International Society for Virtual Rehabilitation

ISVR

NEWSLETTER

NUMBER 21 | SEPTEMBER 2021

Editorial

September 2021 Newsletter 21

Dear reader

This issue is dedicated to a review of the International Conference for Virtual Rehabilitation (ICVR), which was held from 14-16th July 2021 virtually. This was the first edition of ICVR fully virtual, and we organized a different type of meeting to foster much more interaction among the audience and presenters and was very successful. It turned out to be an inspiring conference covering a broad range of topics within virtual rehabilitation, ranging from applications of VR for cognitive rehabilitation, wheelchair practice,… and many more.

We present the keynote speakers and summaries of their talks on pages 3 to 5, the symposia on pages 6 to 12, and the early career and best posters awards on pages 13 and 14.

Also, keynotes, symposia and posters were video recorded and will be available soon at the isvr.org website for our membership only, together with last season's Journal Clubs and Webinar presentations. If you are not yet a member, join us to support our mission and have access to all of these resources.

We are always looking for interesting contributions to the newsletter, and we would like to hear from your experiences, too. If you would like to share your news, upcoming events or an overview of your research, lab, clinic or company, please contact us at newsletter@isvr.org.

Sergi Bermúdez i Badia, ISVR president

SPECIAL ISSUE

ICVR 2021

UPCOMING EVENTS

9th International Conference on Sport Sciences Research and Technology Support
October 28-29, 2021
Valletta, Malta
http://www.icsports.org

European Congress of NeuroRehabilitation
December 8-11, 2021
Digital
https://www.efnr-congress.org/

REHAB WEEK 2022
July 25-29, 2022
Rotterdam, The Netherlands
https://2022.rehabweek.org/

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ICVR IN NUMBERS

13th International Conference on Virtual Rehabilitation

14-16 JULY 2021

This year's **ICVR** was held from **14-16th July**, comprising an exciting program with

3	5	27	24
KEYNOTES	SYMPOSIA	SPEAKERS	POSTERS

77

PEOPLE ATTENDED

Of those, **47** were **members of the ISVR** and **37** were **students** or **post docs.** Most attendees came from the **US (20)**, **Canada (23)** and **Israel (17)**, but also **Portugal**, **Spain**, **Mexico**, **Denmark**, **UK**, **Chile**, **Germany**, **Netherlands**, **Russia**, **Switzerland** were represented.

PROCEEDINGS

KEYNOTE SPEAKERS

Bradford J. McFadyen

Dr. McFadyen is a Professor within the Department of Rehabilitation at Université Laval, as well as a researcher at the Centre for Interdisciplinary Research in Rehabilitation and Social Integration (CIRRIS). He is also a Research Fellow of the Canadian Institute for Military and Veteran Health Research. Dr. McFadyen's research program spans from basic to applied work related to walking and mobility in healthy and pathological populations. Basic work strives to understand how locomotion is adapted to daily environments across adulthood as well as following injury and trauma. This research involves the use of virtual reality to control environmental characteristics and social contexts. On the applied side, he endeavours to apply evidence to design protocols within both real and virtual environments to help clinicians better assess function and expose residual deficits in order to make better decisions about return to function.

How our environment moves us: anticipatory locomotor adjustments and the role of immersive technology to study, evaluate and train them.

There is a symbiotic relationship between our locomotor intentions and the environment. This relationship requires proactive control in order to anticipate the environmental factors that facilitate or obstruct our intended displacement. In his presentation, Dr. McFadyen presented what we have learned about anticipatory locomotor adjustments (ALAs) in relation to the underlying, context specific, control variables for circumvention based on trajectory deviation and maintaining personal space, as well as the multi-articular strategies for stepping on and over surface level changes. He also showed how virtual reality (VR) has been used to advance the study of ALAs, as well as how it might be exploited for clinical assessment and intervention of locomotor capacity and related executive functioning. Finally, certain concerns and questions were raised around the effectiveness of immersive technology in locomotor rehabilitation and the greater need to democratize such technology, not only in relation to decreased costs, but also to render it easier to use and to empower non-technical users with the ability to create and integrate VR content.

The Large Overground Virtual Suite for mobility training.

