Symposium I²-CoRT
Rehabilitation technology in clinical practice
October 13, Hasselt

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Rehabilitation under Horizon 2020

- Close to 350 mio € of funding

- From fundamental research projects funded by the European Research Council such as (non-exhaustive list):
  - **BCINET**: Non-invasive decoding of brain communication patterns to ease motor restoration after stroke
  - **MRI4DEEG**: An EEG calibration toolkit for monitoring rehabilitation of stroke patients
  - **ImpHandRehab**: The development and validation of a hand-based stroke rehabilitation product
  - **SoftHand Pro-H**: A Soft Synergy-based Hand Prosthesis with Hybrid Control
  - **BrainVisionRehab**: 'Seeing' with the ears, hands and bionic eyes: from theories about brain organization to visual rehabilitation
  - **Natural Bionics**: Natural Integration of Bionic Limbs via Spinal Interfacing

- To close to market solutions funded through the SME or the Fast track to Innovation instruments, in diverse fields of rehabilitation, such as cognitive neurorehabilitation, motor, neuromuscular, gender violence rehabilitation,...

- With the bulk of funding allocated to collaborative grants
Robotics in rehabilitation (1)

Based on the definition of a new concept, the "memory of motion", it will lead to a new technology for robot control.

WANDERCRAFT in Paris has designed one of the most advanced exoskeleton for paraplegics, targeting, for the first time, rehabilitation centers like those handle by the Center for Physical Medicine and Rehabilitation of APAJH, based in Pionsat, France.

https://www.memmo-project.eu/
https://www.wandercraft.eu/fr/accueil-2/
**Ambition:** To develop a novel prosthetic hand with improved functionality, smart mechatronic devices/features for safe implantable technology  [http://www.detop-project.eu/](http://www.detop-project.eu/)

**Ambition:** To develop an hybrid exoskeleton that can communicate, assess, and proactively adapt to users. [https://rehyb.eu/](https://rehyb.eu/)

**Ambition:** Validate the technical and economic viability of robotic ortho-prosthesis  [http://www.cyberlegs.eu/](http://www.cyberlegs.eu/)
Robotics in rehabilitation (3)

**Ambition:** Transfer results from laboratory settings to facilitate a clinically and commercially viable medical product

http://www.input-h2020.eu/

**Ambition:** Use robot-based technologies to speed up the rehabilitation (arm and hand mobility as soon and as much as possible)

https://www.ab-acus.eu/retrainer/

**Ambition:** Increase the impact of robotic rehabilitation solutions for people with real needs in the real world

https://softpro.eu/
vCare project: Virtual coaching activities for rehabilitation in elderly

vCARE OBJECTIVES

SMART VIRTUAL COACHING SYSTEM

- Risk Factor Reduction
- Enhancement of Quality of Life
- Better Adherence to Care Plan at Home
- Personalization and Health Promotion

Recover an active and independent life at home

Virtual Coach

- Machine learning & knowledge integration
- Unambiguous location detection
- Clinical pathways: Personalised and adaptive rehabilitation
- Feedback & Serious games
- Activity & health monitoring
- Contextualisation

Virtually enhancing the quality of life

What has to be done?

How to be done?

https://vcare-project.eu/
Virtual Coach as a support for the Rehabilitation

Consider and Evaluate
- motivate
- suggest alternatives
- provide feedback
- remind
- track activities

Analyse and Adapt
- Physio
- Games
- Walking
- Treatment phase 1
- Treatment phase 2
- Treatment phase 3

regular rehabilitation plan

Set up by the physician
Regenerative medicine

HIPGEN

- Randomized, double-blind, multicentre, placebo-controlled phase III trial for restoring muscle function, mobilisation and reduction of post-operative stress in hip fracture patients treated with placenta-expanded adherent stromal cells.

- HIPGEN partners are world-leading experts in orthopaedic surgery or rehabilitation, clinical immunology and performing innovative clinical studies, 3D-cell manufacturing, preclinical and clinical cell therapy and biomarker analyses.

