

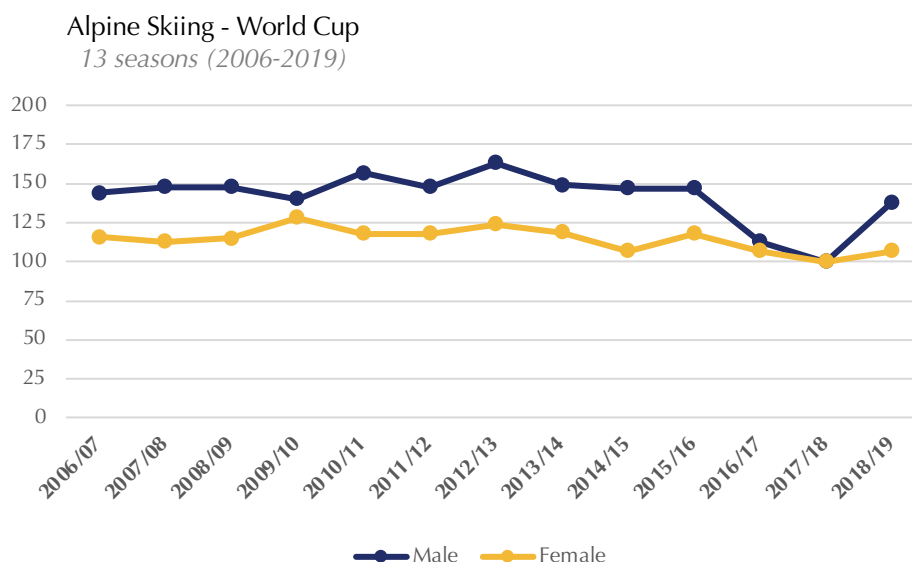
FIS Injury Surveillance System

Alpine Skiing Injury Profile (2006-2019)

World Cup (n = 1,083 injuries)

Key injury pattern: Knee-dominant with a high burden of severe time-loss.

Alpine skiing at the World Cup level is unequivocally defined by **knee** trauma. The knee is the single most injured body part, accounting for **41.3%** of all injuries, and this is not merely a frequency issue but also a **severity** issue. When knee injuries are examined specifically by severity, the picture becomes even clearer: of the 447 knee injuries recorded, 276 (61.7%) resulted in more than 28 days of absence.



Injury Location

The anatomical distribution of alpine World Cup injuries reveals the **lower extremity dominance** characteristic of the sport. Beyond the knee (41.3%), the lower leg and Achilles tendon account for 9.0% of injuries, with hand, finger, and thumb injuries also prominent at 9.7%. Head and face injuries represent 9.4% of the total, while lower back and pelvis injuries contribute 9.2%. Shoulder and clavicle injuries are less common at just 6.1%.

Injury Severity

The full distribution shows:

Body Region	No Absence	1-3 Days	4-7 Days	8-28 Days	> 28 Days*
Head/Face	15.3%	7.1%	13.3%	31.6%	32.7%
Neck/Cervical	25.0%	12.5%	25.0%	12.5%	25.0%
Shoulder/Clavicle	26.6%	9.4%	17.2%	18.8%	28.1%
Upper Arm	14.3%	0.0%	14.3%	28.6%	42.9%
Elbow	0.0%	50.0%	0.0%	16.7%	33.3%
Forearm	20.0%	20.0%	0.0%	0.0%	60.0%
Wrist	25.0%	25.0%	25.0%	16.7%	8.3%
Hand/Finger	42.3%	14.4%	12.5%	23.1%	7.7%
Chest/Ribs	22.2%	11.1%	22.2%	22.2%	22.2%
Abdomen	20.0%	0.0%	0.0%	20.0%	60.0%
Back/Pelvis	13.4%	17.5%	24.7%	28.9%	15.5%
Hip/Groin	13.0%	30.4%	8.7%	21.7%	26.1%
Thigh	17.4%	8.7%	4.3%	43.5%	26.1%
Knee	7.9%	4.1%	7.0%	18.6%	62.4%
Lower Leg/Achilles	13.3%	5.1%	5.1%	24.5%	52.0%
Ankle	9.8%	9.8%	19.5%	34.1%	26.8%
Foot/Toe	0.0%	7.1%	0.0%	50.0%	42.9%
TOTAL	14.8%	8.5%	10.9%	22.9%	41.3%

* >28 days: Severe injury

Nearly **two-thirds of all WC injuries (64.2%) result in more than one week of absence**, and more than four in ten injuries sideline athletes for over a month. Only 14.8% of injuries, fewer than one in six, allow athletes to continue without any time loss.

Regarding the injury severity against body location, among the **448 severe injuries (>28 days), 276 (61.6%) involve the knee**. Lower leg injuries also show high severity: of 97 lower leg injuries, 51 (52.6%) are severe. Two thirds (**64.3%**) of **head and face** injuries involve **more than a week of absence**, ranging from 8 days to over a month. By contrast, hand and finger injuries, while frequent, tend to be less severe; only 8 of 105 (7.6%) result in more than 28 days absence.

