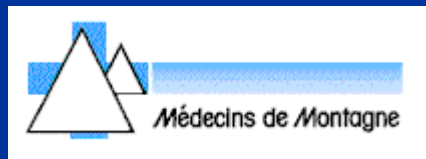


Why wrist injuries for skiers and thumb injuries for snowboarders?

*MH Binet, Centre médical Avoriaz
FRANCE*



**Sitemsh congress
Iran December 2015**

« *Medecins de Montagne* » Skiing safety network.

- 70 physicians in 52 winter sport resorts report all the injuries they have treated.
- The database contains more than 450.000 winter sport injuries since 1992.
- A control group is analysed in 15 ski resorts.

Control group

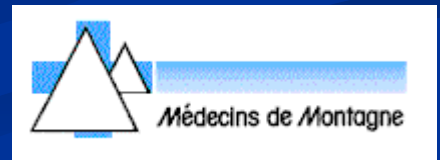
Method

Randomized counting is made at the bottom of ski lifts.

(+ 30000 each season)

Interviews are conducted on ski slopes and car parkings.

(+ 2000 each season)



Injured population

DATA FORM

A standardized form
has been used since 1992.

A Remplir par le Médecin

Localisation précise :

Côté Droit Médian Gauche

CRITÈRES DE GRAVITÉ (à remplir impérativement)

Pronostic vital en jeu Hospitalisation immédiate

Hospitalisation secondaire Pas d'hospitalisation

Echelle :

1	2	3	4	5	6	7	8	9	10
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POUR LES ENTORSES

Stade 1 LLI autre ligament :

Stade 2 LCP

Stade 3 LLE avec arrachement sans arrachement

ICA

POUR LES FRACTURES DU POIGNET DÉPLACÉES UNIQUEMENT

PRISE EN CHARGE EN STATION

Tentative de réduction OUI NON Sans objet

Résultat Anatomique Satisfaisant Incomplet

Type d'immobilisation Appareil brachio-antibrachio-palmar (S.A.B.)

Appareil antibrachio-palmar

Position Fonctionnelle de Judet

DEVENIR DU PATIENT

Traitement orthopédique pur

Avis spécialisé

Chirurgie immédiate

COMMENTAIRES :

Cotation :

ÉPIDÉMIO 2000/2001

MÉDECIN :

Médecins de Montagne Station de l'accident :

DATE DE L'ACCIDENT :

NOM :

Prénom :

Date de naissance :

Sexe : F M

ADRESSE PERSONNELLE - Home address

Rue :

Code postal - Commune :

Pays :

ADRESSE STATION - Local address

RUE :

Code postal - Commune :

PRISE EN CHARGE (possibilité de choix multiples) :

Pisteurs-secouristes Pompier Ambulance

Hélicoptère Propres moyens Autre :

ACCIDENT DE SPORT

Ski alpin Ski carving Miniskis Ski de fond

Snowboard Sport de glace Autre sport :

AUTRE ACCIDENT Voie publique Domestique

ACCIDENT DU TRAVAIL Oui Non

NIVEAU

Débutant Débrouillé Confirmé Professionnel

MOINS DE 16 ANS - Under 16 years

Portiez-vous un casque ? Oui Non

SNOWBOARD

Type de chaussures Souples Rigides

Protection de poignet Oui Non

S'agit-il d'une collision ? Oui Non

Avec un autre usager ? Skieur Surfeur Engin motorisé Autre :

L'accident est-il survenu à la sortie d'un télésiège ? Oui Non

Accident dans le snowpark Oui Non

TYPE DE LÉSION (1 case à gauche)

Fracture Déplacée Suspicion fracture

Non déplacée Décollement épiphyseaire

Ouverte Articulaire

Entorse Déjà réduite

Luxation Réduite au cabinet

Plaie Non réduite

Contusion hémotome

Lésion musculo-tendineuse

Lésion cartilagineuse

TC Glasgow (3 à 15) :

