

PEOPLE WITH NMD AND MODERN TECHNICAL SOLUTIONS FOR DRIVING A CAR

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Background

The ability to drive a car can fundamentally improve the life situation of disabled persons enabling them to regain functional abilities and to participate in society. Therefore one of the aims of the rehabilitation program should be to train the disabled persons to drive a car as soon as possible.

Objectives

Driving a car demands coordination of sensory and motor activities in a dangerous environment using expensive equipment.

Outpatient clinic for disabled drivers

- **Medical doctor – spec. in FMR**
- **Psychologist**
- **Mechanical engineer**
- **Instructor of practical driving**

Methods

- **Anamnesis**
- **Clinical examination**
- **Functional assessment**
- **Testing on Mediatester**

- **Psychological testing***
- **On road testing***

MEDIATESTER



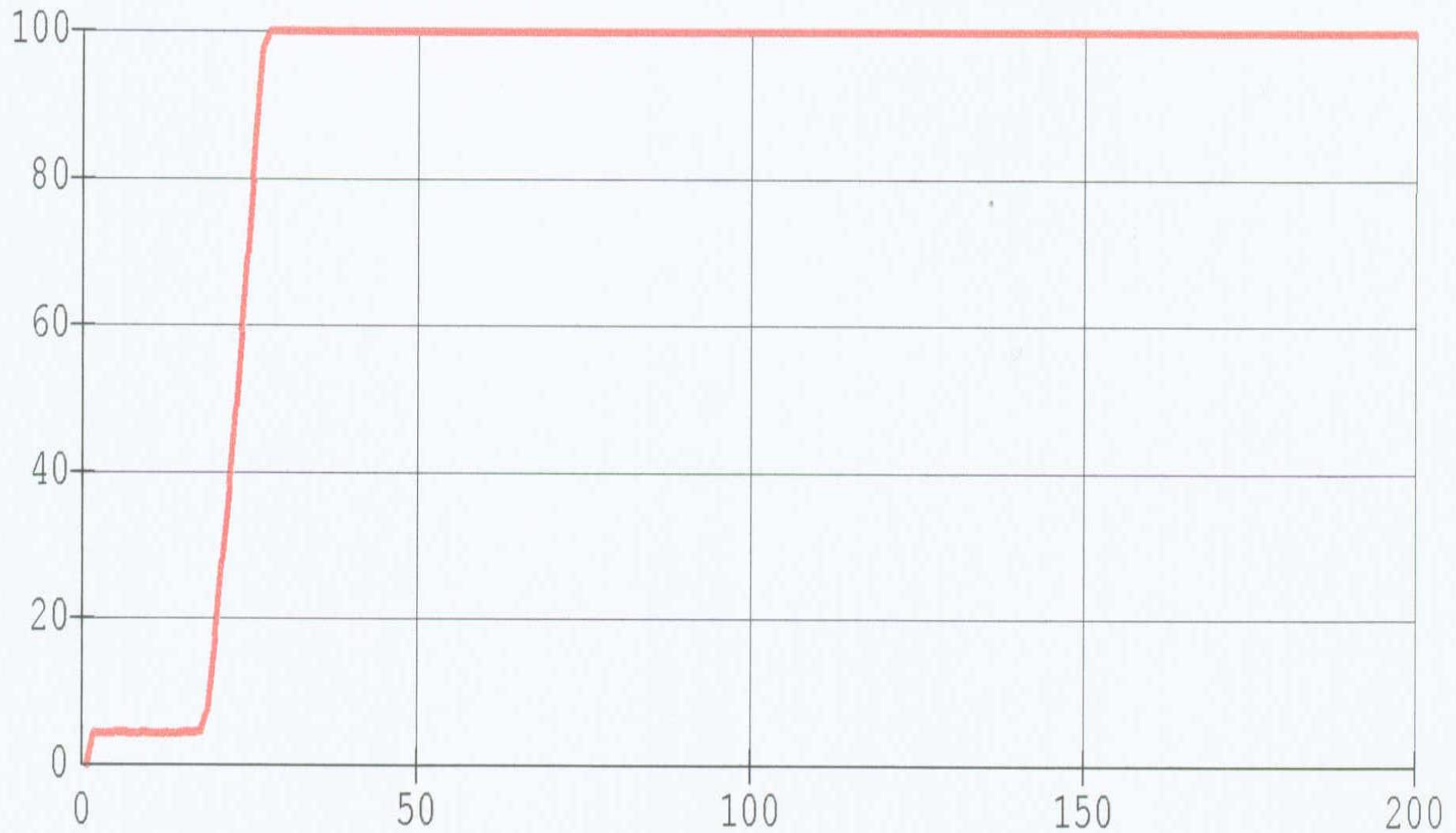
MEDIATESTER



Mediatester - measured parameters

- **The force applied when braking**
- **The force applied when turning a steering wheel**
- **Reaction times**
- **Driving simulation – gas pedal control when following a curve on the monitor**
- **Field of vision**
- **18-light test measuring reaction times and appropriateness of reaction to randomly activated lights**

Brake load (Kg)



Time (20 s) Peak Value = 100 Kg

Curve R with R Hand (Nm)



Time (20 s) Peak Value = 27 daNm

ACOUSTIC Reaction Time (Millsec.) :

404

VISUAL Reaction Time (Millsec.) :

476

Reaction time to multiple visual stimulus (Millsec.)



