



**Functional years**  
**– Can we extend them?**

# Prevention

- At this moment one **of the key social- and health policy objectives** is to find ways how older people can cope in their **own homes** longer than they can today.
- Treatment and rehabilitation focusing on illness and on improvement of deficits.
- The **preventive aspect** for older people is not taken into account as it should be.

# Motivation

- Is important because:
  - maintaining capability requires the **use of one's abilities**
  - it's more likely that a person who is motivated to maintain and train her capabilities also **frequently uses these abilities**
  - So this refers to the aging humans **strength resources** as well as her **emphasis on motivating factors.**

# Palso research

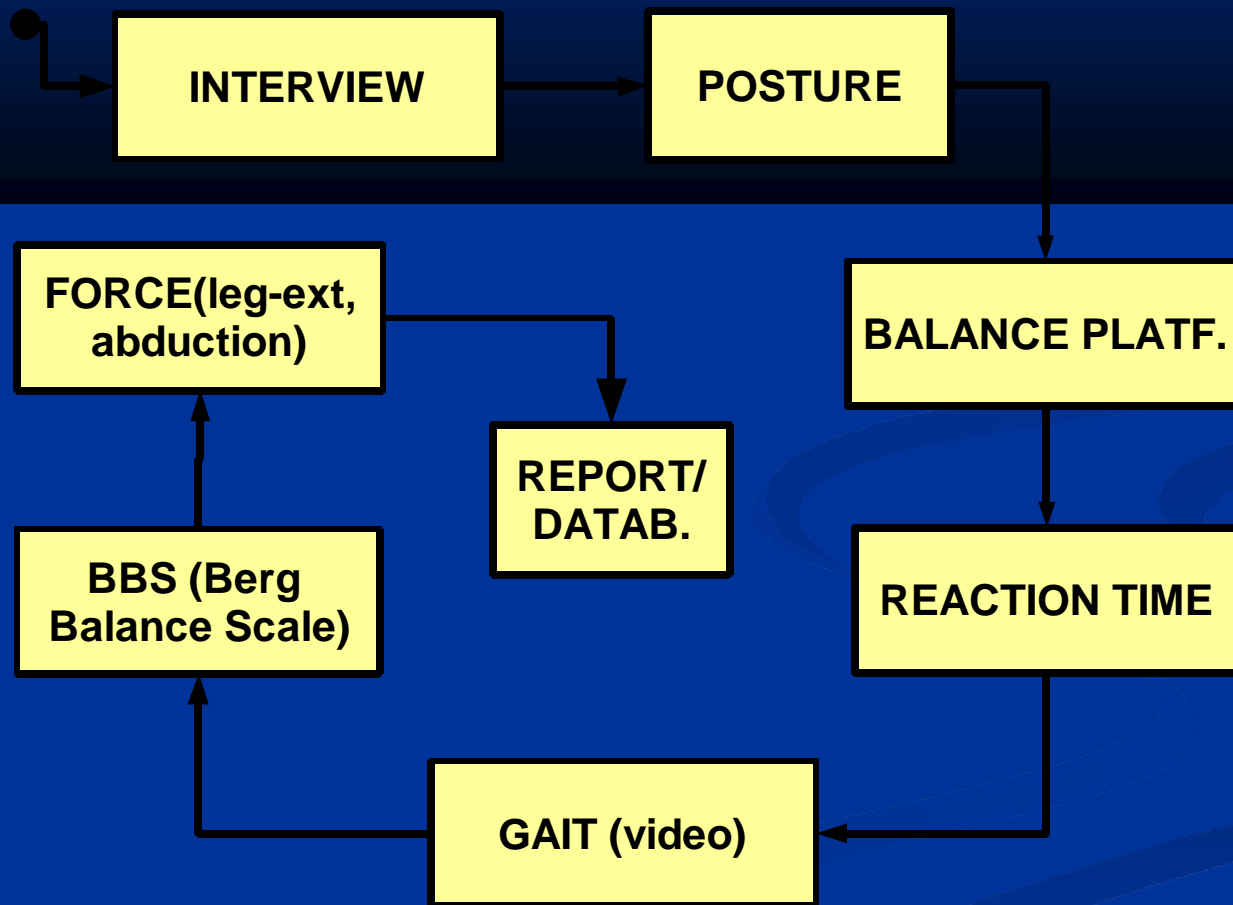
Kokkolan yliopistokeskus Chydenius, terveystieteiden yksikkö, 2007

Testing and examining the balance, the muscular strength, the gait and functional capacity of the elderly. Compare fallers and non-fallers for about 100 home care clients