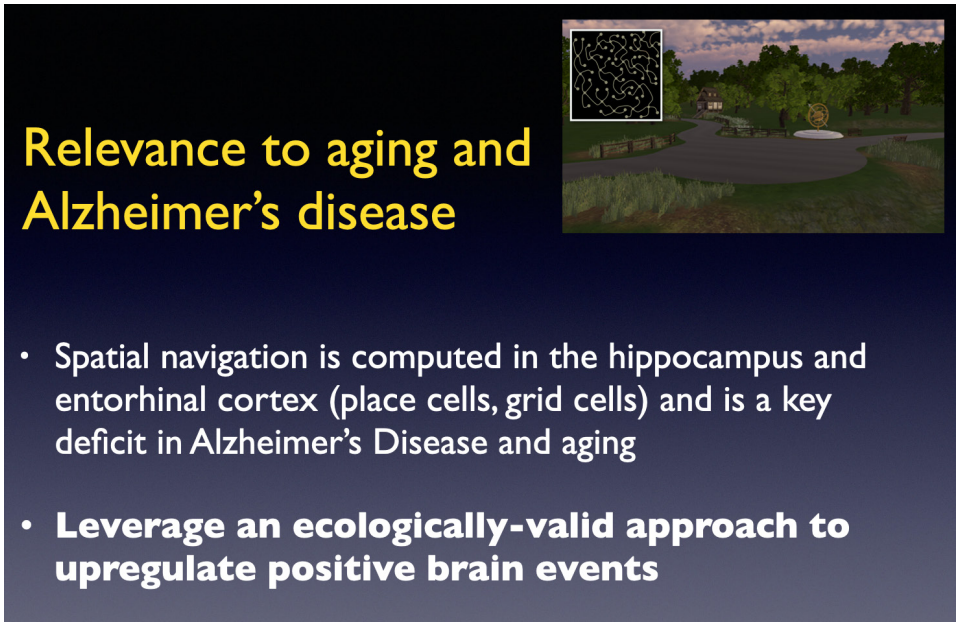
KEYNOTE SPEAKERS

Judy Pa

Dr. Judy Pa is an Associate Professor and Cognitive Neuroscientist at the University of Southern California (USC) in Los Angeles, CA. Dr. Pa has 20 years of human neuroimaging experience and directs a research lab dedicated to Alzheimer's prevention. The primary focus of Dr. Pa's work is to develop and test new multi-domain combination interventions using technology, such as virtual reality and remote activity monitoring, with the goal of preserving brain health and cognition. Dr. Pa is a Project Leader of USC's Program Project Grant on Vascular Contributions to Alzheimer's disease and the Imaging Core Co-Director of USC's Alzheimer's Disease Center. She leads 2 ongoing randomized, controlled intervention trials with a focus on physical and cognitive activities in older adults. Dr. Pa's work is supported by the National Institutes of Health, USA.

Using virtual reality to promote brain health in older adults.

Cognitive decline is a significant public health concern in older adults. Aerobic exercise and environmental enrichment have been shown to enhance brain function. Virtual reality (VR) is a promising method for combining these activities in a meaningful and ecologically valid way. The purpose of our research is to assess the impact of simultaneous exercise and cognitive training in VR on brain health and cognition in older adults. In a small preliminary study of 12 older adults who completed a combined VR intervention study, evidence of engagement of brain blood flow and brain volume, in addition to cognitive function involving executive function and memory, was observed. This early study provides proof of concept evidence that our cycling and spatial navigation intervention may improve brain health and cognition in older adults and should be evaluated in a larger, randomized controlled trial for testing efficacy.



Relevance of VR training to Alzheimer's disease rehabilitation.

KEYNOTE SPEAKERS

Phillipe Archambault

Philippe Archambault is an occupational therapist and Professor at the School of Physical and Occupational Therapy, McGill University. His research is carried out at the Interdisciplinary Research Center in Rehabilitation, Montreal, Canada. His work focuses on the use of technology for the rehabilitation of physical disabilities. Specifically, he is involved in the development and testing of a simulator for the training of manual and power wheelchair skills. In other work, he is looking at the effectiveness of robotic-based therapy, combined with VR, to improve arm function in people with stroke. Philippe Archambault has been a recipient of the Hugh & Hellen McPherson Memorial salary award from McGill University, a Senior Researcher salary award from the Quebec Research Funds and the Rosemary W. Brown prize from McGill University.

Virtual reality for wheelchair skill training.

