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BRIEF NOTE

Types of injury from recreational snowboarding versus skiing: Single season-data from a Mountainside clinic in Dolomites

Types de blessures causées par le snowboard et le ski

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KEYWORDS

Snowboarding;
Skiing;
Injury pattern;
Minor trauma

Summary

Objectives. – With this study we aim to compare the patterns of injury of skiers and snowboarders in order to provide useful data on the topic.

Equipment and methods. – This is a retrospective cohort study which analyzed data of patients presented at a mountainside clinic for a ski- or snowboard-related injury between 4th December 2016 and 17th April 2017.

Results. – In total, 1605 patients were screened, of whom 210 were excluded as they did not meet inclusion criteria, leaving 1395 (1099 skiers and 296 snowboarders) patients for analysis. Multiple injuries were recorded in 64 (5.8%) skiers and 13 (4.4%) snowboarders ($P=0.416$). There was a lower rate of female gender ($n=95$, 32.1% vs. $n=575$, 52.3%; $P<0.0001$) among snowboarders which were also significantly younger than skiers (median 25 years, IQR 16-32 vs. 42 IQR 23-52; $P<0.0001$). In 172 (15.7%) of injuries the injured skier did not cause the accident versus in 21 cases (7.1%) among snowboarders ($P=0.0002$). One-hundred and three skiers (9.4%) vs 13 (4.4%) snowboarders needed to be centralized in a hospital facility ($P=0.008$). In 63.8% ($n=189$) of snowboarders vs. 28.8% ($n=317$) of skiers a positive x-ray was found (<0.0001). Two-hundred and thirty two snowboarders (78.4%) vs. 657 (59.8%) skiers were discharged with splint/brace ($P<0.0001$)

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Résumé

Objectifs. – Avec cette étude, nous visons à comparer les schémas de blessures des skieurs et des snowboarders afin de fournir des données utiles sur le sujet.

Équipement et méthodes. – Il s'agit d'une étude de cohorte rétrospective qui a analysé les données des patients présentés dans une clinique de montagne pour une blessure liée au ski ou au snowboard entre le 4 décembre 2016 et le 17 avril 2017.

Résultats. – Au total, 1605 patients ont été dépistés, dont 210 ont été exclus car ils ne répondaient pas aux critères d'inclusion, laissant 1395 patients (1099 skieurs et 296 snowboarders) à analyser. Des blessures multiples ont été enregistrées chez 64 (5,8 %) skieurs et 13 (4,4 %) snowboarders ($p=0,416$). Il y avait un taux plus faible de sexe féminin ($n=95$, 32,1 % vs. $n=575$, 52,3 %; $p<0,0001$) chez les surfeurs des neiges qui étaient aussi significativement plus jeunes que les skieurs (médiane 25 ans, IQR 16-32 vs 42 IQR 23- 52 ; $p<0,0001$). Dans 172 cas (15,7 %) de blessures, le skieur blessé n'a pas provoqué l'accident contre 21 % (7,1 %) chez les snowboarders ($p=0,0002$). Cent trois skieurs (9,4 %) contre 13 (4,4 %) snowboarders devaient être centralisés dans un établissement hospitalier ($p=0,008$). Dans 63,8 % ($n=189$) des snowboarders contre 28,8 % ($n=317$) des skieurs, une radiographie positive a été trouvée ($<0,0001$). Deux cent trente-deux surfeurs (78,4 %) contre 657 (59,8 %) skieurs ont reçu une attelle/attelle ($p<0,0001$)

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1. Introduction

Skiing and snowboarding are the two most common winter sports. Snowboarders and skiers share the slopes and facilities in all Italian alpine resorts. It has been reported that the pattern of injury may differ between the two [1–7]. In particular it has been shown that snowboarders, being aligned sideways along a single board, not carrying poles, having no releasable bindings may be more prone to upper extremities and head injuries while skiers may be at risk of lower extremities trauma [1–3]. Still, only a few old reports have been published on the topic and further data would be required in order to set safety recommendation for snowboarder and skier sharing the same slopes.

With this study we aim to compare the patterns of injury of skiers and snowboarders in order to provide useful data on the topic.

2. Material and methods

This is a retrospective cohort study which analyzed data of patients presented at a mountainside clinic for a ski- or snowboard-related injury between 4th December 2016 and 17th April 2017.

The clinic, which was the only one present at the site during the study period, sees almost all of the patients brought down by the ski patrol, as well as walk-in patients. Patients evaluated 48 hours after injury were excluded from the study.

Variables included demographics (age, sex), type of sport practiced (snowboard vs. ski), type of injury, need for centralization, accident responsibility and X-ray findings (negative vs. positive x-ray). A positive X-ray was defined as the presence at imaging of all those findings which could be directly correlated to the trauma.

2.1. Statistical analysis

Continuous variables were presented as median and interquartile range and they were compared using Mann–Whitney U-test. Categorical variables were presented as number and percentages and compared with χ^2 test or Fisher exact test when appropriate. A P value <0.05 was considered statistically significant.

3. Results

In total, 1605 patients were screened, of whom 210 were excluded as they did not meet inclusion criteria, leaving 1395 (1099 skiers and 296 snowboarders) patients for analysis.

Differences in the considered variables between snowboarders and skiers are shown in Table 1.

Multiple injuries were recorded in 64 (5.8%) skiers and 13 (4.4%) snowboarders ($P=0.416$). There was a lower rate of female gender ($n=95$, 32.1% vs. $n=575$, 52.3%; $P<0.0001$) among snowboarders which were also significantly younger than skiers (median 25 years, IQR 16-32 vs 42 IQR 23-52; $P<0.0001$).