Hémarthrose -scellée

Dermabrasion

Subluxation

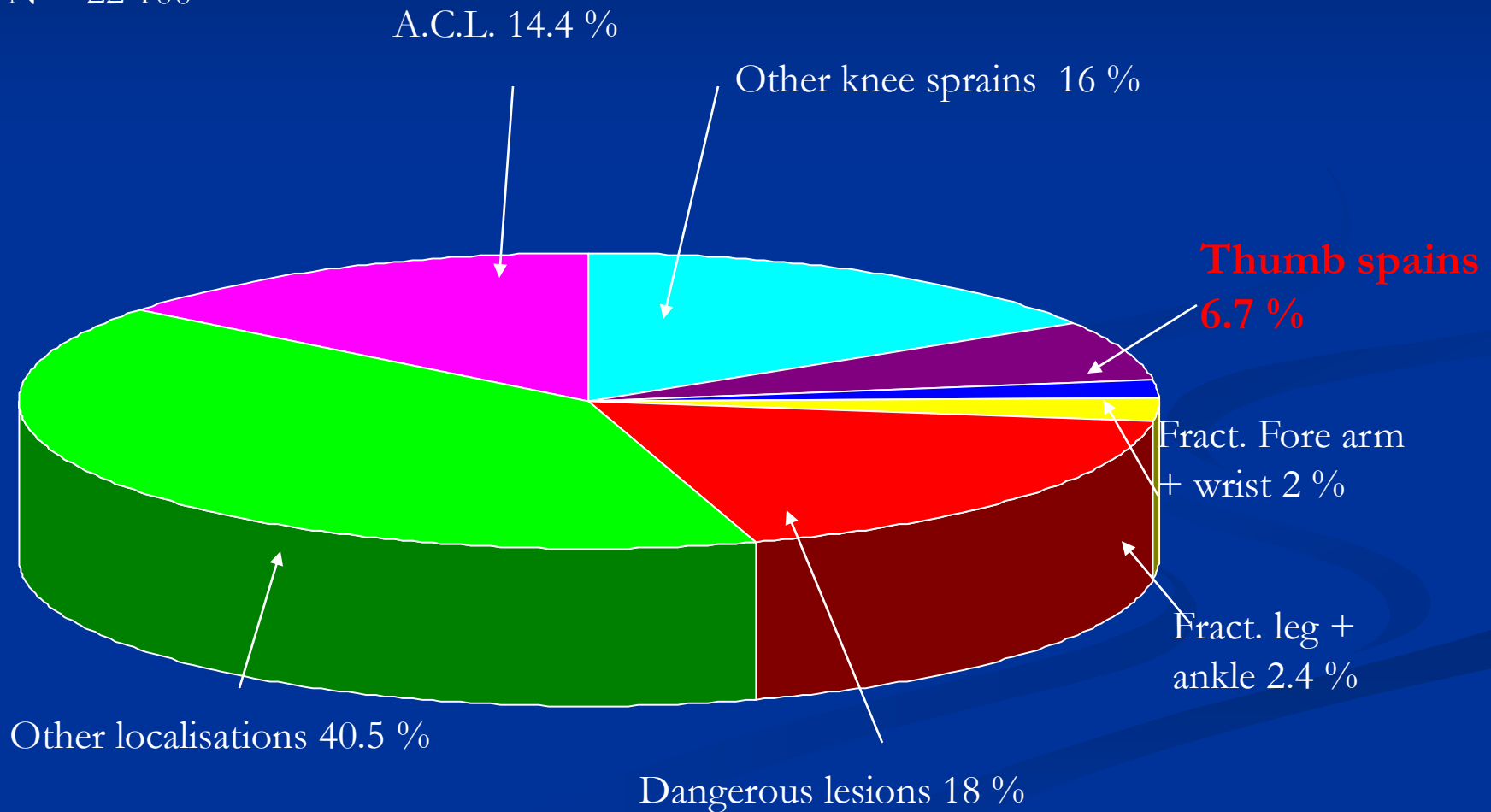
Diagnostic médical :

Décès

Autres, précisez :

