



Deutscher Behindertensportverband e.V.
National Paralympic Committee Germany



The influence of the sit ski position on performance and daily life activity – a case report

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Medical history

- 24 year old male athlete
- Menigomyelocele
- Hydrocephalus
- Malformation (Pelvis, Legs)

Medical history (x-ray)



Classification

	Light R	Ligth L	Pin R	Pin L
L3	2	2	2	2
L4	0	0	0	1
L5	0	0	0	1
S1	0	0	0	0

- ASIA Sensibility Test

Classification

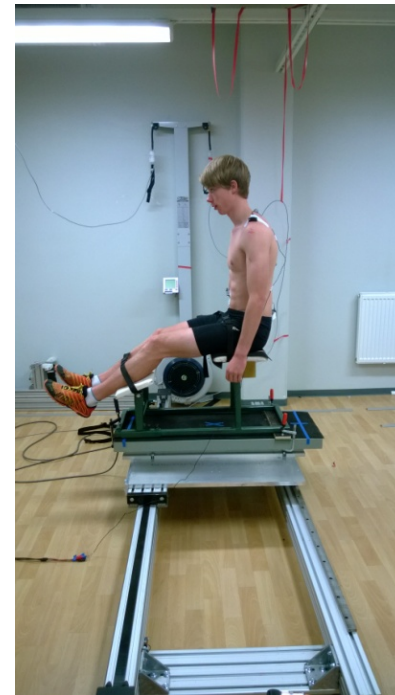
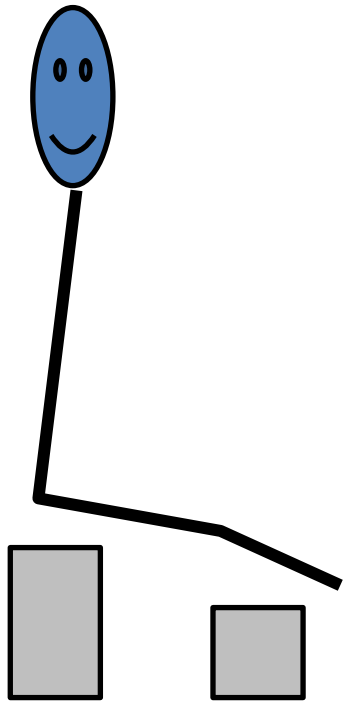
		Muscle Strength R	Muscle Strength L
Hip	Flex	5	5-
	Ext	0	0
	Abd	0	0
	Add	5	5-
Knee	Flex	5	5-
	Ext	5-	5-
Ankle	DorsFlex	0	0
	PlanFlex	0	0

- Muscle testing

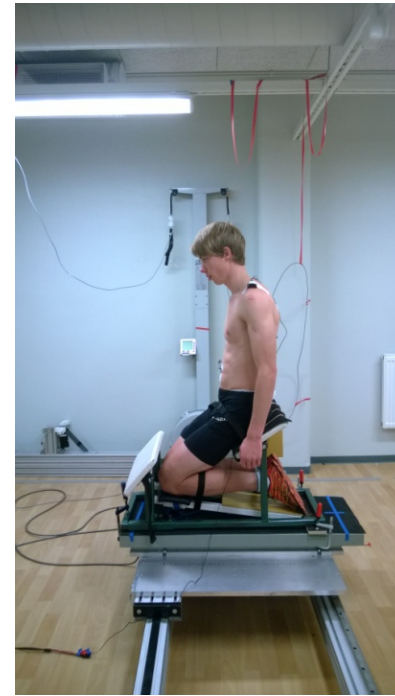
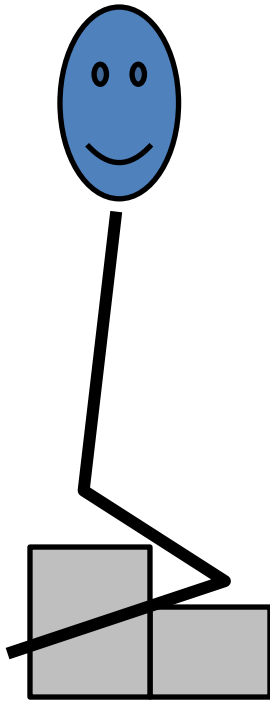
Classification