Wheelchairs and motorized mobility scooters are among the most important assistive technologies used in rehabilitation for individuals with mobility impairments. It is well known that the amount of training provided to new users of mobility devices is insufficient, especially for completing complex tasks and activities that are encountered in the community. Assessing wheelchair skills capacity among users of mobility devices also presents a challenge, particularly with respect to safe execution in 'real life' environments. Our lab has been developing low-cost virtual reality applications that simulate the use of a power wheelchair, manual wheelchair or mobility scooters for the assessment and practice of tasks in various environments. For each version of the system, virtual scenarios were designed based on users' needs, as expressed by expert clinicians and users, through an iterative, participatory approach. This talk will address how the virtual reality simulators and scenarios were developed, how skills learned in the simulator can transfer to real life and how practice in the simulator may improve mobility skills. A validated virtual reality platform that can be used at the users' homes or at rehabilitation facilities, may provide a safe and effective way to increase the amount and frequency of mobility training. Users could increase their autonomy by learning wheelchair and scooter skills in a self-paced manner, and at a time and place they find most suitable.

Virtual wheelchair training using a supermarket scenario

SYMPOSIUM 1

The use of virtual reality and associated technologies for enhanced ecological validity in neuropsychological assessment and rehabilitation

Ana Lúcia Faria[1], Thomas Parsons[2], Rachel Kizony[3], Joana Câmara[1] & Mónica Spínola[1]

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[2] iCenter for Affective Neurotechnologies, University of North Texas
[3] Department of Occupational Therapy, University of Haifa

Given the high prevalence of cognitive impairment and functional dependence after Acquired Brain Injury (such as stroke and traumatic brain injury), degenerative conditions (such as dementia and multiple sclerosis) and psychiatric disorders (such as post-traumatic stress disorders and schizophrenia), finding effective neuropsychological assessment and rehabilitation solutions has been a primary goal for many research studies in the field of Virtual Reality (VR). Existent assessment and rehabilitation approaches rely on theoretically valid principles; however, paper-and-pencil tasks with static stimuli may be demotivating and lack minimal resemblance to everyday life demands.

The issue of ecological validity started being discussed in 1982 when Neisser argued that cognitive psychology experiments were conducted in artificial settings and employed measures with no counterparts in everyday life. In opposition, Banaji and Crowder (1989) advocated that ecological approaches lack the internal validity and experimental control needed for scientific progress. In 1996, Franzen and Wilhelm conceptualized ecological validity as having two aspects; veridicality, in which the person's performance on a construct-driven measure should predict some feature(s) of the person's everyday life functioning, and verisimilitude, in which the requirements of a neuropsychological measure and the testing conditions should resemble requirements found in a person's activities of daily living (ADLs). Since then, the search for a balance between everyday activities and laboratory control has a long history.

One methodology that has the potential for a laboratory vs. everyday functioning rapprochement is VR. Performance of many ADLs, such as doing the groceries, implies getting to outdoor locations, such as supermarkets or shopping malls. Walking across streets, street crossing, and driving are demanding tasks that require multiple and complex cognitive and motor skills that are commonly impaired. Their practice in real environments can be dangerous because of intrinsic hazards such as traffic or pedestrians and are highly resource-intensive in terms of staff management and financial costs, which are scarce in most clinics. These limitations have motivated the use of VR to safely recreate different scenarios such as streets, kitchens, cities, supermarkets, apartments and offices.

VR allows precise presentation and control of dynamic stimuli, providing ecologically valid experiences that combine the control and rigor of laboratory measures with a simulation that depicts real-life situations in a balance between naturalistic observation and the need for control key variables. Over the last years, VR-based methodologies have been developed as promising solutions to improve neuropsychological functions via immersive and non-immersive technologies.

SYMPOSIUM OUTLINE

This symposium aimed to highlight the potential of VR environments for enhanced ecological validity in neuropsychological assessment and rehabilitation in the light of the perspectives of four researchers with heterogeneous experiences in this field. Dr. Faria was the moderator and will start with a review about the topic, reflecting also about the current lack of terminological precision surrounding ecological validity and how there seems to be no agreed upon definition in the literature, nor any means of classification to determine or evaluate a neuropsychological assessment and rehabilitation tool's ecological validity.

Subsequently, speakers made their presentation. Dr. Kizony discussed the concept of ecological validity and its rationale in cognitive and motor assessment from an occupational therapist perspective, presenting her current work in this field with the four-items test.