- The HIPGEN consortium includes Be the Partner that has developed a app for patient data management and engagement giving an added value by filling the gap between science and patients.

https://www.hipgen.eu/
Innovation procurement

R&D / Pre-commercial Procurement (PCP)

Phase 0
Curiosity
Driven Research

Phase 1
Solution design

Phase 2
Prototype development

Phase 3
Original development and testing of limited volume of 1st test products/services

Phase 4
Deployment of commercial volumes of end-products
Wide diffusion of newly developed solutions

Supplier(s)
A, B, C, D
and/or X

Supplier A

Supplier B

Supplier C

Supplier D

Supplier B

Supplier B

Supplier D
MAGIC is a European wide Pre-Commercial Procurement (PCP) focused upon creating innovative technology;

Transforming services for people post stroke to improve physical function and personal independence

Buyers Group

Project support

Observer states

Mobile Assistance for Groups Individuals within the Community - STROKE REHABILITATION cod. 687228 - H2020-PHC-2015 –
http://magic-pcp.eu/
“It was really great to get stroke survivors and clinicians involved with innovation. This will be the first time many of our clinicians have been involved in technology development and they were very excited by it. The need for technological transformation to assist with bridging the GAP between workforce supply and demand remains just as crucial as it was at project inception. There is real hope that a procurable solution will be found by the end of the process”

http://magic-pcp.eu/
What is next?
Horizon Europe: evolution not revolution

Specific objectives of the Programme

- Support the creation and diffusion of high-quality knowledge
- Strengthen the impact of R&I in supporting EU policies
- Foster all forms of innovation and strengthen market deployment

Optimise the Programme’s delivery for impact in a strengthened ERA

Pillar 1
Open Science
- European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

Pillar 2
Global Challenges and Industrial Competitiveness
- Clusters
  - Health
  - Inclusive and Secure Society
  - Digital and Industry
  - Climate, Energy and Mobility
  - Food and natural resources
- Joint Research Centre

Pillar 3
Open Innovation
- European Innovation Council
- European innovation ecosystems
- European Institute of Innovation and Technology

Strengthening the European Research Area
- Sharing excellence
- Reforming and Enhancing the European R&I system

For more information, visit: https://ec.europa.eu/info/files/european-partnership-innovative-health_en/
For more information, visit: https://ai-data-robotics-partnership.eu/
Six main areas of intervention

1. Health throughout the Life Course
2. Environmental and Social Health Determinants
3. Non-communicable and Rare Diseases
4. Infectious diseases
5. Tools, Technologies and Digital Solutions for Health and Care
6. Health Care Systems
European Partnership on Transforming Health and Care Systems

The General Objective: to ensure the transition towards more sustainable, resilient, innovative and high quality people-centred health and care systems.

Key Specific Objectives to be achieved by 2030:
1. To provide multidisciplinary research and innovation actions in priority areas of common interest to fill knowledge gaps, produce evidence and develop guidance on how to transform health and care systems.
2. To provide applied research/development and innovation actions in priority areas of common interest to develop new solutions for health and care to support and maintain people’s health.
3. To strengthen the research and innovation community in the field of health and care systems across Europe.
4. To improve the ability of relevant health and care actors to take up innovative solutions, including organisational, service and policy innovations.
5. To establish a platform for connection and coordination of relevant stakeholders to develop the ecosystems allowing for a swift scaling up and transfer of successful innovations to different health and care systems.
Digital Europe Programme: Complementarity and synergies

AI in MFF: Complementarity & Synergies

AI in Horizon Europe

STATE OF THE ART TECHNOLOGY

R&D&I

AI in Digital Europe Programme

CAPACITY & DEPLOYMENT

- Investing in capacity and infrastructure:
  - Data
  - Algorithms
  - Testing and Experimentation facilities

- Skills

- Boosting deployment:
  - SMEs / Public sector
  - with help of DIHS

- Research, technological development, demonstration, piloting, proof-of-concept
Specific Objective 2. Artificial Intelligence

1. Creation of **Common European Data Spaces**

2. Development of **Common European Libraries of Algorithms**
   - **Toolbox of AI tools** ➔ AI on Demand Platform

3. **World class reference sites for experimentation and testing** of AI in real settings.
Digital Europe Programme

World class reference sites for experimentation and testing

Co-investment with Member States for reference sites
Building on, developing and networking existing facilities for common benefit

1) Technology-centric:
Testing and experimentation facilities for AI components based on neuromorphic and quantum technologies

2) Application-centric:
Reference sites for experimentation and testing AI in essential sectors such as

- **SMART HOSPITALS AND HEALTHCARE**
- **Agri-Food**
- **Smart Mobility**
- **Manufacturing**
- **Smart Cities ( (!! Environment is cross-cutting theme) **
Thank you!