

# Incidence of Sport Injury in Contact and Non-Contact Sports

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**Summary.** The loads and impacts our bodies are exposed to during sportive activities may result in various sports injuries. In this context, the purpose of the present study was to define the prevalence, area and type of sport injuries of athletes and to determine the difference between the contact and non-contact sports depending on the certain variables like treatment methods and recovery times. The total of 185 athletes voluntarily participated in the present study. Sport branches of athletes were classified into two groups as contact (81) and non-contact (63) sports. The data were collected using sports injury questionnaire (SIQ) and socio-demographic attributes questionnaire via online Google Forms. Injury type percentages were as follows; 27,08% knee region, 14,58% shoulder and 12,49% ankle respectively. 66,67% of the athletes were reported being away from sports for longer than 4 weeks due to injuries. Following their injuries, 47,2% of athletes returned to sports after resting; 23,6% after surgical operations and 29,2% after rehabilitation treatments. No differences were found between contact and non-contact groups regarding treatment methods and recovery times. The data regarding injury histories and training exposure times could not be presented due to lack of information from sports clubs and trainers. We would like to suggest that health and athletic performance attributes of athletes should be evaluated on a regular basis using sport performance tests, an injury database should be created, and injury prevention measures should be taken into consideration.

**Key words:** Sport injury, incidence, contact sports, non-contact sports

## Introduction

Sport injuries occurs when whole or some part of the body encounters excessive force above tolerable ranges (1). Strains (injuries in musculotendinous tissue), sprains (various levels of injuries in ligaments), dislocations, subluxations (dislocations where joints are completely separated from each other), muscle or tendon ruptures, fractures, hemarthrosis, synovitis, tendinitis, bursitis and overuse syndromes (injuries resulted from repetitive submaximal overload and/

or friction forces on the muscles of tendons) resulting from sport injuries are frequent problems. These problems can occur both as a result of physical activities as a part of our daily and specific-purpose sportive activities (2).

Sport injuries can also be defined as cases preventing participation in sport in the day following the injury.

Minor injuries: injuries that cause athletes to be unable to continue sports for no longer than 7 days.

**Significant injuries:** injuries that cause athletes to be unable to continue sports for 8-21 days.

**Major injuries:** injuries that cause athletes to be unable to continue sports for longer than 21 days or causing permanent damages

A method that should be mentioned when talking about sports injuries is the 'time-loss' method. In this method, while calculating the total time of being away from sports, the time spent by the athlete inactive (as in rehabilitation) is taken into account, regardless of the time they continue to play or train despite the injury. In addition, this method aims to protect the athletes from injuries in the best possible way. Lessons from the previous injuries plays an important role in achieving effective control mechanisms. What needs to be done is to prevent injury by identifying potential risks and causes of injury (3). Data from epidemiological studies on sports injuries are an indispensable requirement for developing injury prevention, treatment and rehabilitation practices (4).

The most commonly used ways of reporting sports injuries in epidemiological studies are: "absolute numbers" of sports injuries (5), proportions of injuries (6) and incidences (per 1000 hours training/competition exposure) of sports injuries (7). Absolute numbers and proportions of sports injuries alone cannot provide information on the prevalence and risk factors. Accordingly, obtaining information on the duration of exposure to training and competition is important for epidemiological studies (8).

A review called "Concepts in Sports Injuries" in Turkey is actually a study that clearly reveals both terminology and methodological applications in sports injuries (3). This review is an important Turkish resource about what sort of standards a study should possess in order to compare the epidemiological studies on sports injuries.

When we look at the literature on sports injuries in our country, it is seen that the classification of injury is made only according to the sports branches (9, 10, 11, 12, 13). While a study classifies injuries as team sports and individual sports (14), another has adopted researching individual factors (15). Studies investigating the factors outside the sport's performance were also found (16). Although sports injuries are generally examined on the basis of sports branches, there are many similar

movements and similar biomechanical elements between branches. In this study, the purpose was to obtain data on the frequency of sports injuries in order to examine the causes of sports injuries from a different perspective by grouping the branches as contact and non-contact sports.

In this context, the purpose of the present study was to determine the frequencies, areas and types of injuries among elite athletes in contact and non-contact sports and to compare the difference between groups depending on the certain variables like treatment methods and recovery times.

