



**Best Practices in Prevention of Skiing Accidents in Europe:  
The New Challenge  
(Be.Pra.S.A.)**

**Epidemiological Analysis in some European Countries**

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## **Epidemiological Analysis**

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## 1. AUSTRIA

To identify whether the introduction of carving skis and related equipment has altered the overall injury rate and/or the pattern of injury location a research was lead, comparing case series. In the winter season of 1997-98, when carving skis began to appear on the ski market, all injured skiers requiring evacuation or medical treatment in 70 Austrian ski areas were recorded. Five years later, when most skiers were using carving skis, ski injury data were collected in a representative sample consisting of 5 ski areas from the first study. Data collection on injured skiers included subject demographics, weather and snow conditions, mechanism of the skiing accident, the type of ski used, injury location, and in the second study, additionally the date of the last ski binding adjustment. In 1997-98, 1.43 injuries per 1000 skier days were calculated. Out of 17,914 injured alpine skiers, 29.5% of the injured men and 53.0% of the injured women suffered knee injuries. Five years later with the introduction of carving skis, the overall injury rate decreased by 9% but the gender-specific percentages of knee injuries did not change. Female carving skiers not using newly adjusted bindings had a higher risk of knee injury than those with newly adjusted bindings. The maintenance of adequate binding adjustment is especially important for the prevention of knee injuries in female carving skiers.

## **2. SPAIN**

### Baqueira-Beret Ski Resort

Spanish researchers analysed the data registered daily by a ski patrol on injured skiers and nivo-meteorological conditions for skiing, and cross matched these with data on exposure collected at the bases of the lifts. They calculated the injury rates based on three different measures of exposure: injuries per 1000 skier days, injuries per 1000 lift transported skiers, and injuries per 100 000 km skied downhill. They found a global injury rate of 1.76 injuries per 1000 skier days, 0.145 injuries 1000 lift transported skiers and 0.397 injuries per 100 000 km skied downhill.

There was a general injury rate of 2.51 injuries per 1000 skier days for alpine skiing and 5.29 for snowboarding. When we looked at the type of injury, the most frequent were contusions followed by fractures, which were more common for snowboarders than for alpine skiers. In all types of sport, the lower extremities were the most frequently affected region. Injury patterns were different depending on the sport: for alpine skiing, knee sprains were the most frequent for the lower extremities followed by “skier’s thumb” in the upper extremities, whereas for snowboarding knee and ankle sprains had similar frequencies in the lower extremities while wrist and forearm fractures were predominant in the upper extremities.

### 3. NORWAY

The Norwegian Ski Lift Association has conducted a central registration of the injuries occurring in the major ski resorts to survey the injury types. The injuries occurring on the slopes of 12 major Norwegian ski resorts were recorded by ski patrols for the seasons 2002/2003 and 2003/2004.

In total, 3453 injured alpine skiers and 3016 injured snowboarders were recorded (ratio 1,15:1). Contusion was the most common injury type while fractures decreased from 25% to 20% with increasing age in alpine skiers. Dislocations increased with increasing age for both alpine skiers and snowboarders as did shoulder injuries for alpine skiers. Wrist injuries were more common for teenagers than for the other age groups for snowboarders. Lower leg fracture was only recorded for 4% of injured teenagers and adult skiers, but accounted for 15% of the injuries among alpine skiers aged 12 years and younger. The share of injured skiers requiring physician or hospital treatment increased with increasing age for alpine skiers and snowboarders, being about 57% for children and 65% for adults. Collision as an injury cause was highest for injured child alpine skiers (22%), decreasing to about 15% for adolescent and adult alpine skiers.

#### 4. ITALY – FRANCE – SWITZERLAND

An harmonised collection of data about the total amount of the ski injuries in Europe does not exist.

Italy with the SIMON system represents an innovative goal, concurrent with the presence of the Mediciens de Montagne (France), an epidemiological surveillance system network about Winter Sports in France. An additional source of national data is represented in Switzerland by SUVA, which is an independent public law insurance agency specialised in health at work and work injuries and safety.

