Exoskeleton Legs for Elderly Persons

AAL Call 4, Oct 2012 – Sept 2015

AAL Forum 2014 , Bucharest, Evaluating AAL-Markets

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2. **Karlsruhe Institute of Technology (KIT), Germany**
3. **Universidad Politecnica de Cartagena (UPCT), Spain**
4. **Chas Blatchford & Sons Limited (CBSL), UK**
5. **Hocoma AG (HOAG), Switzerland**
6. **Gigatronik Technologies GmbH (GIGA), Germany**
7. **MRK Systeme GmbH (MRK), Germany**
8. **Projecto Control Montaje SL (PCM), Spain**
9. **Mobile Robotics Sweden AB (MRSA), Sweden**
10. **Gävle kommun (GAKO), Sweden (end user group)**

The idea

- Develop and Commercialize an Exoskeleton for the assistive elderly market

Objectives

- Support elderly in their indoor and outdoor mobility needs to enable them to continue living independently at home for as long as possible. The technology should compensate for functionality loss because of ageing

- A fashionable approach should overcome the scepticism to use a walking aid, the product doesn't make the elderly look old, but modern instead

- Ideally an elderly person is proud: "Yesterday I was able to walk 12 km with EXOLEGS, not only 5 km like before. I enjoyed it !"






Existing Exo-Legs

ReWalk, Argo Medical, Isreal

Hercule, RB3D, France

Rex Bionics, NZ

HAL exoskeletons, Cyberdyne, Japan

Honda, Japan

Ekso Bionics, USA

- Existing exo skeletons adress mainly the paraplegic market
- There are projects for exo skeletons to address industrial markets
- Nobody covers at the moment the needs of elderly in the market

Advanced Functional Movement Therapy Solutions, Neuro-rehabilitation

- Hocoma, Swiss company
- Office and production near Zurich
- 150 employees
- United States office near Boston
- Asian office in Singapore
- Eastern European office in Ljubljana
- Over 40 Sales Partners worldwide

Figures May 2013

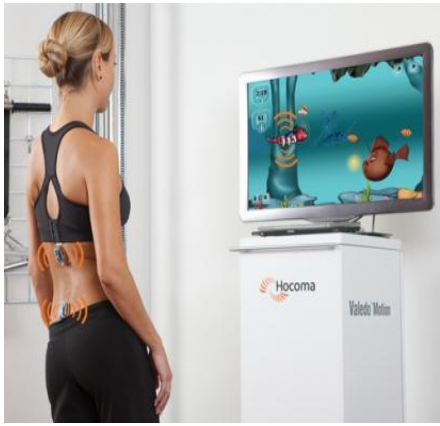
Advanced Functional Movement Therapy Solutions, Neuro-rehabilitation

