

# KNEE INJURIES IN YOUNG SKI RACERS



Dr ESCODA ALEGRET, Bernat

Centre Mèdic Pas de la Casa - Grau Roig

Grandvalira ski area

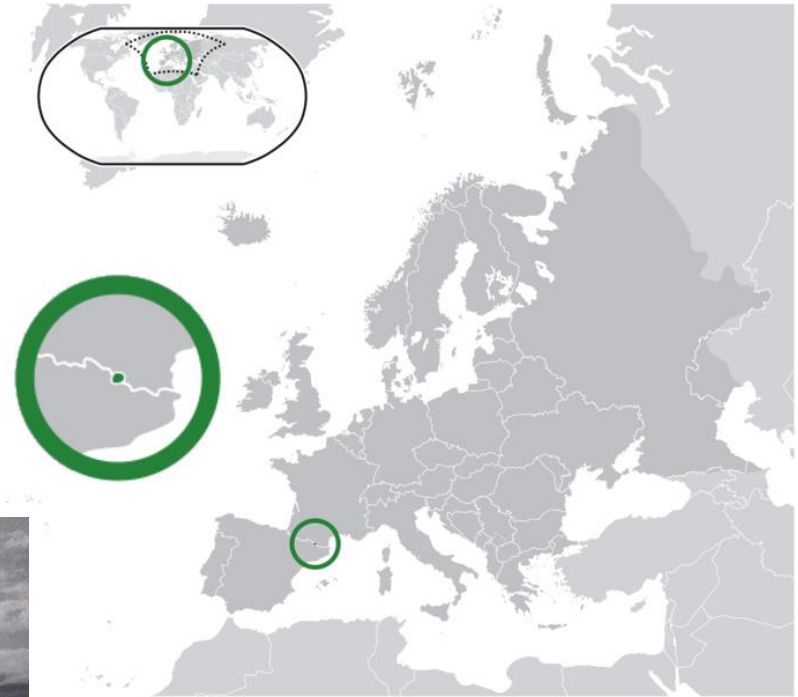
ANDORRA

SITEMSH Congress Teheran December 2015



# INTRODUCTION

Andorra, is a small country with only 468 square km, 40km from border to border, 70000 inhabitants living from low tax commerce, banking, tourism...



Knee Injuries in Young Ski Racers

# INTRODUCTION

One of the main sources of income in Andorra is ski industry with 2000 direct jobs and 10000 indirect jobs.



In the last 10 years andorran ski areas received about 2.8 million users/season

# KNEE INJURIES IN YOUNG SKI RACERS

Epidemiology of knee injuries resulting from ski accidents has been deeply described,  
it is a typical topic in all SITEMSH congresses  
and a quick search on PubMed returns quite a lot of publications

The screenshot shows the PubMed search interface. At the top, there is a navigation bar with 'NCBI Resources' and 'How To' dropdown menus, and user links for 'bemat\_escoda', 'My NCBI', and 'Sign Out'. The main search bar contains the text 'ski knee injuries' and a 'Search' button. Below the search bar, there are links for 'Create RSS', 'Create alert', and 'Advanced'. The search results are displayed in a table-like format. On the left, there are filters for 'Article types' (Clinical Trial, Review, Customize ...) and 'Text availability' (Abstract). The main content area shows 'Search results' with 'Items: 1 to 20 of 174'. There are also options for 'Summary', '20 per page', and 'Sort by Most Recent'. On the right, there are options for 'Send to' and 'Filter your results', which includes 'All (174)' and a highlighted filter 'Published in the last 5 years (44)'. At the bottom, there are navigation controls for 'First', 'Prev', 'Page 1 of 9', 'Next', and 'Last', along with a 'Manage Filters' link.