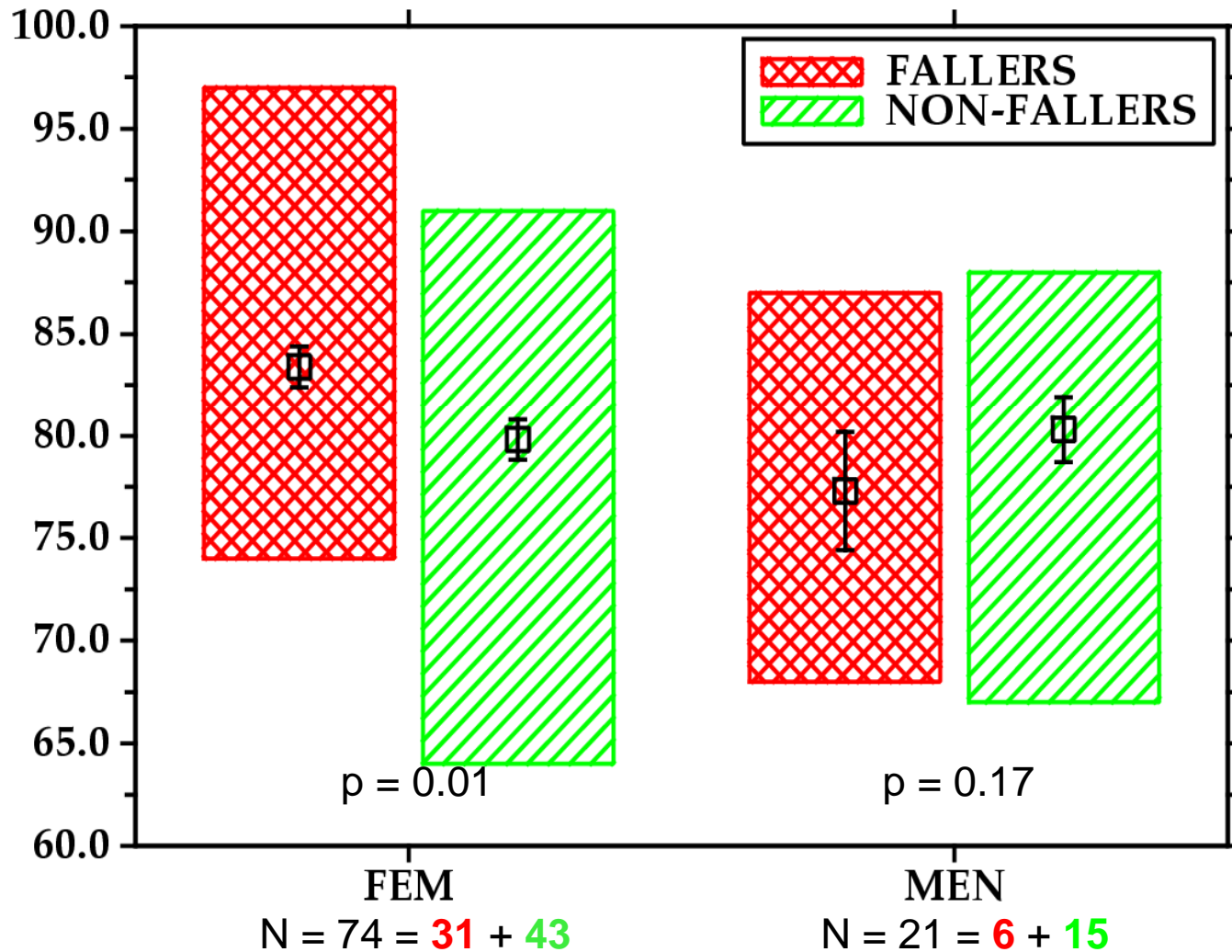
Developing test protocols and –equipment in co-operation with HUR Oy, Raisoft Ltd and the physical institution Medirex.

Inform the elderly in home care about balance and functional capacity.

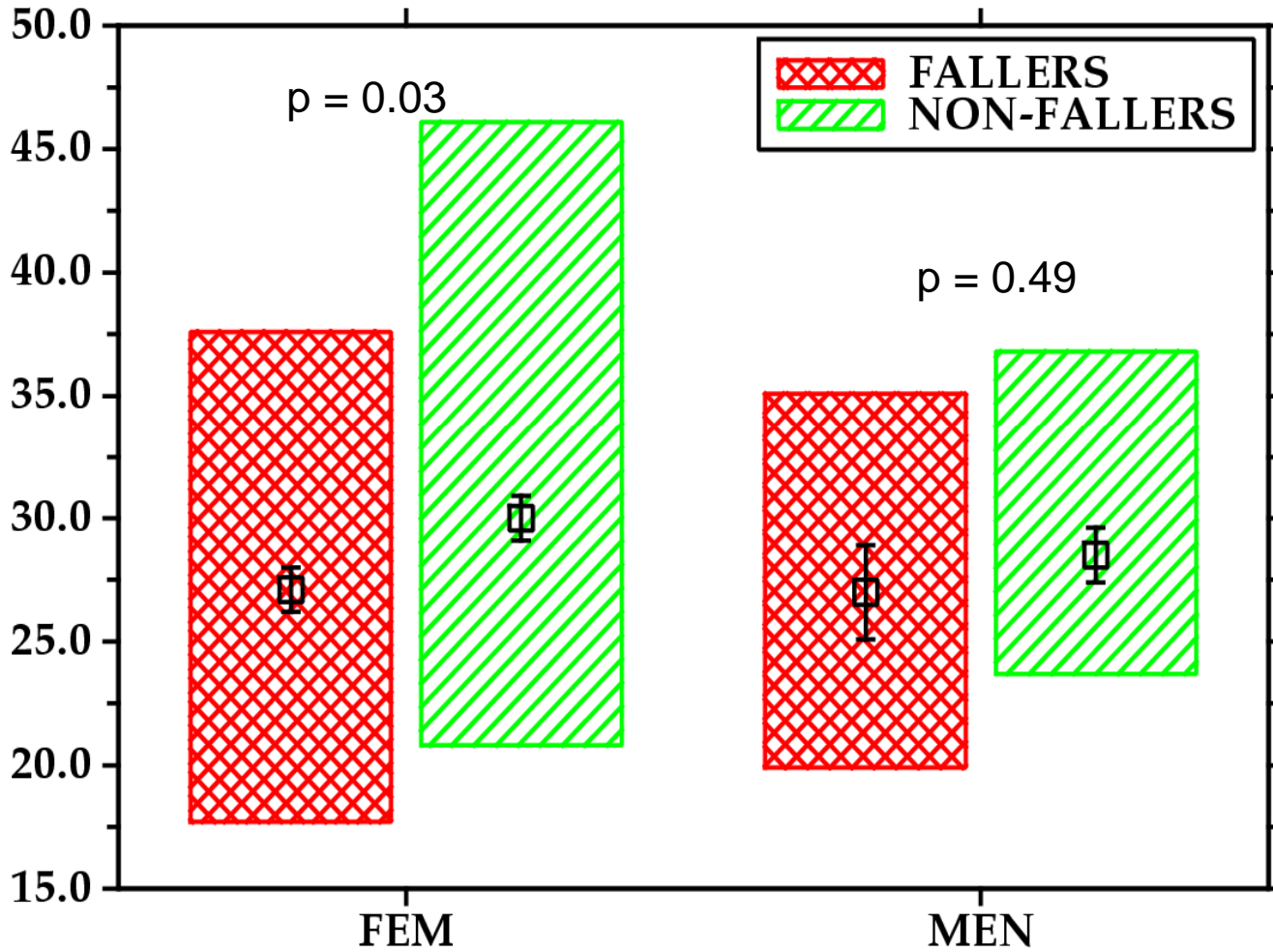
# “Test battery”