796



628



680



684



688



576



5.000

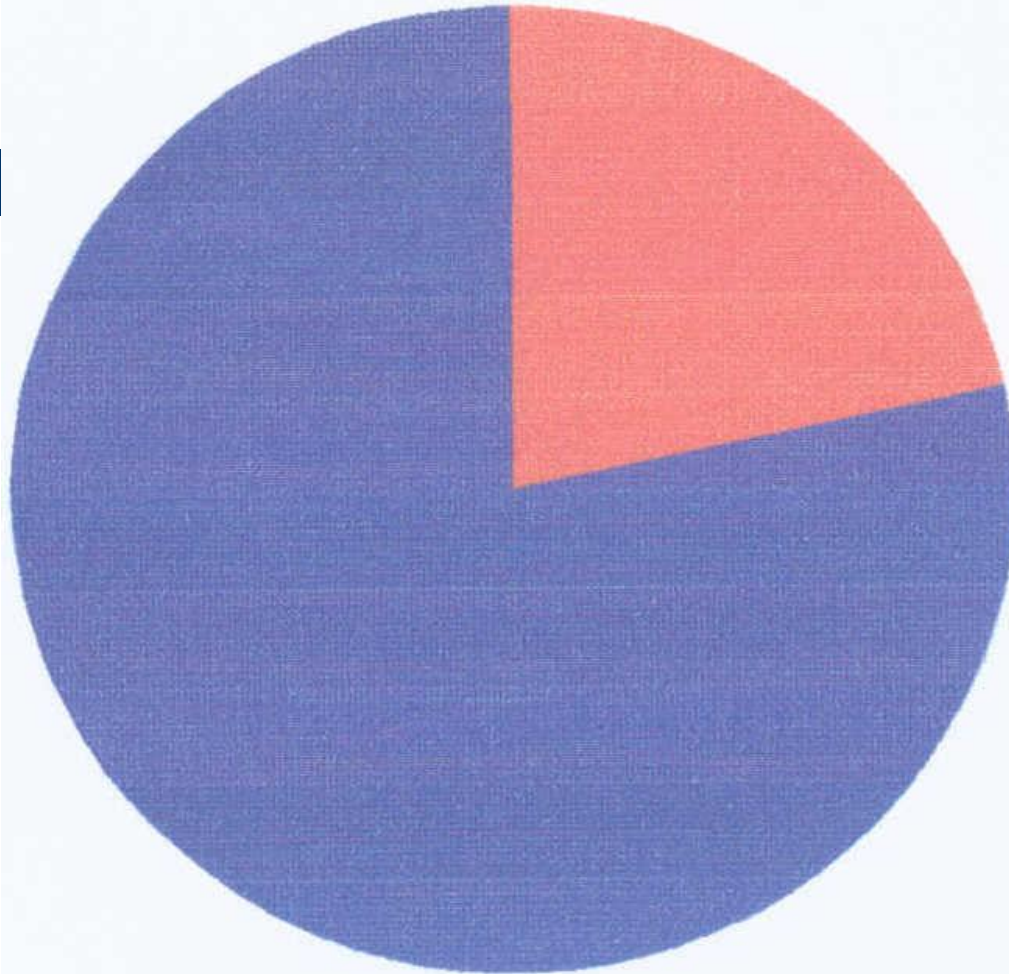


5.000



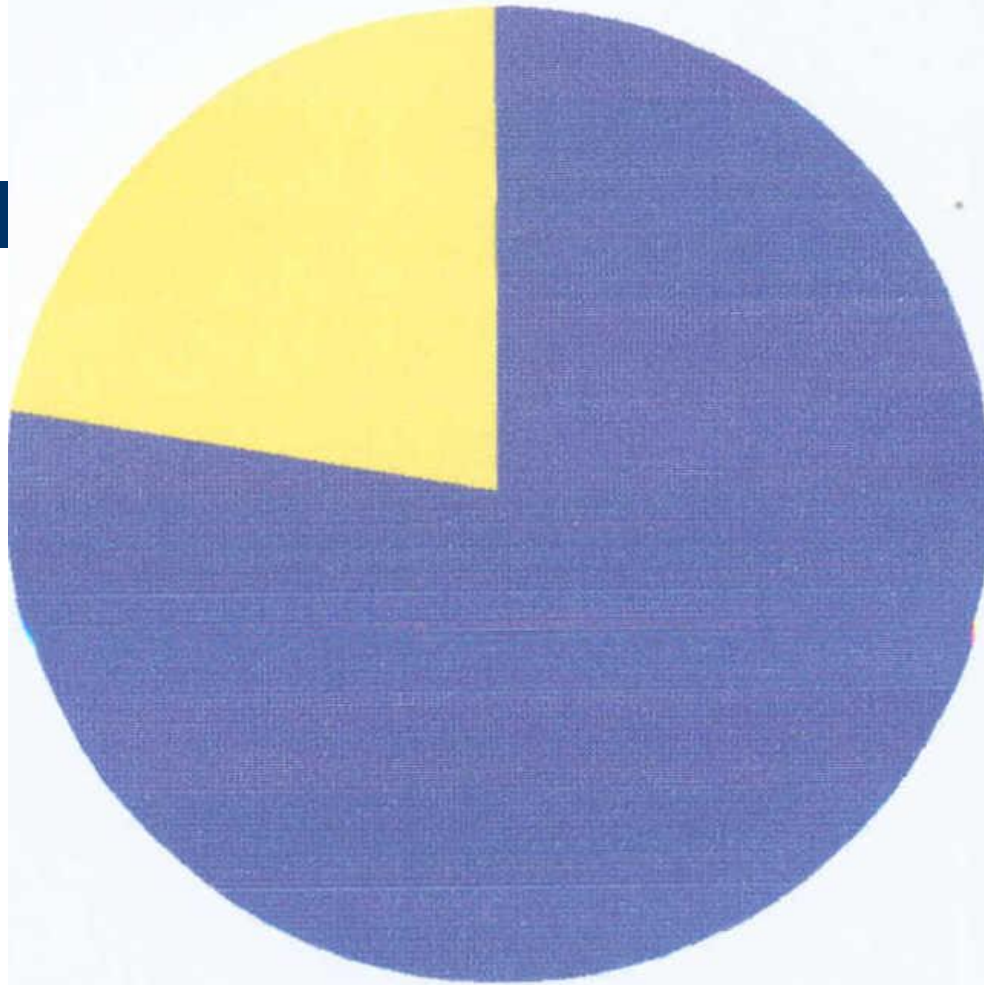
5.000

Test Pole R



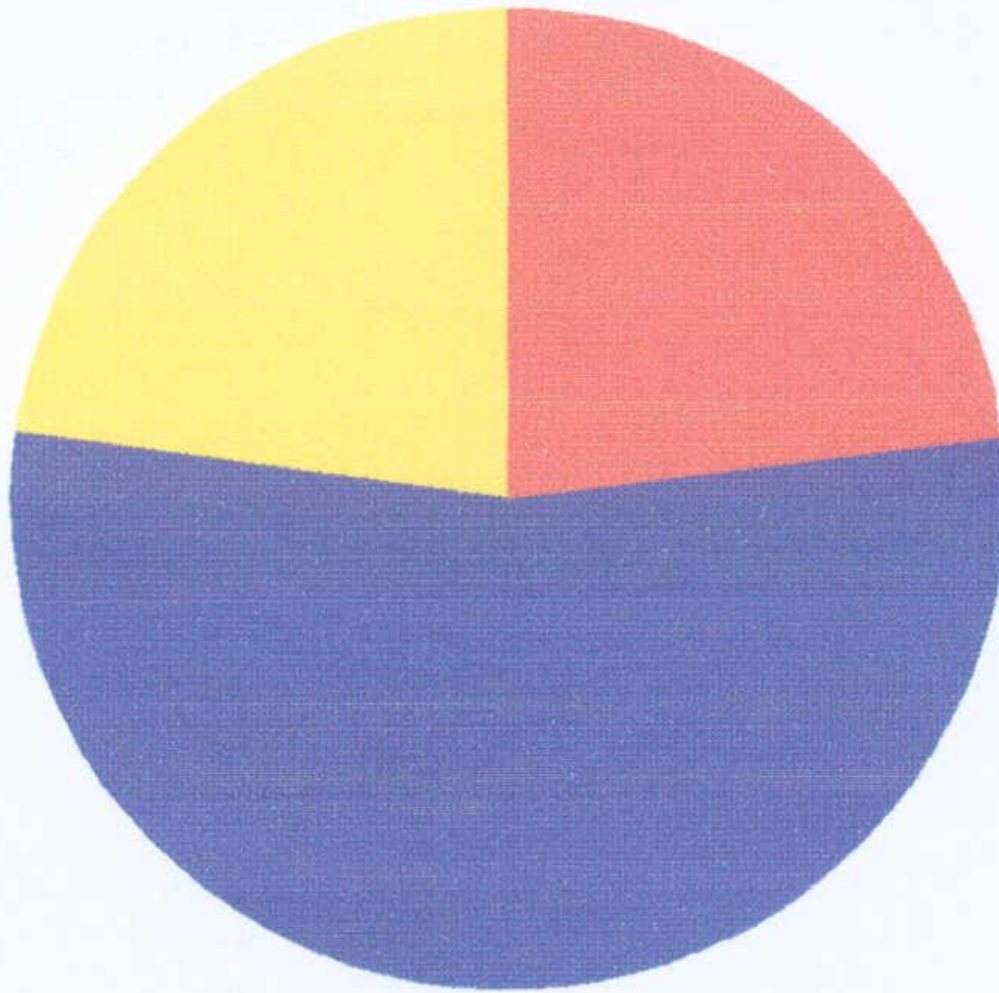
Angle 78°

Test Pole L



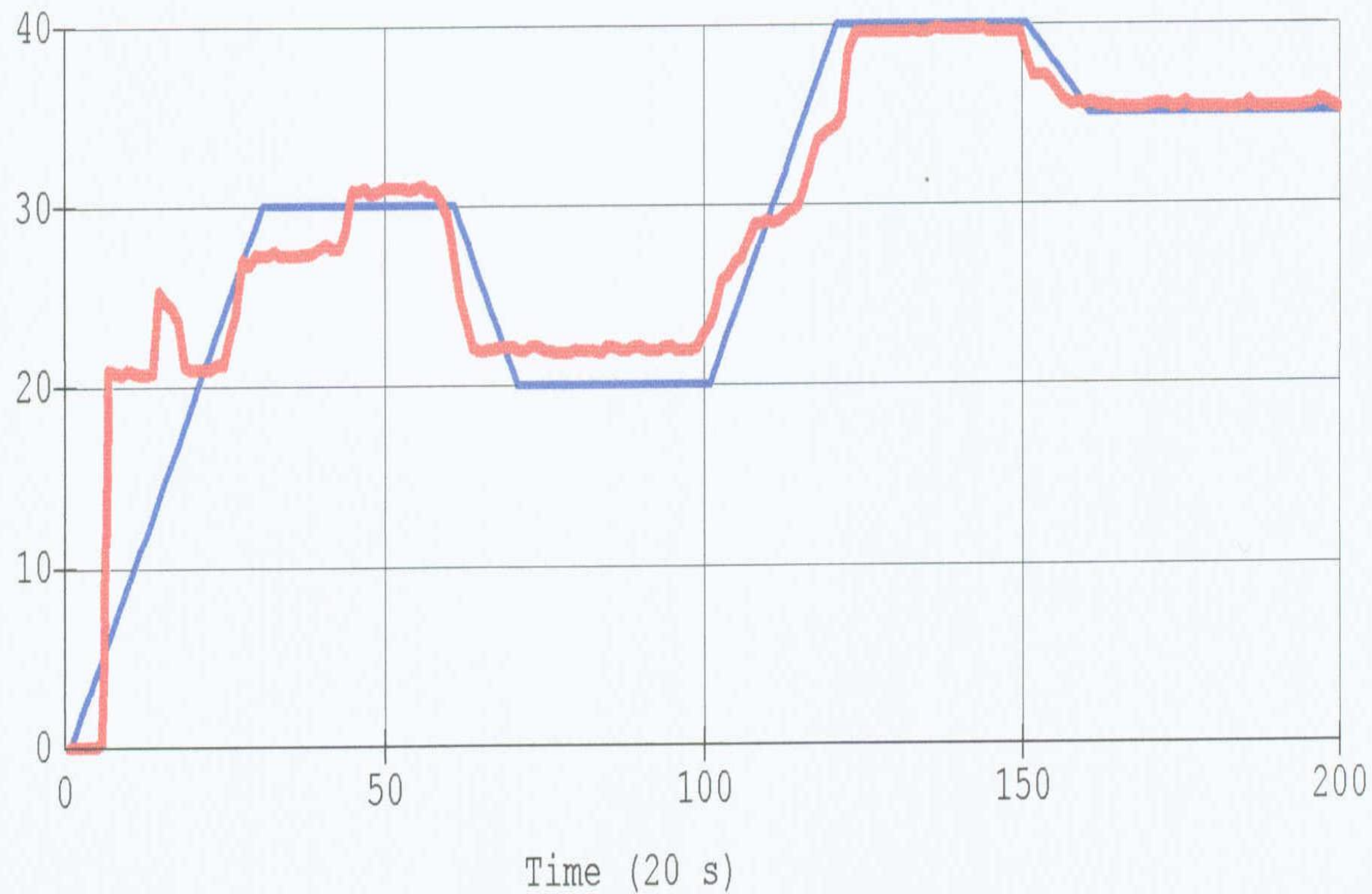
Angle 80°

Test Pole L - R