Injury Type

The tissue-level breakdown confirms the ligamentous nature of alpine skiing injuries:

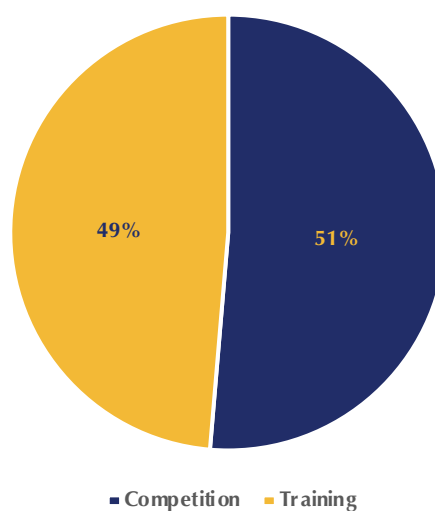
Injury Type	Count	Percentage
Joint/Ligament	510	47.1%
Fracture/Bone Stress	248	22.9%
Muscle/Tendon	118	10.9%
Concussion/Nervous System	89	8.2%
Contusion	67	6.2%
Skin/Laceration	30	2.8%

Joint and ligament injuries account for nearly half of all injuries, with ACL ruptures representing a substantial subset. Across the 13 seasons, **168 total ACL ruptures** were recorded at World Cup level. The **8.2% concussion rate** represents a meaningful head injury burden – 89 concussions over the surveillance period.

Injury Circumstances

Joint and ligament injuries are the largest category at approximately **42% (1,640/3,950)**. Fractures and bone stress injuries follow at **24% (964/3,950)**. Concussions and nervous system injuries account for **11% (440/3,950)**. Muscle and tendon injuries contribute another 11%, with contusions at approximately 9%.

The distribution of injuries across activity contexts provides critical insight for prevention planning.

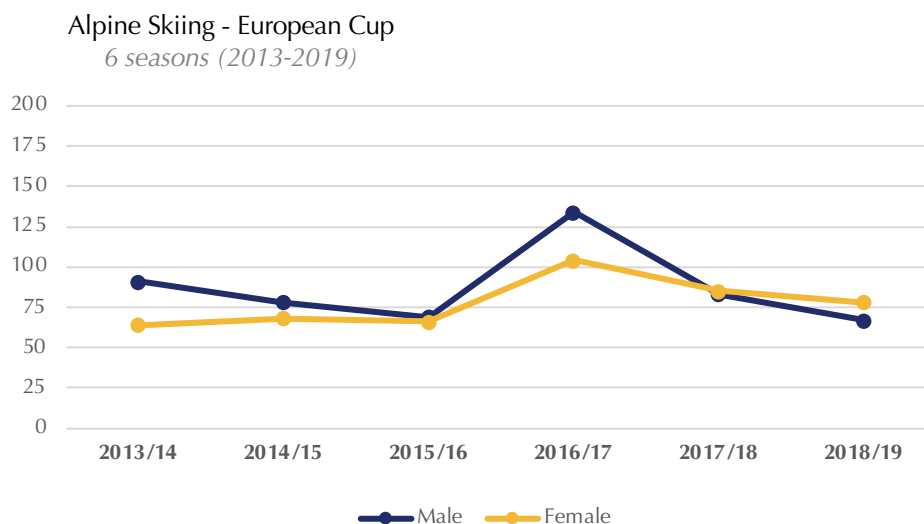


The near-equal split between training (49%) and competition (51%) contexts is notable. While race-day injuries attract the most attention, **training environments generate nearly half of all injuries**. This finding underscores that risk mitigation strategies must be applied as rigorously during training as in race conditions.

Among competition injuries, the speed disciplines carry higher risk per exposure. Downhill consistently produces the highest injury incidence per 1,000 runs across seasons, followed by super-G. Giant slalom and slalom show lower per-run incidence, although the higher number of runs in technical events means they still contribute meaningfully to the absolute injury count.

European Cup (n = 239 injuries; 2013–2019)

Key injury pattern: Mirrors World Cup patterns with an even higher severe injury proportion, validating that injury mechanisms are intrinsic to the sport.



Injury Location

The European Cup anatomical distribution largely parallels the World Cup, with some notable differences:

Body Part	EC Count	EC %	WC % (comparison)
Knee	86	36.0%	41.3%
Hand/finger/thumb	32	13.4%	9.7%
Lower leg/Achilles	23	9.6%	9.0%
Head/face	21	8.8%	9.4%
Lower back/pelvis	20	8.4%	9.2%
Ankle	17	7.1%	3.8%
Shoulder/clavicle	12	5.0%	6.1%

Two differences stand out. First, **hand and finger injuries are notably higher in the European Cup (13.4% vs 9.7%)**. Second, **ankle injuries are nearly twice as common in the EC (7.1% vs 3.8%)**.

