Traffic accidents and injuries

A challenge in international cooperation.

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What is traffic medicine

- Questions concerning driving lisense and -ability,aging etc.
- Epidemiology
- Studies on biomechanics
- Studies on tecknical materal related to biology
- Initial treatment of injured at the scene of the accident,inhospital and rehabilitation
- Conection to the organization of emergency medical care
- Documentation on quality of treatment
- Toxicology,alcohol,medication,drugs

WHO ranging of severity of health problems on global basis

Lost lifes

Lost years of living

Day of stay in hospital

1. Cardio vascular diseases
2. Accidents
3. Cancer

Injuries to persons in Norway

Basis:

Hospital- and prehospital based

special registries on national

Level

Supported by:

National registry on causes of death,

of sick leave

Registry of occupational accidents

National Bureau of Statistics and the police registry on traffic accidents

National road and railway authorities,Insurance companies etc

Groups of accidents	%
Domestick accidents	28
Leisure time accidents	17
Occupational accidents	16
Sports accidents	16
Trafic accidents	9
Violence	4
Others	10
Totalt	**100**

N = 445 000

International accident research

Army based clinical descrition of injuries to person-WW 1

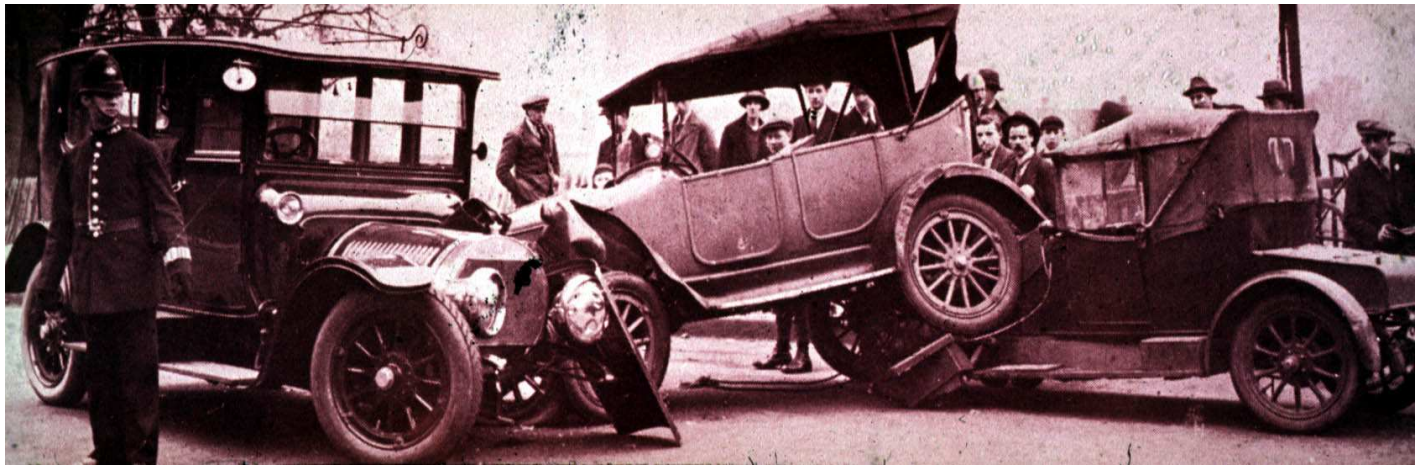
Occupational accidents between WW 1 an2

Proper documentation and injuries and systems of treatment WW2

Trauma research in USA,GB and Germany 1950-60

Increased efforts in this field from 1960 onwards

1927



Institutions with a long tradition in accident science.

USA - STAP - institute UCLA,later automotive industry

France - ONSER – Paris-automotive industry

Germany -Automotive industry along with hospitals,forensic medicine

Sweden - University of Gothenburgh,University Hospital,Tecknical University(Chalmers)

automotive industry

England - Birmingham University – UK

General- Biomechanical laboratories of ”desent” car factories

EURO Ncap(Delft etc.)