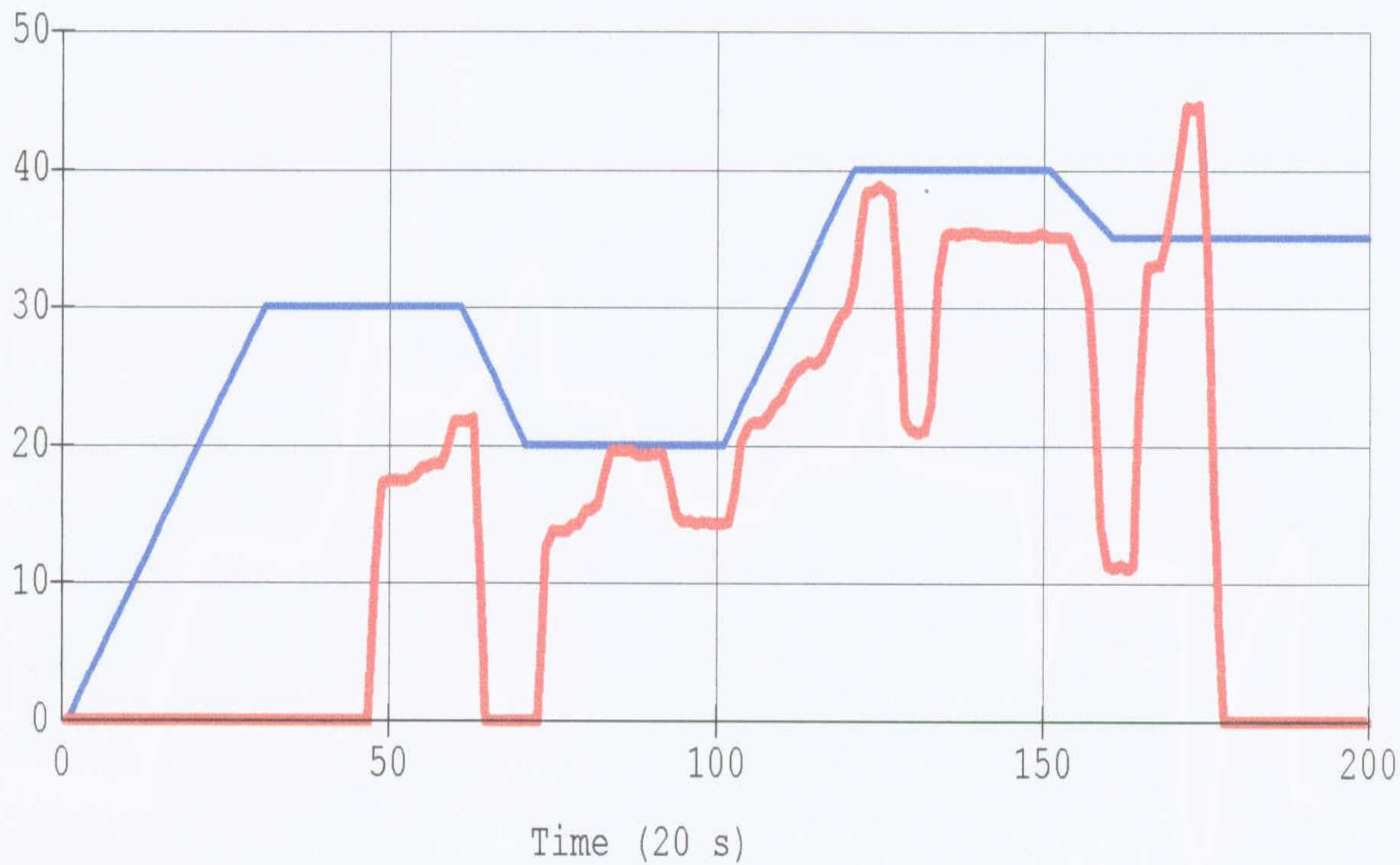


Angle Left 82° Right 83°

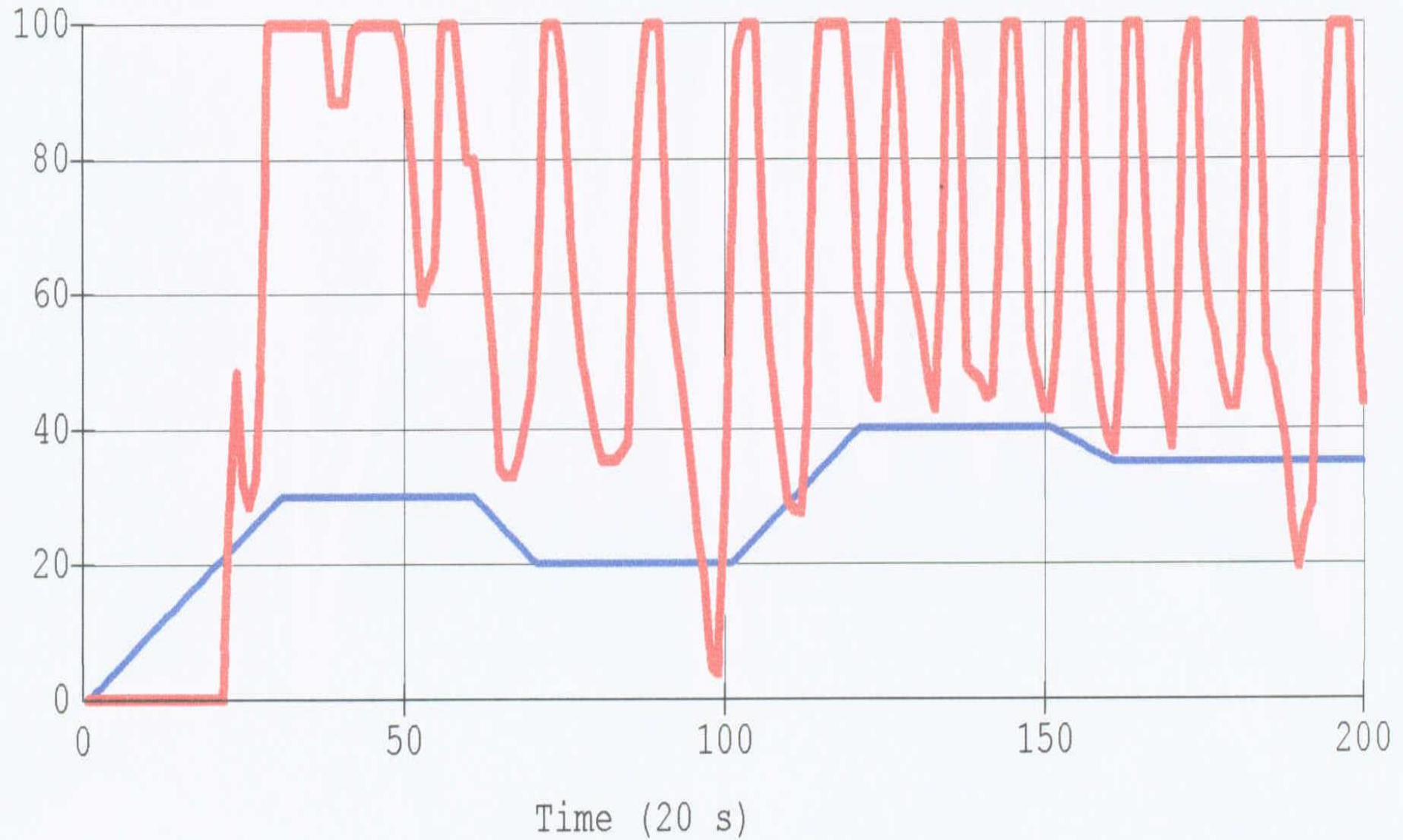
Modulability A



Modulability A



Modulability A



Study

68 healthy subjects

- A up to 25 years of age**
- B 25-45**
- C 45-65**
- D over 65**

Study

196 patients

44 head injury

