



Exergaming Physiotherapy



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Carol Davila University
Aldebarani Gonzaleza
al.gonzalez@hotmail.it



DISCLOSURE

+ Today's menu

- Exergaming
- Physiotherapy
- Exergaming Therapy
- Teletherapy
- Exegaming addiction



+ Exergaming

Use of video games involving virtual reality (simulated environment) and some form of physical exercise



Atari Puffer project
80's



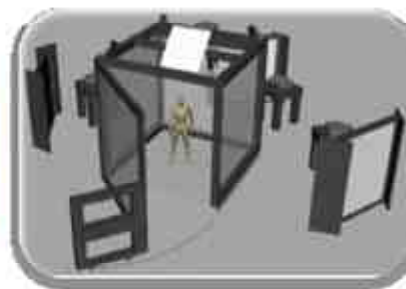
Konami's Dance Dance
Revolution
90's



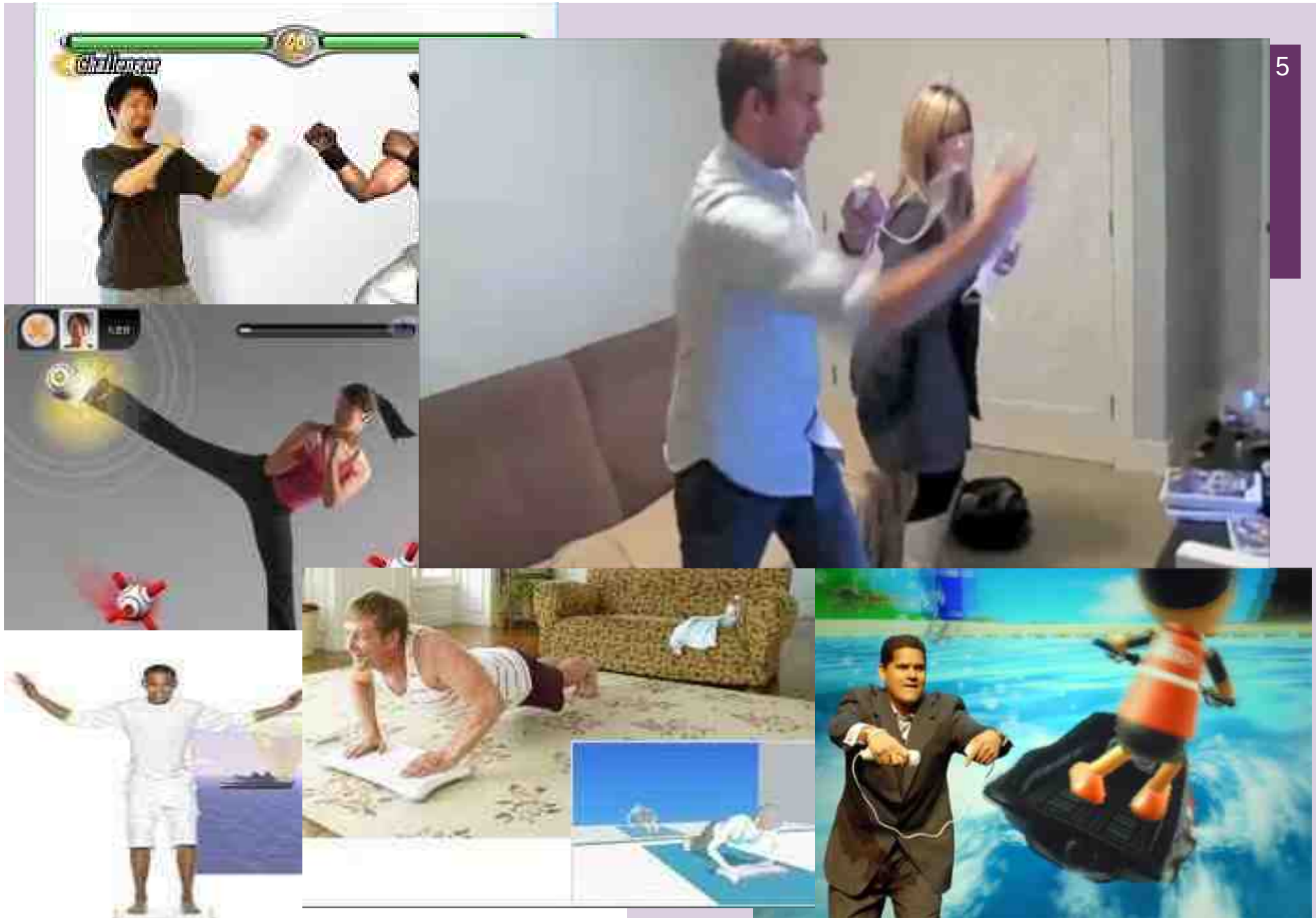
Nintendo's Wii
2000's



CAREN



Cave



+ Physiotherapy

Treatment of disease, injury, or deformities by physical methods such as massage, heat and exercise among others.