# AGE



# BMI ( $\text{kg m}^{-2}$ )

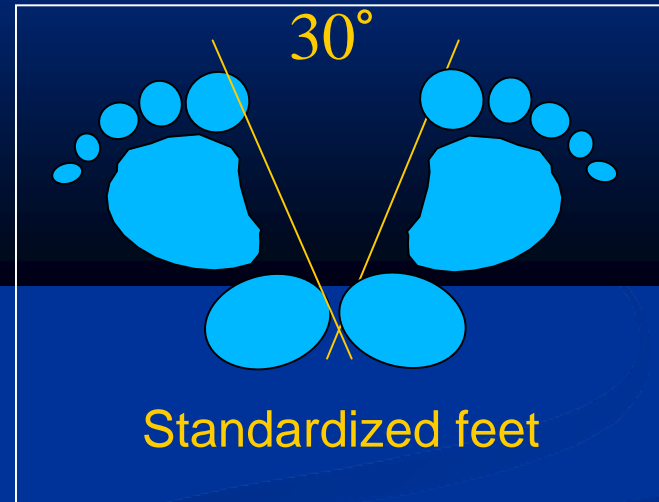




# Balance measurement

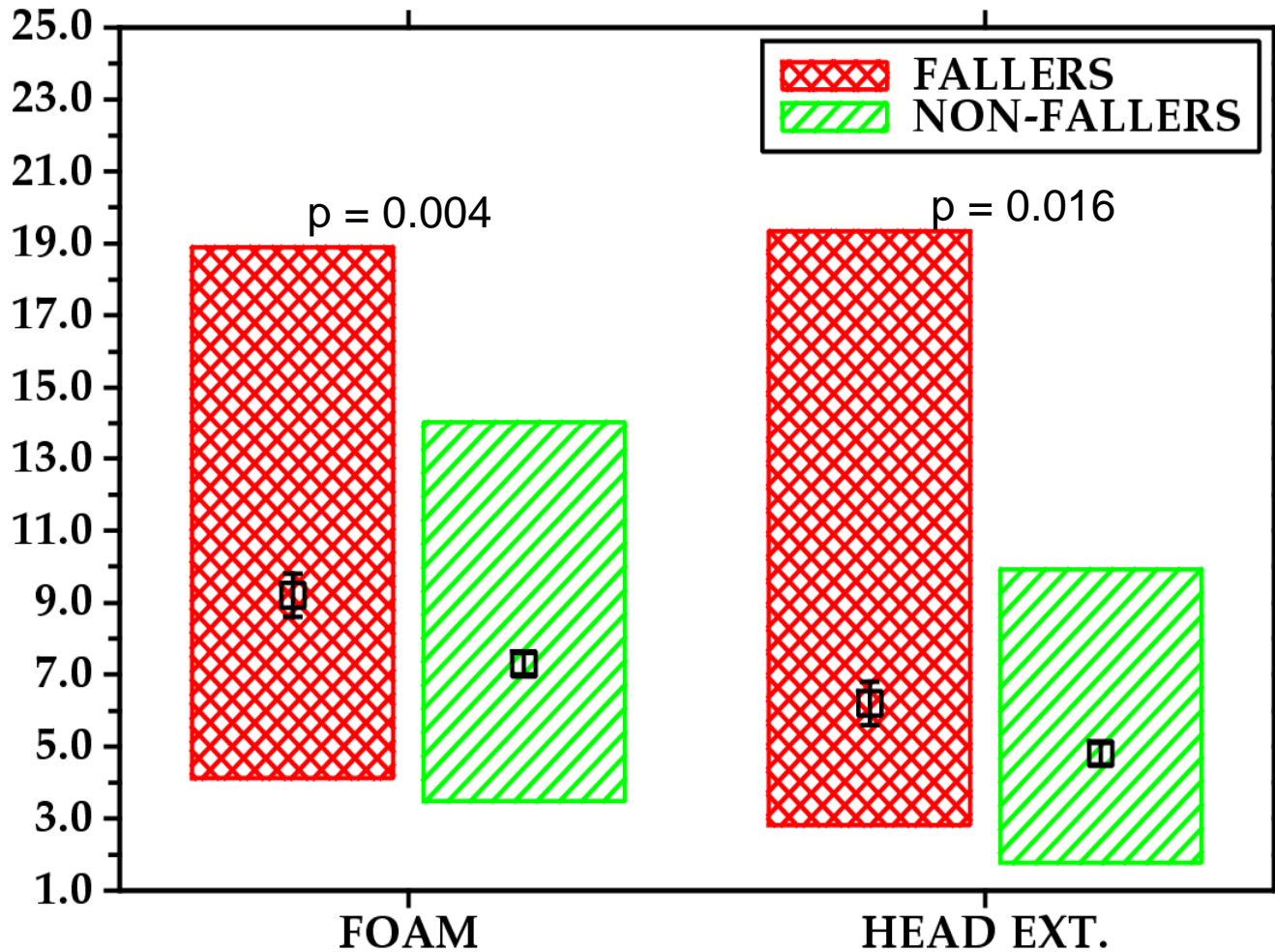
30 s, still standing

- Eyes open
- Eyes closed
- Eyes open
- Eyes closed
- Soft surface
- With head rotation
- With extension of the head
- With perturbation