39 lower limb amputation

31 cerebrovascular insult

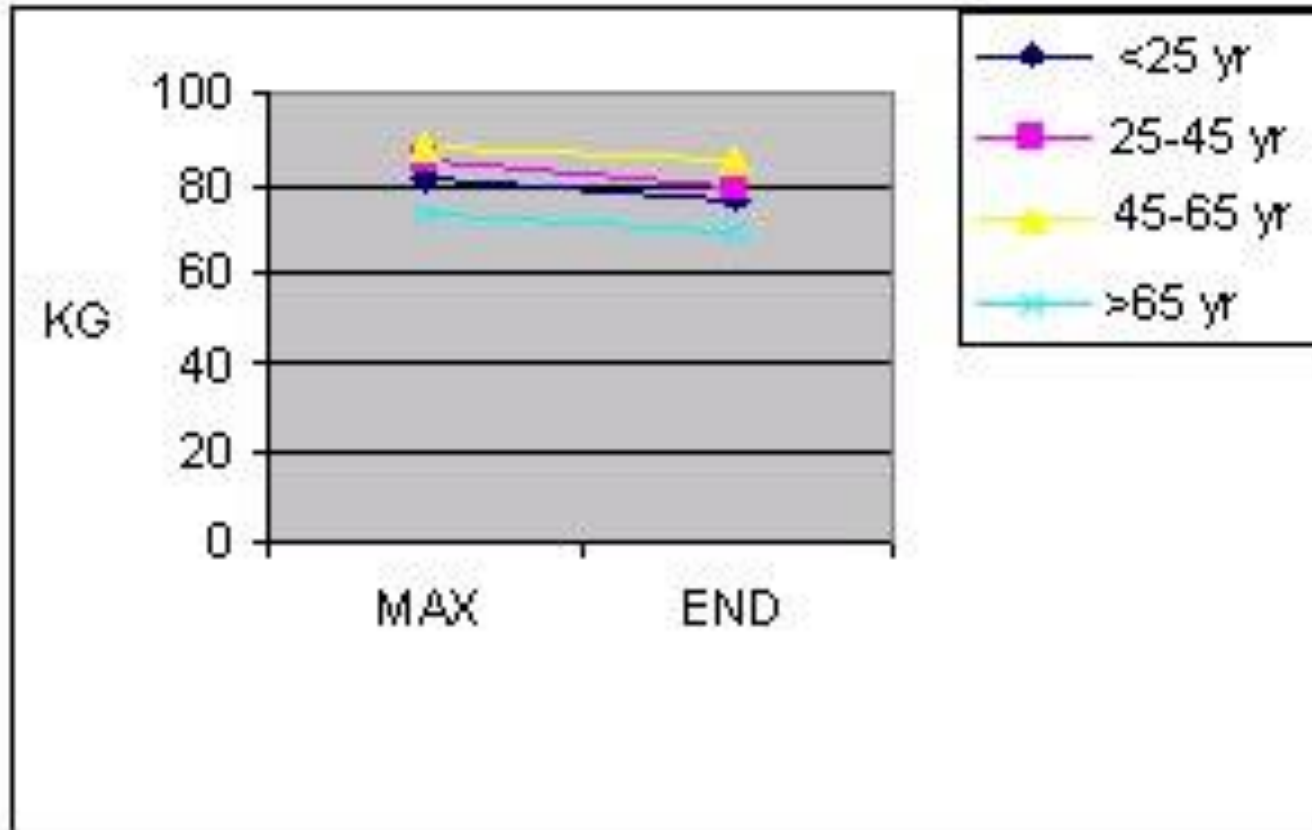
38 neuromuscular diseases

28 spinal cord injury

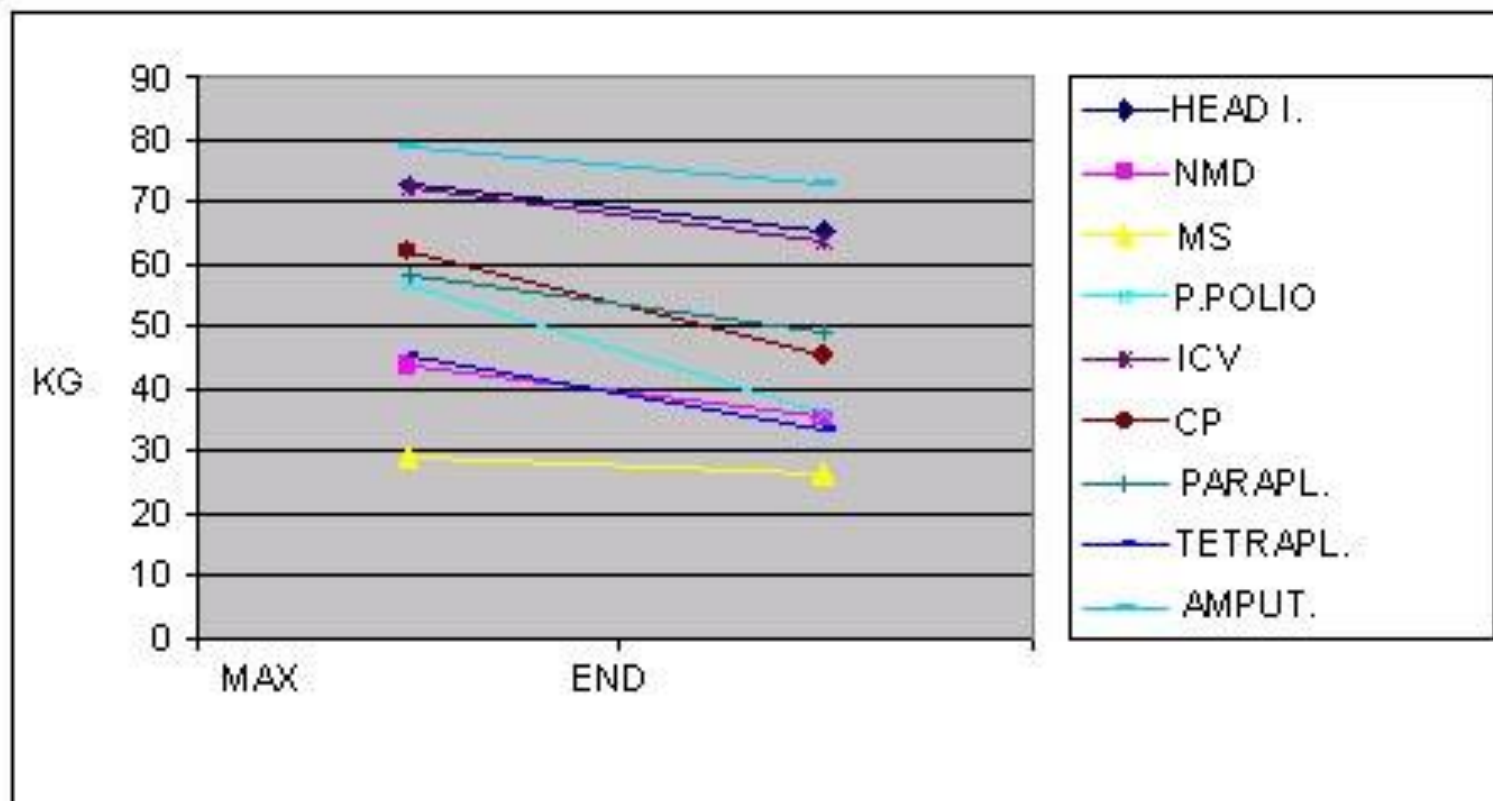
9 cerebral palsy

7 multiple sclerosis

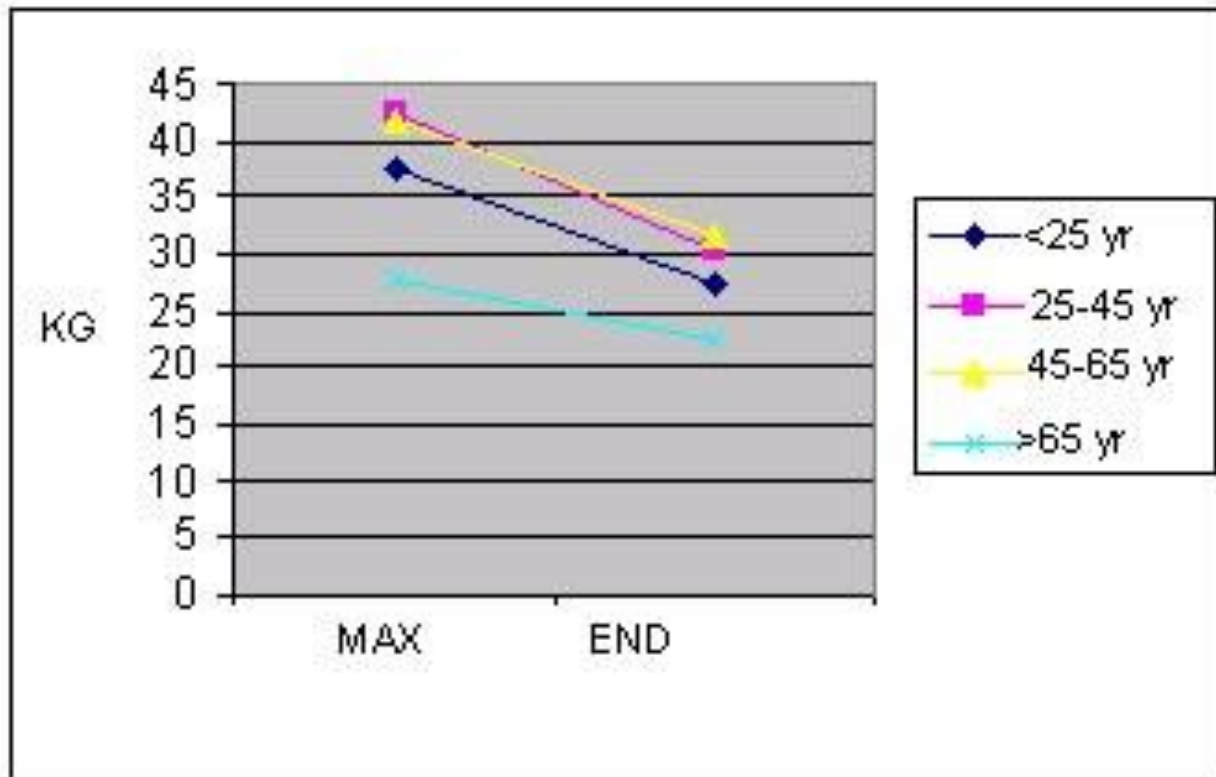
Braking load – healthy persons