For

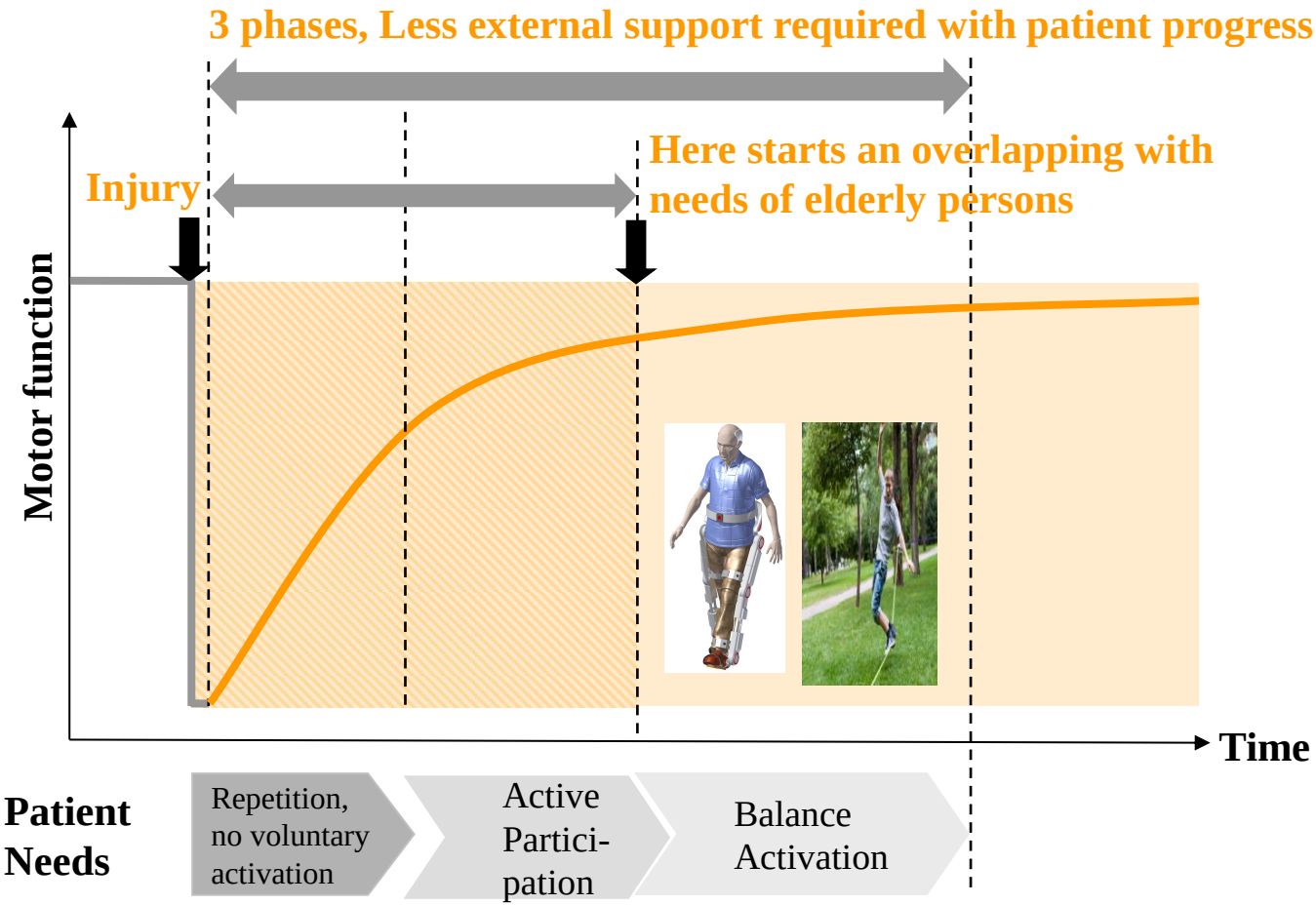
- upper extremities Armeo®
- lower extremities Lokomat®
- early rehabilitation Erigo®
- low back pain therapy Valedo®

With

- Robotics
- Augmented Performance Feedback in a virtual environment
- Assist-as-needed support
- Assessment Tools



Continuum of Neuro-rehabilitation



In Neuro rehabilitation, the motor functions need to be rebuilt again. It counts how much functionality can be transferred from rehabilitation to the daily living. Elderly persons lose their motor functions. Use it or lose it! Both groups have similar needs.

Challenging Market

Great idea!
Huge market!
Product for elderly in an ageing society!

Very high expectations!

Customer segmentation, who is really the customer ? Elderly end user or their relatives or the insuranse or an elderly care sentre ?

What is the acceptable pricing of the product ?

Elderly market is complex

Challenge- Functional Solutions

Product competition

"iWalkActive" AAL award winner 2013

wheelchair

Crutches

Walker

Exoskeleton

Pricing ? Either Exo-Legs gives much more value and reason for higher price or the price can't be far away from a motorized wheelchair (~EUR 5k ?) if an insurance must be convinced! Huge volume required for this low pricing!