In 172 (15.7%) of injuries the injured skier did not cause the accident versus in 21 cases (7.1%) among snowboarders ($P=0.0002$). One-hundred and three skiers (9.4%) vs. 13 (4.4%) snowboarders needed to be centralized in a hospital facility ($P=0.008$).

In 63.8% ($n=189$) of snowboarders vs. 28.8% ($n=317$) of skiers a positive x-ray was found (<0.0001). Two-hundred and thirty two snowboarders (78.4%) vs. 657 (59.8%) skiers were discharged with splint/brace ($P<0.0001$).

Table 1 Patients' characteristics and injury patterns.

Variable	Ski (n = 1099)	Snowboard (n = 296)	P
Age (years)—median; IQR	42 (23-52)	25 (16–32)	< 0.0001
Sex—female—(%)	575 (52.3)	95 (32.1)	< 0.0001
Injuries			
Head - n - (%)	19 (1.7)	4 (1.3)	0.845
Spinal column - n - (%)	17 (1.5)	5 (1.7)	0.929
Thorax - n - (%)	35 (3.2)	7 (2.4)	0.640
Upper extremities - n - (%)	389 (35.4)	252 (85.1)	< 0.0001
Shoulder	180 (16.4)	77 (26)	0.0002
Arm	35 (3.2)	11 (3.7)	0.786
Elbow	9 (0.8)	17 (5.7)	< 0.0001
Forearm	4 (0.4)	2 (0.7)	0.821
Wrist	58 (5.3)	132 (44.6)	< 0.0001
Hand	103 (9.4)	13 (4.4)	0.008
Hip - n - (%)	42 (3.8)	2 (0.7)	0.010
Lower extremities - n - (%)	661 (60.1)	39 (13.2)	
Thigh	13 (1.2)	1 (0.3)	0.334
Knee	511 (46.5)	21 (7.1)	< 0.0001
Leg	78 (7.1)	8 (2.7)	0.008
Ankle	52 (4.7)	7 (2.4)	0.102
Foot	7 (0.6)	2 (0.7)	0.738
Others' responsibilities	172 (15.7)	21 (7.10)	0.0002
Centralized	103 (9.4)	13 (4.4)	0.008
Discharged with Positive X ray	317 (28.8)	189 (63.8)	< 0.0001

4. Discussion

Types of injury significantly differ between skiers and snowboarders. This has already been shown by a few reports which have been published since the introduction of snowboards in Winter Olympics in 1998 [3–7]. Still most of those studies were at least 20 years old and, thus, reporting data about population in which the rate of snowboarders was significantly lower than that of present days [1,3,6]. Furthermore, at that time, the relative rate of beginners was higher than what is expected in present days in which snowboard is a well-established winter sport.

Upper extremities were more common among snowboarders. This, which is directly connected to the mechanic of the sport, was also reported by others and did not vary in time [4]. Only Wasden et al. [7] did not find any differences in the rate of injuries of the upper extremities between snowboarders and skiers; this might be due to the fact that they analyzed only patients who were treated in the emergency department of a level I trauma centers and, thus, minor accidents, like wrist injury, might have already been filtered by mountainside clinics. Coury et al. [2], analyzing injuries in snowboarders according to skill levels, demonstrated that, wrists were more commonly injured in beginners while shoulders in intermediate and advanced skill levels counterparts.

Previous studies showed rates of wrist injuries in snowboarders to be around 20% of all injuries [1–4]. In our report this rate was more than doubled (44.6%). In our opinion this finding should be interpreted in light of the increased spread of snowboarding in recent years which resulted in a higher

number of beginners per season. For this reason, it might be reasonable to recommend the use of wrist guard at least during the learning curve in order to avoid wrist injury in snowboarders.

As expected, lower extremities injuries were significantly less common among snowboarders, representing 13.2% of cases in the present series. As reported by others [1–3,6], this is due to the different mechanic of snowboarding which “protects” lower extremities from twisting injuries. In our report lower extremities injuries in snowboarders were due to high energy incidents or non-adequate equipment.

Demographics in our cohort is similar to what has already been reported since 30 years ago. Male patients were slightly more common in our series (52 vs. 48%); in addition, they were more frequently centralized than female patients (56% vs. 44%). The higher probability to sustain a major injury in mountain-related activities for male patients was also recently found by Soule et al. [8] in their review of accidentology in mountain sports.

Snowboarders are usually younger than skiers and the rate of female has been stable around 30%. Similar figures have been shown by Polites et al. [9], who presented a recent analysis on a National Trauma Data Bank–based pediatric population of skiers and snowboarders, suggesting that the trend of male/female ratio might remain stable for the next decade. The authors also found a higher rate of head injury in snowboarders than in skiers (26.4% vs. 22.7%, $P=0.13$) while the helmet was used more frequently by skiers (46.4% vs. 34.2%, $P<0.0001$).

Head injury was a rare event in our series. This is due to the fact that head injury were generally centralized. In

addition, it must be highlighted that the use of the helmet is compulsory for children younger than 14 years old in Italian slopes and this can significantly affect the rate of head injury in this sub-population.

This study has a few limitations due to its retrospective nature. First, the analysis did not consider the level of experience among skiers and snowboarders and that could have helped in defining the type of injury per group according to the skill level. Second, no details about safety devices/equipment have been retrieved and we could not analyze the impact of this latter variable on the type of injury.

In conclusion, snowboarding and skiing are associated with different types of injury. In particular, snowboarders which are usually younger and of male gender are more prone to be injured in the upper extremities than skiers which displayed a higher rate of lower extremities injury.

Disclosure of interest

The authors declare that they have no competing interest.

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