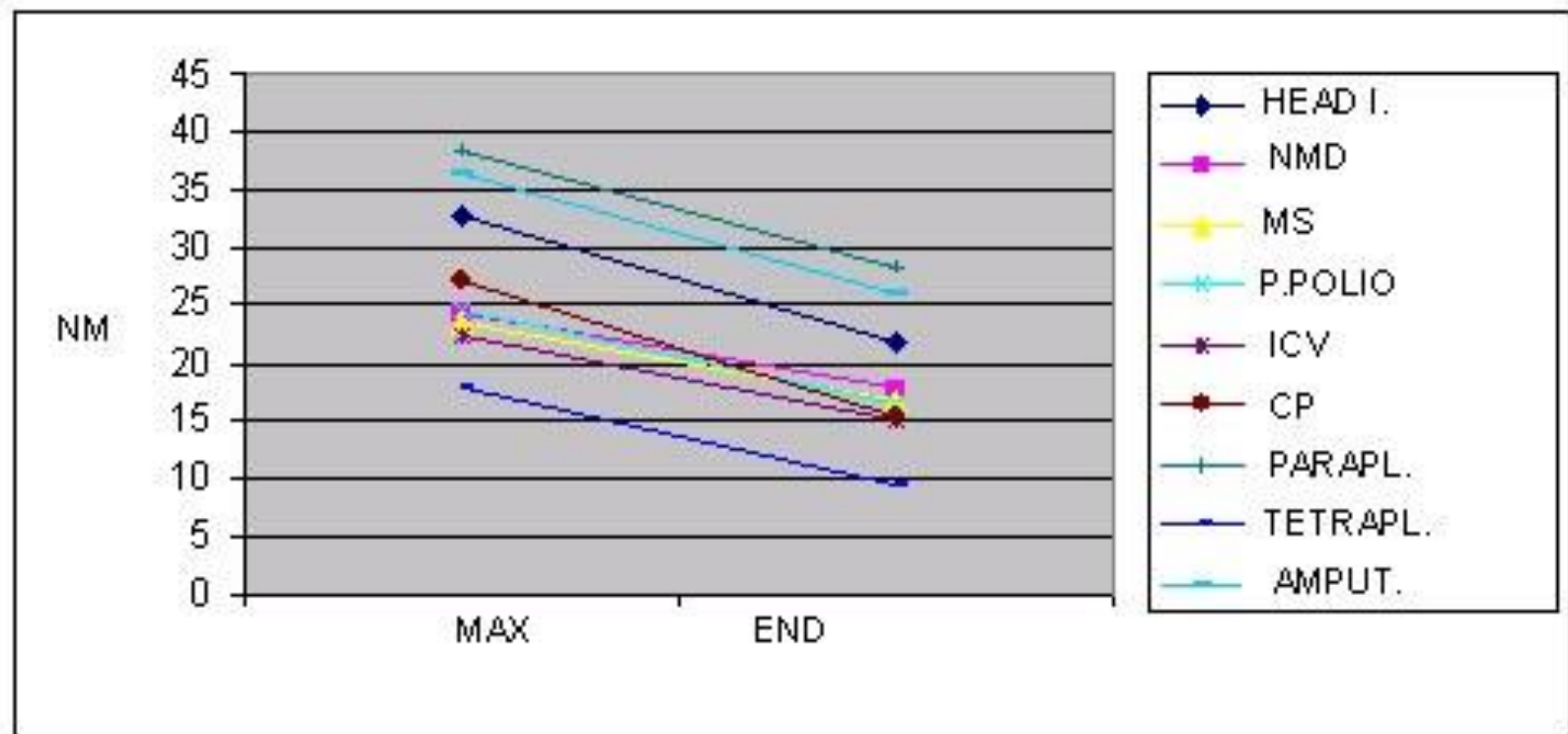
Braking load - patients



Torques by turning steering wheel (both hands to the left) – healthy persons



Torques by turning steering wheel (both hands to the left) – patients



Statistics - regarding the muscle force used to brake and to turn a steering wheel