Switching for an intervention perspective, Dr. Faria shared her approach on the design and development of an ecologically valid rehabilitation tool (the Reh@City) promoting discussion on the results, limitations and insights of its clinical validation studies. Ms. Câmara and Ms Spínola described the development process of a VR-based cognitive training platform (the BRaNT project), inspired by a set of activities of daily living. Ms Câmara promoted discussion on the challenges associated with the developmental process, which involved interviews with neuropsychologists. Ms Spínola explored aspects such as verisimilitude of the virtual world, the veridicality of the tasks and the influence of the technologies used on the development process.

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SYMPOSIUM 2

Developing Immersive Vestibular Rehabilitation Tools: Hardware Comparison, Software Refinement, and Lessons Learned

P H Sessoms[1], S E Kruger[2], K B Delpy[2], D M Bodell[1,3], J VanDehy[1],V P Ordek[1], K B Rosen[2]

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[3]Naval Medical Center San Diego, San Diego, CA, USA

In the past decade, the use of virtual and augmented reality (VR and AR) based head mounted displays (HMDs) has increased in healthcare settings. Such hardware is typically used in combination with immersive environments, creating tasks that monitor, assess, and/or treat different patient populations across a variety of clinical disciplines. However, the development process, from conception to implementation, can be challenging. Within the Military Health System, the National Intrepid Center of Excellence and Naval Health Research Center have been working collaboratively to pare down the Computer Assisted Rehabilitation Environment (CAREN), a large-scale VR-based system. Despite the benefits observed, by both clinicians and patients, there is limited access to CAREN systems. To increase accessibility and meet the clinical demand for mobile vestibular rehabilitation tools, we leveraged the portability of HMDs by evaluating new VR and AR hardware and then developed software applications for therapeutic use. To do so, we formed an interdisciplinary team of clinicians, engineers, programmers, and scientists. This symposium will describe how we've partnered to take a clinical idea from an initial concept to end product.

SYMPOSIUM 3

High time for high-level tests in VR: Development of Integrative VR cognitive assessments

Meir Plotnik

Center of Advanced Technologies in Rehabilitation, Sheba Medical Center, RamatGan, Israel & Dept. of Physiology and Pharmacology, Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel.

Human behavior involves integration of different functional domains, e.g., cognition, motor, affect and sensory processing. Often, when evaluating performance, each of these domains are assessed separately, a fact which compromises the ecological validity of the evaluation and may limit practical and generalizable conclusions. Virtual reality (VR) technology enables the presentations of simulated situations that call for integrative performance. We posit that VR based evaluations reflecting synergic activation of several functional domains, will provide a more comprehensive perspective of performance within and between specific domains. However, we face significant challenges in designing virtual environments (VE) for this purpose, since the technology enables the creation of almost infinite options, but optimizing simulations that are ecologically relevant requires extensive validation efforts.

In this symposium we will present initial studies that were designed according to principles which target the evaluation of more than one competency and the interactions between competencies. Further, we will emphasize the gradual methodological approach, which webelieve is essential, in developing relevant VEs. When aiming to translate neurocognitive tests from their traditional 'pencil-and-paper' versions to the proposed VR versions, we take into consideration that each response on a cognitive task involves interactions between sensory and motor functions - first to select the required behavioral response and then to plan and execute it. These processes cannot be distinguished and examined with traditional pencil-and-paper testingor even with computerized testing platforms. Thus, as a first step, we aim to develop VR neuropsychological tests by adapting well-validated traditional measures of cognitive constructs. These adaptations will enhance ecological validity by including multiple multimodal (e.g., cognitivesensory-motor) interactions, facilitating measurement of cognitive function in a mannermore relevant to the interaction among multiple functions characteristic of everyday activities. Reaching this goal requires a gradual, multi-staged process. In each stage, the developer needs to ensure preservation of the cognitive construct, and also the reliable (reproducible) andmeaningful (reveals additional dimension of information) definition of the new outcomes.

This symposium introduces novel and contentious topics since there are many unanswered questions. For VRbased cognitive testing, we will demonstrate application of evaluations-based on measurements of multiple domains and their interrelationship. The studies are highly multidisciplinary, combining expertise from, e.g., engineering, neurophysiology

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and cognitive science. Finally, as we face enormous gaps in knowledge, the topic investigates new concepts of human-VR interaction not previously studied, that have the potential for advancing clinical assessments and cognitive research.

BRIEF DESCRIPTION OF TALKS

Validation of a virtual-reality adaptation of the Rey Auditory Verbal Learning Test

Amihai Gottlieb, Shani Kimel-Naor, Maya Cohen, Hila Iny, Oran Ben-Gal, Glen Doniger,Michal Schnaider Beeri, Meir Plotnik

Speaker: Amihai Gottlieb, MSc, PhD student, Tel Aviv University, Tel Aviv, Israel.

