
PERSONAL MEASURES

- Choose basketball shoes that fit properly to your feet. Put ankle supports as they can reduce ankle distortions.
- Elbow and kneepads can protect you from bruises and abrasions.
- Mouth guards can protect your teeth and mouth on collisions.

Do you believe that mouth guards should be worn? For children or adults only?

_____
_____
_____

Do you think that appropriate footwear minimize the risk of ankle injury?

_____
_____
_____

ENVIRONMENTAL MEASURES

- Check the court before you start playing. Outdoor courts should be without hole rocks and other hazards. Also the boundary lines should not be close to walls or fences.

Do you think that posts and tableaus should be padded for children players in basketball?

_____
_____
_____

In basketball, it has been noticed that elite athletes have more knee injuries compared to non-elite. Where do you attribute this discrepancy?

_____
_____
_____

Would you suggest any other measures for the prevention of basketball injuries?

_____
_____
_____

Football

Statistics

The vast majority of injuries in football are in males as an expression to the preference of boys in this sport. Most of injuries are contusion bruises and abrasions. However, serious injuries such as fractures, dislocations, and distortions account for almost 40% of all injuries reported in the Accident and Emergency departments. Children are mainly injured in upper extremities.

According to your experience which is the most frequent type of injury occurring during football in elite and non-elite athletes? (Please note the five most frequent in a decreasing order.)

Elite	Non elite

Children	Adults

How could we prevent football injuries?
PERSONAL MEASURES

- Proper footwear play a very important role in preventing sports injuries. Rubber cleats are not usually necessary for children under 10, though they pose little potential harm for them. They are most useful on a soft-field sport such as soccer. Molded shoe rubber cleats are recommended rather than the screw-on variety.
    - Shin guards are the only protective devices that are recommended by the international and collegiate soccer associations. Shin guards are assumed to be most effective in reducing leg abrasion, contusions and fractures.

The use of kneepads or the use of shin guards is assumed to be effective in reducing leg abrasions, contusions and preventing fractures.
Do you think that they should be proposed?

_____
_____
_____

Do you believe that mouth guards should be worn in football? Children or adults only?

_____
_____
_____

Do you think specific rule changes in sports that involve collisions between players are necessary for reducing the injury risk?

_____
_____
_____

Could you list some suggestions aiming to promote "fair-play" games?

_____
_____
_____

ENVIRONMENTAL MEASURES

- Check the playing surface before you start playing for rocks and holes.
- Soccer goal posts should be padded.

Do you think padded goal posts should be recommended only for children playing football (soccer)?

_____
_____
_____

Would you suggest any other measures for the prevention of football injuries?

_____
_____
_____

Gymnastics Injuries

Statistics

Gymnastics is by far the most favorite sport among girls. Due to the type of this sport all body parts seem to be equally susceptible to injury risk. Soft tissue injuries were the most common type of injury. However, dislocation and distortions accounted for proportions that range from 14% to 21%.

According to your experience, which is the most frequent type of injury occurring during Gymnastics. (Please note the five most frequent in a decreasing order.)

Elite	Non-elite

Children	Adults

PERSONAL MEASURES

- A variety of footwear can be worn safely, depending on the activity, the performing surface, and the experience of the gymnast. Options include bare feet, cotton socks, special gymnastic shoes and athletic shoes.
- Spotters should be used during practices, and while performing demanding routines.

ENVIRONMENTAL MEASURES

- Before the start check the equipment for proper maintenance.
- Equipment in the athletic area must be properly arranged and secured, in order to avoid collisions.

Would you suggest other measures for the prevention of gymnastic injuries?

_____

_____

_____

Volleyball injuries

Statistics

According to results of Accident and Emergency departments surveillance system of five European countries, girls are injured more frequently than boys in volleyball, probably due to the fact that girls are keener on playing volleyball compared with to male. Almost half of injuries reported are contusion bruises, and abrasions. One of four injuries in volleyball is dislocations and distortions, while fractures are the third more common type of injury. Concerning the anatomic site of injury, upper extremities account for the majority of injuries, with finger injuries ranking first.

According to your experience, which is the most frequent type of injuries occurring during volleyball? (Please note the five most frequent in a decreasing order.)