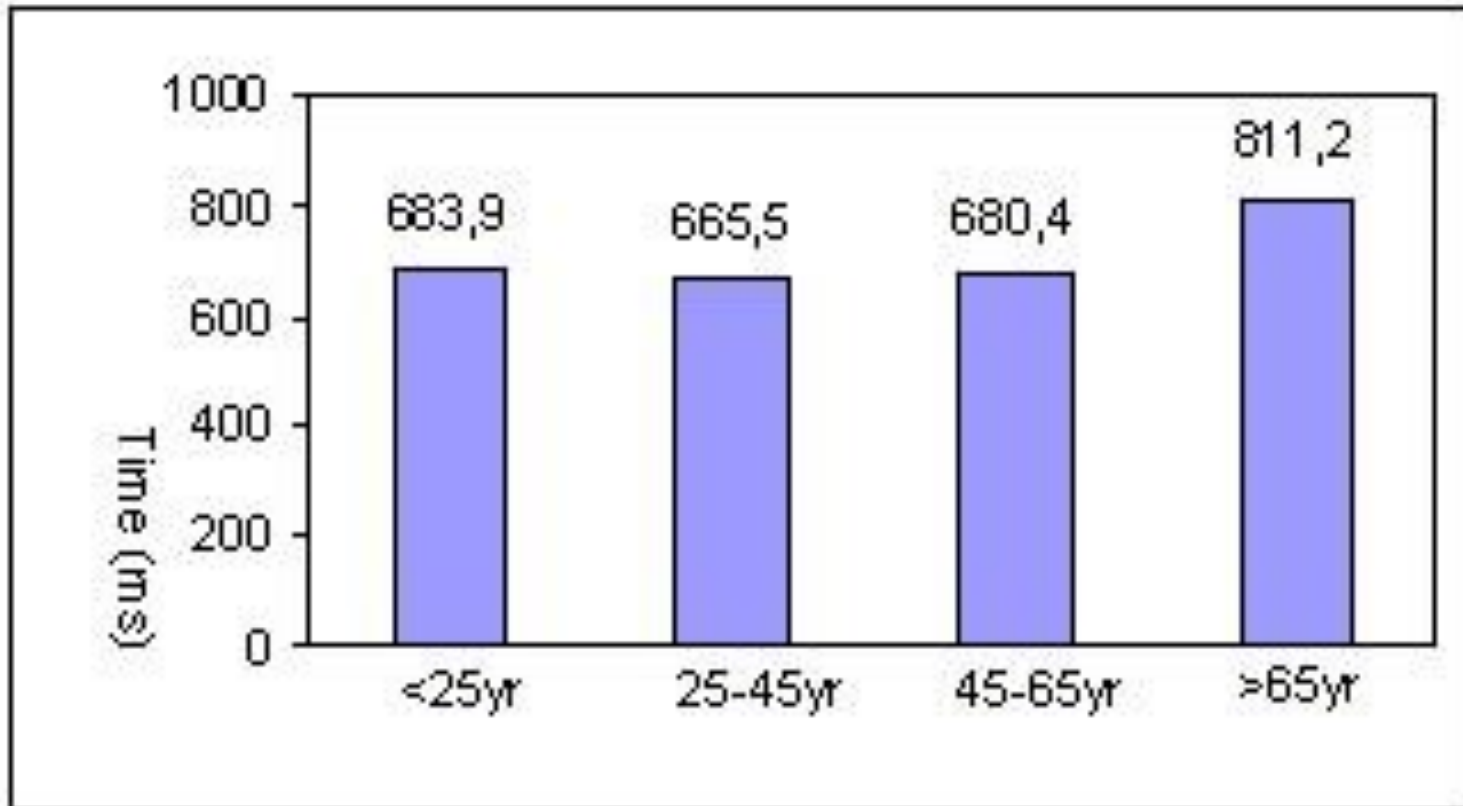
($p > 0,05$)

(A,B,C,D), AMPUT, PARAPL

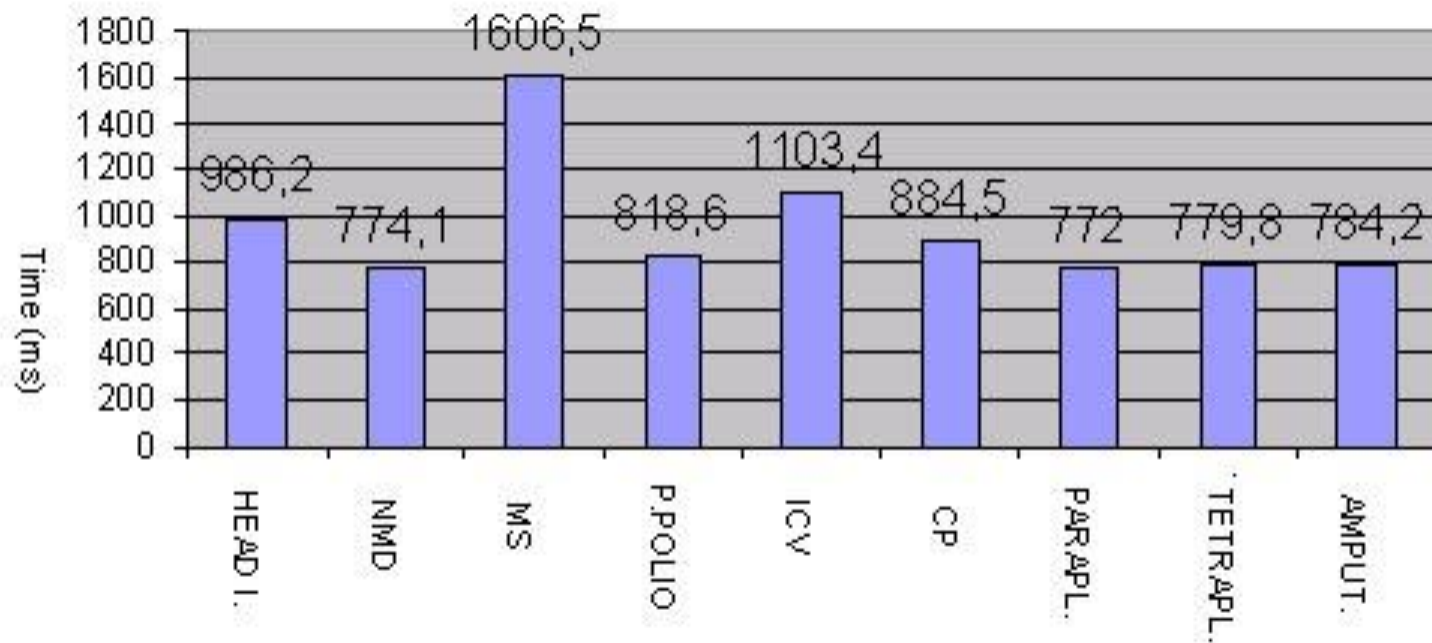
($p < 0,05$)