Alpine skiing adults

N = 22 100



Snowboarding children

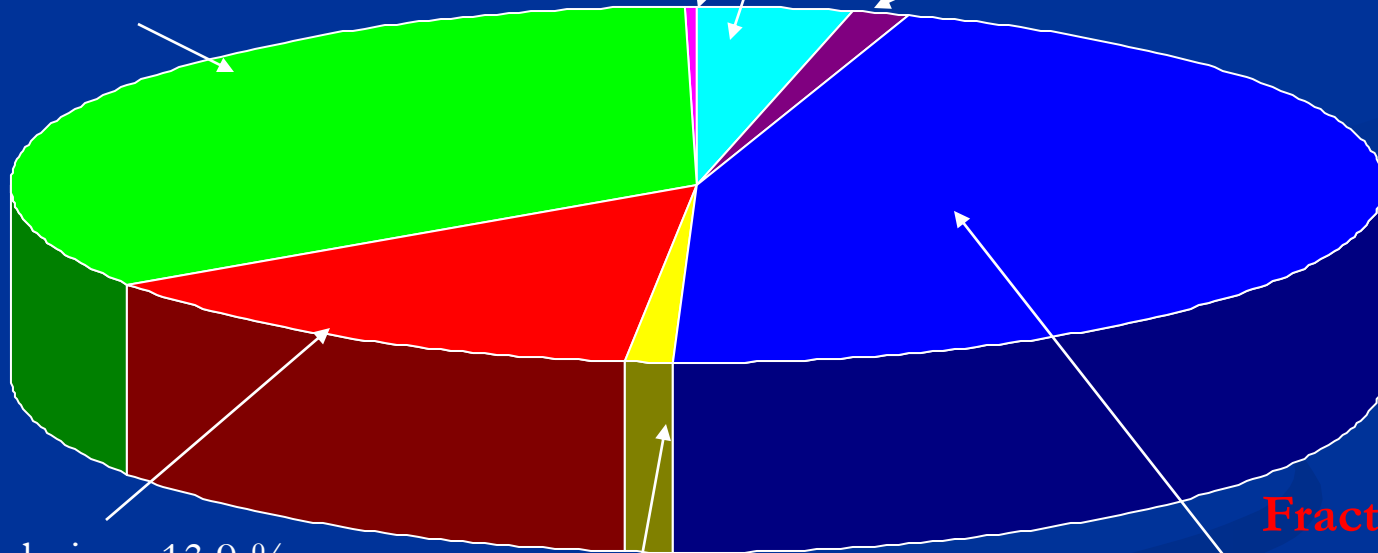
N = 4312

Other localisations 34.1 %

A.C.L. 0.4 %

Other knee sprains 3.8 %

Thumb sprains 1.2 %



**Fract. Fore arm
+ wrist 45.7 %**

Fract. leg +
ankle 1.1 %

Dangerous lesions 13.9 %

Typical injuries

Alpine skiing



Snowboarding



Fall mechanism

Alpine skiing



Snowboarding



Snowboarding fall mechanism

- The reception occurs on the heel of the hand and gives an hyperextension of the wrist, cause of the injury
- All lost of balance give a fall on the hand (forwards, backwards, side fall)