+ Popular Devices

7



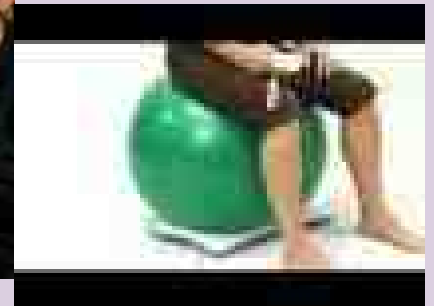
Nintendo Wii



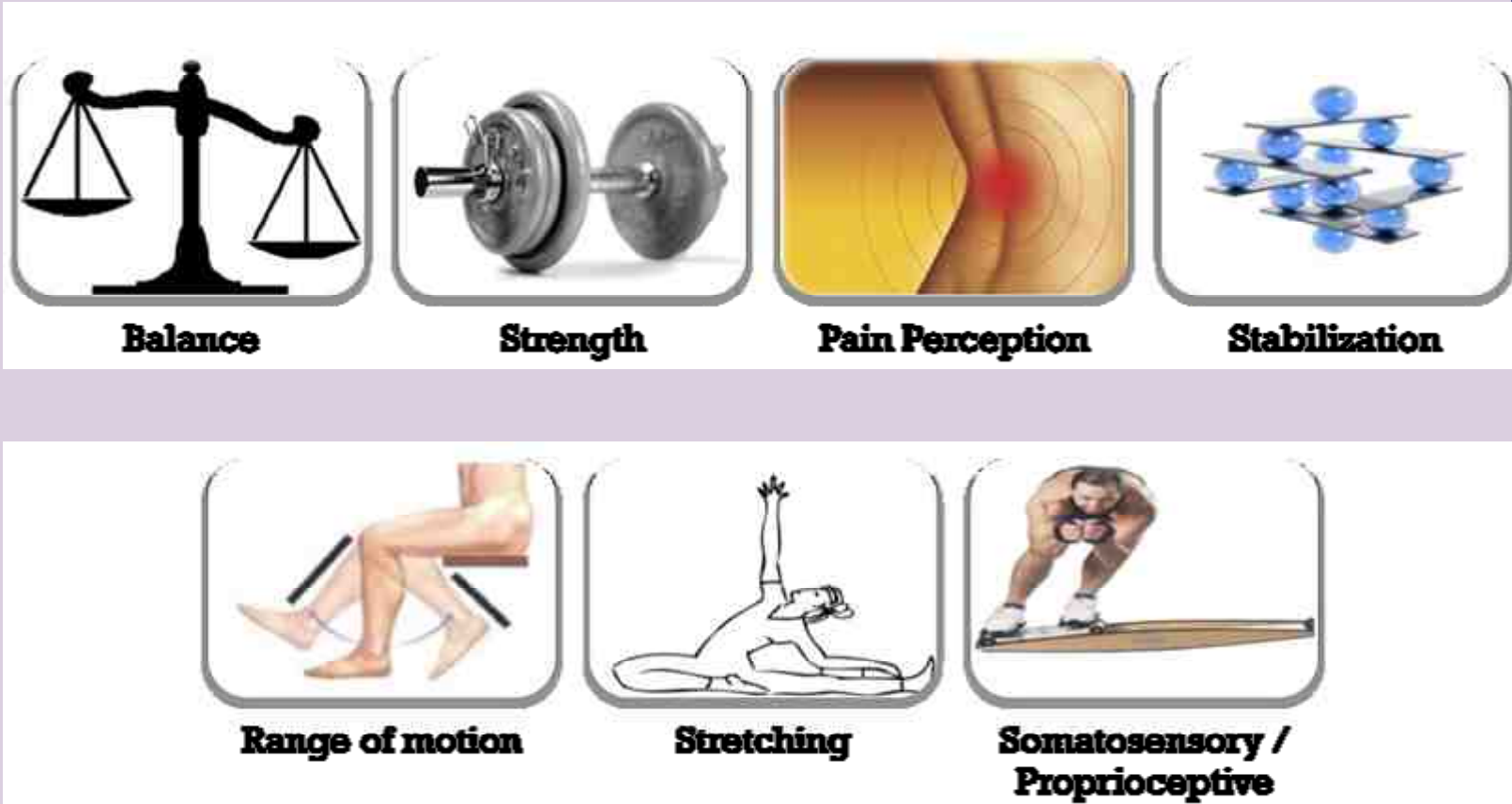
**Play Station's
Eye-toy**



Xavix EYEHAND is a fun "multi-task training" application that stimulates the neurotransmission system between the brain and the body.