**(A,B,C,D), HEAD I, NMD, ICV, CP, TETRAPL,
P.POLIO, MS**

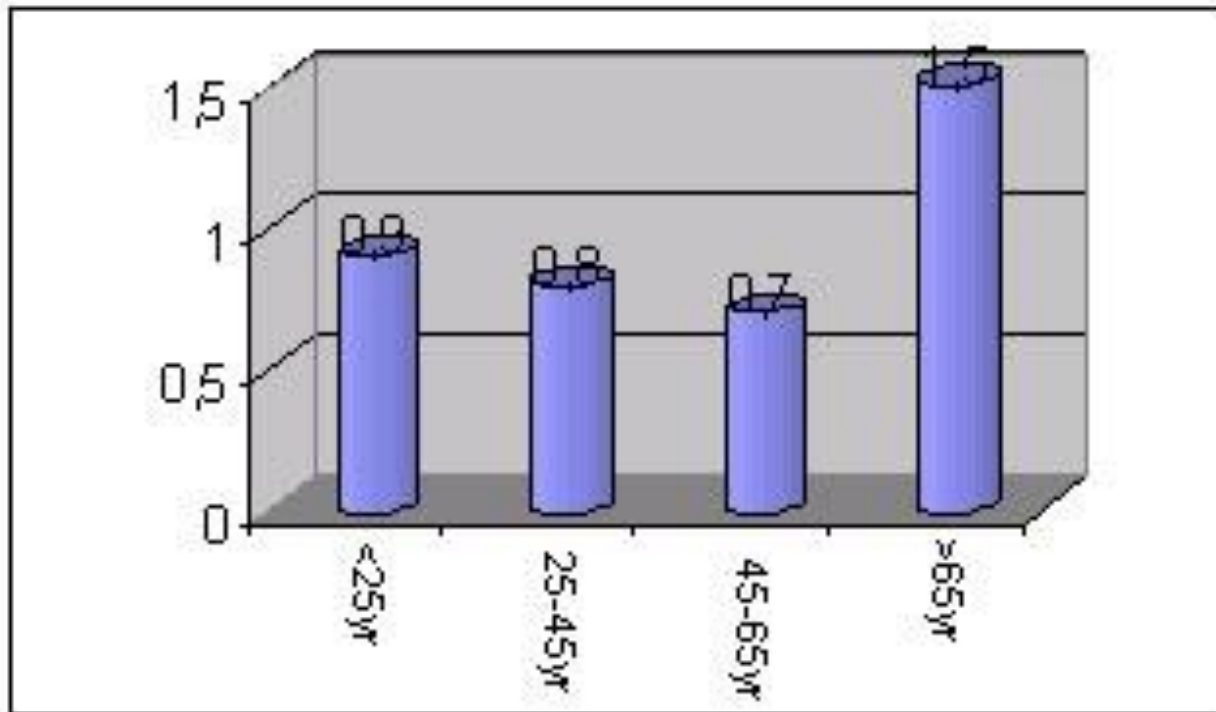
Reaction times – healthy persons



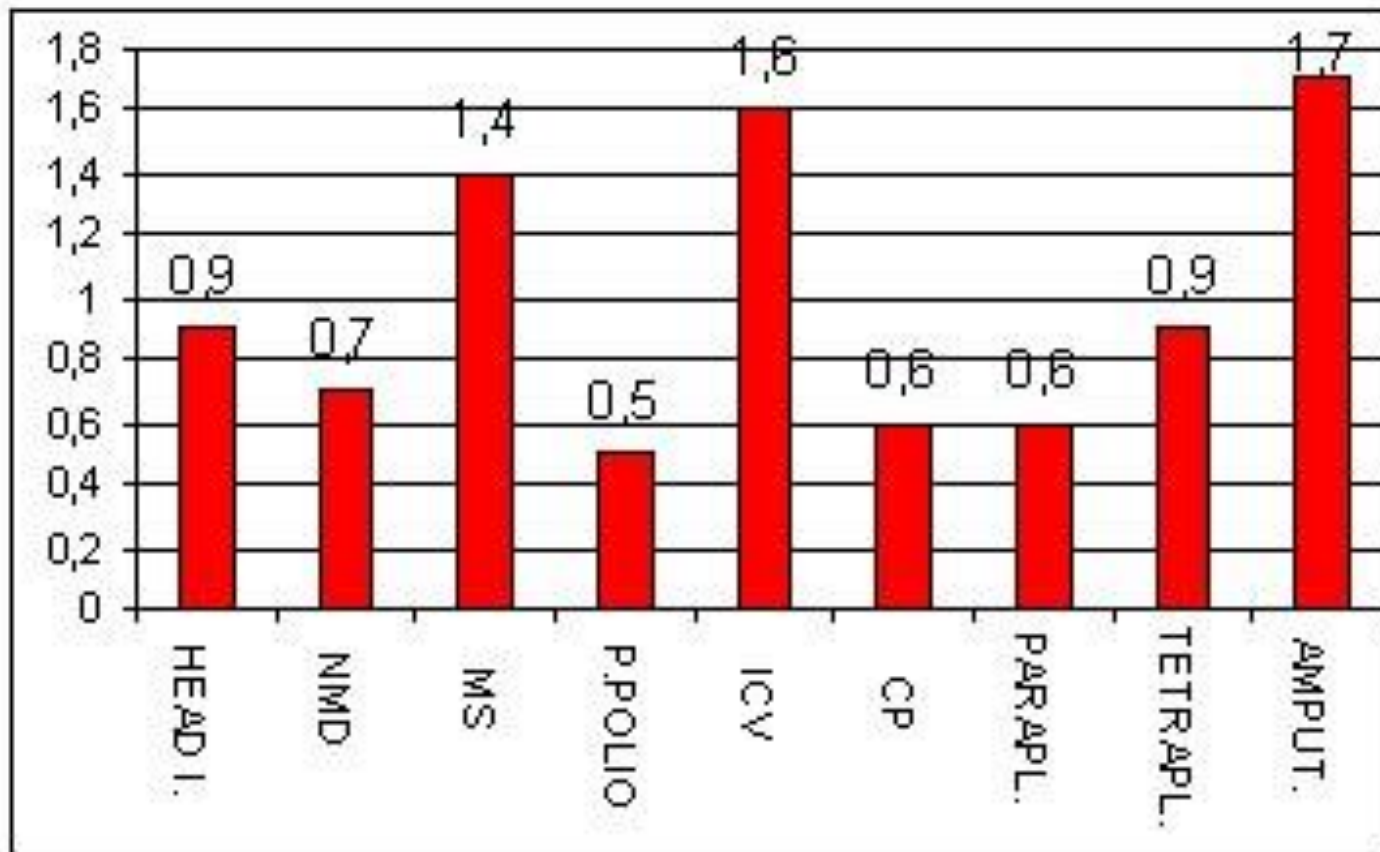
Reaction times – patients



Test 9 lights – number of mistakes (healthy persons)



Test 18 lights – number of mistakes (patients)



Statistics - regarding the results of the 9-light test

$p > 0,05$)

(A,B,C), PARAPL, TETRAPL, NMD, P.POLIO

$(p < 0,05)$

(A,B,C), D, AMPUT, HEAD I, ICV, CP, MS

Final estimation

Able to drive a car without limitations.

Able to drive an adapted car (the determination of adaptation).

Able to drive by limiting radius to ____ km away from the place of residence.

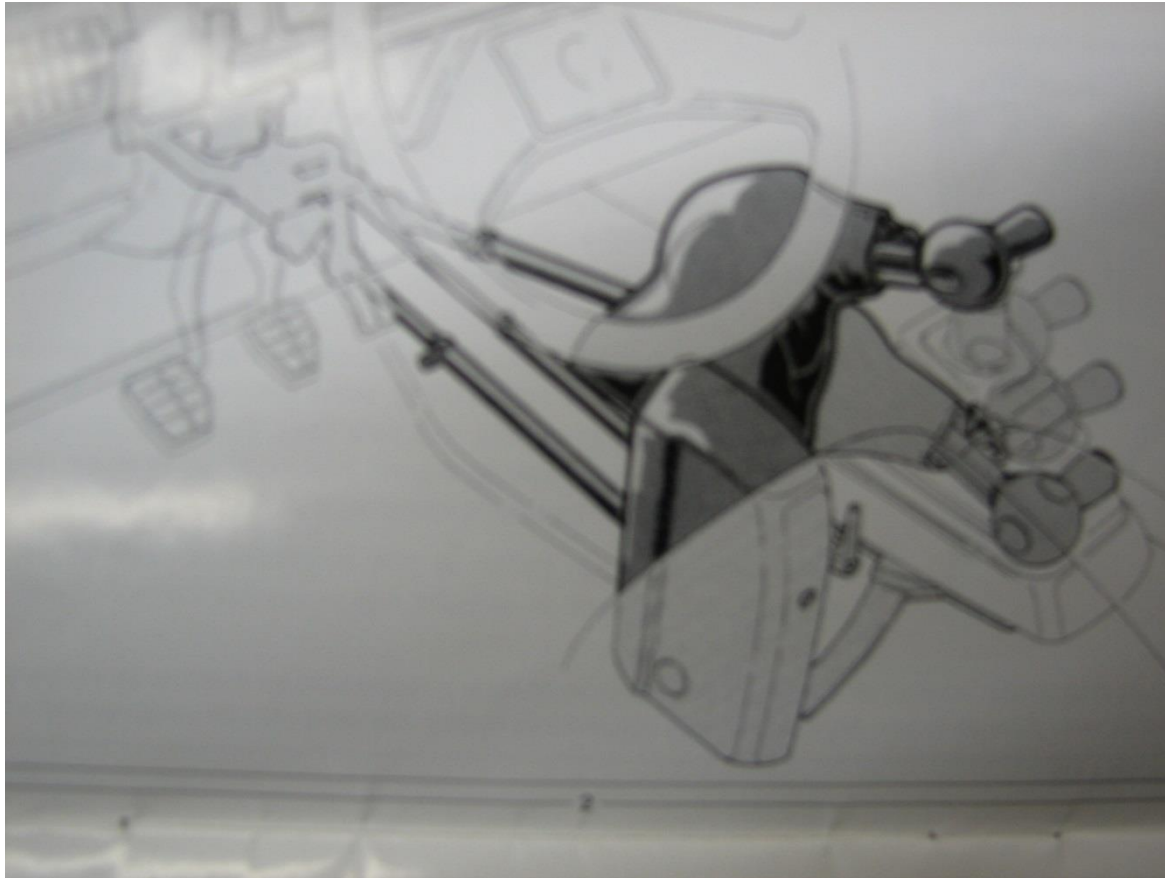
Able to drive only during the day.

