University of Zurich[UZH]

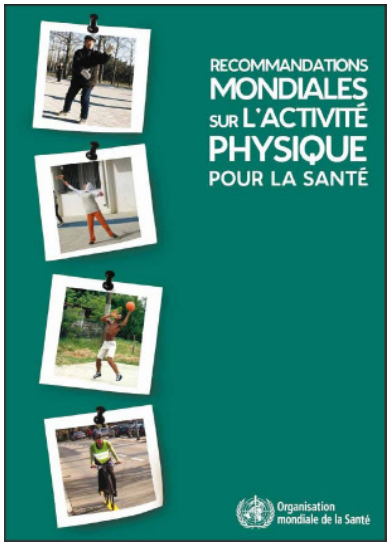
Institute of Social and Preventive Medicine

Sport injuries and physical activity promotion

Incidence des lésions sportives selon différentes catégories d'âge et de population

Brian Martin, MD MPH; Eva Martin-Diener MSc MPH
Physical Activity and Health Unit

Journée Romande d'Orthopédie
CHUV, Lausanne, 07.04.11



2010

www.who.int/dietphysicalactivity

Health benefits of physical activity in adults

- ↑ Life expectancy
- ↑ Cardiorespiratory fitness
- ↑ Muscular fitness
- ↑ Healthy body mass
- ↑ Healthy body composition
- ↑ Bone health
- ⇧ Sleep quality
- ⇧ Health-related quality of life

- ↓ Coronary heart disease
- ↓ High blood pressure
- ↓ Stroke
- ↓ Diabetes type II
- ↓ Metabolic syndrome
- ↓ Colon cancer
- ↓ Breast cancer
- ↓ Depression

Additionally in older adults:

- ↑ Functional health
- ↑ Cognitive function

- ↓ Risk of falling

↑ *strong evidence*
⇧ *modest evidence*

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

Health benefits of physical activity in children

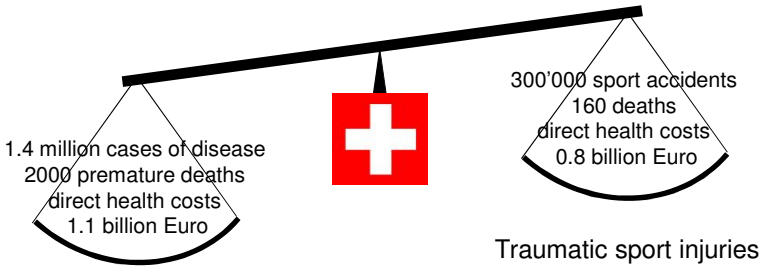
- ↑ Physical fitness
  - ↑ Cardiorespiratory endurance
  - ↑ Muscular strength
- ↑ Health status
  - ↑ Favourable cardio-vascular risk profile
  - ↑ Favourable metabolic disease risk profile
  - ↑ Bone health

- ↓ Body fatness
- ↓ Anxiety symptoms
- ↓ Depression symptoms

↑ *strong evidence*
⇧ *modest evidence*

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

Both physical inactivity and traumatic sport injuries are relevant for public health

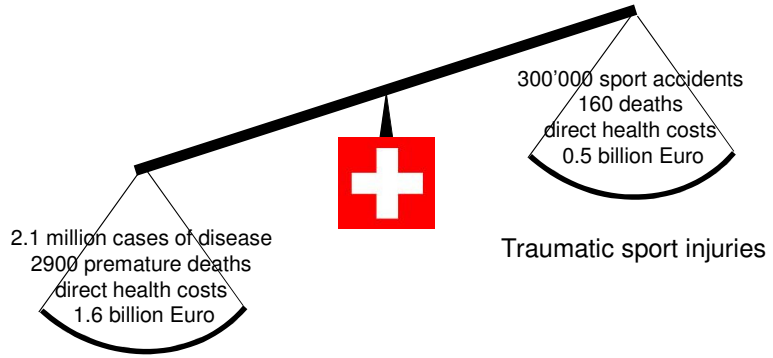


Traumatic sport injuries

Physical inactivity

Martin BW, Beeler I, Szucs T, Smala AM, Brügger O, Casparis C, Allenbach R, Raeber PA, Marti B. Economic benefits of the health-enhancing effects of physical activity: first estimates for Switzerland. Schweiz. Schweiz Z Sportmed Sporttraumatol, 2001; 49 (3): 131-133.