# KNEE INJURIES IN YOUNG SKI RACERS

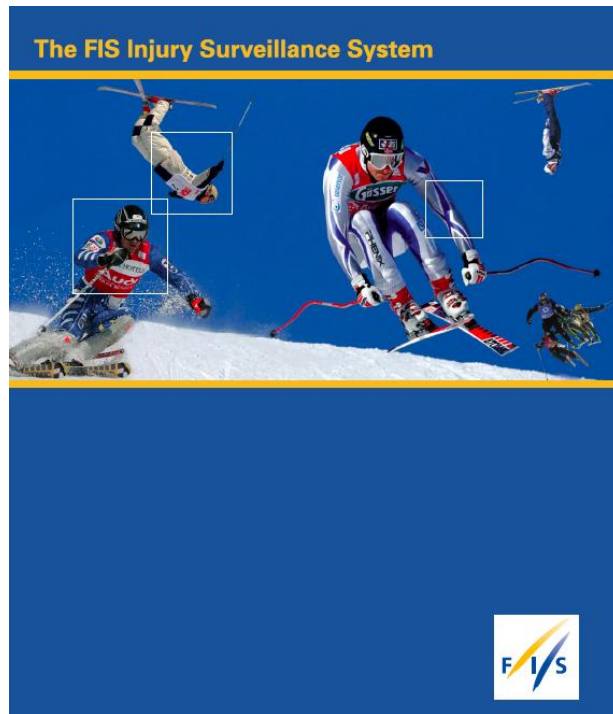
... but the knowledge of knee injuries resulting from racing skiing, is far behind, since some studies appear

The screenshot shows the PubMed search interface. At the top, there is a navigation bar with 'NCBI Resources' and 'How To' menus, and user options for 'bernat\_escoda', 'My NCBI', and 'Sign Out'. Below this is the PubMed logo and the text 'US National Library of Medicine National Institutes of Health'. The search bar contains the query 'ski knee injuries racing' and a 'Search' button. Below the search bar are links for 'Create RSS', 'Create alert', and 'Advanced'. On the left side, there are 'Article types' (Clinical Trial, Review, Customize ...) and 'Text availability' (Abstract) filters. The main content area shows 'Search results' with 'Items: 11'. On the right, there are 'Send to:' and 'Filter your results:' sections. The 'Filter your results:' section shows 'All (11)' selected and 'Published in the last 5 years (7)'. A 'Manage Filters' link is also present.

Knee Injuries in Young Ski Racers

# KNEE INJURIES IN YOUNG SKI RACERS

Since 2006-2007 the International Ski Federation records data on injuries during high level competition and training...



FIS Injury Surveillance System

Video analysis of 4 ACL injuries

2012/13 World Cup season



Oslo Sports Trauma  
RESEARCH CENTER

Knee Injuries in Young Ski Racers

# KNEE INJURIES IN YOUNG SKI RACERS

... but this concerns adult skiers participating in World Cup and recently Europa Cup races

**Injury Surveillance Study - World Cup Teams** Oslo Sports Trauma RESEARCH CENTER

**Injury report / Verletzungsmeldung / Rapport de blessure**

All injuries that occur during team activities should be reported! Alle Verletzungen, die während Mannschaftsaktivitäten auftreten, sollten gemeldet werden/Toutes les blessures qui se produisent pendant les activités d'équipe devraient être rapportées

**Event information/ Informations sur l'événement**  
 Discipline/ Disziplin/ Discipline: \_\_\_\_\_

**Athlete information/ Informations sur l'athlète/Données sur l'athlète**  
 Name/ Name/ Nom: \_\_\_\_\_  
 Country/ Land/ Pays: \_\_\_\_\_ Gender/ Geschlecht/ Sexe:  Male/ Männlich/ Masculin  Female/ Weiblich/ Féminin  
 Birth date (DD.MM.YYYY) / Geburtsdatum/ Date de naissance: \_\_\_\_\_