# LATERAL SWAY $stdX$ (mm)



# Gait



4m walking + videotaping

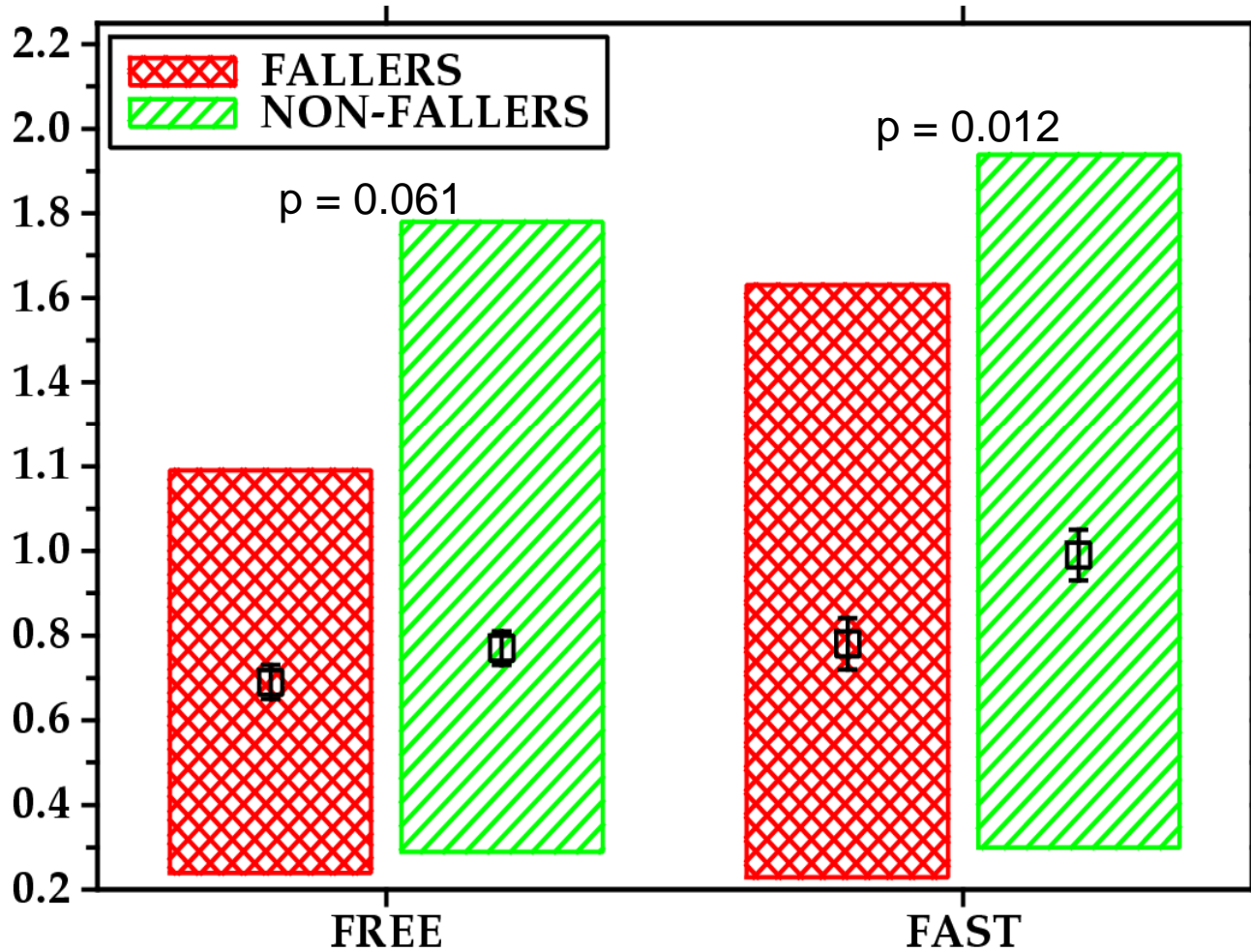
Gait analysis

Walking speed measurement

Normal walking

Fast walking

# GAIT SPEED ( $\text{m s}^{-1}$ )



# Muscular strength

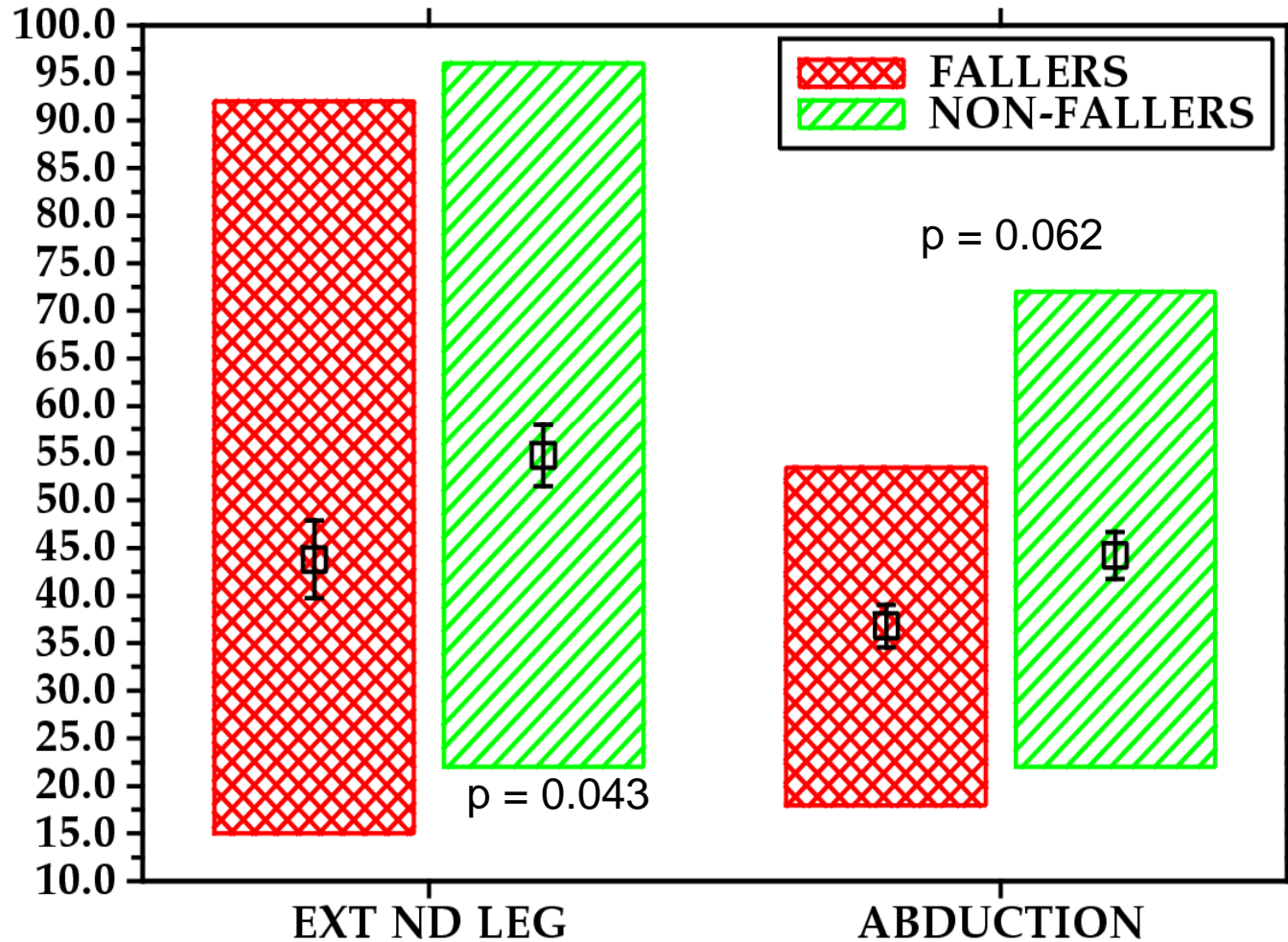