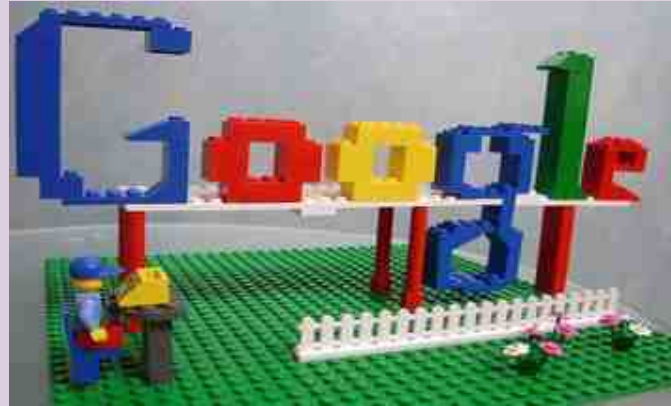
+ Exergaming therapeutic targets



+ Impact and Effectiveness Evidence

Burned patients	• Reduce pain perception and improves range of motion (13)
Parkinson's	• Improves movement and a reduction in depression (Herz et al 2009)
Cerebral Palsy	• Improvements in visual-perceptual processing, postural control, and functional mobility (18)
After Stroke	• Wii is useful in upper-limb rehabilitation (16) • Wii safe, feasible, and potentially effective alternative to facilitate rehabilitation therapy and promote motor recovery (17)
Grannies	• Six hours of Wii bowling can reduce their risk to fall (19)
Physiotherapists	• favor the use of Wii as a complement to traditional therapy (14)
Compared to traditional therapy	• Similar strength, balance gain, posture stability improvements but increased levels of intrinsic motivation, interest, enjoyment (11), (12)

+ Why is it useful:



11

- Fun
- Engaging
- Motivating
- Repetition of movement
- Provision of feedback
- Challenging
- Rewarding
- Distraction
- Assessment
- Adaptability and variability based on patient baseline
- Data storage
- Online remote data access
- Reduced medical costs

+ Exercise physiotherapy: A cyber-service?

Physical part

- Examination
- Evaluation/
Diagnosis

Cyber part

- Treatment/
Plan of care:
- Follow-up:
data
recordings.

+ Future

Wearable Sensors
E-goniometer
(12)

Glove orthopedic
teletherapy
undergoing
clinical trials (21)

Constant
decreasing
prices of
technology

Partnerships

+ Exergaming addiction?

Addictive parents



Video Games

- Excessive use of video games is associated with a number of problems which resemble a dependence syndrome (4)
- 11.9% of gamers meet the diagnostic criteria of addiction (5)



Exercise

- Associated with increased plasma dopamine concentration in serum and striatum (19, 20)
- About 42% of the clients in a gym are sport addicts (7)



Have questions, comments, or need further information?

Contact me at: al.gonzalez@hotmail.it



- 11 Therapeutic Exergaming Berkeley, CA June 03-June 05 ISBN: 978-0-7695-3644-6 [Brendan O'Huigin Barry Smyth Garrett Coughlan Diarmaid Fitzgerald Brian Caulfield](#)
- 13 The effect of virtual reality on pain and range of motion in adults with burn injuries. [Carrougher GJ, Hoffman HG, Nakamura D, Lezotte D, Soltani M, Leahy L, Engrav LH, Patterson DR. Department of Surgery, University of Washington, Seattle, Washington, USA.](#)
- 12 Russell, Trevor (2007-06) Goniometry via the internet. *Australian Journal of Physiotherapy*, 53 2: 136.
- 14 The utility of a video game system in rehabilitation of burn and nonburn patients: a survey among occupational therapy and physiotherapy practitioners. [Fung V, So K, Park E, Ho A, Shaffer J, Chan E, Gomez M.](#)
- 15 Clinical use of Nintendo Wii bowling simulation to decrease fall risk in an elderly resident of a nursing home: a case report. [Clark R, Kraemer T.](#)



- 17 Effectiveness of virtual reality using Wii gaming technology in stroke rehabilitation: a pilot randomized clinical trial and proof of principle. [Saposnik G, Teasell R, Mamdani M, Hall J, McIlroy W, Cheung D, Thorpe KE, Cohen LG, Bayley M; Stroke Outcome Research Canada \(SORCan\) Working Group.](#)
- Virtual rehabilitation--benefits and challenges. [Burdea GC.](#)
- 18 Use of a low-cost, commercially available gaming console (Wii) for rehabilitation of an adolescent with cerebral palsy. [Deutsch JE, Borbely M, Filler J, Huhn K, Guarrera-Bowlby P.](#)
- 19 PET Studies of the Effects of Aerobic Exercise on Human Striatal Dopamine Release. Gene-Jack Wang, Nora D. Volkow, Joanna S. Fowler, Dinko Franceschi, Jean Logan, Naomi R. Pappas, Christopher T. Wong and Noelwah Netusil
- 20 Plasma dopamine responses to standing and exercise in man. Glen R. Van Loon, Leonard Schwartz and Michael J. Sole



- 21 A virtual-reality-based telerehabilitation system with force feedback Popescu, V.G.; Burdea, G.C.; Bouzit, M.; Hentz, V.R.; ?CAIP Center, Rutgers Univ., Piscataway, NJ, USA