The Norwegian Injury Prevention Program

HQ Defence Command Norway,

Medical Devision

&

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Okt 2000

The Norwegian Injury Prevention Program.

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Aims

The Norwegian injury prevention program is a four-step project.

1. We wanted to determine the incidences and types of musculoskeletal injury among conscripts and officer cadets undergoing basic military training.
2. We wanted to identify risk factors according to individuals, equipment, and the nature of training.
3. We wanted to propose recommendations for injury prevention.
4. Finally, we wanted to estimate the effects of some of the proposed measures by means of intervention studies.

We have finished the first three steps, and we are now planning the fourth.

Methods

The study population consisted of 6488 conscripts and 321 officer cadets drawn from the Army, the Air Force and the Navy. The conscripts were monitored through an initial 6-10-week period of basic military and physical training. The officer cadets were monitored through a 1-year training course. Every injury for which a conscript had to consult a doctor was registered. Two samples of 480 and 912 conscripts were used to determine individual risk factors according to data obtained on age, body composition, medical examination, previous physical activity, aerobic fitness, use of smokeless tobacco and smoking habits.

Incidence and types of injury

Incidence rates for the Army, Air Force and Navy conscripts respectively were 15.3, 13.4 and 9.3 injuries per 100 conscript-months (13-27% of the recruits). For the officer cadets the incidence was highest during an introductory 6-week basic training period when rates of various training schools ranged from 26.7 to 45.5 injuries per 100 cadet-months (30-42% of the cadets). This was five to nine times higher than the incidence rates during the rest of the year.

Most of the injuries were overuse injuries, and they were sited in the lower limbs.

The most common types of injury among conscripts were low back pain; overuse knee injuries (such as patellofemoral pain syndrome, iliotibial band friction syndrome and patellar tendinitis); achilles tendinitis; sprains of joint capsules or ligaments; and periostitis or compartment syndromes of lower leg. With the exception of low back pain, the same diagnosis groups were most frequently used in officer cadets too. Reasons for the low rates of back pain in officer cadets may be that they were more physical fit due to selection or that they were more motivated for training.

Risk factors

Increased risks of injury were found at higher age, high and low body mass index, dysfunctions of the back or lower limbs, reduced mental health, low levels of previous physical activity, low levels of self-assessed physical fitness, slow run times, smoking and snuff-taking. Women sustained more injuries than men.

Increased risks of injury were found at higher levels of general strain, higher levels of activities in marching boots, and higher levels of activities such as marching and running.

Recommendations for injury prevention

Recommendations for injury prevention include

1. Selection of individuals for different kinds of duty, taking account of individual risk factors.
2. Differentiation of strain by division into training groups according to individual risk factors.
3. A gentle start, with slow progression both in general and specific strain
4. Progression for a longer period of time.
5. A slow introduction of marching boots
6. Measures for reducing risk factors such as overweight, smoking and the use of smokeless tobacco.

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3. Heir T, Eide G. Injury proneness in infantry conscripts undergoing a physical training programme: smokeless tobacco use, higher age, and low levels of physical fitness are risk factors. Scand J Med Sci Sports 1997:7: 304-311.
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5. Heir T. Injuries in military training. Academic dissertation. Oslo: Norwegian University of Sport and Physical Education, 1998 (in Norwegian).

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Background

- Reports on high frequences of injures among conscripts and officer cadets
- High absence from physical training
- High consumption of antiflogistica

Aims

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- Propose recommendations for injury prevention
- Estimate the effects of proposed measures by means of intervention studies

Study population

Army/Navy/Air Force:

6488 conscripts: 6-10 weeks of basic training
321 officer cadets: 1-year training course

Individual risk factors:
Two samples of 480 and 912 conscripts

Incidences, conscripts

	Injured (%)	Injuries per 100 Conscript - Months
Army	27,3	15,3
Air Force	21,6	13,4
Navy	13,0	9,3

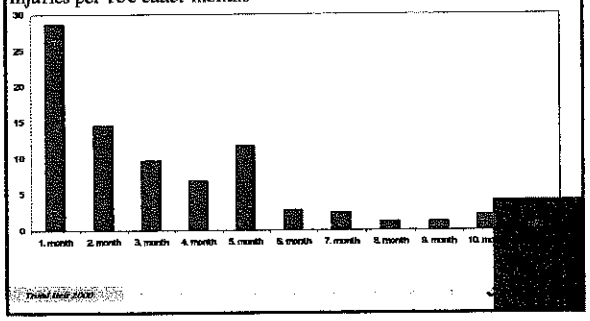
Incidences, officer cadets

Injuries per 100 Cadet - Month

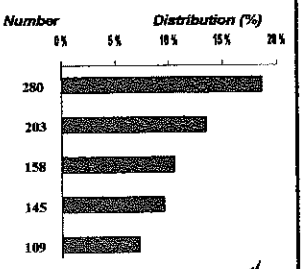
	Entrance course	Rest of the year
Coastal Artillery	45,5	9,4
Air Force	30,2	5,4
Navy	26,7	3,1