class LW 11,5

Sitting position - old



Sitting position - new

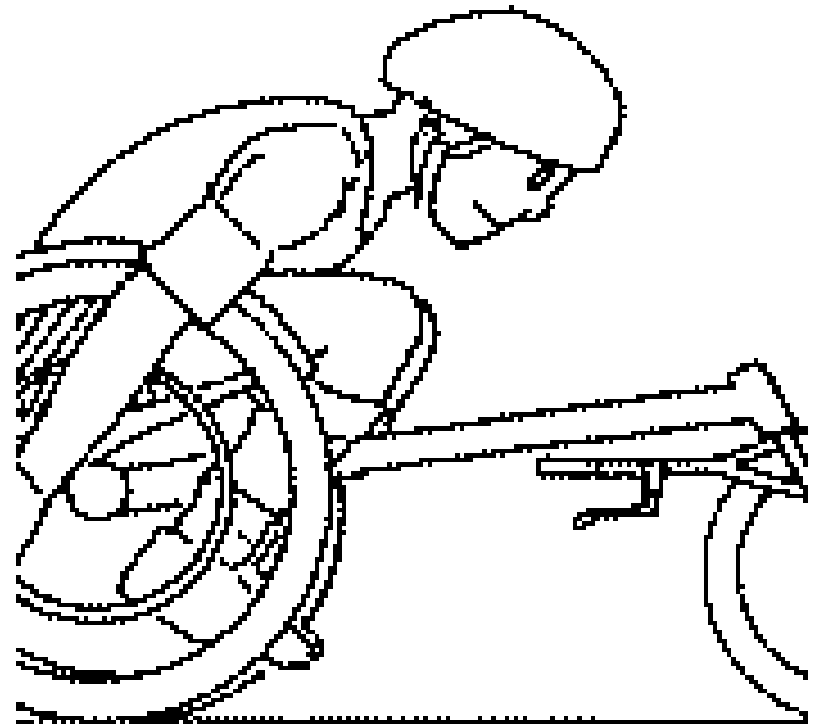


Inspiration from other sports

Handbike



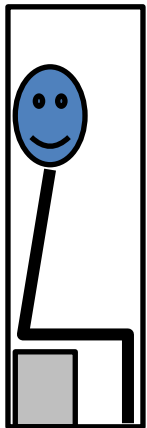
Race wheelchair



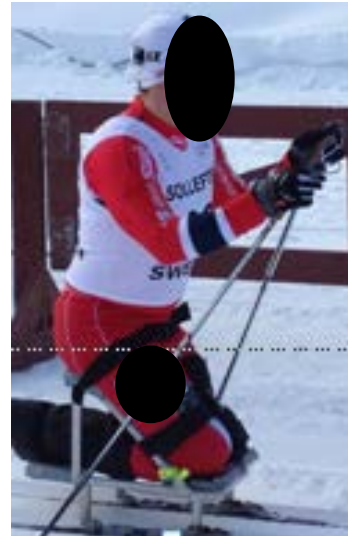
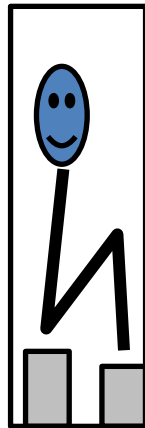
Most common sitting positions in competition



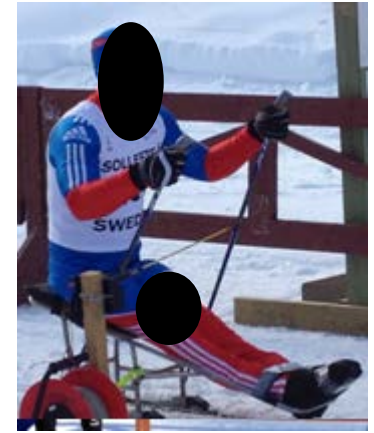
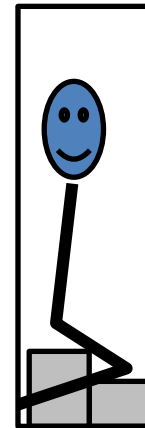
P1
normal