## Methods

### *Participants*

The total of 185 athletes from different branches (football and basketball as contact, swimming, rowing, volleyball, squash, tennis and athletics as non-contact sports) voluntarily participated in the present study. Data used from 144 athletes (age  $27,22 \pm 5,889$ , 108 males, 38 female), who experienced sports injuries were utilized for the present study. Participants with no injury were excluded from analysis. Sport branches of athletes were classified as contact (81) and non-contact (62) sports. Opponent or teammate caused injuries in non-contact sports, which occur rarely, are excluded from the scope of the study. The athletes filled in sports injury questionnaire (SIQ) for the injuries they had experienced within the last year and socio-demographic attributes questionnaire online via Google Forms. Google Forms links delivered to athletes via clubs and coaches. Additional information about the injury history of the athletes was requested from their clubs. The classifications related to sports injuries in the questionnaire (region, type, etc.) were prepared by us considering the sports injuries form in the F-MARC Football Medicine Manual (17). Participants who had multiple injuries in the last year were asked to fill the form separately for each injury.

Demographic data part of the questionnaire included questions about gender, age and educational backgrounds of the participants. For the second part, the athletes were asked to answer closed-end questions on whether they had sports injuries in the previous year and the type, area, location, time and reason of

their injuries, also the time they had been away from sports due to those injuries.

### Data Analysis

Research data were collected through questionnaires, and no other techniques were used such as interview or observation. Data were presented as frequencies and descriptive statistics. The Chi Square Test was used to determine whether there was a difference between the contact and non-contact sports in terms of data variables.

### Results

Regarding injury histories or training exposure time of the athletes, sport clubs couldn't provide any data. Of the 185 athletes, 144 (77,8%) were reported having experienced sports injuries within the previous year, while 41 (22,2%) were reported that they hadn't had any sports injuries within the previous year. The participants with no injury history were excluded from distributions and analysis.

### Discussion

The purpose of the present study was to obtain data on incidence of injuries and determine the

difference between the contact and non-contact sports depending on the certain variables like treatment methods and recovery times. 185 athletes (age 27,22 ± 5,89, 108 males,38 female) from different sport branches voluntarily participated in the present study. Sport branches classified as contact and non-contact sports. 144 (77,8%) of the participants were reported that they have experienced sports injuries within the previous year.

In the related literature, there were similar studies to the present study on sport injury rates (18, 19, 20, 21). It was found that 62,5% of sport injuries occurred during training and 37.5% during competitions. In terms of the distributions of the sports injuries by training or competitions, the findings of the present study were in agreement with the findings of the research by Ekstrand et al (22) On the prevalence and types of sports injuries among professional UEFA athletes. Hootman, et al (20), who conducted an epidemiological study on 15 university sport branches and Brooks and Fuller 2006 (4) who conducted a study titled "The Effects of Methodological Problems in Sports Injuries" on the results and explanatory samples reported findings, which are also in agreement with the findings of the present study related to the lower extremity injury rates. They have found more than 50% of all reported injuries were on the lower extremity. Similarly, the most frequently injured area in the present study was found to be the lower extremity (% 60,42).

Atay et al. (23) stated that in the research they conducted in 143 wrestlers in order to determine the regions of sports injuries that occur in wrestlers, the areas where the most injuries were observed in the wrestlers were as follows: knee with 43,4%, wrist with 33,6% ankle and the shoulder with 32,6% (23). In the present study the most injuries observed were on knee with 27,08%, shoulder with 14,58% and ankle with 12,49% respectively in the top three. As we can see that rates are

**Table 1.** The distribution of participants' educational level

Education	N
High school	20
University	88
Master Degree	28
Doctorate	8
Total	144

**Table 2.** The distributions of sport injuries in training and competition

	Contact sports		Non-contact sports		Total	
	N	%	N	%	N	%
Training	39	48,15	51	80,95	90	62,5
Competition	42	51,85	12	19,05	54	37,5
Total	81	100	63	100	144	100

**Table 3.** The distributions of sport injuries according to body regions

Injury region	Contact sports		Non-contact sports		Total	
	N	%	N	%	N	%
Upper Limb	23	28,40	18	28,57	41	28,47
Lower Limb	50	61,73	37	58,73	87	60,42
Head & Neck	7	8,64	7	11,11	14	9,72
Chest & Back	1	1,23	1	1,59	2	1,39
Total	81	100	63	100	144	100