Maximum isometric muscle strength  
Knee extension, 120 degree angle.  
The best of three attempts.

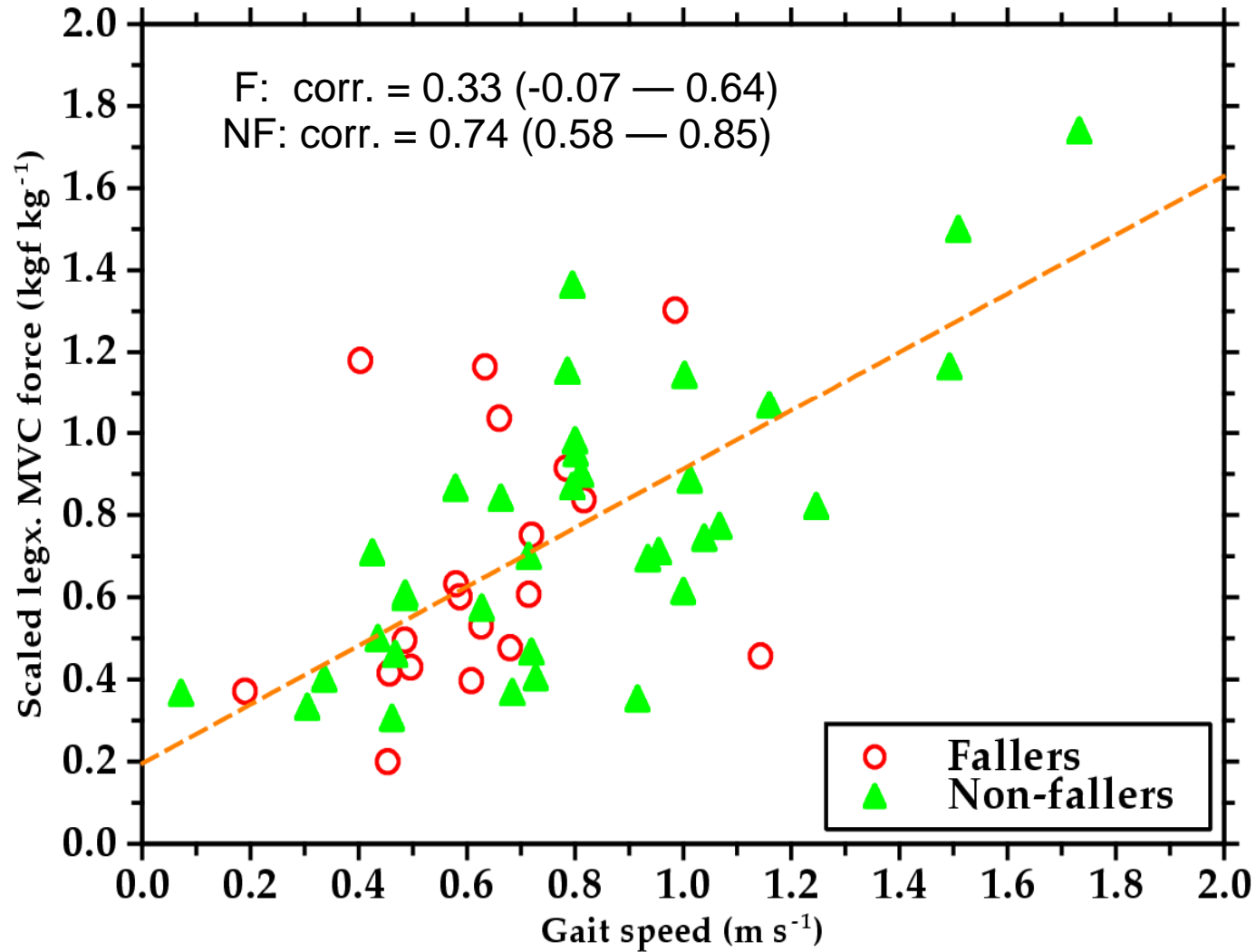


Maximum isometric muscle strength  
Hip abduction, 10 degree angle.  
The best of three attempts.