Injury Severity

The European Cup cohort reports the **highest proportion of severe injuries among all disciplines:**

Severity Category	EC Count	EC %	WC % (comparison)
No absence	27	11.3%	14.8%
1–3 days	13	5.4%	8.5%
4–7 days	22	9.2%	10.9%
8–28 days	54	22.6%	22.9%
>28 days (severe)	116	48.6%	41.3%

Nearly half (48.5%) of EC injuries result in more than 28 days absence – 7 percentage points higher than the World Cup. Combined with the moderate time-loss categories, **71.1% of EC injuries cause more than one week of absence.**

Body Region	No Absence	1-3 Days	4-7 Days	8-28 Days	> 28 Days*
Head/Face	19.00%	4.80%	23.80%	19.00%	33.30%
Neck/Cervical	0.00%	0.00%	0.00%	0.00%	0.00%
Shoulder/Clavicle	27.30%	18.20%	9.10%	18.20%	27.30%
Upper Arm	0.00%	100.00%	0.00%	0.00%	0.00%
Elbow	0.00%	0.00%	0.00%	50.00%	50.00%
Forearm	0.00%	0.00%	0.00%	100.00%	0.00%
Wrist	28.60%	0.00%	0.00%	28.60%	42.90%
Hand/Finger	43.80%	3.10%	6.30%	37.50%	9.40%
Chest/Ribs	0.00%	100.00%	0.00%	0.00%	0.00%
Abdomen	0.00%	0.00%	100.00%	0.00%	0.00%
Back/Pelvis	10.50%	10.50%	26.30%	31.60%	21.10%
Hip/Groin	0.00%	50.00%	0.00%	0.00%	50.00%
Thigh	0.00%	0.00%	0.00%	66.70%	33.30%
Knee	1.20%	1.20%	4.80%	16.70%	76.20%
Lower Leg/Achilles	0.00%	9.10%	4.50%	18.20%	68.20%
Ankle	0.00%	0.00%	5.90%	29.40%	64.70%
Foot/Toe	20.00%	0.00%	0.00%	20.00%	60.00%
TOTAL	11.3%	5.4%	9.2%	22.6%	48.5%

* >28 days: Severe injury

Of 86 **knee injuries**, 64 (**76.2%**) are severe, an even higher proportion than at World Cup level (62.4%). Similarly, 11 of 17 ankle injuries (64.7%) result in more than 28 days absence.

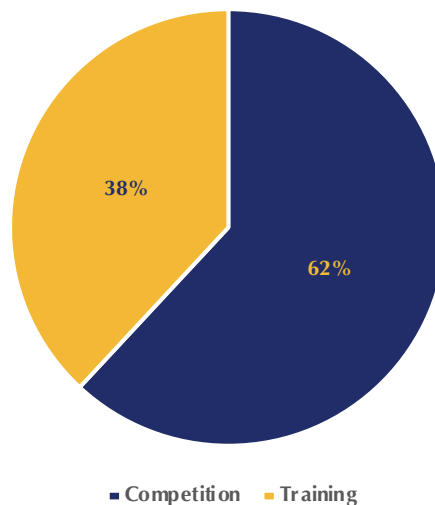
Injury Type

The most striking difference is the **higher fracture rate in the European Cup (31.8% vs 22.9%)**.

Injury Type	EC Count	EC %	WC % (comparison)
Joint/Ligament	107	44.8%	47.1%
Fracture/Bone Stress	76	31.8%	22.9%
Concussion/Nervous System	21	8.8%	8.2%
Muscle/Tendon	22	9.2%	10.9%
Contusion	10	4.2%	6.2%

Injury Circumstances

The EC circumstance distribution differs from World Cup in that FIS-level competitions contribute a larger share (23.9% vs 7.1%). **Training** still accounts for **more than a third of all injuries**, reinforcing that prevention efforts must address both contexts.



Key Takeaways for Prevention Focus

- **Knee and ACL injuries** remain the dominant concern, with **41%** of injuries at this location and **62% of knee injuries** resulting in **severe time loss**.
- The near-equal split between **training and competition** injuries means prevention programmes must **address both contexts equally**.
- The European Cup's elevated severity profile (49% severe vs 41% at World Cup) warrants attention to whether **developmental-level athletes face additional risk factors**.
- Differences in injury body locations between World Cup and European Cup may reflect **differences in equipment, course preparation, or gate-clearing technique** at this competition level.
- The **ankle injury rate** in the European Cup (7.1%) is nearly double the World Cup rate (3.8%), a difference worth taking seriously. **Boot fitting practices and binding release settings** at the developmental level may deserve further investigation.
- Nearly half of all EC injuries (48.6%) result in more than 28 days of absence, compared to 41.3% at World Cup level. The **elevated severity profile** in European Cup may reflect **differences in medical support, course preparation, or athlete experience** at the developmental level.
- The substantial percentage-point difference in **fracture injuries** between European Cup and World Cup may relate to **course characteristics, athlete protective equipment, or the types of crashes** occurring at this level.
- The European Cup **circumstance distribution** also tells a story about how developing athletes spend their time. FIS-level competitions contribute 23.9% of EC injuries compared to just 7.1% at World Cup level. These differences may reflect the **competition calendar of developing athletes** – a busier competition calendar for emerging athletes as they race more frequently in lower-tier events to accumulate the race starts needed to advance. This higher competition frequency, spread across more venues with varying standards, creates a different risk exposure profile than the more concentrated World Cup circuit.