The Rey Auditory Verbal Learning Test (RAVLT) is a widely used verbal memory neurocognitivetest. Its main component consist of a list of 15-non-semantically related items is read to the participants, whom are asked to recall as many items as they can remember. We created a VR adaptation of the RAVLT and tested its construct and agerelated discriminant validities among78 participants from different age groups. An avatar, taking the role of daily personal assistantserved to introduce the word lists.

Studying Cognitive-Motor Interactions Using a Novel Tablet based Application of the Color Trails Test

Noa Ben Yair, Meytal Wilf, Yotam Bahat, Meir Plotnik

Speaker: Noa Ben Yair, BSc student, Ben Gurion University, Be'er Sheva, Israel.

The color Trails Test (CTT), is among the most popular tests designed to measure cognitive function, specifically executive function, was converted from its traditional pencil-and-paper version to a tablet-based application (TabletCTT). Feasibility and convergent validity of the Tablet-CTT were confirmed with 24 healthy young adults participants. Intriguingly, the digitizedformat revealed that the excessive performance time of the divided attention task (compared to the sustained visual attention task), is due to lengthening of movement planning rather thanmovement execution.

Studying head movement – manual interactions during the performance of three dimensional trails making.

Adi Lustig, Or Koren, Meytal Wilf, Meir Plotnik

Speaker: Adi Lustig, MSc, PhD candidate, Center of Advanced Technologies in Rehabilitation,Sheba Medical Center, Ramat Gan, Israel.

The VR based 3D version of the CTT (VR-CTT) requires relatively increased multi directional space scanning of the environment in order to locate the virtual target balls, and then to reachthem with a hand avataric representation. We will introduce methods to quantify the relationships of between head-gaze movements and manual movements and how those are affected among 110 healthy participants from 3 age groups. We found that while performing divided attention tasks the hand lags head scanning to a higher extent as compared to sustainedvisual attention task.

Analytical approach for creating multiple versions for virtual reality-based Color Trails Test

Meytal Wilf, Noa Ben Yair, William Geoffrey Wright, Meir Plotnik

Speaker: Meytal Wilf, Post-Doc, Center of Advanced Technologies in Rehabilitation, ShebaMedical Center, Ramat Gan, Israel.

CTT is extensively used in standard neurocognitive assessments and research. In many cases, multiple assessments need to be performed on the same individual, either under varying experimental conditions, or at several timepoints. However, repeated testing of the same task might result in learning and fatigue affects, which might confound test outcomes, suggesting multiple shorter versions of the CTT test are necessary. Here, we used VR-CTT data from a largecohort of 165 participants from 3 age groups. We found that a subset of test targets is sufficientfor reliable assessment of cognitive performance.

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Immersive virtual reality tools to assess and train attentional deficits in brain damaged patients

Sonia Crottaz-Herbette, Meytal Wilf, Nicolas Ferron, Julia Felrath, Daniel Perez-Marcos,Celine Dupuis, Stephanie Clarke, Andrea Serino

Speaker: Sonia Crottaz-Herbette, University Hospital Lausanne

Sonia Crottaz-Herbette will present novel immersive VR tools allowing to capture different dimensions of attentional deficits in brain damaged patients, in a short, yet validated way, and use this information to define and fine-tune individualized trainings. These are presented in gamified therapeutic activities forms, targeting ad-hoc attentional functions. Immersive VR is used to boost exploration of a 3D, wide-range, multisensory space, ina goal directed, ecologically valid and highly motivating fashion. Datasets from healthy controls and pilot results from brain damaged patients will demonstrate the feasibility and the potentials of the approach.

SYMPOSIUM 4

Untangling Virtual Reality and Video Game Definitions: Discussion of Unifying Terminology

J E Deutsch[1,2], M F Levin[3], J L Palmieri[1,2,4], S Bermúdez i Badia[5]

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[4]Rutgers New Jersey Medical School, NJ, USA
[5]N-LINCS Madeira & Madeira Interactive Technologies Institute, University of Madeira, Madeira, Portugal

This symposium provides a historical perspective to explain the terminology used to describe virtual reality-based rehabilitation. For that, different perspectives and methodologies are used to understand the current use of terminology and its limitations. A new nomenclature is suggested and the audience is expected to contribute their input in refining it.