Elite	Non-elite

Children	Adults

PERSONAL MEASURES

- Kneepads can protect you form knee injuries during falls.
- Defensive pants, which are padded from hip to knee, can protect you from floor burns and bruises.
- Footwear should be lightweight, provide strong ankle and arch support, and offer good shock absorption.

ENVIRONMENTAL MEASURES

- The playing court should be clear from any obstructions and adequate overhead clearance.
- Any exposed metals used in the volleyball net should be covered with padding.

Would you suggest other measures for the prevention of volleyball injuries?

_____

_____

_____

Boxing

According to your experience, which are the most frequent types of injury occurring during boxing? (Please note the five most frequent in a decreasing order.)

Elite	Non-elite

Children	Adults

PERSONAL MEASURES

- Use of headgear and thumbless, impact-absorbing gloves can prevent injuries upon contact.
- Use of mouth guards can protect your teeth and mouth on collision.

The use of prophylactic helmets, unlimited lengths of hand bandage, and heavier gloves have not been effective in minimizing the occurrence of injuries.
However do you think that it should be proposed?

_____
_____
_____

Ocular injuries are common and account for more hospitalizations than neurologic injuries. What measures can be taken to prevent these injuries?

_____
_____
_____

What is your opinion about boxing? Please indicate all that apply.

- **It is a sport that teaches self-defense, discipline, strength, and agility.**
- **It is a sport that promotes aggressiveness.**
- **It represents a threat to the health of athletes practicing.**
- **It is not a dangerous sport.**

Comment:

_____
_____
_____

If you answered affirmatively to the previous question, which action of the following would you suggest?

1. Legal limitations.

2. Regulation at the level of athletic organizations.

3. Educational programs aiming to inform the parents, teachers, trainers about the danger posed to the health of athletes practicing in this sport.
4. Other _____

Comment:

_____
_____
_____

If a child wanted to start boxing, at which age do you think is appropriate to get into the sport?

_____
_____
_____

Ice Hockey

There is some speculation regarding the association of helmets and full-face shields use with an increased risk of cervical injuries by promoting a more aggressive play or due to biomechanical alterations, which might take place during collisions.

Comments:

_____

_____

_____

Do you believe the interdiction of body checking in ice hockey for children younger than 15 years old is necessary for preventing cervical spine trauma?

_____

_____

_____

Horse Riding

According to your experience, which are the most frequent types of injury occurring during horse riding? (Please note the five most frequent in a decreasing order.)

Elite	**Non-elite**

Children	**Adults**

Doping

According to your experience do you think than doping increase the risk of injury (except the other severe consequences on health)? If yes, please indicate what types of injuries? Please mention in relation with specific substances.

Type of injury	Substance

According to your experience in what extent do you think that the problem of doping exists among elite athletes? (Please provide a crude estimation of the use among the elite athletes as a proportion in the following sports)

Type of sport	% of doping use among **non elite** athletes	% of doping use among **elite** athletes
Weight lifting		
Cycling		
Track and field		
Boxing		
Gymnastic		
Other (specify)		

Appendix E - Newsletter for Sports Injuries Prevention

Appendix F - Questionnaire on doping survey

UNIVERSITY OF ATHENS
SCHOOL OF MEDICINE
DEPT. OF HYGIENE AND EPIDEMIOLOGY

CENTER FOR RESEARCH AND PREVENTION
OF INJURIES AMONG THE YOUNG

CE.RE.PR.I

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All data is confidential and will be used for research purposes only

Year of birth |__|__|__|__|
Education

Mother |__|	Father |__|
1. No education 2. Primary education (<9 years) 3. Secondary education (<12 years) 4. Higher/University education (> 12 years)	1. No education 2. Primary education (<9 years) 3. Secondary education (<12 years) 4. Higher/University education (> 12 years)

Occupation (If are in pension then list the last occupation)
Mother: _____
Father: _____

Gender: 1.Male 2.Female |__| Height: _____cm Weight:_____ kg

1) Do you smoke? |__|

1. No, never
2. Former smoker or abstinence >3 years
3. Yes (smoker) or also abstinence <3 years

2) If you are a smoker, when did you start? |__|__| (Years)
How many cigarettes do you smoke per day? |__|__|

3) Do you drink alcoholic beverages?
1.YES 2.NO |__|
If **YES** do you usually drink: (Fill in the following table)