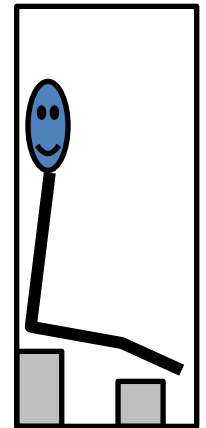
P2
knee high



P3
kneeing

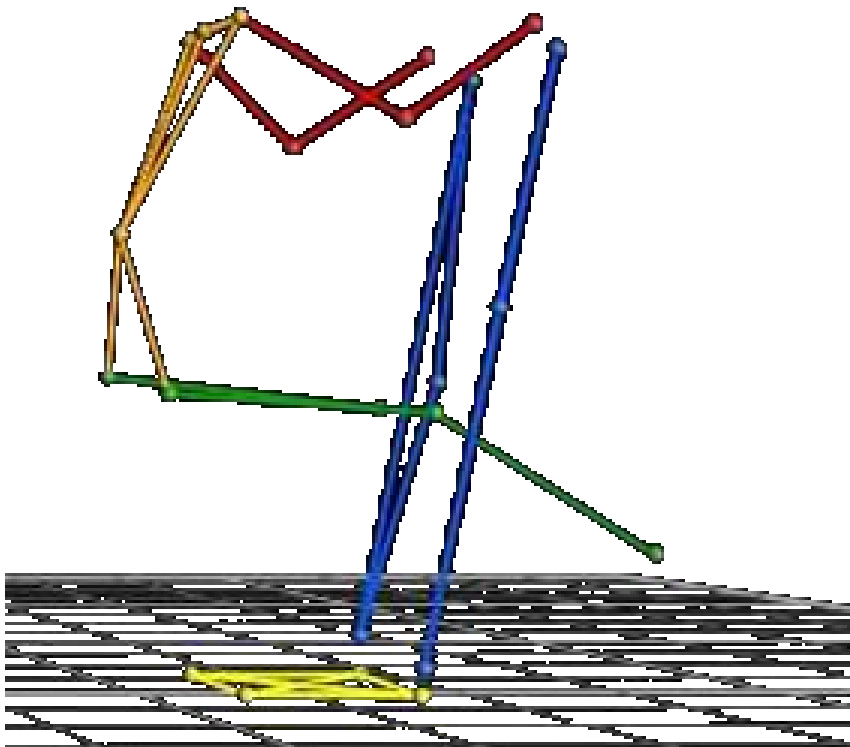


P4
long sit

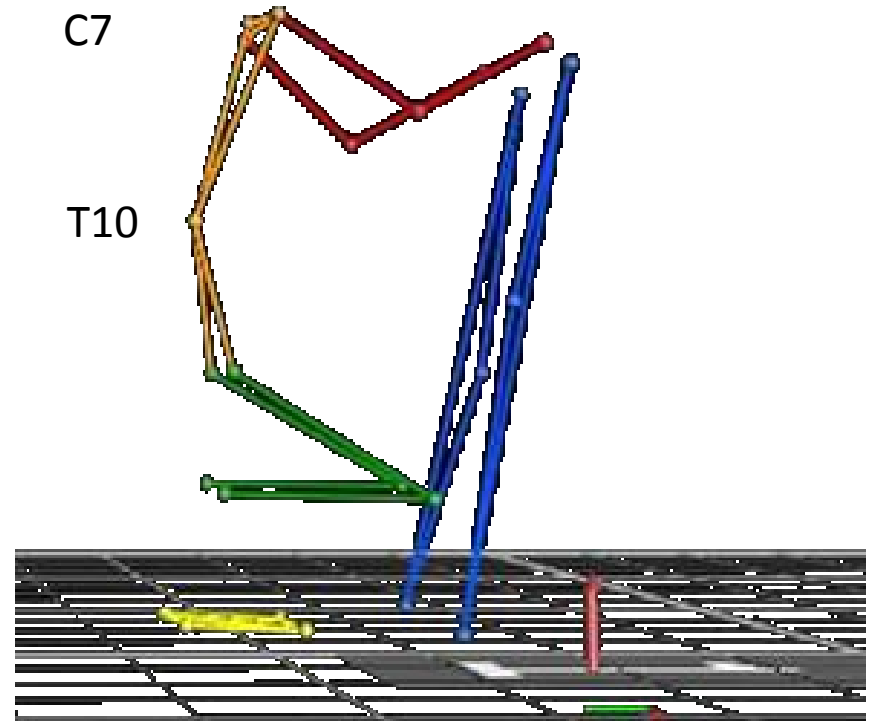


Vicon analysis

Old position

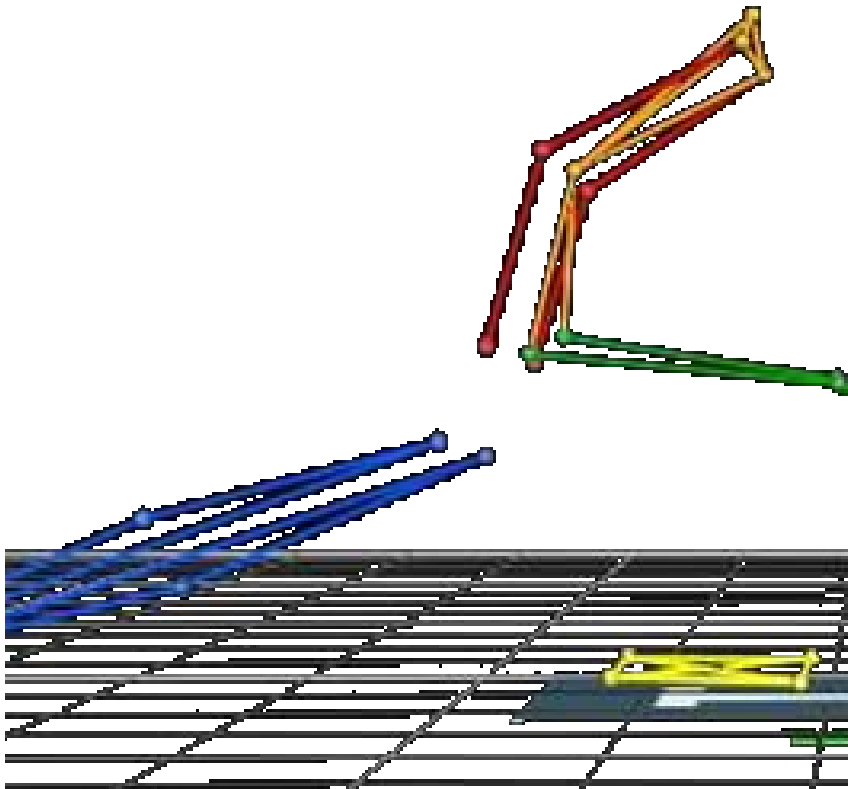


New position

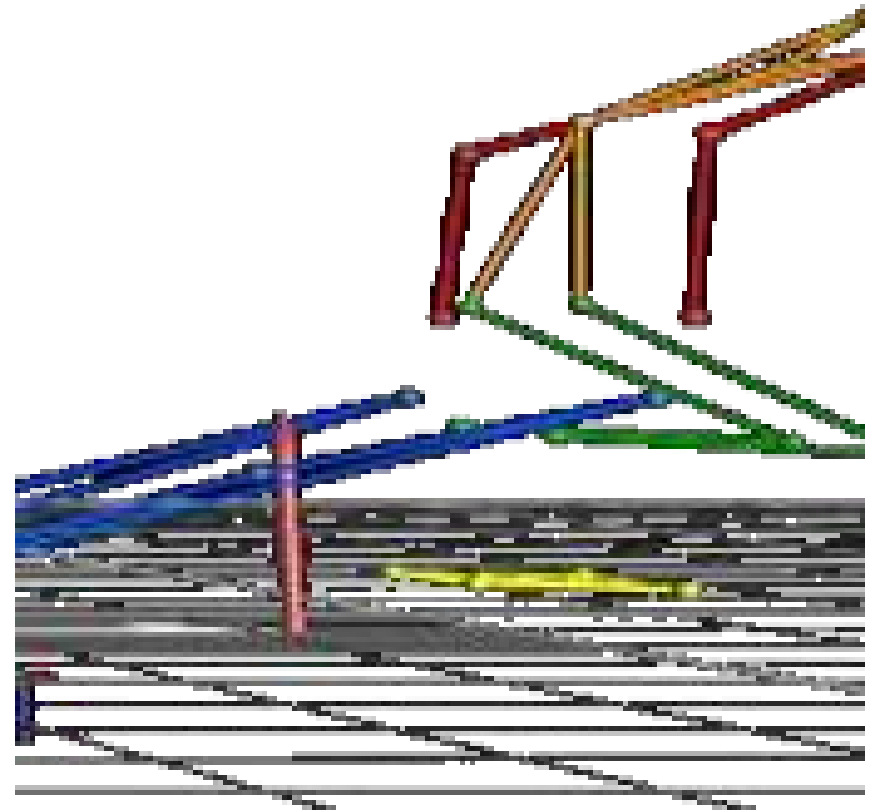


Vicon analysis