The main 3 sources of data are not comparable due to the Italian system, where are almost exclusively included ski injuries on the slopes and the statistic unit is based on the injury. On the other side, the Switzerland data are just based on the insured people, who are just a small part of the skiers totality. In addition, the data from France refer to winter sports, which include also the alpine ski.

From the comparative analysis of data from Italy, France and Switzerland, the pattern of injuries on the ski slopes is sufficiently homogenous about the injuries.

Please refer to the table below:

Lesione	Italy	France	Switzerland
Distortion and Dislocation	42%	37%	46%
Fracture	16%	27%	14%
Bruising	27%	16%	24%
Wound	8%	7%	5%
Other	7%	13%	11%

In addition to the motivations above, the main differences among the collected data are due to the differences among typologies and levels of skiers: in fact, France and Switzerland host a higher number of snowboarder than Italy. This consideration reflects to the injuries number. In fact, in Italy ski injuries and snowboarder injuries have a ratio 4,6:1 (every injured snowboarder - 4.6 injured skiers), in Switzerland and France the data ratio is similar but not homogeneous with the Italian data: 2,7:1 Switzerland and 2,8:1 France. About the recorded presences on the slopes data from Mediciens de Montagne (France) show that in 2006-2007 winter season, the skiers were 6.200.000 and snowboarders were 1.800.000. Therefore the ratio about just the presences on the slopes and not about injuries on the slopes is 3,4:1 in France. On the other side, in Italy the collected data reported 2.500.000 skiers and 500.000 snowboarders: the ratio between skiers number and snowboarders number is 4:1.

Non esistono raccolte di dati relativi alla totalità degli incidenti sciistici in Europa. L'Italia con il sistema SIMON rappresenta una realtà all'avanguardia, alla quale può essere accostata la Médecins de Montagne (Francia), una rete di sorveglianza epidemiologica degli sport invernali in Francia. Un'altra base di dati di carattere nazionale è quella costituita, per la Svizzera, dalla SUVA, un'azienda autonoma di diritto pubblico che assicura contro le ripercussioni degli infortuni e delle malattie professionali.

Va osservato che le 3 basi di dati non sono sovrapponibili perché quella italiana riguarda in maniera pressoché esclusiva gli incidenti sciistici accaduti in pista, ed ha come unità statistica l'incidente, mentre i dati svizzeri si riferiscono ai soli soggetti assicurati, che, quindi, rappresentano una parte dell'universo degli sciatori. I dati francesi, per contro, fanno riferimento agli sport invernali, di cui lo sci alpino rappresenta la parte principale, ma non esclusiva.

Confrontando i dati Italiani con quelli Francesi e quelli Svizzeri, emerge come il pattern degli incidenti sulle piste da sci appare sufficientemente omogeneo per quanto riguarda le lesioni.

Lesione	Italy	France	Switzerland
Distorsione e Lussazione	42%	37%	46%
Frattura	16%	27%	14%
Contusione	27%	16%	24%
Ferite	8%	7%	5%
Altro	7%	13%	11%

Le differenze, oltre alle motivazioni già accennate, sono dovute anche alla diversa composizione dell'utenza: Francia e Svizzera hanno un numero di snowboarder assai superiore rispetto all'Italia e questo si riflette anche nel numero di infortuni: mentre in Italia il rapporto tra incidenti con gli sci e quelli con lo snowboard è 4,6:1 (ovvero per ogni infortunato con lo snowboard ce ne sono 4,6 infortunati con gli sci), in Svizzera e Francia i rapporti sono simili fra loro e distanti dalla realtà italiana: 2,7:1 per la Svizzera e 2,8:1 per la Francia. Relativamente alle presenze effettivamente registrate sulle piste i dati della Médecins de Montagne stimano, per la stagione 2006-2007, in circa 6.200.000 il numero di sciatori mentre il numero di snowboarder stimato è di 1.800.000, il che significa che il rapporto come presenze su pista e non come infortuni è, per la Francia, pari a 3,4:1. Per l'Italia, invece i dati parlano di 2.500.000 di sciatori e 500.000 snowboarder: in questo caso il rapporto tra numero di sciatori e numero di snowboarder è 4:1