Both physical inactivity and traumatic sport injuries are relevant for public health

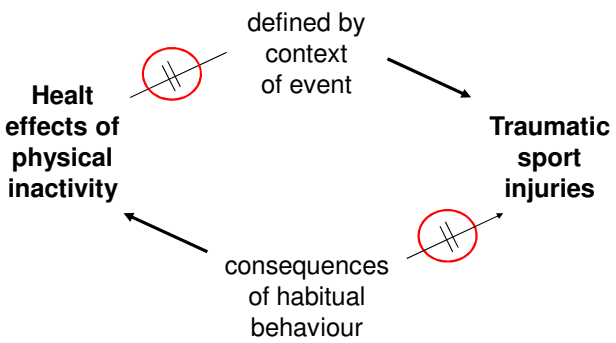


Traumatic sport injuries

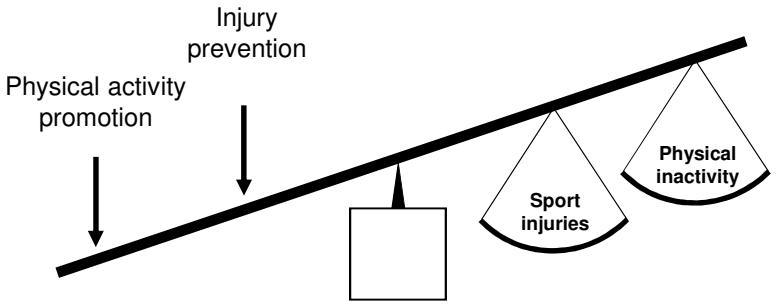
Physical inactivity

Updated estimates, as of 2006

Sport injuries can also happen in inactive people!



Is this the correct model?



Changes in PA behaviour and sport injuries 2002-2007

Survey Sport Switzerland 2008[1] (behaviour 2007, 15–74 y, n=10'262)
> prevalence data for different sport activities (%)
> frequency of activity (days per year)
> average duration of activity (hours and minutes per session)

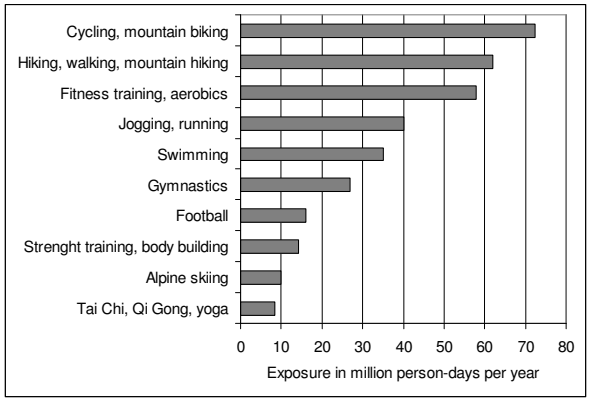
Survey Sport Switzerland 2000[1] (behaviour 2000, 15–74 y, n=2057)
> prevalence data for different sport activities (%)

Injury statistics Swiss Council accident prevention[2] (17–64 y)
> monitoring data 2000
> monitoring data 1998/99/00 and 2005/06/07

1) Lamprecht M, Fischer A, Stamm HP. Sport Schweiz 2008. Magglingen, BASPO 2008
2) Specific analyses

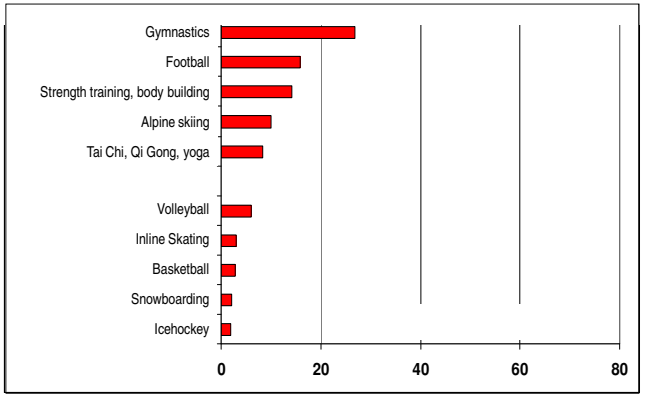
Changes in PA behaviour and sport injuries 2002-2007

Exposure estimated for 10 most frequently reported sports...