INTRODUCTION

The terms used in the literature to describe virtual reality simulations for rehabilitation of sensorimotor and cognitive deficits are confusing. Part of this confusion may be explained by the development of virtual reality simulations in different disciplines and for different applications. The integration of video games into rehabilitation has further added to this confusion (Deutsch, Borbely, Filler, Huhn, & Guarrera-Bowlby, 2008; Rand, Kizony, & Weiss, 2008). The lack of clarity with terminology both for virtual reality (Huygelier, Mattheus, Abeele, van Ee, & Gillebert, 2021) and related terms such as immersion and presence (Rohrbach, Chicklis, & Levac, 2019) has been highlighted by authors and the International Society for Virtual Rehabilitation community. Historically, different definitions have been suggested for virtual reality applied to rehabilitation (Burdea, 2003; Weiss, Rand, Katz, & Kizony, 2004) but these have not been universally or consistently adopted. The unclear terminology leads to inconsistencies in reporting study results that in turn, limits synthesis efforts and generalization of findings. The purpose of this symposium is to provide an historical context to explain terminological inconsistencies both for virtual reality applications and serious games, to use two searching strategies to understand how the terminology is being used in rehabilitation and to offer agreedupon definitions in order to foster a unified approach for reporting on virtual reality-based rehabilitation. The session is intended to be participatory with expected discussion between presenters and attendees and efforts at consensus using polling.

METHODS

Different perspectives on terminology

An introduction frames the problem about how unclear terminology leads to inconsistencies in reporting study results that in turn, limit synthesis efforts and generalization of findings to practice. This is followed by four presentations.
The first presentation discusses definitions of virtual reality based in their field of origin and how they may be best applied to rehabilitation as well as the concepts of presence and immersion and how they relate to virtual rehabilitation applications. The second presentation traces the confusion in the use of the terms video games and exergames and describes the origin of some of the early definitions of these technologies applied to rehabilitation, including the term virtual reality. The third presentation

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summarizes a literature search (using PubMed from inception to Sept 2020) to document the overlap in terminology between virtual reality applications and video games for sensorimotor rehabilitation and fitness. The fourth presentation uses quantitative analysis to further describe the frequency and relationship between the terms currently used in the literature of the field of virtual reality-based rehabilitation. Finally, a naming convention is proposed and discussed and voted on by the audience.

Polling, Discussion and Consensus

Prior to the presentations, audience polling is planned to elucidated the challenges with the current terminology. After the presentations, polling and discussion with the audience offer opportunities for discussion and consensus on the proposed definitions.

RESULTS

Results of the literature search in Pubmed regarding the use of virtual reality-based rehabilitation terminology is presented, and discussed with respect to their historical perspective. Several definitions from the literature are shared and a unifying definition offered. The results of the symposium findings, discussions and voting will be reported separately on a dedicated follow up publication.

DISCUSSION AND CONCLUSIONS

The frequent interchangeable use of the terms, virtual reality and either video games and exergames was documented and can in part explain the confusion of these terms. A proposal for virtual rehabilitation umbrella terms with two distinct streams for Virtual Reality applications and Serious Games was proposed and will be further vetted.

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SYMPOSIUM 5

Adoption of technology-based clinical assessment and intervention: Implications for achieving greater clinical acceptance and influencing healthcare policy

N Gefen[1], D Kairy[2], R Kizony[3], D Rand[4], S-H Schless[5], P L Weiss[6]

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[4]Department of Occupational Therapy, Tel Aviv University, Israel

Despite impressive advancements in rehabilitation technology over the past 20 years, questions continue regarding the extent to which these systems are successfully adopted and how to account for technology under-usage. The objective of this symposium is to describe some of these examples as a model for working towards greater clinical acceptance of rehabilitation technology and influencing healthcare policy. Four topics will be presented as examples of how new technologies have been adopted in rehabilitation and how clinical research can be used to substantiate the ways in which advanced technologies can stimulate changes in healthcare policy as well as support all stakeholders in their ability to take advantage of these developments.

INTRODUCTION

Despite impressive advancements in rehabilitation technology over the past 20 years, questions continue regarding the extent to which these systems are successfully adopted and how to account for technology under-usage. In some cases, device prototypes have been developed primarily in lab environments that cannot provide sufficient support for clinical distribution. In other cases, there is a cost-accuracy trade-off such that less expensive equipment is used despite its limitations in outcome accuracy and resolution. Finally, there is insufficient research evidence demonstrating usability and effectiveness since many studies still rely on small sample sizes and short-term interventions not carried out under realistic field conditions. On the other hand, several encouraging examples of research and development highlight the promise of addressing these limitations. The objective of this symposium is to describe some of these examples as a model for working towards greater clinical acceptance of rehabilitation technology and influencing healthcare policy.