Some private elderly might buy an expensive Exoskeleton solution

Target Customers

Private elderly persons

Elderly care organization

Rehabilitation centre

Health insurance

University

- Reduce falls related costs
- Less healthcare costs due to prevention of secondary effects of immobile elderly
- Reduce the need for additional personal in an ageing society, with longer independence
- Life quality: independent life, support on functional daily activities
- Reduce effort and costs for the family of the potential user (elderly person)
- Become more attractive elderly care center
- Improve therapy outcome
- Be more attractive rehabilitation center by providing latest technology
- Use platform for education, offer attractive student work

Customer Needs, insurance

Fall statistics
Incidence - Approximately 28-35% of community-dwelling adults over the age of 65 (Scuffham *et al.* 2003), and 50% in residential care (WHO 2007) fall every year. About half of those fall repeatedly (Scuffham *et al.* 2003). The community-dwelling figure increases to 32-42% for those over the age of 70 (WHO 2007), and to 50% for those over the age of 80 (NICE 2004). In 1999 fall-related injuries in people aged 60 or over accounted for 0.8 million admissions to hospital in the UK (Scuffham *et al.* 2003).

Example Falls- Cost estimates vary. Scuffham *et al.* (2003) places the total cost of unintentional falls to the NHS in 1999 at £1 billion and the National Institute for Health and Clinical Excellence estimated the cost to be £2.3 billion per year in 2004 (NICE 2004).

Interest for health insurances, if “Fall Incidents” could be reduced. For a new product, this is hard to prove or even impossible or **it takes long time** to get studies which are also expensive.

An insurance or government can’t be convinced with soft factors

Get an Exo from «Government»

Example ES

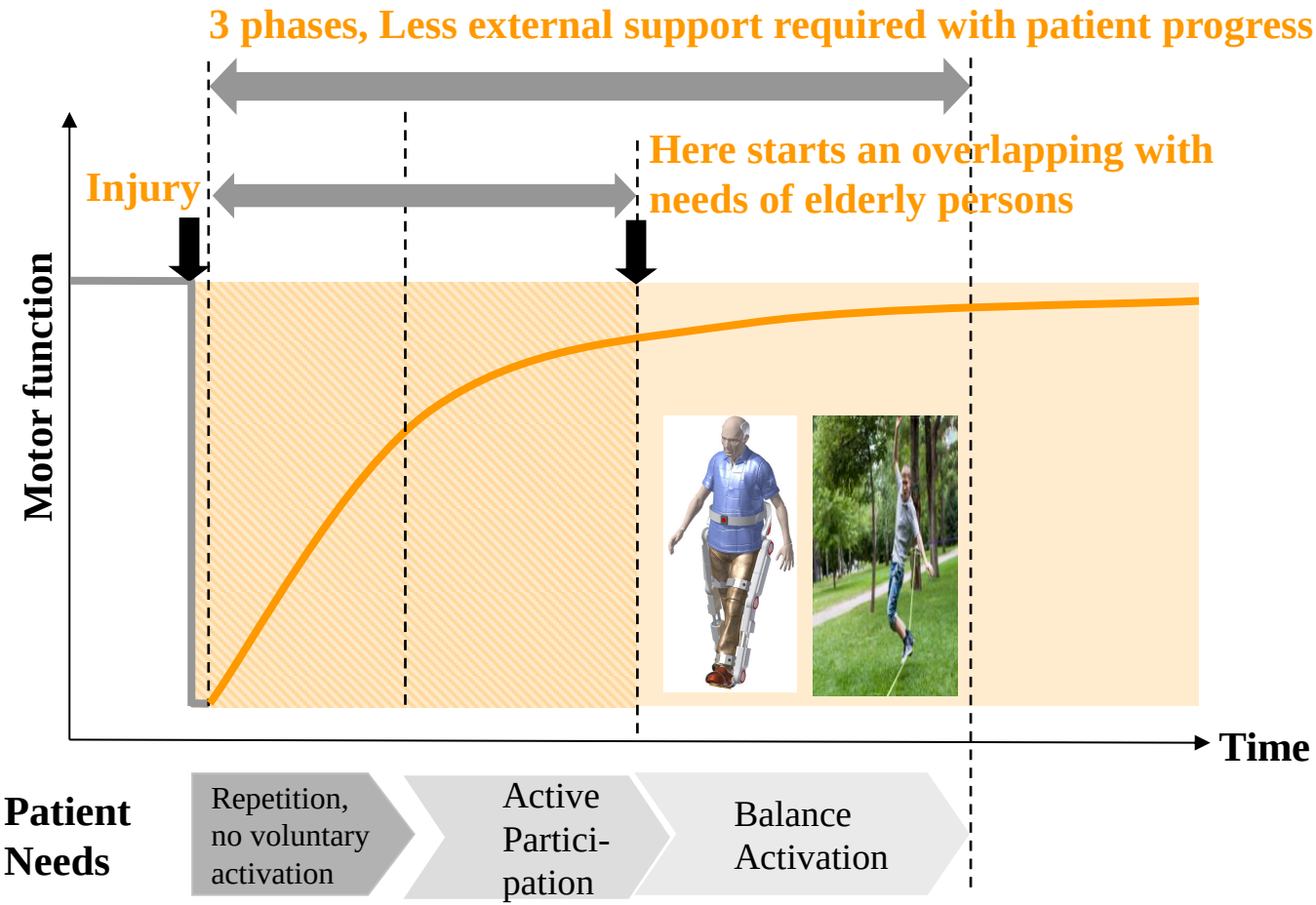
- 17 Regions, services are managed directly by the Government in each Region. Each Region managed their own economical gestion.
- heterogeneous process: buy own equipments, private insurances cover part of fundings, managed through the Health Department, Health Department of the Region request the device & gets approval by Government of Spain
- Decentralized in the beginning and centralized at the end