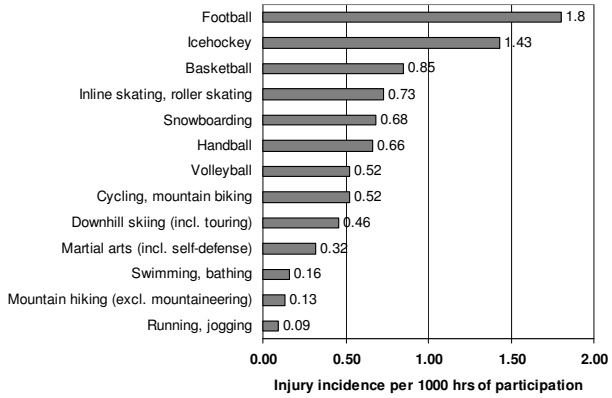
Changes in PA behaviour and sport injuries 2002-2007

Exposure estimated for 10 most frequently reported sports...
+ exposure for 10 sports with most injuries -> 5 additional



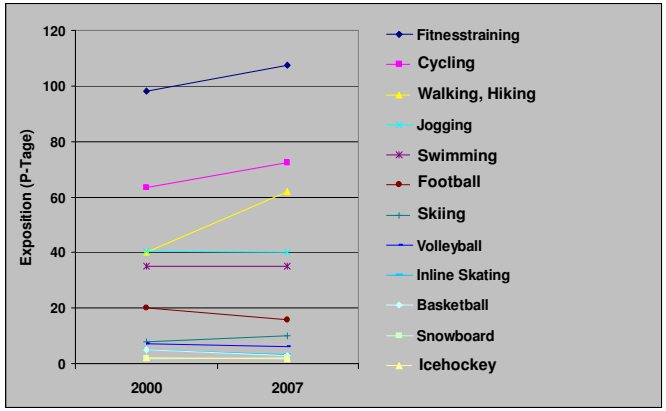
Changes in PA behaviour and sport injuries 2002-2007

Estimation of injury incidence per 1000 hours exposure



Changes in PA behaviour 2002-2007

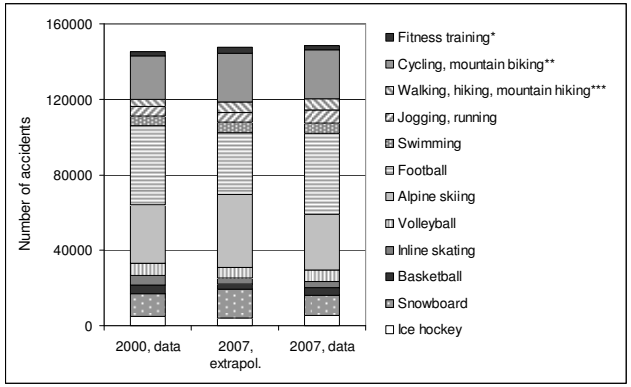
Increase in total exposure time: +10.0%



Including 3.7% population increase in 15 to 74 year olds

Changes in sport injuries 2002-2007

Increase in sport accidents (extrapolated): +1.4%
Increase in sport accidents (measured): +2.2%



Changes in PA behaviour and sport injuries 2002-2007

Increase in sport accidents (extrapolated): +1.4%
Increase in sport accidents (measured): +2.2%
Increase in total exposure time: +10.0%

- **Increases in PA activity at the population do not need to be accompanied with proportional increases in injuries when people are switching to less dangerous activities (e.g. walking, cycling, fitness training)**

bfu-report no. 64

Physical Activity Promotion and Injury Prevention

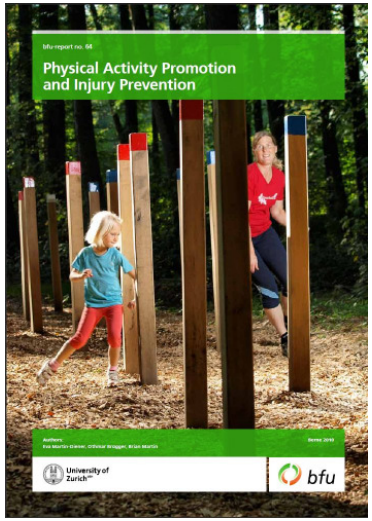
Relationship in sports and other forms of physical activity