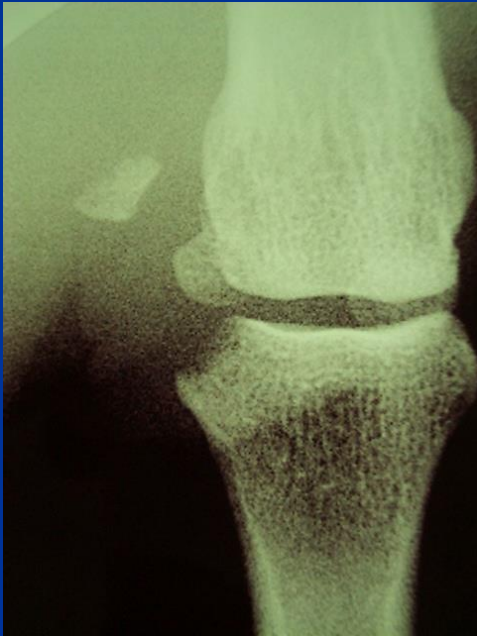


Alpine skiing fall mechanism



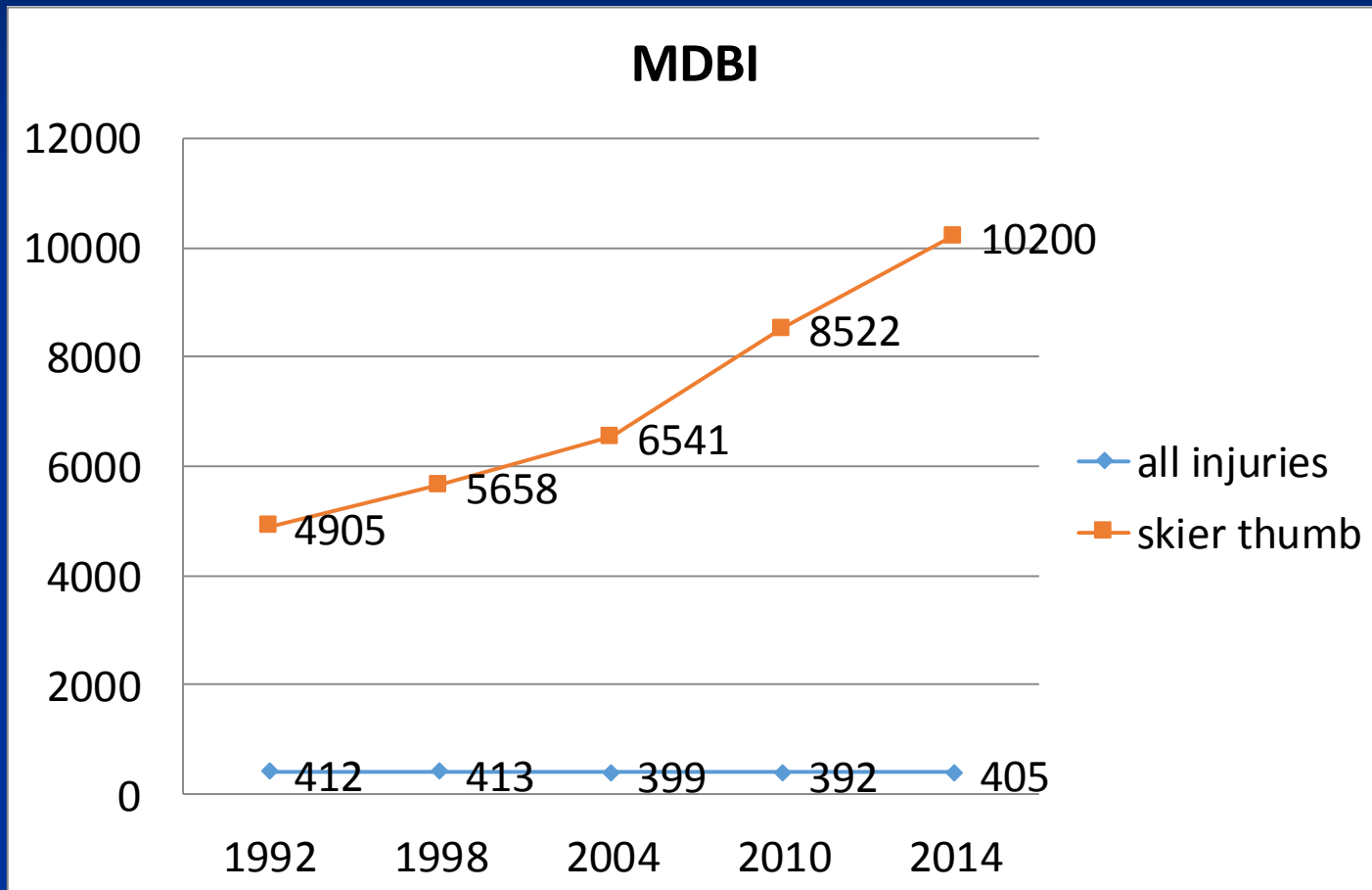
The hand grips the stick in a prehension position. In case of fall even if the stick is not fixed with the strap, the reception occurs with the thumb in abduction.

Skier thumb



Thumb sprain was in the top 2 of alpine ski injuries for many years.

Skier thumb evolution



Discussion

- The real number of thumb injuries is difficult to count because many of these are minor and don't push the skier to see any doctor.
- The questionnaires filled by our control population show the real number of these injuries (twice as measured in the injured group)

Evolution of the grip



- In the fifties (1950 ...) the small diameter of the upper part of the stick has been responsible of many severe eye injuries.

Evolution of the grip



- Sixties (1960...)
thin grip

Evolution of the grip



- Larger grip in the seventies (1970...)

Evolution of the grip



- Eighties (1980...) Larger grip with cubital hand support at the bottom.