# LEG STRENGTH (kgf)

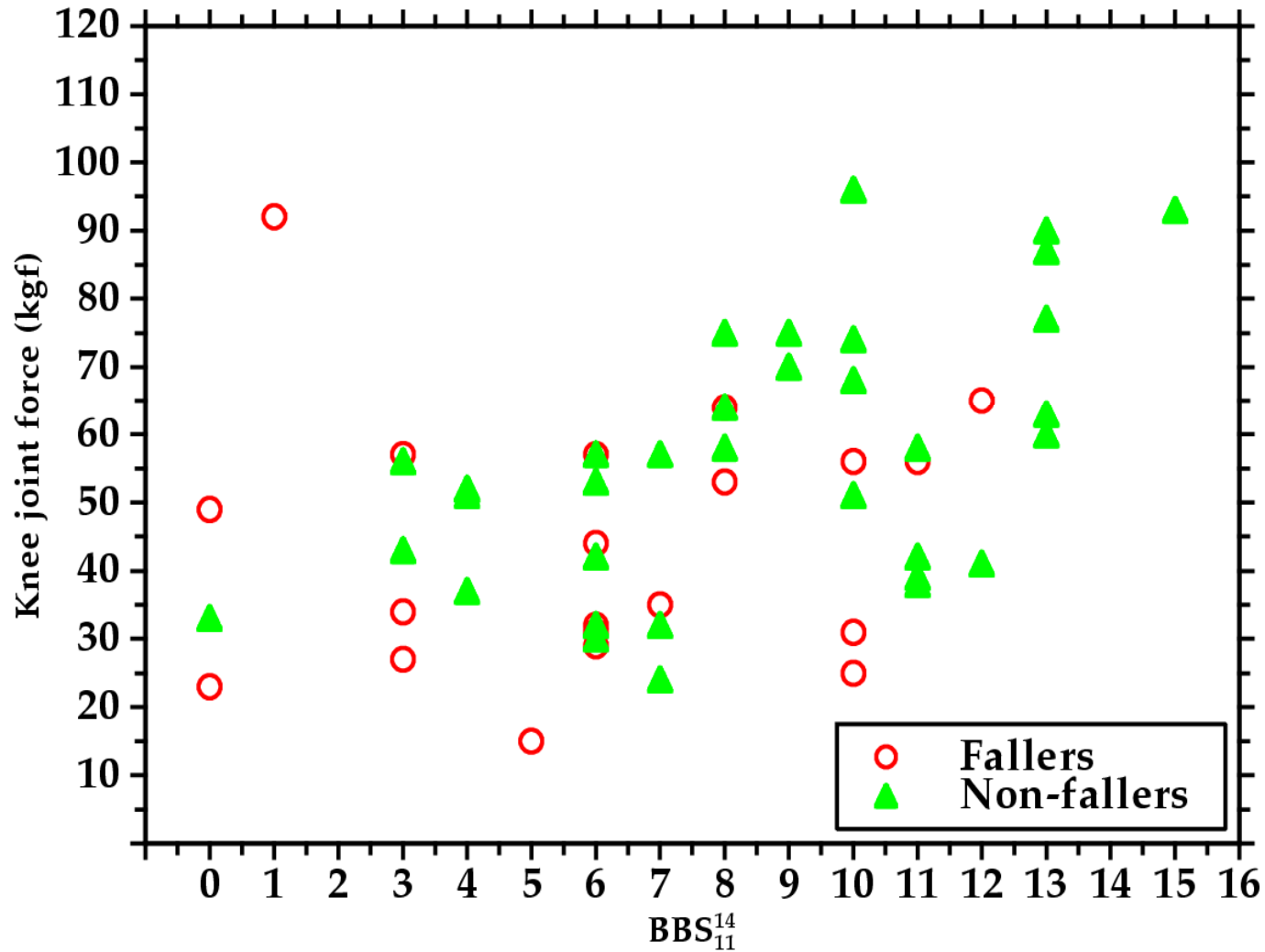


# FORCE vs SPEED



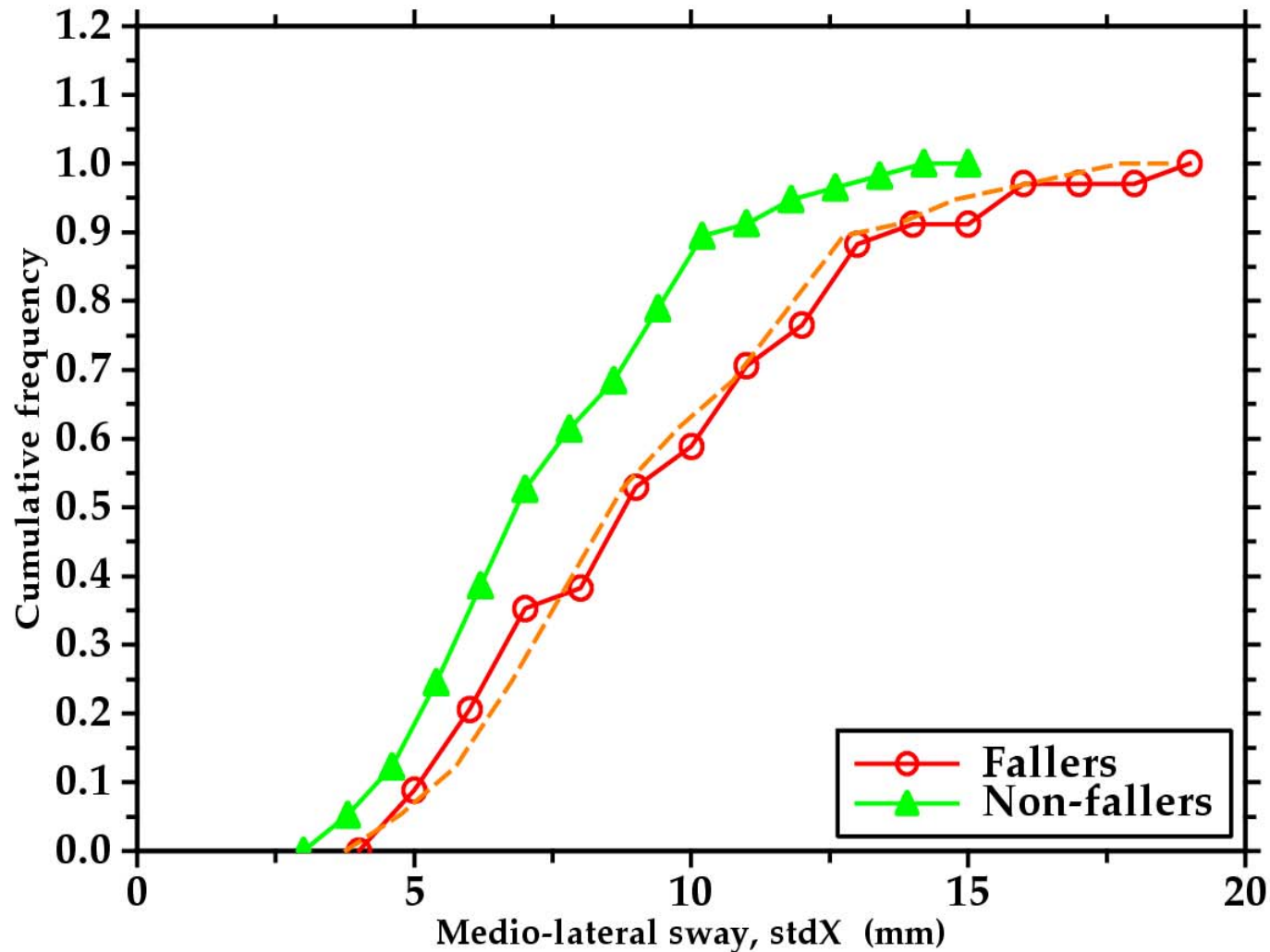


# FORCE vs BBS





# LAT. SWAY CUM. FREQUENCY



# Conclusions

- Evidence for different “physiological profiles” of fallers and non-fallers (BMI, lateral sway, gait speed, strength)
- Balance and reaction tests need to be demanding enough to differentiate fallers and non-fallers (perturbations, sensory isolation, multi-task etc)
- A comprehensive and multidimensional test battery is needed to estimate fall risks



**WELMED**



**Health  
Assessment  
Systems**



[www.welmed.fi](http://www.welmed.fi)



## **WELMED** testing laboratory measure:

Physical function

Balance

Muscle strength

Movement

Muscle activity (SEMG)

Gait

Reactivity

Position

### **Project Management:**

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# WELMED LABs

(Mariankatu 16 Kokkola)