Authors:
Eva Martin-Diener, Othmar Brügger, Brian Martin

Berne 2010

University of Zurich

bfu

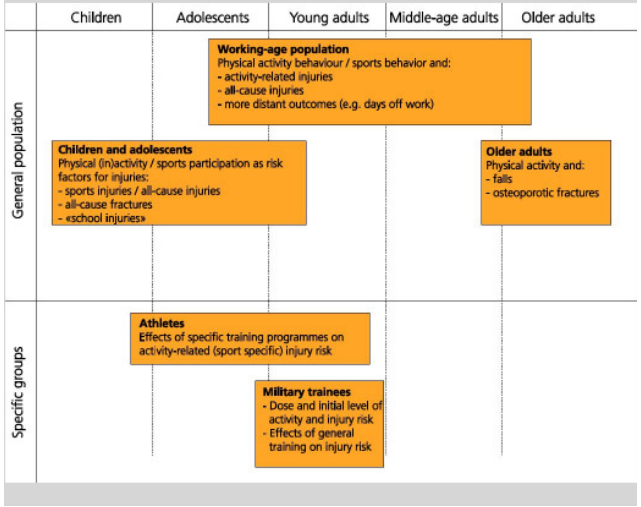


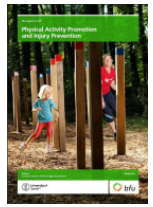
Review starting from evidence in USDHSS Physical Activity Guidelines Advisory Committee Report 2008, further studies identified

Including comments from international institutions (EMGO, CDC)

www.bpa.ch
www.bfu.ch

Figure 6
Pysical activity behaviour and risk injury: Research areas identfied in the scientific literature according to age groups





Prevention of sport injuries. Systematic review of randomised trials.

"All 6 multi-intervention training programs (2809 participants) were effective in preventing sport injuries (risk reduction ≥ 50% in 5 studies)"

Aaltonen S, Karjalainen H, Heinonen A, Parkkari J, Kujala UM. Arch Intern Med 2007; 167 (15): 1585-1592

Reductions in overuse and traumatic injury in the US Army

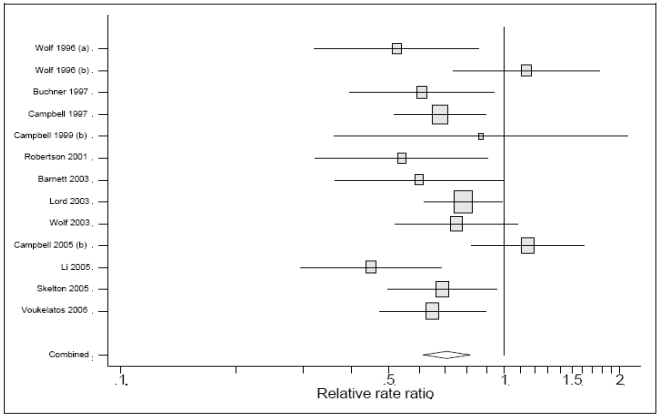
between multiple intervention group (n = 1283) and historical control group (n = 2559)

Table 4 Crude and adjusted risk ratios (95% confidence intervals) for the three types of injuries comparing multiple intervention (MI) and historical control (HC) cohorts (risk ratios are HC/MI from Cox regression)

Analysis	Any time loss injury	Time loss overuse injury	Time loss traumatic injury
Men			
Crude	1.13 (0.98 to 1.30)	1.18 (1.00 to 1.40)	1.38 (1.06 to 1.81)
Adjusted	1.46 (1.21 to 1.77)	1.58 (1.26 to 1.99)	1.50 (1.06 to 2.12)
Women			
Crude	1.31 (0.96 to 1.79)	1.65 (1.14 to 2.38)	1.40 (0.75 to 2.62)
Adjusted	1.77 (1.10 to 2.83)	2.52 (1.47 to 4.31)	1.37 (0.57 to 3.29)

Knapik JJ, Bullock SH, Canada S, Toney E, Wells JD, Hoedebecke E, Jones BH. Influence of an injury reduction program on injury and fitness outcomes among soldiers. Inj Prev. 2004 Feb;10(1):37-42.

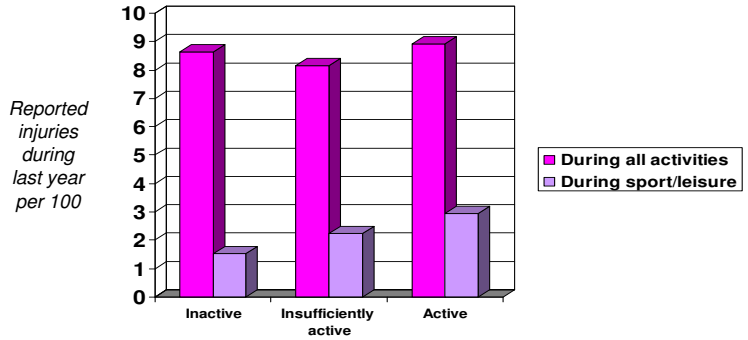
Effect of exercise interventions to prevent falls in older adults



Pooled rate ratio 0.71 (95% CI 0.61 to 0.82; *P*<0.001). Tests for heterogeneity Q = 21.49, *P*=0.044; I2 = 44%.