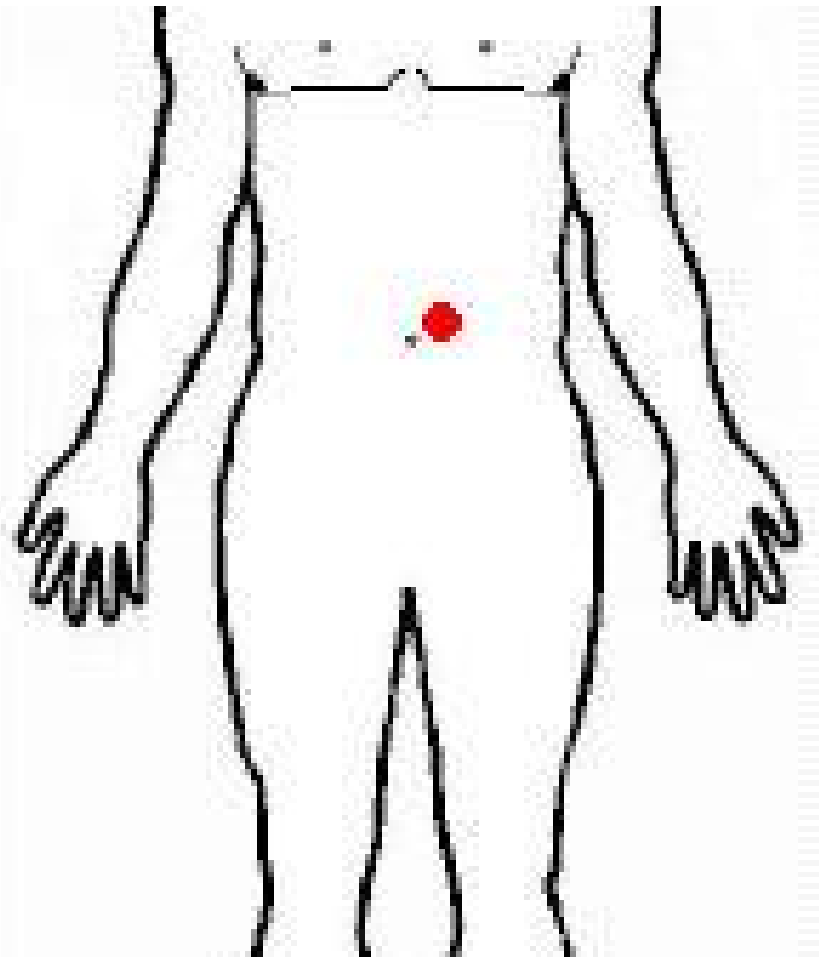
Old position



New position

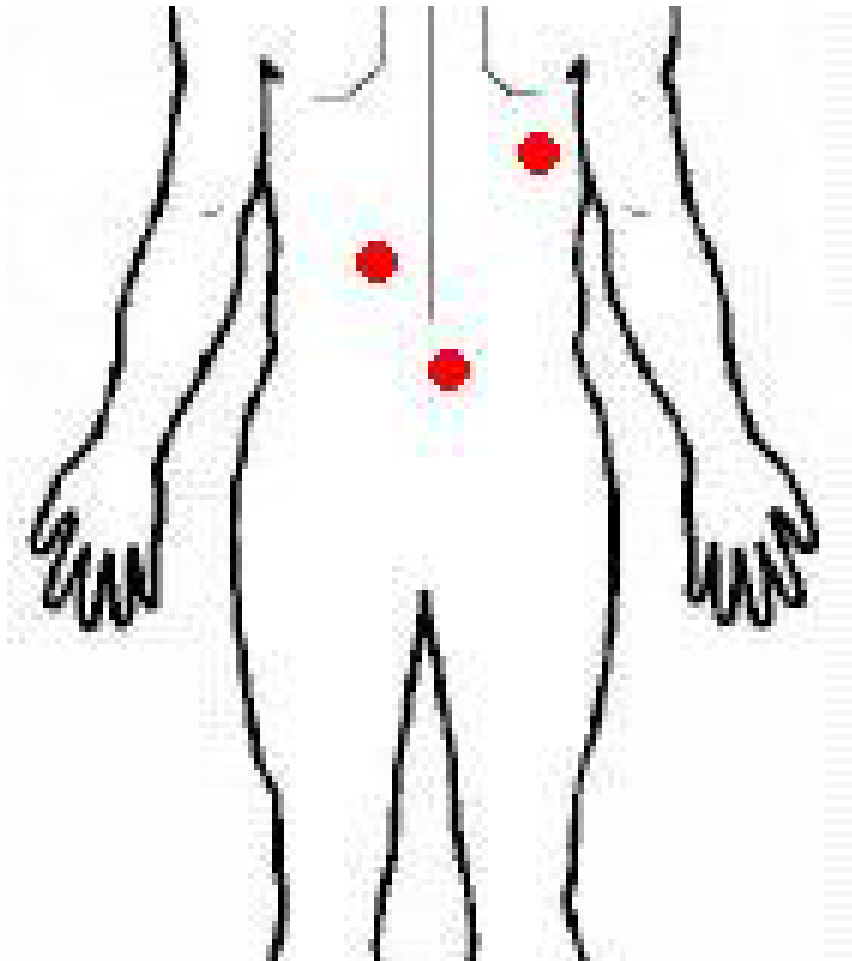


Electromyogram - front



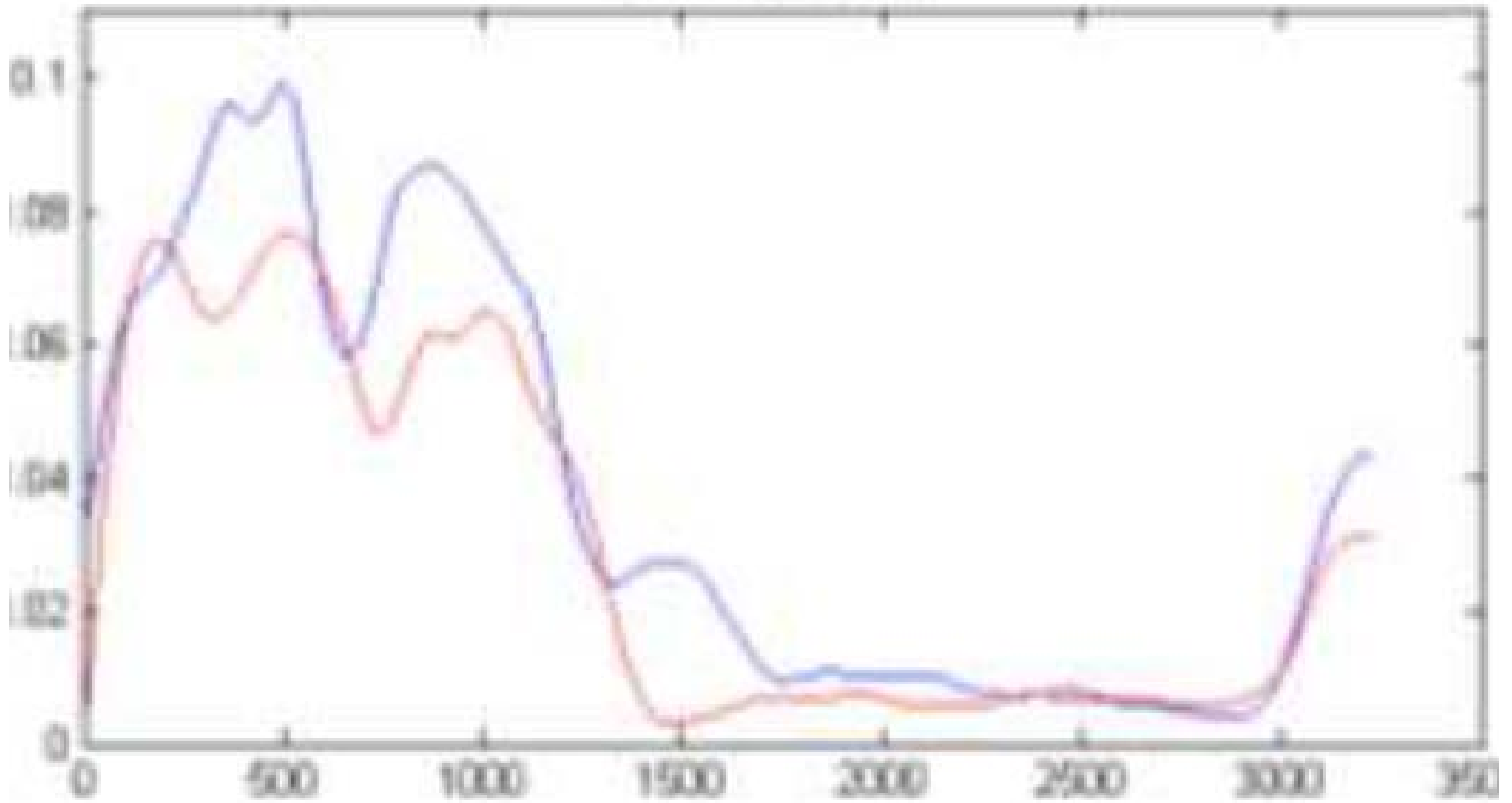
- M. rectus abdominis

Electromyogram - back

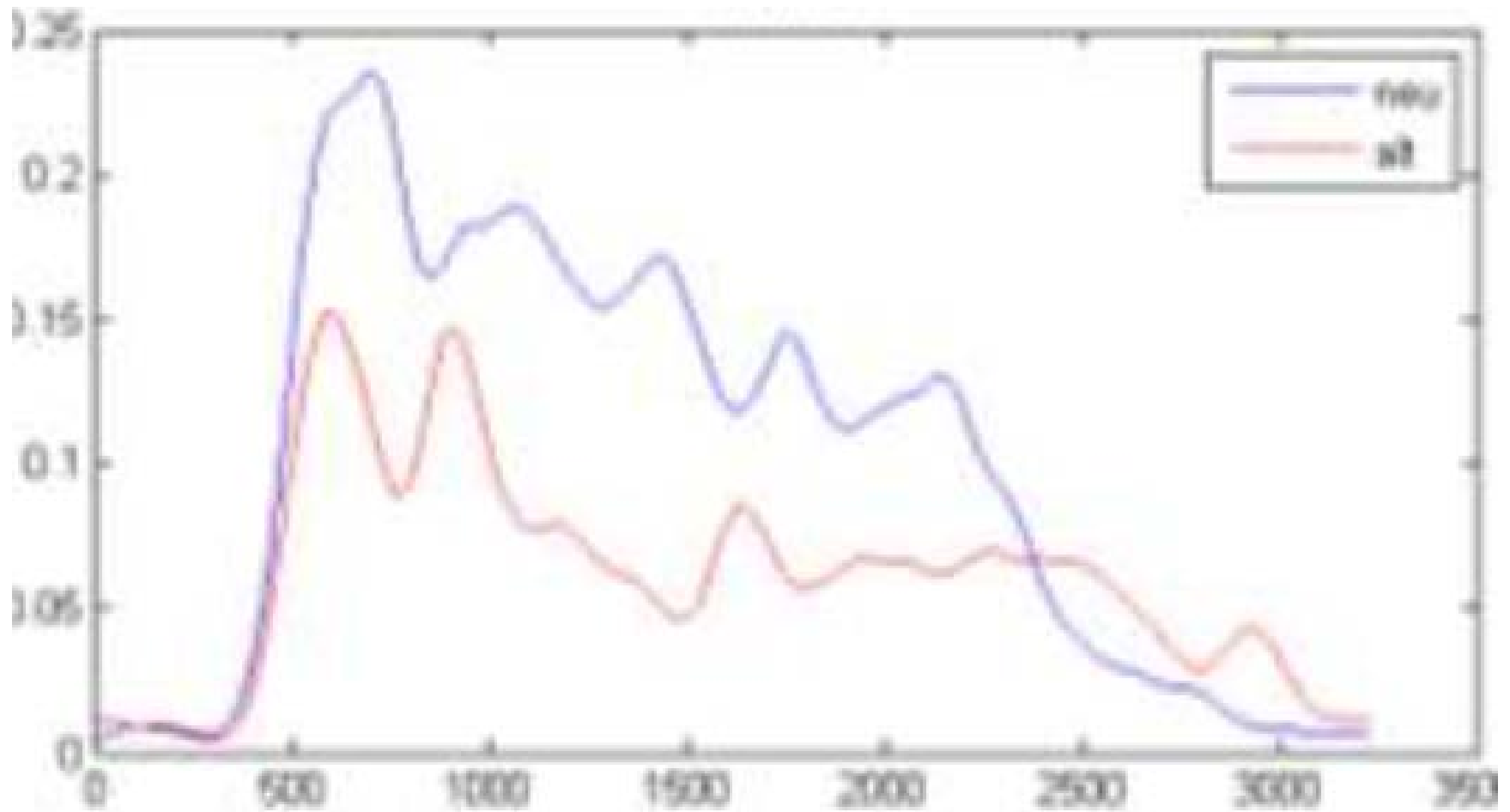


- M. multifidus
- M. erector spinae
- M. latissimus dorsi