EXAMPLES OF REHABILITATION TECHNOLOGIES

Motion analysis laboratories to optimize intervention (S-H. Schless)

Motion analysis laboratories are considered the gold standard tool to measure walking (gait); the high-tech instrumentation enables the collection of objective and quantitative data (joint kinematics, kinetics and muscle activity), deconstructing the gait deviations into primary, secondary and tertiary problems (e.g., Schless et al., 2019).
This information can then be used by the medical team to optimize their interventions, ranging from the creation of a focalized patient-specific treatment plans in physiotherapy, through to providing dynamic musculoskeletal information for surgeons to assist with their surgical planning. Previous scientific evidence along with our own clinical experience has highlighted that the integration of a motion analysis system with a multidisciplinary team improves the clinical management of the patient when compared with previously used low-tech approaches (i.e., visual observation). This in turn can potentially lead to shorter rehabilitation period for the patient, as well as reducing the risk of needing additional surgical interventions in the future.

Role played by the Covid-19 pandemic in increasing the use of telerehabilitation (D. Kairy)

Already in 2017, the WHO presented a call for action to address unmet needs and improve access to rehabilitation worldwide. While telerehabilitation has been proposed as a strategy to help improve access to care, its uptake in clinical practice was slow prior to the pandemic. With the introduction of public health restrictions for physical distancing, several barriers were overcome allowing increased use of telerehabilitation to improve access to services when in-person rehabilitation services were limited due to personnel being reallocated. While rehabilitation services have gradually started resuming to being provided in person, lessons learned from telerehabilitation use during the pandemic can contribute to improving access to rehabilitation worldwide (Tanguay et al., 2021). It is important however to ensure that, as new models of care using telerehabilitation are proposed, including hybrid models combining in person and remote services, optimal access to quality rehabilitation services

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remains a priority for all.
This talk will present examples of telerehabilitation use and address possible pitfalls to consider with the scaling up of telerehabilitation practices.

Powered mobility: Changes in health care policy based on clinical evidence (N. Gefen)

Powered mobility is sometimes the only option for independent mobility for children with physical disabilities. To receive a fully funded powered wheelchair from the Israel Ministry of Health (IMOH), people with disabilities need to prove their proficiency. Three variables (the ability to stop and go upon request, the use of a joystick and the ability to propel a manual wheelchair for short distances) were identified that predicted powered mobility proficiency in 80% of the cases and that 96% of the cases who would not become a proficient driver (Gefen et al., 2019a). In another study, an adult simulator was validated for use with children with physical disabilities and in a third study conventional powered mobility training was compared to simulator-based training; both were equally effective in progressing driving skills and obtaining proficiency (Gefen et al., 2019b). These results led to health care policy changes in the procurement process and in the acceptance of a simulator as a viable practice option. Thus change can be facilitated based on clinical evidence.

Potential of touchscreen tablets to practice motor and cognitive tasks in rehabilitation (R. Kizony & D. Rand)

This talk will discuss touchscreen tablets and their clinical use to practice and evaluate motor and cognitive tasks in a motivating and easy manner during and following rehabilitation (Kizony et al., 2016; Givon Schaham et al., 2020). In addition, the presenters will show how the tablet can be used for self-management, daily activities and for leisure for different populations. The theoretical, practical and research aspects of planning tablet use for rehabilitation will be discussed as well as the use of the embedded sensors and apps. However, questions remain whether we are fully utilizing the potential of this technology for rehabilitation.

DISCUSSION (moderated by P L Weiss)

We will conclude the symposium with a discussion on ways advanced technologies can stimulate changes in healthcare policy as well as support all stakeholders in their ability to take advantage of these developments. We will focus on 1. How can a dialog between technology developers, researchers and clinicians be nurtured in a way that leads to "best clinical practices" in rehabilitation technology? 2. How can we develop tools that can help identify the most promising, feasible and realistic technologies for rehabilitation?