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008. Source: Adapted from Campbell A and Robertson M 2008.

Cumulative incidence of accidents by leisure-time activity level in the US National Health Interview Survey 2000 to 2002 (n=93'159)



Carlson SA, Hootman JM, Powell KE, Macera CA, Heath GW, Gilchrist J, Kimsey CD Jr, Kohl HW 3rd. Self-reported Injury and Physical Activity Levels: United States 2000 to 2002. Ann Epidemiol. 2006 Apr 18;

Physical Activity Risk in Children and Adolescents

Apart from a few longitudinal studies, mostly cross-sectional studies attempting to identify risk factors for injuries
→

Consistent evidence:

participation in sports ⇔ risk of sports-related injuries

Some evidence:

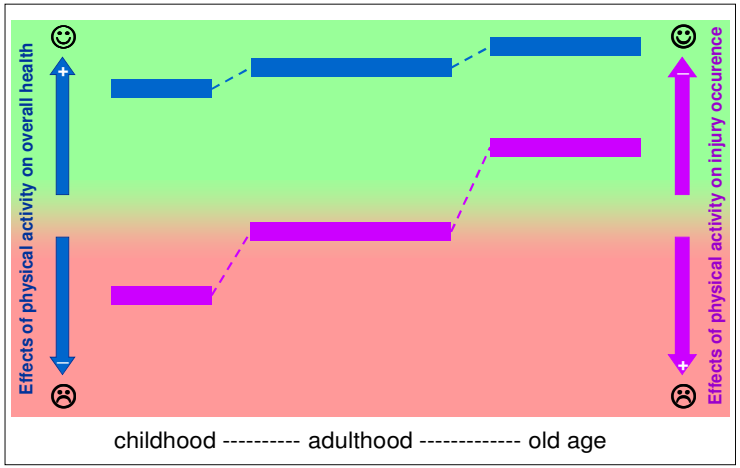
participation in sports ⇔ risk of fractures and injuries from all causes

Limited evidence from few studies:

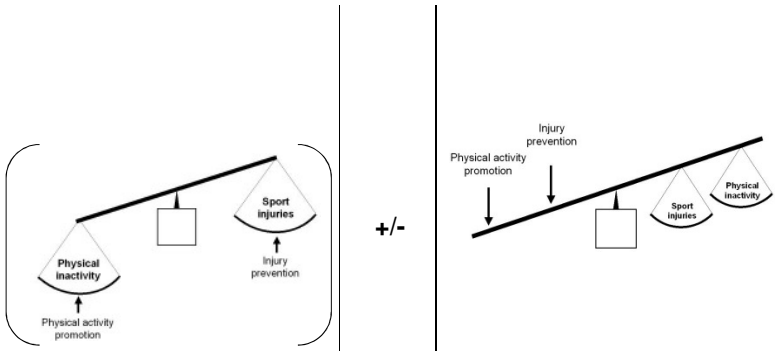
non-sports activities ⇎ injuries from all causes

non-vigorous activities (⇔) protection from fractures

PA promotion and injury prevention in different age groups



PA promotion and injury prevention in different age groups



childhood ---------- adulthood ---------- old age

Draft implementation recommendations for age groups

- **Link up PA promotion and accident prevention**

  To avoid an increase in injuries, it is important to accompany PA promotion with all measures of accident prevention

- **Support the right choices in PA promotion.**

  Activities should be appropriate for age as well as individual level of fitness and experience

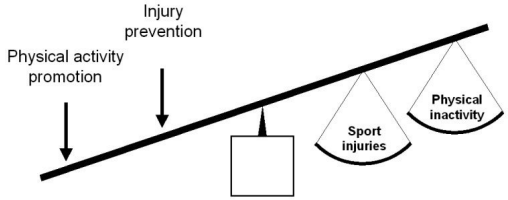
- **Physical activity promotion is accident prevention.**

  Multidimensional training programmes seem to be most effective, general measures of accident prevention should be observed.

childhood ---------- adulthood ---------- old age

Conclusions

- Both physical activity promotion and the prevention of sport injuries are important public health issues
- Synergies exist and should be strengthened



- (Much) more research is needed