**Injury information/ Information zur Verletzung/Information sur la blessure**

**Body part injured/ Verletzter Körperteil/Partie du corps blessée**

Head/face/ Kopf/Gesicht/Visage  
 Neck-cervical spine/ Nacken-Halswirbel/Nuque-Vertèbre cervicale  
 Shoulder-clavicle/ Schulter-Schulterblatt/Épaule-Clavicule  
 Upper arm/ Oberarm/ Bras  
 Elbow/ Ellbogen/Coudes  
 Forearm/ Unterarm/Avant-bras  
 Wrist/ Handgelenk/Poignet  
 Hand-finger/thumb/ Hand-Finger-Daumen/Main-Doigt/Pouce  
 Chest (sternum-ribs/corpus/back)/ Brustkorb/Rippen/Rücken/Boîte thoracique/Traie/ Dos (sternum-côtes/Thorax/Vertèbres)  
 Abdomen/ Bauch/Abdomen  
 Lower back-pelvis-hip/ Lendenwirbel-/ Becken-/ Hüft-/Wirbel der Lenden-/Bassin  
 Hip-groin/ Hüfte-/Leiste/Hanche-Aîne  
 Thigh/ Oberschenkel/Cuisse  
 Knee/ Knie/Genou  
 Lower leg-ankles/tendon/ Unterschenkel-Achillessehne/Lambe-tendon/Cuisse  
 Ankle/ Fußgelenk/Cheville  
 Foot-heel/toe/ Fuss-Ferse-/Zehen/Fied./Talon-Œillets  
 information not available/ Information nicht verfügbar/information non disponible

**Right/ Right/ Droite**  
 Left/ Link/ Gauche  
 Not applicable/ Nicht anwendbar/Non applicable

**Specific diagnosis/ Genaue Diagnose/Diagnostic spécifique**  
 \_\_\_\_\_

**Body part injured/ Verletzter Körperteil/Partie du corps blessée**

Fracture and bone stress/ Frakturen und Ermüdungsrisse/ Fractures et fissures de fatigue  
 Joint (non-injury) and ligament/ Gelenke (nicht Knöchel) und Bänder/ligaments (articulation) et ligament  
 Muscle and tendon/ Muskel und Sehne/Muscle et tendon  
 Contusion/ Quetschung/Contusion  
 Laceration and skin lesion/ Risswunden und Hautverletzungen/Ris et lésion de la peau  
 Nervous system including concussion/ Nervensystem (inkl. Gehirnerschütterung)/Système nerveux y compris commotion cérébrale  
 Other/ Anders/Autres  
 information not available/ Information nicht verfügbar/information non disponible

**Expected absence from training and competition/ Voraussichtliche Abwesenheit von Training und Wettkämpfen/Présence à l'entraînement et en compétition**

No absence/ Keine Abwesenheit/d'absence  
 1 to 2 days/ 1 bis 2 Tage/ 1 à 2 jours  
 3 to 4 days/ 3 bis 4 Tage/ 3 à 4 jours  
 5 to 7 days/ 5 bis 7 Tage/ 5 à 7 jours  
 8 to 28 days/ 8 bis 28 Tage/ 8 à 28 jours  
 >28 days/ >28 Tage/ >28 jours  
 information not available/ Information nicht verfügbar/information non disponible

**Date/ Datum/ Date:** \_\_\_\_\_

**Site/ Ort/ Lieu:** \_\_\_\_\_

**Right/ Right/ Droite**  
 Left/ Link/ Gauche  
 Not applicable/ Nicht anwendbar/Non applicable

**Specific diagnosis/ Genaue Diagnose/Diagnostic spécifique**  
 \_\_\_\_\_

Note: If there are multiple injuries resulting from the same accident, please describe the most serious injury above and the less serious injuries here! Anmerkung: Wenn aus dem gleichen Unfall mehrere Verletzungen resultieren, bitte beschreiben Sie die schwersten Verletzungen oben und die weiteren Verletzungen hier unten. Note: Si y a des blessures multiples résultant du même accident, veuillez décrire les blessures les plus sérieuses ci-dessus et les blessures moins sérieuses ci-dessous.