Example SE

- Assistive products sold or provided by state via H-SAM
- Different possibilities. If assessed to need the assistive aid, the state provides it but if not, person can purchase it directly from H-SAM.
- Mainly centralised via H-SAM but some municipalities can opt for different methods

The process to get an Exoskeleton for elderly persons officially as a choice beside other existing solutions, can be simple to understand with one contact point (SE) or very complex (ES).
a) In both cases, convincing arguments will be required
b) Product pricing must be comparable to existing solutions!

Practical Market approach



Introduction of an Exoskeleton as a medical device in the field of neuro rehabilitation is a logical step in the rehabilitation continuum. Product to be established in this field for acceptance and evidence in the consumer assistive market

Practical market approach

- Conclusion to look at 3 business models within the EXOLEGS project:

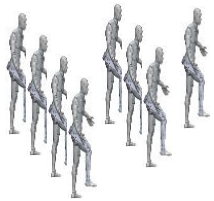
1. BP to introduce EXO-LEGS within the field of Neuro Rehabilitation, where there is a good market possibility for Hocoma (**Lead HOAG**). Higher product pricing for the lower porduct volume is acceptable. Elderly persons could also be private customers after the rehabilitation
   This market can pave the road to the consumer product
2. BP for **Elederly person market** as final customer buying a exo Leg (**Lead UGAV**). This market is in longterm the biggest with very high potential but also the most difficult one to address with highest financial efforts and higher risk for investors
3. BP in the field of orthopaedics with lead from Blatchford. Here the approach is to consider a modular system with assistive support for a specific joint or leg (**Lead CBSL**). Elderly persons provided with an Orthotic device for support.

Practical market approach

Radical Innovation in a consumer market!

first

Neuro & Orthopaedic Rehabilitation market



Smaller market with rather high product pricing!
Short time to market! Will deliver evidence for the assistive consumer market

second

Consumer market: Convince private persons, Health Insurance and health care organization

Big market with rather low product pricing in a consumer environment!
Capital intensive with rather long time to market expected!

THANK YOU


HÖGSKOLAN
I GÄVLE


Gävle
KOMMUN


Blatchford
get busy living


GIGATRONIK


PCM
Proyecto
Control
Montaje S.L.


KIT
Karlsruher Institut für Technologie


MRK-SYSTEME GMBH


Universidad
Politécnica
de Cartagena


Hocoma