Type of drink 1° |__|	Quantity of glasses per occasion|__|	How often do you go out socially? |__|
1.Wine, beer (5-15%alcohol) 2. Whisky, cogniac,liquer (>30% alcohol)		1.Daily 2.Very often (3-6 days per week) 3.Often (1-3 days per week) 4.Sometimes 5.Rarely 6.Never

4)Have you ever been drunk? |__|
1.Never
2.Once
3.2-3 times
4.4-10 times
5.>10 times

5) Do you drink coffee?
1.YES 2.NO |__|

If **YES** how many cups of coffee do you drink on average per week? |__|__|

6) Did you exercise at all this year? |__|
1. Daily
2. > than three times a week
3. < than three times a week
4. Rarely-not at all

7) Do you usually exercise? |__|
1.YES 2.NO
If **NO** please turn to question **16**

8) If **YES,** how much does exercising please you |__|
1. Very much
2. Enough
3. Moderately
4. A little
5. Not at all

9) How many hours do you exercise per week? |__|__|

10) In particular, which sports do you practice? Please mention the two dominant
_____
_____

11)Are you a member of a sports club or team?
1.YES 2.NO |__|
If NO**, please turn to question** 16
If **YES,** of which sport? Please mention two if you participate in more than one
_____
_____
How many years have you been a member of the particular sports club? |__|__|

12) Have you participated in any national sports events in Greece? (amateur championship or not i.e. school events or among athletic clubs)?
1.YES 2.NO |__|

13) Have you ever participated in international sports events?
1.YES 2.NO |__|

14) Are you on a specific regimen during the sporting period ?
1.YES 2.NO 3.There is no sporting period |__|

15) Have you ever been required to follow a particular diet exclusively due to the sport you practice?
1.YES 2.NO |_

16) Have you ever taken any of the following food supplements during the past year without a therapeutic purpose or without doctor's prescription?

1.YES 2.NO |__|
If **YES** please fill in the two tables that follow

	If YES note	Who recommended them (Fill in the number) 1.Friend/co-athlete 2. Parents 3.Coach, physical training teacher 4. Physiotherapist 5.Doctor 6. Pharmacist 7.Nutritionist 8.Food supplements salesperson 9. Other 10.None
1. Vitamins	|__|	|__|
2. Iron	|__|	|__|
3. Microelements	|__|	|__|
4. Proteins-Aminoxides	|__|	|__|
5. Calcium	|__|	|__|
6. Creatine	|__|	|__|
7. Caffeine	|__|	|__|

8. Pro-hormone supplements	|__|	|__|
9. Isotonic solutions	|__|	|__|

Which is the reason for taking them, please describe. Do you believe they fulfilled their purpose? Do they harm health?

	Which is the reason for taking them? 1. faintness 2. fatigue 3. diet 4. boosting 5. rehabilitation from ill 6. therapeutic purposes 7. replacement of fluids 8. increase of muscle mass 9. enhancing athletic performance 10. other specify_____	Did they fulfil their purpose?	Do they harm health? 1.They harm health 2.They do not harm health 3.I don't know
1. Vitamins		YES|__| NO|__|	|__|
2. Iron		YES|__| NO|__|	|__|
3. Microelements		YES|__| NO|__|	|__|
4. Proteins-Aminoxides		YES|__| NO|__|	|__|
5. Calcium		YES|__| NO|__|	|__|
6. Creatine			
7. Caffeine			
8. Pro-hormone supplements		YES|__| NO|__|	|__|
9. Isotonic solutions			

17) Have you ever suffered one or more injuries due to sports activity that has kept you away from exercising for more than one day?

1.YES 2.NO \|__\|

If **YES** please fill in the following table with reference to the 2 most recent injuries

Date (year)	It happened during: 1.Training 2 .Sports event 3.Other (i.e. non organized athletic activity)	Describe the type of injury you had and the injured body part	Treatment 1.Medicine 2.Cast 3.Surgery 4. Other	Time of absence from sports participation (days)
	|__|		|__|	
	|__|		|__|	

18) Have you ever intaken any pharmaceutical substances with the intention of increasing your sports performances?

1.YES 2.NO \|__\|

If **YES**, which was the most recent take? (Date)

If **Yes**, please fill in the following table. If **NO** please fill in the last column only: (Do they harm health?)