Please complete page 2/ Bitte vervollständigen Sie Seite 2/stop remplir page 2

**Injury circumstances/ Umstände der Verletzung/Circonstances de la blessure:**

Competition/ Wettkampf/Compétition  
 Official FIS training/ Offizieller FIS Training/Entraînement officiel de la FIS  
 Other team activity on snow/ Andere Teamaktivitäten auf Schneeflächen/activités des équipes sur neige  
 Basic training, not on snow (weight lifting, running etc.) / Grundtraining, nicht auf Schnee (Gewichtheben, Laufen, etc.) / Entraînement de base (haltérophie, course, etc.)

**Type of snow/ Schneetyp/Classe de neige:**

Natural snow/ Naturschnee/Neige naturelle  
 Artificial snow/ Kunstschnee/Neige artificielle  
 Plastic/ Plastik/Plastique  
 Not applicable/ Nicht anwendbar/Non applicable

**Course conditions (multiple choices possible) / Snow/condition (multiple choices possible) / Adhérence neige (Condition de la piste (plusieurs multiples possibles))**

Ice/ Eis/Glace  
 Soft/ Weich/Doux  
 Compact/ Kompakt/Compact  
 Wet/sloped snow/ Wasserbeladener/ Schneefläche nass/par Two  
 Chemicals used/ Salz, snow softener, others / Gekaufte Chemikalien/Salz, Schneewalze/ autres/Produit chimique utilisé (sel, assouplissant de neige, autres)  
 Not applicable/ Nicht anwendbar/Non applicable

**Weather conditions (multiple choices possible) / Weather/condition (multiple choices possible) / Conditions météorologiques (plusieurs multiples possibles)**

Sunny/ Clear/ Sonnig/Wetter/Tempé- rature  
 Cloudy/ Bewölkt/Couvert  
 Rainy/ Regen/Pluie/Pluie  
 Snowing/ Schneefall/Chute de neige  
 Foggy/ Nebel/Brume  
 Flat light/ Diffuse Licht/Mauvaise visibilité  
 Artificial light/ Künstliche Beleuchtung/Illumination artificielle  
 Not applicable/ Nicht anwendbar/Non applicable

**Wind conditions/ Wind/Direction/Condition de vent**

No wind/ kein Wind/No vent  
 Some wind/ Etwas Wind/Un de vent  
 High wind/ Starker Wind/Fort fort  
 Not applicable/ Nicht anwendbar/Non applicable

**Video/ Vidéo/ Vidéo:**  
 Is there a video available from the accident? / Ist ein Video vom Unfall verfügbar/Est-ce qu'un vidéo est disponible de l'accident?  
 No/ Nein/Non  
 Yes/ Ja/Oui

**Other comments/ Weitere Bemerkungen/Autres commentaires:**

\_\_\_\_\_

Please send this injury report as soon as possible to/ Bitte schicken Sie diese Verletzungsmeldung so rasch als möglich an/ Veuillez envoyer ce rapport de blessure le plus vite possible à la: Oslo Sports Trauma Research Center Postboks 4014 Ullevål Stadion, 0806 Oslo, Norway fax: +47 23 26 23 07 e-mail: fisisc@nib.no

Knee Injuries in Young Ski Racers

# KNEE INJURIES IN YOUNG SKI RACERS

If we look closer to specific publications on *ski racing* related *knee* injuries in *young* athletes the search for easily available data or studies is poor



Knee Injuries in Young Ski Racers

# KNEE INJURIES IN YOUNG SKI RACERS

Activity-related knee injuries and pain in athletic adolescents.

Bergstrom KA, Brandseth K, Fretheim S, Tvilde K, Ekeland A  
Knee Surg Sports Traumatol Arthrosc. 2001 May;9(3):146-50

45 students at a ski high school,  
73% of the students reported activity-related pain/injuries  
of the knee  
61% had overuse injuries,

→ intervention in training and physiotherapy  
1 year later, they found a significant **reduction of knee  
pain/overuse injuries**, from 73% to 35%

# KNEE INJURIES IN YOUNG SKI RACERS

Prevention of ACL injuries in competitive adolescent alpine skiers.