WELMED LABs

# WELMED test groups

- Prophylaxis group
- Knee and hip prosthesis patients
- Fallers group
- Special group
- Strength training group





# Prophylaxis group



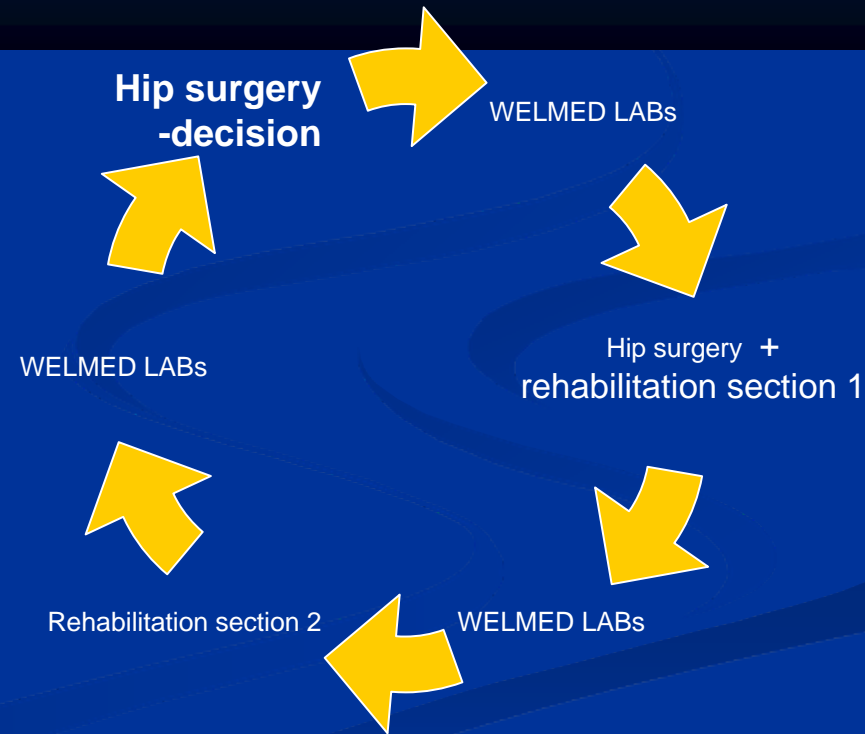
- Carried out with older people living in Kokkola and with Medirex, HUR and Raisoft
- The objective is to be able to assess the deficits in capacity of those who are not yet a part of our service system and in advance prevent capacity decline
- Evaluate the effectiveness of fitness training
- Develop WELMED LAB's research protocol evaluating the elderly



# Knee and hip prosthesis patients



- Involves KP-KS, Medirex, Kokkolan Tk, HUR and Raisoft
- The objective is to be able to assess and develop hip surgery patients in the health care chain
- Evaluate the effectiveness of rehabilitation / cost effectiveness
- Develop WELMED LAB's research protocol evaluating hip patients