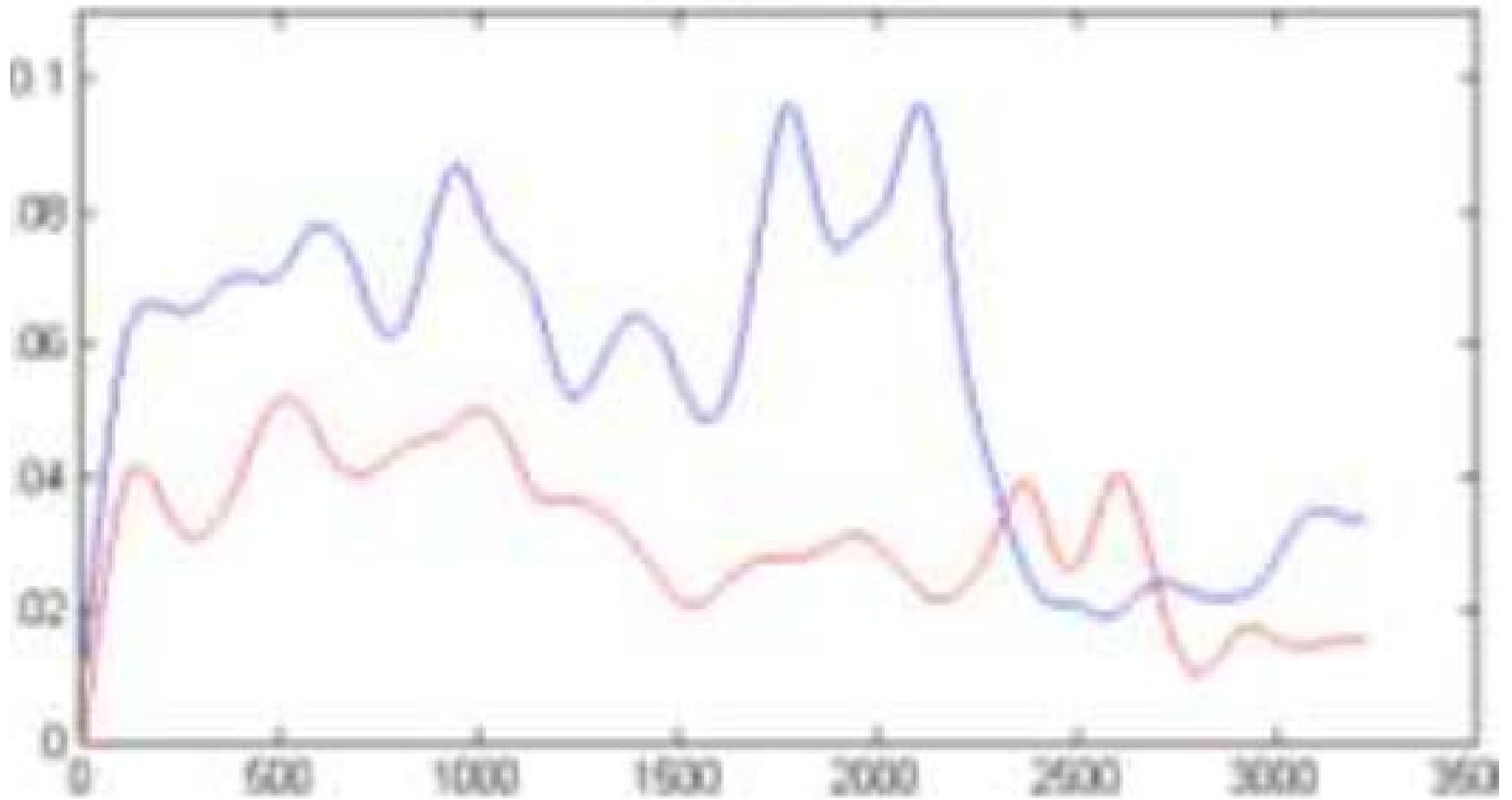
Electromyogram M. latissimus dorsi



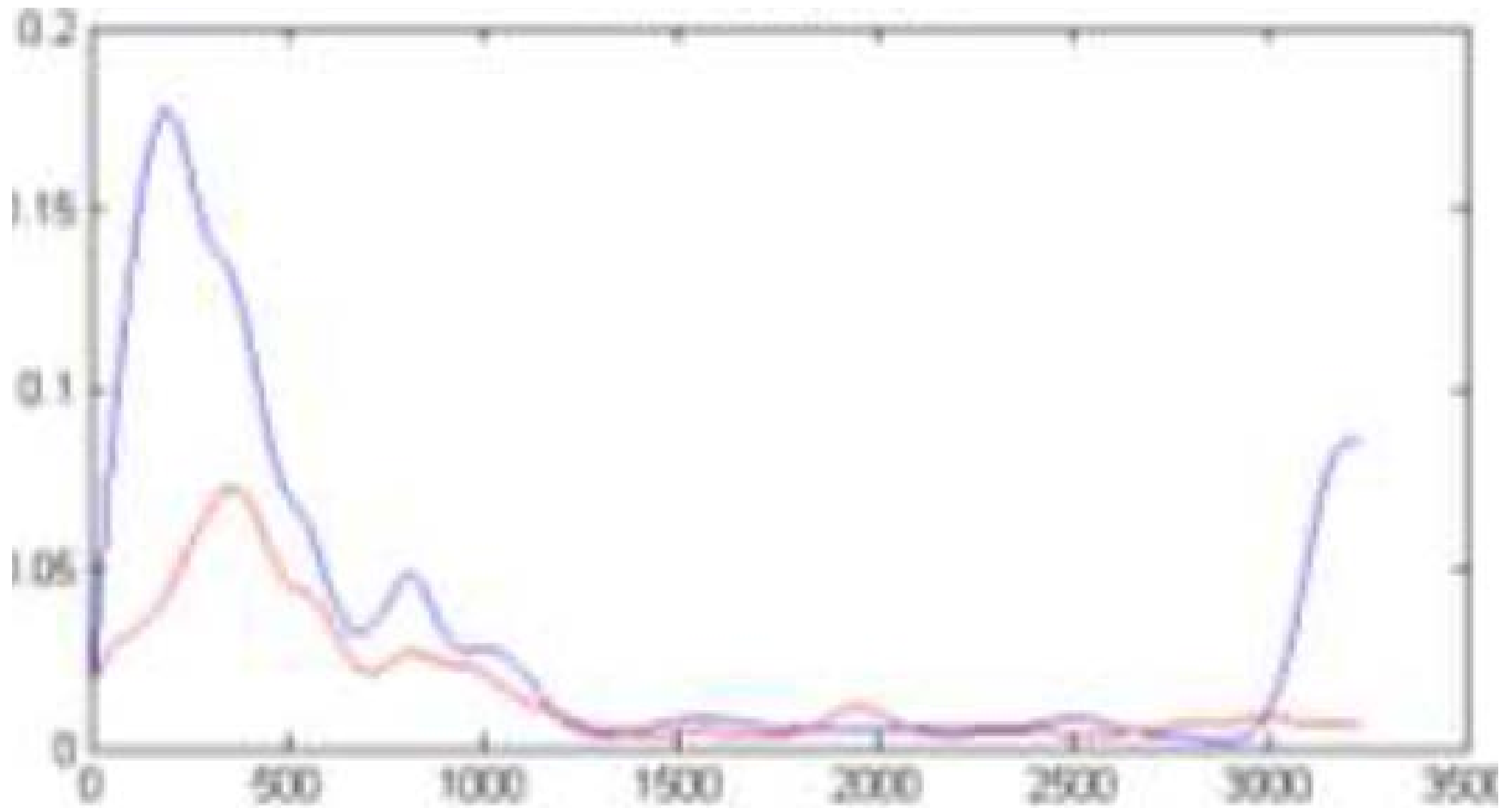
Electromyogram *M. multifidus*



Electromyogram M. erector spinae



Electromyogram M. rectus abdominis



Funktional improvements

- Better control of the sit ski
- Better curve technique