Westin M, Harringe M, Engstrom B, Alricsson M, Werner S  
Stockolm Sports Trauma Research Center, Karolinska  
Institutet

A prevention program performed a 45% reduction of the ACL injury incidence rate

**BOTH STUDIES SHOW THAT KNEE INJURY PREVENTION PROGRAMS IN YOUNG SKI RACERS CAN BE SUCCESSFULL**

# KNEE INJURIES IN ANDORRA SKI TEAM

Andorra Ski Team  
actually 26 alpine skiers – 2 freestyle skiers

- mean age 18 y.o. (from 16 to 26)
- mean time in the team: 3 years
- 19 males / 9 females



# KNEE INJURIES IN ANDORRA SKI TEAM

NUMBER OF INJURIES LEADING TO MORE THAN 1 week OUT OF COMPETITION or NORMAL TRAINING during the past 5 years:

- 8 overuse **knee** injuries

(14 low back pain, soft tissues injuries due the boot pressure)

- 10 traumatic **knee** injuries of witch 4 ACL

(4 fractures, 3 muscle/tendons injuries)

# KNEE INJURIES IN ANDORRA SKI TEAM

during the past 5 years:

- 5 athletes have left the national ski team, 2 after an injury:
  - a 23 year old male alpine skier, after his 2nd ACL injury (even he reached a full recovery of his previous physical and technical level)
  - a 22 year old female freestyle skier after an ACL injury (she resumed later competition in freeride skiing)

# KNEE INJURIES IN ANDORRA SKI TEAM

## KNEE INJURIES IN OUR SKI TEAM

- are the leading cause of significant traumatic injuries
- can contribute to the decision to retire from ski racing
- are far behind low back pain in the ranking of overuse injuries

# RACING SKIING VERSUS LEISURE SKIING

- ski gear: ski, boots, binding settings... are different
- hard/icy snow is required for racing, meanwhile easy skiing snow is preferred for leisure slopes
- the intensity and time of practice are different
- in racers we consider not only injuries during ski competition, but also: ski training, physical training

# RACING SKIING VERSUS LEISURE SKIING

- all these differences between ski racers and leisure skiers can probably lead to different injuries by their frequency, distribution and characteristics



Knee Injuries in Young Ski Racers

# ADULT SKI RACERS VERSUS YOUNG SKI RACERS

or should we talk about physical immature  
vs mature athletes ?

- anatomical/physiological  
differences will lead to different types of  
injuries (ex: ACL rupture vs spina tibialis  
avulsion in very young skiers)

# ADULT SKI RACERS VERSUS YOUNG SKI RACERS

- technical skills can be acquired quickly, meanwhile top physical fitness needs years of specific, well conducted training to be achieved

- the experienced athlete has a better understanding and control of the factors leading to injury

# CONCLUSION (1/3)

The study of knee injuries in young ski racers should consider:

- not only traumatic injuries as do usual studies on ski epidemiology
- but also overuse injuries, as they are common and can also lead to breaks in the competitive activity
- injuries related to physical training

# CONCLUSION (2/3)

the early detection, diagnostic and treatment of knee injuries in young ski racers involves :

- the team physician
- the ski trainer
- the physical trainer
- the athlete

**A good coordination and communication between all the staff members is paramount for the optimal management of injuries**

# CONCLUSION (3/3)

Some prevention measures have already shown their utility on the control of knee injuries in young ski racers, further studies should encourage their use.

Performance in sport is only possible in healthy athletes.

Study and prevention of sport injuries must be a priority of every health professional taking care of young athletes.

# Thank you

[www.cmpas.com](http://www.cmpas.com) / [www.medisport.ad](http://www.medisport.ad)  
[b\\_escoda@hotmail.com](mailto:b_escoda@hotmail.com)

Knee Injuries in Young Ski Racers



[www.sitemsh.org](http://www.sitemsh.org)