Able to drive only in the company of other person.

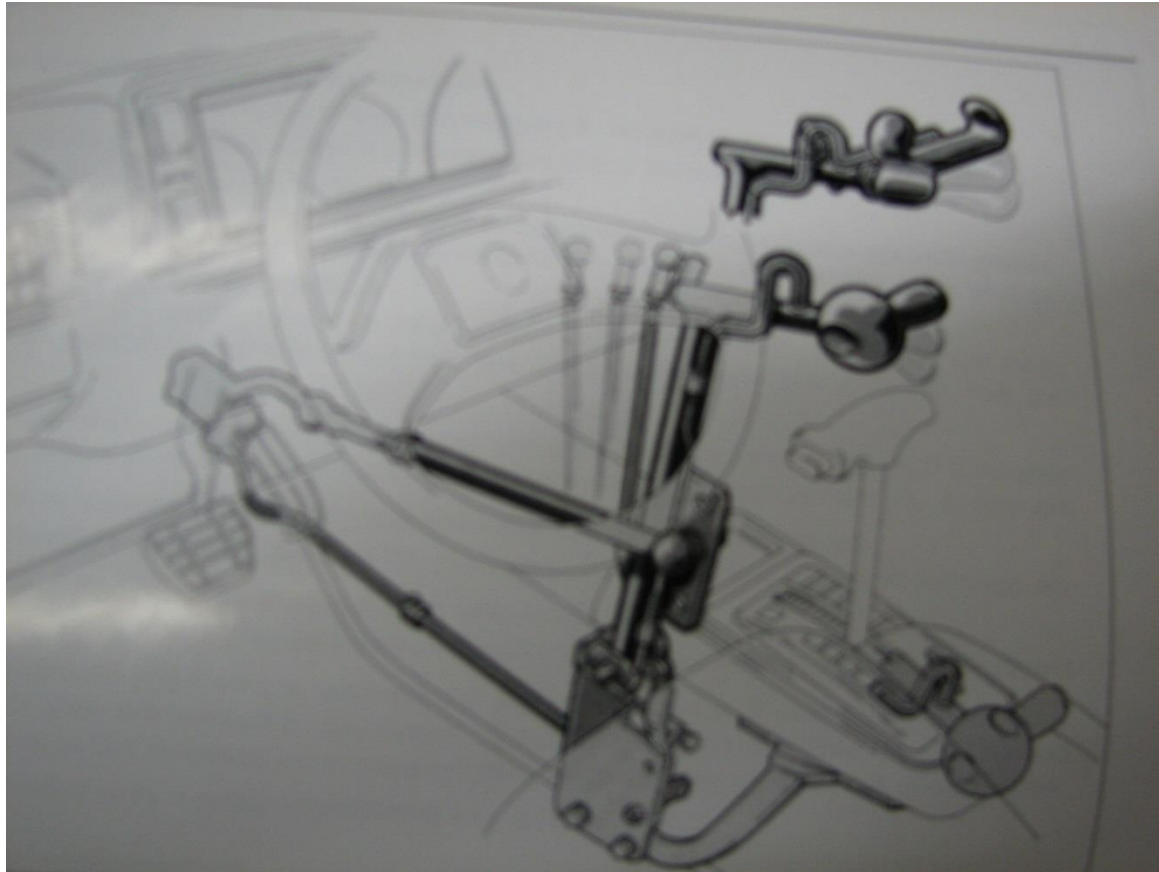
Incapable of independent driving, not even with limitations.

Requires special training on adapted vehicle (definition).

HAND OPERATED CLUTCH, BRAKE AND GAS



HAND OPERATED BRAKE AND GAS



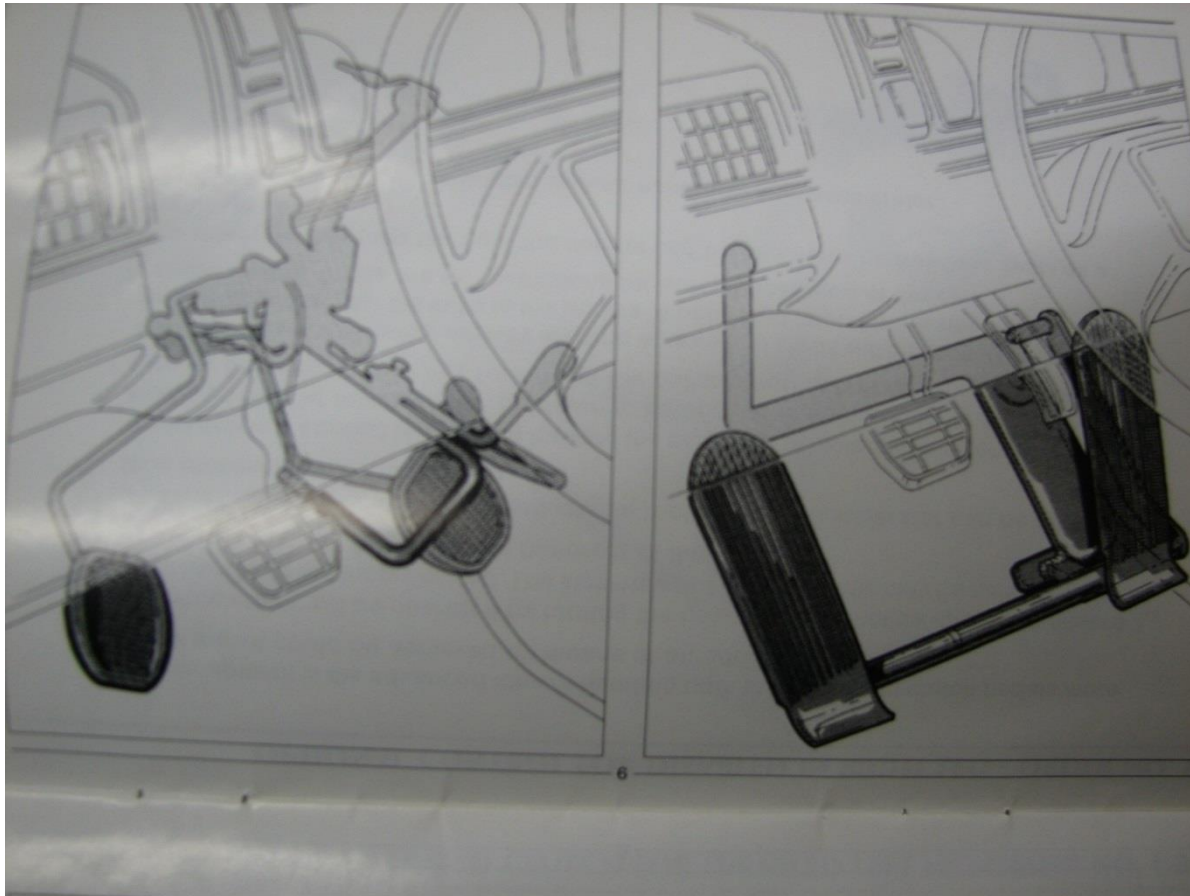
HAND OPERATED BRAKE AND GAS



HAND OPERATED BRAKE AND GAS



TRANSFERRING OF GAS PEDAL FROM RIGHT TO THE LEFT SIDE



DRIVING VIA JOYSTICK



DRIVING VIA JOYSTICK



DRIVING VIA JOYSTICK



DRIVING VIA JOYSTICK



ROTATING SEAT



LIFT FOR WHEELCHAIR



RAMP



VAN WITH THE LIFT



DRIVING SIMULATOR