Norway-University hospitals in Oslo(1966) and Trondheim(1974)

But;Norway is dependant upon the strong science presented by the major laboratories internationally

Some project to be mentioned from Norway

Kirkeveiproject in Oslo 1965 (Ringkjøb, Blikra, Bö)

Trondheim from early 1970\ies

Cooperation with the Tecnical University;NTH-NTNU(-SINTEF)

Epidemiology

Traumatology

Biomecanical in cooperation with Gothenburgh, Paris,Birmingham, Stuttgart

Knowledge compulsory for scientists in trauma research

Biomechanics-low-high energy related to type of accident

Blut trauma-sharp trauma-what can we expect of injuries?

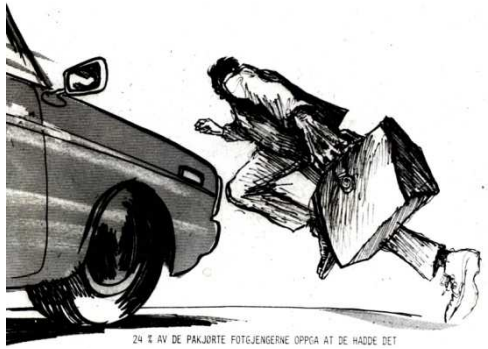
Accelleration-decelleration

NB-Angular accelleration(rotation)-spine-brain

Level of tolerance related to size,age,general physical condition

HALVPARTEN AV DE ELDRE PAKJØRTE FOTGJENGERNE HADDE FYSISKE HANDIKAP

29 % AV FOTGJENGERNE MELLOM 18 og 50 AR VAR PAVIRKET AV ALKOHOL



24 % AV DE PAKJØRTE FOTGJENGERNE OPPGA AT DE HADDE DET

Collection of information:

- Police
- Tecnical experts,_road ingeneers-(AAG=UAG etc)
- Medical personel at the scene of the accident(paramedics,doctors etc.)
- Initial treatment
- Final treatment in hospitals,including operations
- Rehabilitation
- Evt.autopsies
- Consultations with international experts institutions(EURO N-Cap etc.)

Tecnical information afforded:

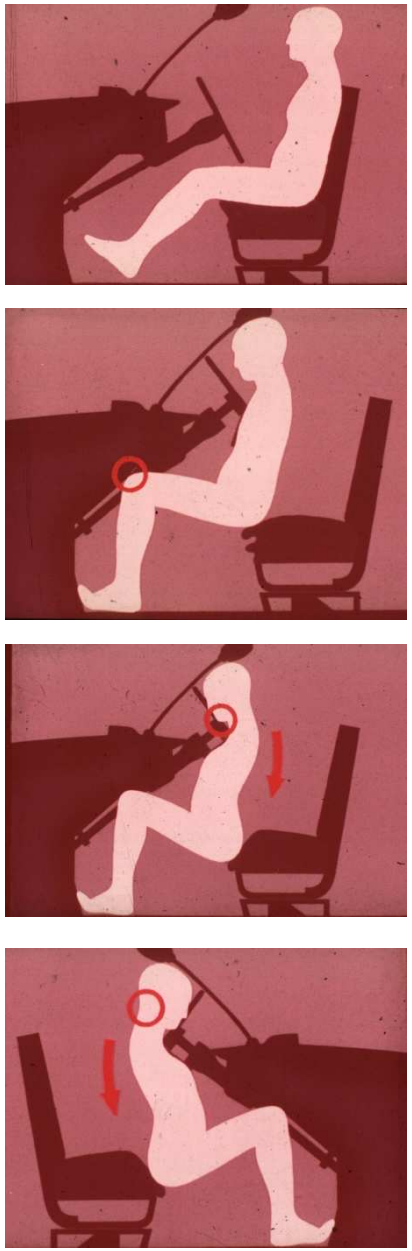
- Weather conditions,temperature
- Timing(day,night,illuminated,darkness)
- Factors leading to the accident
- Injury producing part of vehicle
- Speed
-Safety equipment at disposal and in use/not used
-Direction of impact
- Size and weight of the vehicles involved

Categories of road users treated i Norwegian hospitals

Car drivers	19,0%
Car passengers	15,9%
Trucks ,lorries (drivers,few pass.)	6,1%
Busses	1,3%
Motorcyclists	5,0%
Mopedists	6,0%
Pedestrians	13,3%
Cyclists	33,0%
	Total 100
	N=41 200