Injuries during 1-year officer training

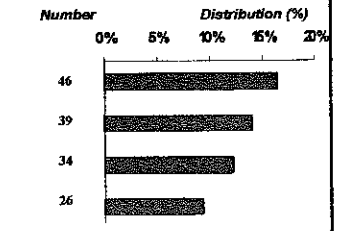
Injuries per 100 cadet-months



Injuries in conscripts

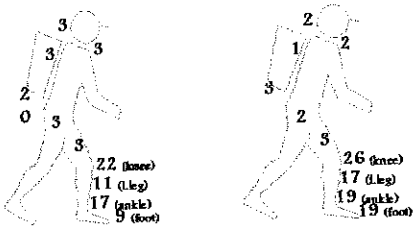


Injuries in officer cadets



Localization of injury

Site of injury (%)

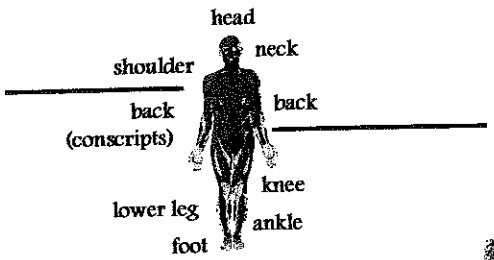


Conscripts

Officer cadets

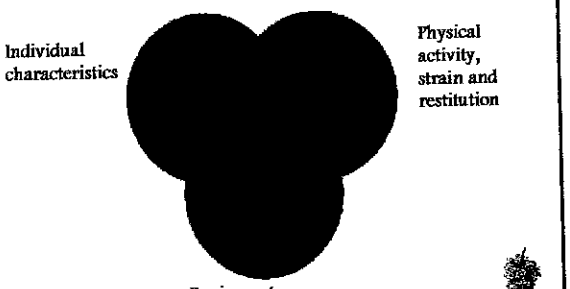
Musculoskeletal complaints

Normal population



Military personell

Risk of injury



Risk factors

- Gender

Risk factors

- Gender
- Age

Risk factors

- Gender
- Age
- Body mass index

Risk factors

- Gender
- Age
- Body mass index
- Health profile

Risk factors

- Gender
- Age
- Body mass index
- Health profile
- Previous physical activity

Risk factors

- Gender
- Age
- Body mass index
- Health profile
- Previous physical activity
- Running capacity (3000 m)

Risk factors

- Gender
- Age
- Body mass index
- Health profile
- Previous physical activity
- Running capacity (3000 m)
- Physical fitness (self-assessed)

Risk factors

- Gender
- Age
- Body mass index
- Health profile
- Previous physical activity
- Running capacity (3000 m)
- Physical fitness (self-assessed)
- Smoking

Risk factors

- Gender
- Age
- Body mass index
- Health profile
- Previous physical activity
- Running capacity (3000 m)
- Physical fitness (self-assessed)
- Smoking
- Smokeless tobacco

Risk factors

- Gender
- Age
- Body mass index
- Health profile
- Previous physical activity
- Running capacity (3000 m)
- Physical fitness (self-assessed)
- Smoking
- Smokeless tobacco

Risk factors

- High levels of general strain

Risk factors

- High levels of general strain
- Marching and running

Risk factors

- High levels of general strain
- Marching and running
- Activities in marching boots

Injury prevention

Differentiation of strain

⇨ Selection of individuals for different kinds of duty

⇨ Division into training groups according to individual risk factors

Injury prevention

Progression

⇨ A gentle start, with slow progression both in general and specific strain

⇨ Progression for a longer period of time

⇨ Variation in forms of movements

Injury prevention

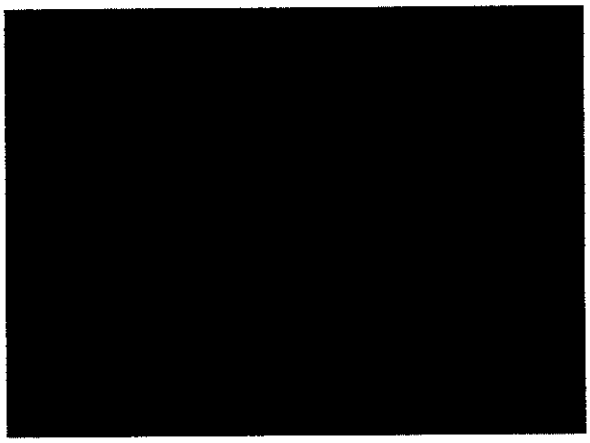
Variation in the use of footwear

- ⇨ Slow introduction of marching boots
- ⇨ A liberal use of sport shoes

Injury prevention

Reduction of individual risk factors

- ⇨ overweight
- ⇨ smoking and smokeless tobacco use
- ⇨ physical inactivity and unfitness



Controlled trials

Controlled trials

1. Sport shoes versus marching boots
2. Differentiation of strain
3. Slow progression for a longer period
4. Cessation of smoking and snuffing

Injury, classification

Most of the injuries are

- ⇨ overuse injuries
- ⇨ sited in the lower limbs

Hva så ?

Forslag til tiltak

Tentative cause, officer cadets

- Most of the injuries were associated with ordinary military activities (75%)
  - marching
  - infantry running
  - field exercise
- A minority of injuries were related to sport and basic physical training (12%)

Injury - definition

Skade er en smerte, inflammasjon eller funksjonssvikt som:

- er lokalisert til muskel, skjelett eller bløtdelsvev
- er av en slik grad at rekrutten søker og får konsultasjon hos lege
- helt eller delvis kan være et resultat av ytre traume eller belastning i tjenesteperioden