Evolution of the grip



- Ninetees (1990)

Years 2000 : thinner grip design



Actual grips



Prevention

- In order to prevent thumb injuries, many different designs have been tried in recent passed.
- None of them has shown any difference in thumb injuries!



Other prevention

- Safety system allowing disjunction between hand and stick in case of fall.
- No statistical difference in risk of thumb injury has been proved.



Discussion

- Our hypothesis to explain this important diminution is that grip design influence the risk of thumb injury.
- Actuals grips actuels are thinner than those of years 70 to 90.
- The size of space between thumb and index could be determinant.
- Other elements could influence : short skis or carved skis has change the use of the sticks in alpine skiing.

Wrist fracture incidence in snowboarding

- More than **95.000** wrist fractures each winter season in the world for snowboarders. (more than 10 000 only in France!)



Usual types of fractures for adult snowboarders



Usual types of fractures for teenagers



fractures often difficult to diagnose

Fractures of the distal radius are always present when a sharp pain is found on the wrist joint or when a oedema is present.

Obliques radiography could be usefull to find them.



fractures could be severe

- Comminution because of high energy related to short and rigid protective devices



Prevention of snowboard wrist injuries



- Wearing protective wrist guards is recommended in many countries

% of snowboarders equipped with wrist protection

- Actually in France only 12% of the snowboarders are wearing protective devices (of any kind)
- In Switzerland: 28%, USA and Canada are over 40 %, New Zealand more than 50 % (because prevention specific campaigns)

What protective device?



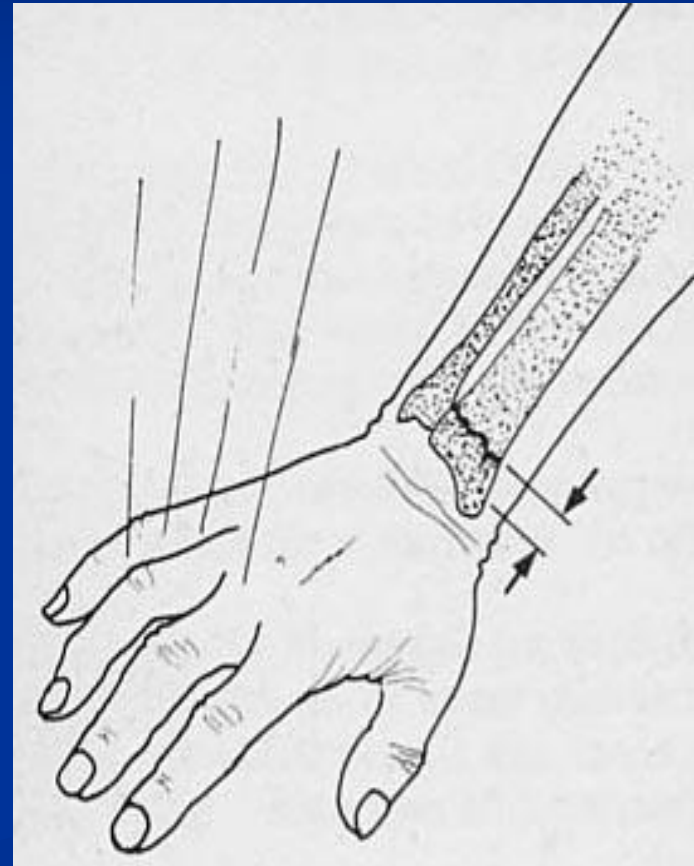
Unusual fractures

- Observed on snowboarders with rigid wrist guards



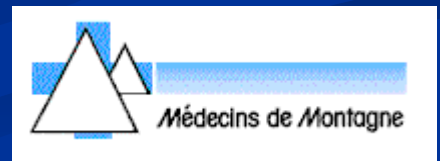
Prevention for snowboarders

- The analyse of the falls shows that the fracture is due to hyperextension of the wrist joint.
- Biomechanics studies have calculated the loads. They are very high.