Any part of the car interior may give injuries

to unbelted car occupants



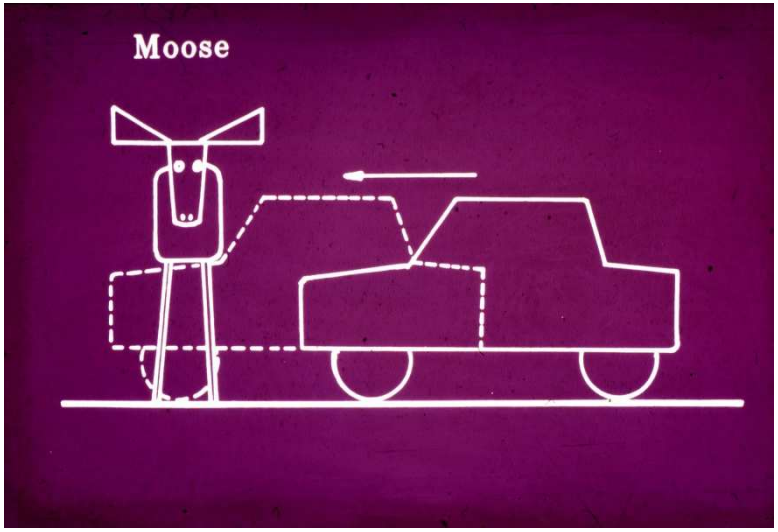
Biomechanical,surgical and forensic research internationally has give us detailed knowledge about the biomechanics of trauma in verey body region

Use of safety belt is by far the most efficient safety device in cars

10 airbags is less worth tha 1 belt in use

The belt is streching-prolonging-in the aim of reducing the initial presssure

Protective equipment quite efficient by collisions with big animals is now available