- At uphill climb:
 - Slightly lower frequency of moving cyclus
 - Probably because of longer cyclus way

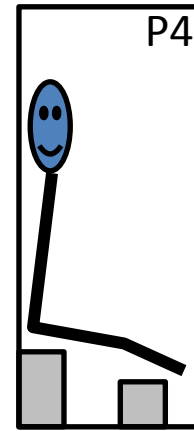
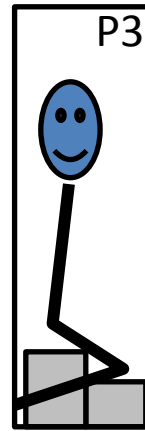
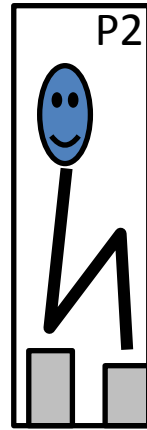
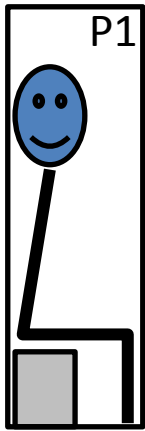
Improvement in daily life activity

- Athlete is now able to lift his wheelchair into the luggage trunk of his car by himself
- in general: improved core stability

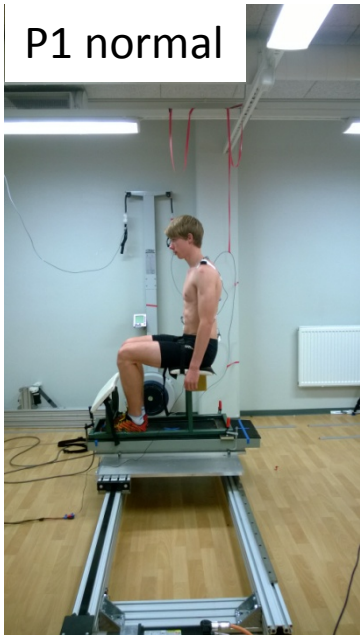
Missing facts

- Spiroergometry with both sit skis
- Moving cyclus analysis
 - cyclus frequency and cyclus way
- Is the new sit ski more effective/economic?

Sitting positions



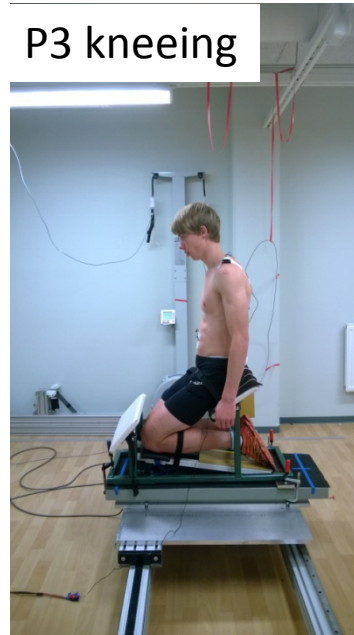
P1 normal



P2 knee high



P3 kneeling



P4 long sit



FORCE PRODUCTION, BALANCE CONTROL AND MUSCLE ACTIVATION IN DIFFERENT SITTING POSITIONS – PILOT STUDY FOR DISABLED SIT SLEDGE CROSS- COUNTRY SKIERS

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