Substance	Intaken	Reason	Fulfilled their purpose?	Harm health? 1.YES 2.NO 3.DON'T KNOW
Doping	YES|__|NO|__|		YES|__|NO|__|	|__|
Androgenics (testosterone)	YES|__|NO|__|		YES|__|NO|__|	|__|
Diuretics	YES|__|NO|__|		YES|__|NO|__|	|__|
B-blockers	YES|__|NO|__|		YES|__|NO|__|	|__|
Growth hormone	YES|__|NO|__|		YES|__|NO|__|	|__|
Erythropoetine (EPO)	YES|__|NO|__|		YES|__|NO|__|	|__|
Hormones	YES|__|NO|__|		YES|__|NO|__|	|__|
Stimulating substances	YES|__|NO|__|		YES|__|NO|__|	|__|
Unknown substance	YES|__|NO|__|		YES|__|NO|__|	|__|

19) Do you know any friend or co-athlete of yours who has intaken any of the above substances to enhance his/her performance?
1.YES 2.NO |__|
Do you know which of the above substances is most often consumed?
If you know, please mention: _____

20) Do you believe that the particular substances enhance the athletic performance?
1.YES 2.NO 3.DON'T KNOW |__|

21) Do you believe that the particular substances may harm health?
1.YES 2.NO 3.DON'T KNOW |__|

22) Personally speaking, would you use them to enhance your performance?
1.YES 2.NO 3.I DON'T KNOW |__|

23) Would you discourage a friend/co-athlete of yours to use them?
1.YES 2.NO 3.I DON'T KNOW |__|

24) Would you encourage a friend/co-athlete of yours to intake these substances to enhance his/her performance?
1.YES 2.NO 3.I DON'T KNOW |__|

25) Do you believe that the anti-doping control policy held in athletic events is effective in scanning the athletes who intake them?
1.YES 2.NO 3.I DON'T KNOW |__|

26) Do you believe that in major athletic events (European, world championships) prohibited substances are being used by: |__|
1. The majority of athletes
2. Many
3. A few
4. Very few
5. None
6. Don't know

Appendix G - Tables for Doping analyses

Table 1

Distribution of 2650 tertiary education students by country of origin and university department

Country	Number of questionnaires	Department	University
Finland	671	Medical, Technology	University of Tampere
		Sports	University of Jyväskylä
France	219	Sports	University Paris 5
Germany	500	Medical, Sports, Economical	University of Bochum
Greece	592	Medical, Sports, Nutrition	University of Athens
Italy	118	Medical	University of Trieste
Israel	550	Medical, Pharmacy, Dentistry, Medical Sciences	Hebrew University of Jerusalem,
		Sports	The Zinman College of Physical Education and Sport - Wingate Institute. Natanya
Total	2650		

Table 2

Distribution of 2173 tertiary education students by admission of doping and selected sociodemographic variables

Variable	Doping admission		Total	p value from chi square (degrees of freedom)
	N	%	N	
Country of origin				0.10
Finland	25	3.9	650	(5)
France	3	1.4	212	
Germany	16	3.6	449	
Greece	16	4.3	372	
Italy	2	2.8	71	
Israel	6	1.4	419	
Gender				0.001
female	21	1.9	1097	(1)
male	47	4.4	1076	
Age				0.005
< 21	5	2.3	224	(1)
21-22	12	2.1	574	
23-24	17	2.7	628	
25-26	16	3.9	409	
27+	18	5.3	338	
University school				0.02
biomedical	19	2.1	911	(1)
other	49	3.9	1262	
Body Mass Index				0.001
< 19	2	1.7	120	(1)
19-20	7	1.5	457	
21-22	17	2.5	681	
23-24	20	3.6	557	
25-26	14	6.1	230	
27-28	5	6.2	81	
29+	3	6.4	47	

Table 3

Distribution of 2173 tertiary education students by admission of doping and by variables indicating involvement in sport activities

Variable	Doping admission		Total	p value from chi square (degrees of freedom)
	N	%	N	
Sporting activity (hrs/week)				0.035
< 4	13	2.4	535	(1)
4-6	18	2.5	724	
7-10	21	3.7	571	
11+	16	4.7	343	
Participation in major sport event				0.001
no				(1)
yes	47	2.6	1838	
	21	6.3	335	

Table 4

Distribution of 2173 tertiary education students by admission of doping and by major lifestyle characteristics