Bonnet goes down in the front

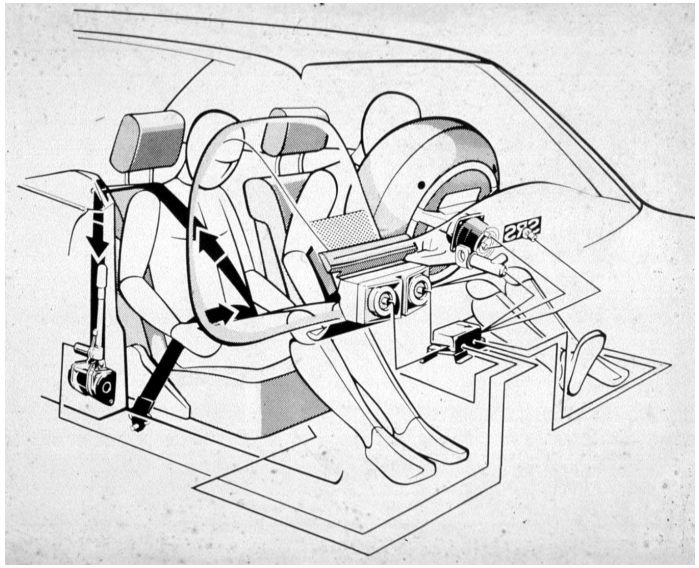
It goes upwards in the rear part

Important to reduce injuries to

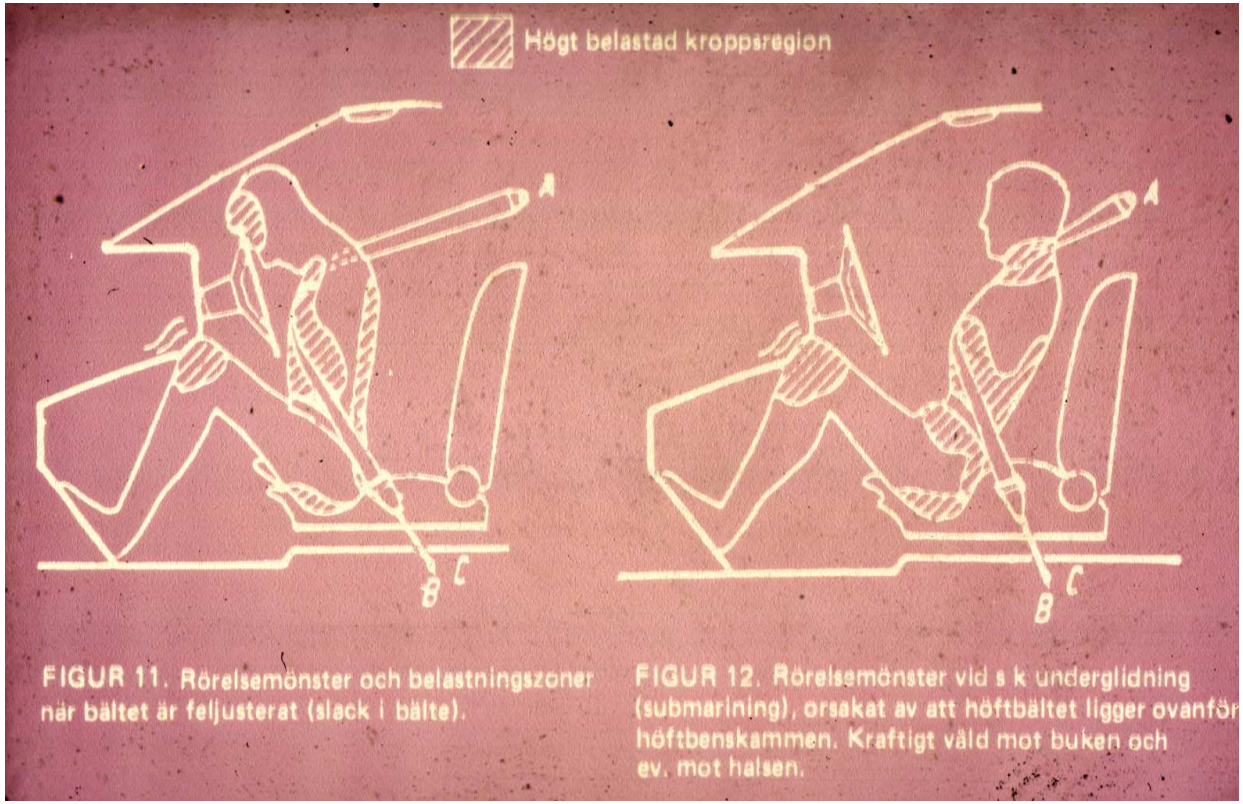
pedestrians hit by cars

Outside-pedestrian airbags

reduce the injury svereity



Wrong use of safety equipment may lead to injuries



FIGUR 11. Rörelsemönster och belastningszoner när bältet är feljusterat (slack i bälte).

FIGUR 12. Rörelsemönster vid s k underglidning (submarining), orsakat av att höftbältet ligger ovanför höftbenskammen. Kraftigt våld mot buken och ev. mot halsen.

By using safety equipment the occupants may say uninjured also by severe destruction of the car

Small car hit by a heavier one

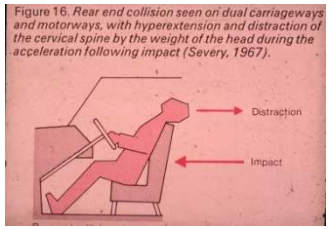
4 fatal caes in the small car-minor injuries in the big one

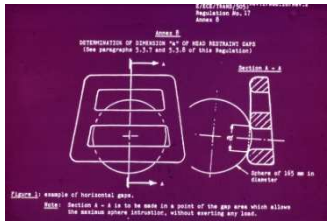
Rear-end impacts usually give less severe injuries

But there are expetions-NB angular accelleration

Shape and position of the neck protection related the length of the occupant

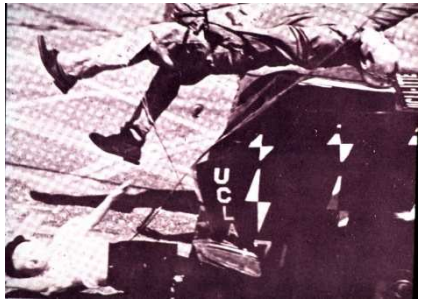
Many cars have now ”active” nech protection in the front seats





Mechanism of injury seen by pedestrians hit by cars

- Speed
- Shape of car/lorry front
-Hight of pedestrian related to the front of vehicle
-Front angle of the car(>-< 30degrees)
-Solidity of impacting part of vehicle
-NB rwear par of bonnet,wind shield frame
  and fatal head injuries-(airbag)



- Third contact with the ground
- Fourth contect by roll ovver accidents

International gained knowlede about mechanism of accident and of injuries seen by cyclists.

- 91% are single accidents
- Turn over
- High speed
- Slippery road(wet,ice,sand9
-Collision with fixed obstacles
-Hit by cars
-Brake failiure
-Bags or clothes in front wheel etc.