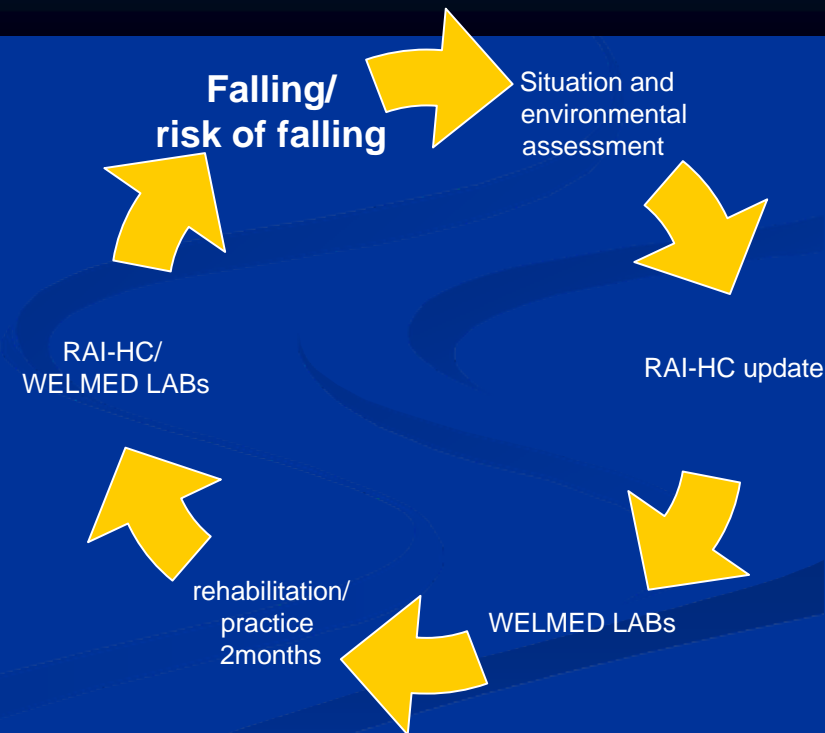




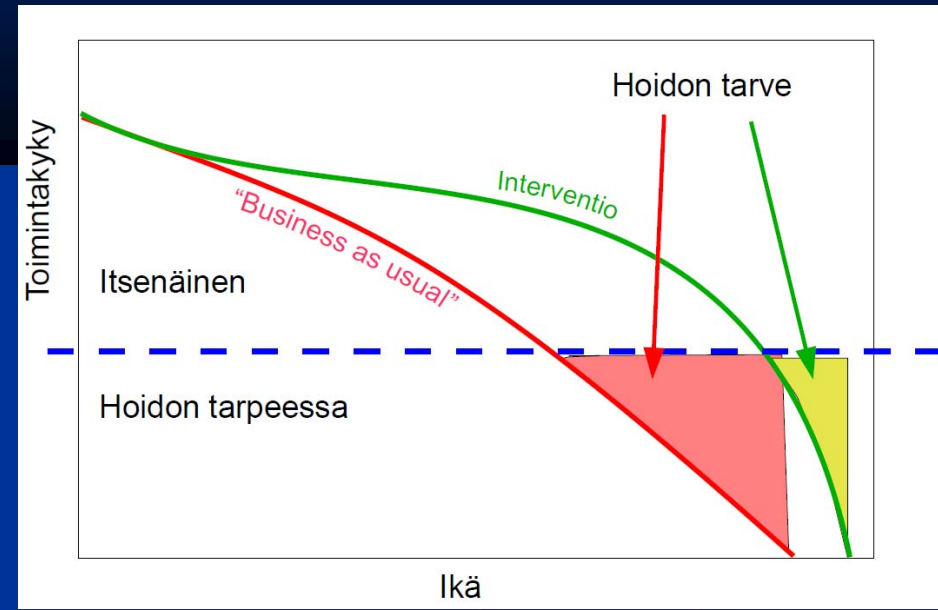
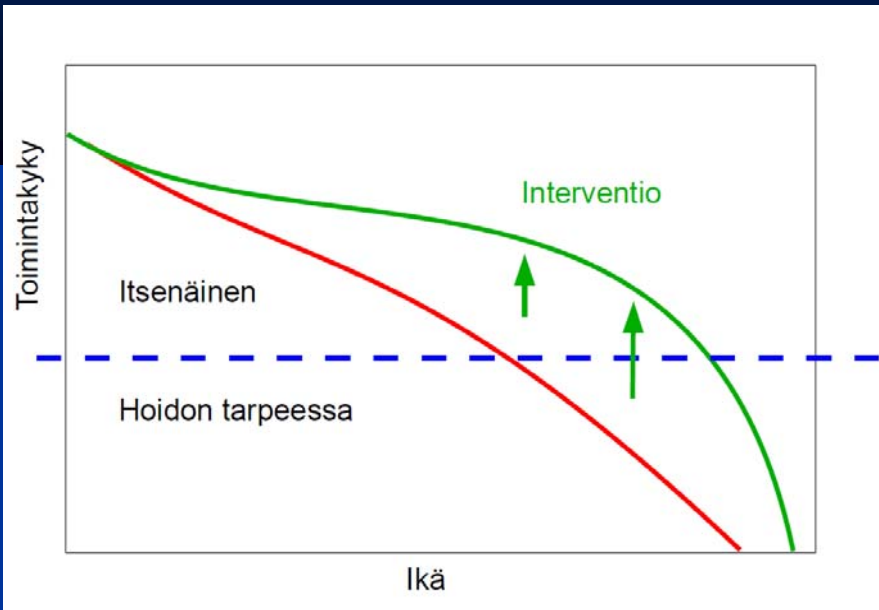
# Fallers group



- Carried out with the home care in Kokkola and with HUR, Raisoft and Medirex
- The objective is to develop measures to prevent fall accidents at home
- Evaluate the effectiveness of fitness training/ cost effectiveness
- Develop WELMED LAB's research protocol evaluating clients falls-/risk of falls




# Intervention gives more functional years



# Management Plan


- WELMED studies aims at explaining the reasons of falls.
- A personal home practice program is drawn up.
- Exercise is added to the management plan, the home carers guide the client to carry out the exercises.
- Follow-up investigation after 2 months.

 **PhysioTools**  
*Work with the Best*

Personal Exercise Program


Provided by : Sample User      Date : 22.3.2009

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 Sit on a chair without arm rests, with your arms across your chest.


© HJR Oy

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 Lean forward.


© HJR Oy

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 Put your weight on your feet while leaning forward.

© HJR Oy

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 Stand up by straightening your knees. Sit down again.  
Repeat \_\_\_ times.

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Built on PhysioTools®

22.3.2009

1/2

# Strength exercise in groups

Muscle strength increases with muscle mass (Mänty et al 2006).

Resistance should be 60-80% of 1RM (repetition maximum).

1-3 sets.

10-15 repetitions.

1-2 minute breaks between the sets.



# Relation between training load and number of repetitions

<u>% of RM</u>	<u>No. of reps</u>
100%	1
95%	3
90%	5
85%	7
80%	10
75%	12
70%	15

# Hip Protective Trousers

P. Kannus et al. Prevention of hip fracture in elderly people with use of a hip protector.  
Massachusetts Medical Society. Nov. 2000, vol. 343, nr.21.



Respecta Oy,  
KPH – hip protector



Steripolar Oy,  
SAFEHIP – hip protector



# WELMED Follow-Up Test

- The strength of quadriceps muscle should be at least the same as the body weight - for the weaker leg as well.
- The client should be able to rise from a chair without using her hands.
- The weight should be distributed evenly between the feet.
- Direction of sway; back and fort.
- Area of sway eyes open/eyes closed.
- Medication and pain.





# Maintaining capability requires activity