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AWARDS

Early Career Award

Marika Demers is a post-doctoral research fellow at the Motor Behavior and Neurorehabilitation Laboratory in the Division of Biokinesiology and Physical Therapy at the University of Southern California. Dr. Demers received her BSc in occupational therapy from the Université de Montréal, and her MSc and PhD in Rehabilitation Sciences at McGill University. Her research interests include the use of health technologies, such as active video games and virtual reality, to better assess and enhance arm and hand motor recovery and improve rehabilitation care for people with neurological impairments.

Best Poster

Usability and Usefulness of VSTEP Examination Suite: Faculty Perspective

Judith E. Deutsch PT PhD FAPTA received her BA in Human Biology from Stanford, her MS in Physical Therapy from USC and her PhD in Pathokinesiology from NYU. She completed a post-doctoral fellowship in Rehabilitation Research at UMDNJ. Dr. Deutsch is Professor and Director of the Research in Virtual Environments and Rehabilitation Sciences (Rivers) Lab in the Doctoral Programs in Physical Therapy at the Rutgers Biomedical and Health Sciences. Her current research includes the development and testing of virtual reality and serious games to improve functional mobility and fitness of individuals with neurologic health conditions. She contributes to the transfer of the technology and knowledge translation aimed at facilitating adoption and evidence-based practice of these technologies. She is an active member of the global PT community serving currently as President of the International Neurological Physical Therapy Association a sub-group of the World Physiotherapy. She was the first Editor in Chief of the Journal of Neurologic Physical Therapy and is now a member of the Editorial Boards of the Journal of Neural Engineering Research and Games for Health. The AHA, NSF and NIH fund her work. She is a member of the Editorial board at the Journal of NeuroEngineering and Rehabilitation.

AWARDS

(continued from page 13)

Best Poster - PhD Student

Investigating a Virtual Reality Head-Mounted Display as a Valid Posturography Tool

Jonathan Marchetto is a Ph.D. candidate and Presidential Fellow at Temple University in the Neuromotor Sciences program. His research focuses on postural control, eye-tracking, and developing novel virtual reality assessments for concussion patients. He earned his B.A. and M.A. from Montclair State University, where he worked as a researcher in psychology and motor learning focused on visual control of movement. He recently joined Northwestern Mutual as a full-time user experience researcher, where he applies his academic experience to understand how we interact with technology, inform the development of new applications, and leverage science to drive financial decisions.

Best Poster - MSc Student

The effects of the movements of a virtual pedestrian on circumvention: Comparison between healthy older and younger adults.

Félix Fiset completed his master's degree in physiotherapy in 2019 and is currently pursuing a research master's degree in clinical and biomedical sciences at the Université Laval. Since 2017, he has been working as a part of Dr. Bradford McFadyen's team on experiments using virtual reality to better understand how people perform anticipatory locomotor adjustments in complex environments. Currently, his MSc research is aimed at understanding how aging affects the visual information younger and older adults use when circumventing pedestrians with unpredictable trajectories and different gait patterns. In addition, he works part-time as a physiotherapist working with clients of all ages who present with musculoskeletal impairments.

ISVR Society News

The website at http://www.isvr.org acts as a portal for information about the society. We are keen to to enhance the community aspects of the site as well as to to make it the first port of call for people wanting to know what is going on in the field of virtual rehabilitation and its associated technologies and disciplines. Please do visit the site and let us know details of any upcoming events or conferences or news items you would like us to feature on the site. We intend to add further features in the coming year including member profiles; a directory of journals who publish virtual rehabilitation related work; and a list of Masters and PhD level theses completed or currently being undertaken in the field. As well as sending us details of events and news for display, we would welcome suggestions from members about what else they would like to see on the site, or ideas for how we can further develop the virtual rehabilitation community through it.

Please mail webdec@isvr.org with any information/ideas using ISVR INFO in the subject header.

Membership information

Membership of ISVR is open to all qualified individual persons, organizations, or other entities interested in the field of virtual rehabilitation and/or tele-rehabilitation. Membership (regular, student or clinician) entitles the member to receive reduced registrations at ISVR sponsored conferences and affiliated meetings (see webpages for more details). There is also an active ISVR facebook page, which is another source of useful information, currently with 1197 members.

Call for Contributed Articles

- If you are a technology expert in virtual rehabilitation or you have experience in the clinical use of virtual rehabilitation technologies, and would like to be featured in an upcoming ISVR newsletter issue
- If you would like to submit a contributed article relevant to the ISVR community
- If you have any news, summaries of recent conferences or events, announcements, upcoming events or publications

We are looking forward to your contribution! Please contact us at newsletter@isvr.org.

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