Prospective Study to Compare Efficacy of Different Designs of Wrist Protection for Snowboarders

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- Andrew Rowlands, Department of Accident and Emergency, Raigmore Hospital Inverness
- Philippa Wadsworth, University of Aberdeen Medical School
- Jean-Dominique Laporte, Les Angles



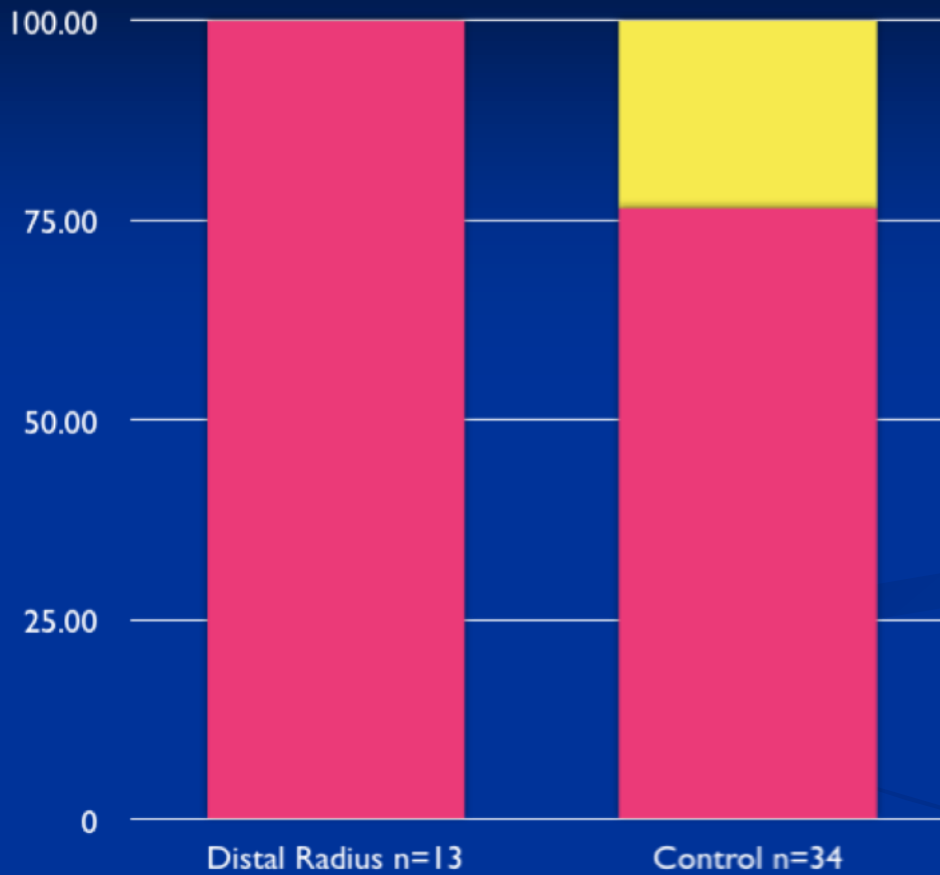
Method

- Questionnaire-based study conducted at the Centre Medical d'Avoriaz during the period January-March 2011
- Questions relating to use and type of wristguard and injury details (for injured group)
- No selection/exclusion based on any demographic criteria, though demographic information collected for comparisons to be made

Method

- We have collected the type of protection for both group injured and control:
 - Gloves, mittens or simple guard
 - Position of the protection : palm side, dorsal side, both sides.
 - Length of the protective guard
 - Stifnees of the protection