**Table 4.** The distributions of sport injuries according to body parts

	Contact sports		Non-contact sports		Total	
	N	%	N	%	N	%
Mouth -Teeth - Chin	1	1,23	2	3,17	3	2,08
Ankle	12	14,81	6	9,52	18	12,49
Leg	13	16,05	4	6,35	17	11,81
Head & Neck	6	7,41	5	7,94	11	7,64
Wrist	6	7,41	2	3,17	8	5,56
Elbow	2	2,47	2	3,17	4	2,78
Knee	18	22,23	21	33,33	39	27,08
Hand	2	2,47	6	9,52	8	5,56
Hip	5	6,17	3	4,77	8	5,56
Shoulder	13	16,05	8	12,7	21	14,58
Thigh	2	2,47	3	4,77	5	3,47
Waist & Chest & Back	1	1,23	1	1,59	2	1,39
Total	81	100	63	100	144	100

**Table 5.** The distributions of sport injury types

Injury Type	Contact sports		Non-contact sports		Total	
	N	%	N	%	N	%
Sprain	16	19,75	10	15,87	26	18,06
Dislocation	4	4,94	1	1,59	5	3,47
Contusion, Bruise	11	13,58	12	19,05	23	15,97
Muscle or tendon Strain	29	35,81	25	39,68	54	37,51
Laceration/Rupture	1	1,23	0	0	1	0,69
Fracture	7	8,64	7	11,11	14	9,72
Overuse	7	8,64	4	6,35	11	7,64
Tendinitis, bursitis, synovitis	6	7,41	4	6,35	10	6,94
Total	81	100	63	100	144	100

higher from our study and the alignment of the regions are not all similar. It is possible to state that the difference arises from the sample group and there may be changes in the rates due to the absence of martial arts in

our sample group. According to the research by Kerr et al. 2018 (24) on college and high school football players with 10 years of follow-up, injury rates by body parts injured were found the hip/thigh/ leg (upper and lower)

**Table 6.** The distributions of recovery time following sport injury

Recovery time	Contact sports		Non-contact sports		Total	
	N	%	N	%	N	%
Less than a week	17	20,99	17	26,99	34	23,61
1-3 weeks	8	9,88	6	9,52	14	9,72
More than 4 weeks	56	69,13	40	63,49	96	66,67
Total	81	100	63	100	144	100

**Table 7.** The distribution of treatment type for recovery following sport injury

Treatment type	Contact sports		Non-contact sports		Total	
	N	%	N	%	N	%
Surgical operation	24	29,63	10	15,87	34	23,6
Rest	38	46,91	30	47,62	68	47,2
Rehabilitation	19	23,46	23	36,51	42	29,2
Total	81	100	63	100	144	100

**Table 8.** Chi-square test results on treatment methods of contact and non-contact sports

Groups Surgical operation		Treatment Method			Total	X <sup>2</sup>	p
		Rest	Rehabilitation				
Classifications	Contact	24	38	19	81	4,914	,086
	Non-contact	10	30	23	63		
Total		34	68	42	144		

**Table 9.** Chi-square test results on recovery time of contact and non-contact sports

Groups Less than a week		Recovery Time			Total	X <sup>2</sup>	p
		1-3 weeks	More than 4 weeks				
Classifications	Contact	17	8	56	81	,714	,700
	Non-contact	17	6	40	63		
Total		34	14	96	144		

with 23,3%, the knee with 15,3% the shoulder with 12% and the ankle with 11,7% (24). When we regrouped our findings according to Kerr study, we found that the hip/thigh/ leg (upper and lower) placed the second rate with 20,84%. When we analysed only the contact sports in the present study which includes Football and basketball players, the injury rates were found to be, the hip/thigh/ leg (upper and lower) 24,67%, knee with 22,23%, shoulder 16,05% and ankle 14,81% respectively. The present study's findings were similar in terms of percentages. This outcome can be considered as important because we have used a web-based sports injury surveillance like Kerr et al.'s study (24).