Variable	Doping admission		Total	p value from chi square (degrees of freedom)
	N	%	N	
Tobacco smoking				0.05
0	49	2.9	1681	(1)
1-9	7	2.4	294	
10-19	8	6.0	134	
20+	4	6.3	64	
Drunkness occasions				0.001
never	8	1.4	559	(1)
rarely (1-3)	15	2.4	637	
frequently (4-10)	16	4.7	340	
often (11+)	29	4.6	637	
Coffee drinking				0.04
no	16	2.1	762	(1)
yes	52	3.7	1411	
Supplement use				0.001
no	16	1.3	1209	(1)
yes	52	5.4	964	
Doping peer				0.001
no	12	0.9	793	(1)
yes	56	7.1	1380	

Table 5

Multiple logistic regression derived adjusted Odds Ratios (OR) together with 95% confidence intervals (95% CIs) for doping by specified variables.

Variable	Category or increment	ORs	95% CIs		p-value
Country of origin					
	Germany	baseline			
	Finland	1.1	0,60	2,19	0.68
	France	0.3	0.09	1.15	0.08
	Greece	1.5	0.72	3.09	0.30
	Italy	1.4	0.29	6.80	0.70
	Israel	0.6	0.21	1.47	0.24
Gender					
	female	baseline			-
	male	1.8	1.01	3.17	0.05
Age					
	1 year	0.9	0.99	1.01	0.64
Body Mass Index					
	2 kg/m^2	1.3	1.05	1.56	0.01
University school					
	biomedical	0.5	0.27	0.88	0.01
	other	baseline			
Alternatively introduced additional variables					
Sporting activity (hrs/week)					
	~ 3 per week	1.1	0.89	1.47	0.31
Participation in major sport event					
	no	baseline			
	yes	2.0	1.16	3.50	0.01
Tobacco smoking					
	~ 7 cigarettes	1.2	0.98	1.48	0.08
Drunkness occasions					
	~ 4	1.4	1.09	1.82	0.01
Coffee drinking					
	no	baseline			
	yes	1.9	1.04	3.32	0.03
Supplement use					
	no	baseline			
	yes	4.1	2.25	7.54	0.0001
Doping peer					
	no	baseline			
	yes	8.3	4.34	15.94	0.0001

Table 6

Doping in relation to dietary supplement use by the individual and peer doping. Independent and interactive effects

	Supplement: No Doping peer: No	Supplement: Yes Doping peer: No	Supplement: No Doping peer: Yes	Supplement: Yes Doping peer: Yes
Dopers	3	9	13	43
Non dopers	846	522	347	390
% of dopers	0.4	1.7	3.6	9.9
Relative risk	1	4.9	10.6	31.1

Appendix H - Scientific publications and congress presentations

Scientific publications

- Belechri M, Petridou E. Sports Injuries in the European Union member states: a "team sport" project. Injury Prev. 2001; 7: 165-167.

- Belechri M, Petridou E, Kedikoglou S, Trichopoulos D, and the Sports Injuries European Union Group.
  Sports injuries among children in six European Union countries.
  Eur J Epidemiol. 2001;17: 1005-12 (Phase I)

- Petridou E, Kedikoglou S, Belechri M, Papadopoulos FC, Trichopoulos D, and the Sports Injuries European Union Group.
  Sports injuries among adults in six European Union Countries.
  *Submitted for publication. (*Phase I)

- Papadopoulos FC, Petridou E, Trichopoulos D, and the Sports Injuries European Union Group.
  Performance enhancing substances among young adults in six developed countries.
  *Submitted for publication. (*Phase II)

Congress presentations

- "Sports injuries among adults in European Union Countries". Belechri M, Bauer R, Gofin R, Henke T, Marchi A, Mulder S. Nectoux M. Dept of Hygiene and Epidemiology, Athens University Medical School, Athens Greece. 6th World Conference for Injury Prevention and Control, Montreal, 2002

- "Sports injuries among children in European Union Countries". ". Petridou E. Belechri M, Bauer R, Gofin R, Henke T, Marchi A, Mulder S. Nectoux M. Dept of Hygiene and Epidemiology, Athens University Medical School, Athens Greece. 6th World Conference for Injury Prevention and Control, Montreal, 2002
  Best poster award in the 6th World Conference for Injury Prevention and Control in Montreal on May 12-15, 2002.

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