Main injuries:

- Head Neck
- Arm Shoulder
- Lower leg few inj.seen in the trunc-but may be severe

International experience with motorized 2-wheelers

Majority single accidents-speed---

Sliding on slippery road,wet,sand,ice(seldom)

Collision with fixed obstacles(trees,poles,rocks)

Collision with cars

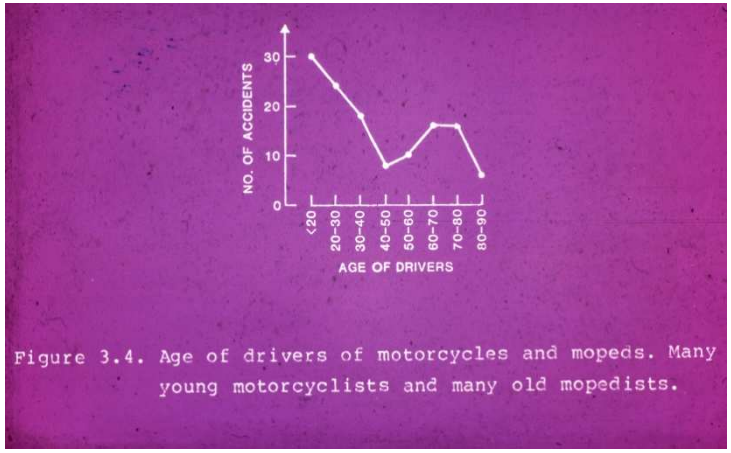


Figure 3.4. Age of drivers of motorcycles and mopeds. Many young motorcyclists and many old mopedists.

Injuries frequently seen:

- Head-neck
-Shoulder
.-Lower leg,ankle
- Knee,tigh
- Abdomen
- Thorax

Injury reducing equipment:

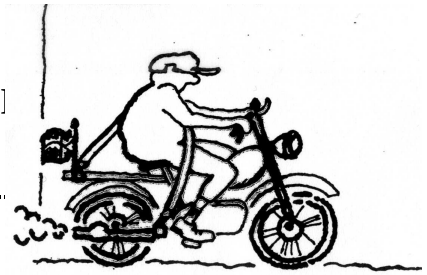
Helmets with 3 layers(2012)

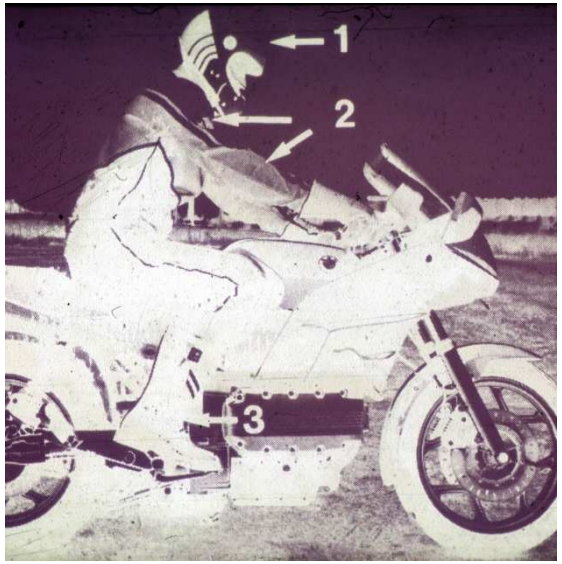
Airbags:Neck,shoulder,back

knee,

abdome

NB no belt-------





Safety measures and equipment gained by international cooperation

3 point belt in every seat and every car/truck,bus(why not trains?)

Airbags wherever useful(up to 10)

Neck protection in every seat

International norms for ground level of cars(takes time-EU etc.)

Zones for compression front and rear

Engine under the car by frontal impacts

Strong A-pillar

Bonnet down in front-up in rear

Pedestrian airbags(partly available)

Take every new device prooved to reduce injuries to person by alle types of traffic accidents(helmets,airbags,radars,infrared illumination by fog and darkness etc.)

Conclusions:

Accident preventive and injury reducing regulations,behavour and tecnical efforts/equipment must be an obligation to authrities and road users;

Locally In must be continuous-not only bu campaigs.

Nationally Numerous international-national studies support this

-internationally

NB!IT WORKS!