In the present study it was found that top four injury type rates were; 37,51% muscle or tendon strains, 18,06% sprains, 15,97% contusion or bruise and 9,72% fractures respectively. In the study of Alp et al. (9) among the young futsal players (age 16,40±1,08), according to the total frequency of injuries, it has found that contusion and bruise has the highest rate with 69,9%, muscle and tendon strains with 53,9% and muscle pain with 28,3% (9). The injury types and rates were not similar to our study. Also, no pain related injuries were reported in our study. It could be resulted from the differing definition of injury in the two studies. In our study (and in most of the literature) sports

injuries were defined as an injury resulting from an organized training or competition, and with the opinion of the relevant health personnel, it results from the athlete's participation in training or competition for one or more days after the day of injury. We could not find the definition or classification of injury in the aforementioned study. Kerr et al. (24) also found the distribution of injuries were as; 26,0% ligament sprains, 25,7% muscle or tendon strains and 9,7% contusions in training respectively. Addition to that, 38,9% ligament sprains, 14,5% contusions and 13,1% muscle or tendon strains were found in competitions. In the present study muscle and tendon strains were the most common of all injury types with percentages of 35,81% in contact and 39,68% in non-contact sports. The second most common injury type in contact sports was sprains in contact sports with 19,75%, and Contusion-Bruise with 19,05% in non-contact sports. Our findings showed similar results in terms of injuries seen in the first row. Since the sample group in Kerr's study was only football players, it is understandable that different rates can be seen.

In present study it was found that 23,61% of the athletes were reported being away from sports for less than a week, 9,72% for 1-3 weeks, 66,67% for longer than 4 weeks due to injuries. Also, for contact and non-contact sports, time loss due to sport injuries were not differs from the total variables. The rates of body dorsal area injuries found in the present study were lower than the rates found in aforementioned studies. No differences were found between the treatment methods of contact and non-contact sport groups according to the chi-square test results. Also, no differences were found between the recovery time of contact and non-contact sport groups according to the chi-square test results. When sports branches are classified as contact and non-contact, it may be natural to expect differences in recovery times and treatment methods. However, despite the use of this classification in our study, the similar distribution of injury types (strain, sprain, contusion, bruise) and injury regions (knee, shoulder, ankle) seems to have affected the similarity of treatment methods and recovery times. In other statistical calculations made between data groups, no results were found that met the evaluation conditions.

The related studies in the literature provided different definitions for sport injuries and also provided different classifications on these definitions (22,21). These differences in the definitions and classifications in the epidemiological studies causes difficulties in comparing between sport injury backgrounds and archives. After injuries, 47,2% of athletes returned to doing sports after rest; 23,6% after surgical operations and 29,2% after rehabilitation treatment. Rest method was the most common recovery method for contact and non-contact sports. Surgical intervention in treatment has taken the second place in contact sports, while rehabilitation was the second in non-contact sports.

When we analyze some of the research conducted in Turkey in recent years, sports injuries defined with "Time Loss" phrase as we did. Variables on the duration of exposure to training and competition were not found in the studies (9, 25). Although the Fysion Blesreg injury incidence scale was used in some other studies, the data related to the training or competition times on the scale were not mentioned (26,27). Since sport clubs were not provided data on injury history or training exposure for the athletes, no background information was obtained in the present study. This could be a justification for the present and aforementioned studies.

## Conclusions

The present study investigated the frequently experienced sport injuries by athletes. Especially the high rates of reoccurrence in muscle or tendon strains and the joint injuries like sprains necessitates improvements in athletic performance qualities, which can decrease the risk of sports injuries. It is a must that sport clubs, trainers or physicians to obtain the data on injury history or training exposure of the athletes. We strongly suggest to do so. Athletes and trainers should be provided with training programs on athletic and other ergogenic practices that may prevent injuries in accordance with the data and findings presented above. In the absence of a database of injury history, it seems that necessary information can be obtained safely with the help of online questionnaires as in our study and Kerr's. The similarity between our study, in

which data was collected by a one-time questionnaire, and a study with a 10-year follow-up period in terms of injury types and regions, is a detail that should be taken into account when it comes to the effectiveness of questionnaires. Our findings nonetheless highlight the continued need to inform future injury prevention strategies to improve athlete safety.

## Practical Applications

We suggest that health and athletic performance attributes of athletes are tested and evaluated with appropriate and modern approaches, an injury history database should be created and injury prevention measures should be taken. Athletic weaknesses can be pre-determined with these methods and injuries can be prevented. It is important for countries to establish “national online injury tracking systems” at the local level, as in one of the previously mentioned study (24). Addition to that, educational programs can be organized for athletes, trainers and sport managers in order to raise awareness on the issue.

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