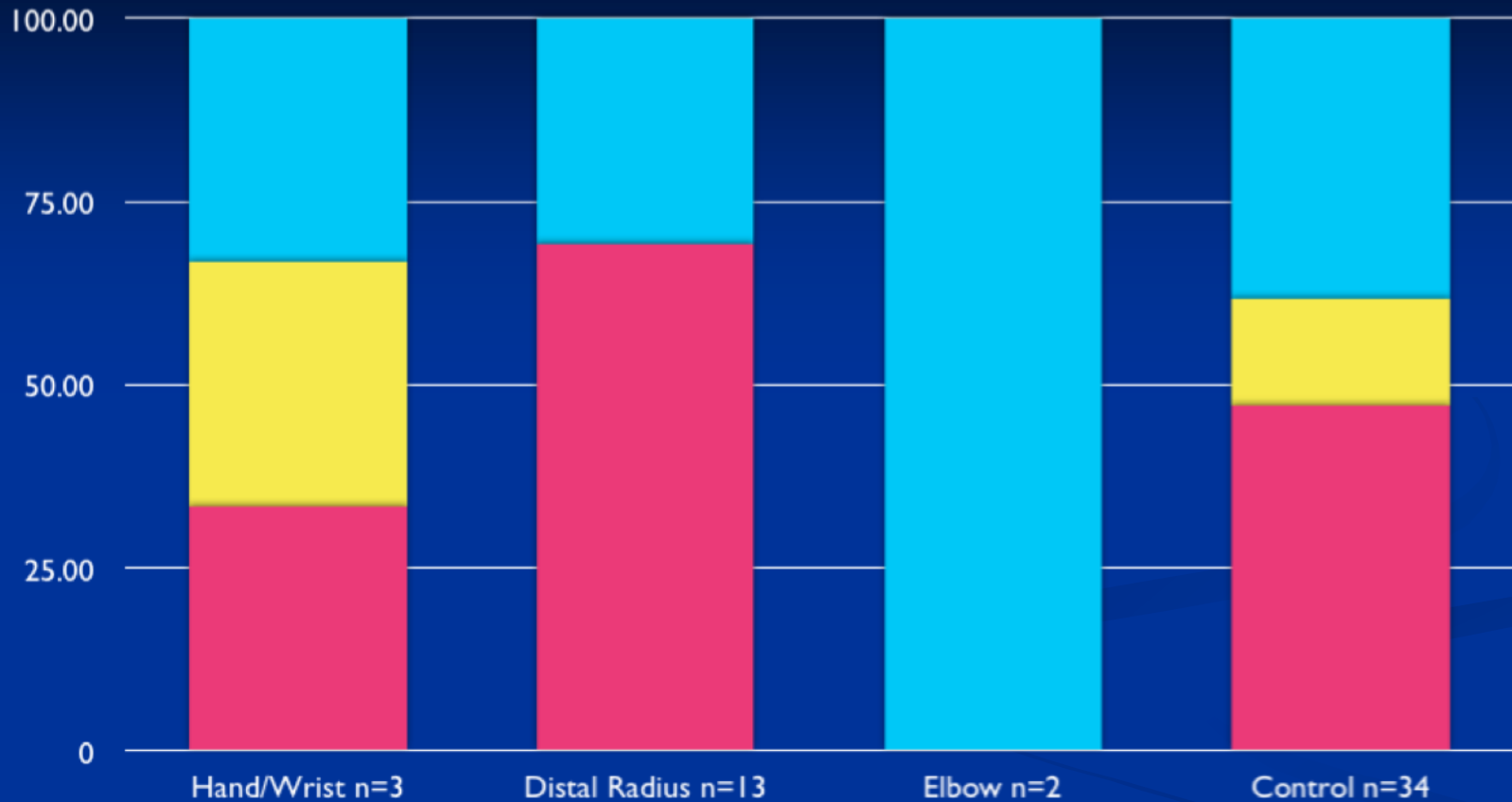
Results 1- Length



	Distal Radius	Control
Short	100.00	76.47
Long	0.00	23.53
p value	0.031	

■ Long
■ Short

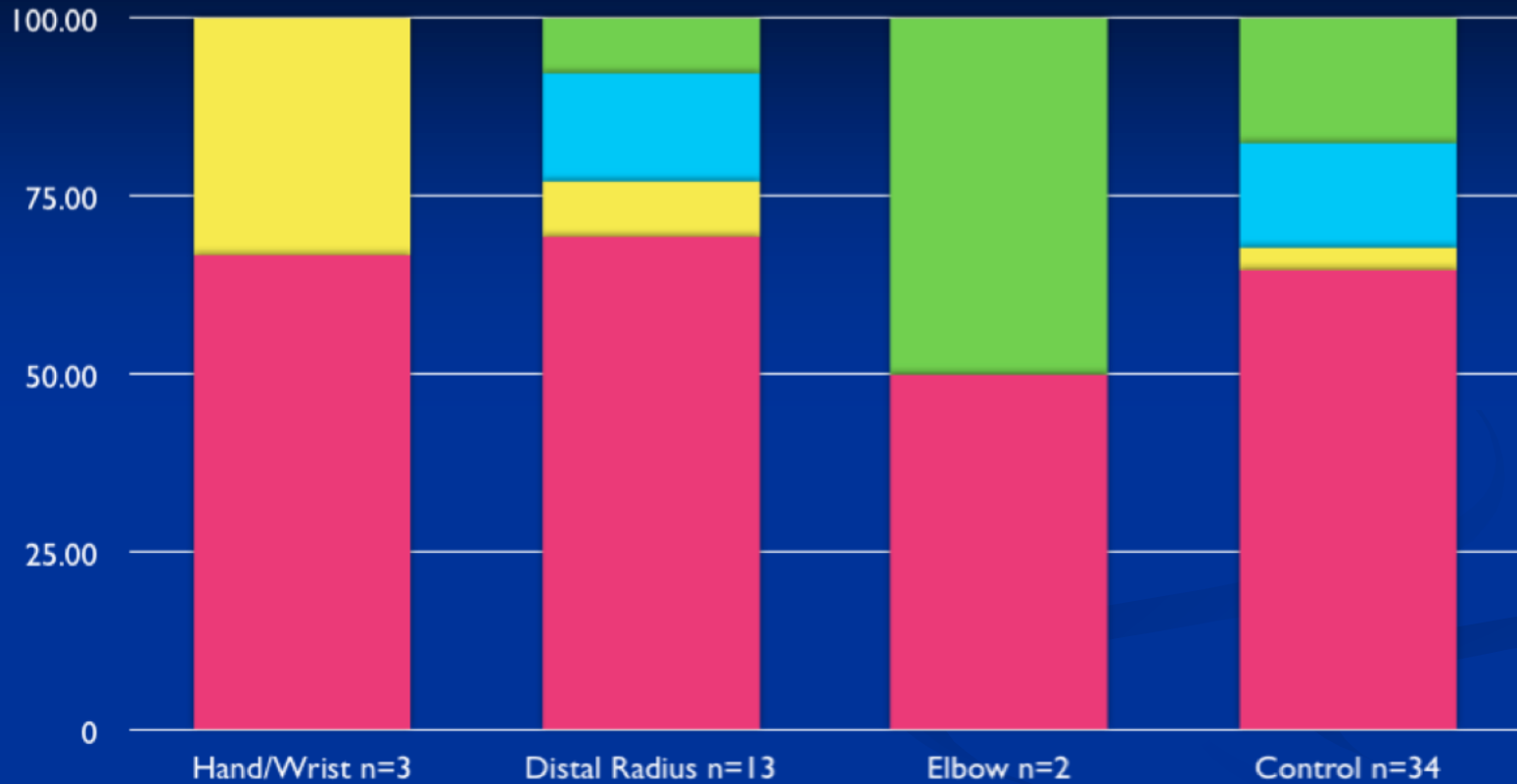
Results 2- Position



	Hand/Wrist	Distal Radius	Elbow	Control
Palm	33.33	69.23	0.00	47.06
p value	0.396	0.064	0.280	
Dorsal	33.33	0.00	0.00	14.71
p value	0.321	0.126	0.728	
Both	33.33	30.77	100.00	38.2
pvalue	0.438	0.200	0.146	



Results 3- Rigidity



	Hand/Wrist	Distal Radius	Elbow	Control
rigid%	66.67	69.23	50.00	64.71
p value	0.443	0.221	0.457	
soft%	33.33	7.69	0.00	2.94
p value	0.083	0.267	0.942	
flex all%	0.00	15.38	0.00	14.71
p value	0.621	0.293	0.728	
flex wrist%	0.00	7.69	50.00	17.65
p value	0.559	0.223	0.291	



Discussion

- Short wristguards were a greater proportion of guards used by those with distal radius fractures than controls, showing they are ineffective protection
- Palm side wristguards may also be less effective—they may provide impact protection but cannot protect against hyperextension

Prevention

- One model with a long dorsal flexible has shown better protection.
- It allows to absorb the loads during dorsal flexion (extension) of the wrist.
- The working group for standards will in near future establish a new CE for snowboarding wrist protection.



Conclusions

Thumb sprains have decreased by alpine skiers for more than 50% since last 10 years without any oriented prevention measure.

The more likely cause of this diminution is the thinner grip of alpine sticks during this period.

Conclusions

- Short protective devices bring some protection for low energy falls, but are dangerous for high energy falls.
- The protection of the hyper extension of the wrist is the key to bring the best preventive effect without any other injury situated on the upper limb.

Thank you for your attention!

**See you in Japan for
35 th Sitemsh congress**

March 2016 13 th-17th

