

Use of a computerized exercise program in a rehabilitation facility

A pilot feasibility study

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Value of computerized exercises

- Practicing multiple task-oriented approaches to complete an activity may help with planning and problem solving
 - e.g. Safe practice of balance skills to avoid falls

Marley 2000, Kizony 2003, Rose 2002

Value of computerized exercises continued

- Improves self-esteem after traumatic brain injury, spinal cord injury, stroke
Richardson 2004, Thornton 2004, Kizony 2003
- Improves balance in the elderly or those with a neurological diagnosis
Bisson 2004

Benefits of computerized exercises

- Challenging but safe
- Can control stimulus and measure outcome
- Removes physical barriers, and allows control and manipulation of environment, active participant
- Therapist can apply new strategies in ordinary situations, data collection
Rose 2002

Benefits of using VR for rehabilitation

- Graded task difficulty, adaptable according to patient capabilities Rizzo 1997
- Individual yet standardized Schulteis & Rizzo 2001
- Interacting in multi-dimensional and multi-sensory environment Wilson 1996
- Engaging and enjoyable Reid 2002

Change in health care practices

- Change is essential to improve health care
- Need to integrate innovative, evidence-based, efficient care delivery by
 - Describing and communicating practice patterns
 - Assessing learning skills and willingness to change
 - Identifying barriers and facilitators
 - This will help identify valid approaches to care and integrate these new techniques into practice

Fraser 2002

Objective: To test feasibility of using a computerized exercise delivery system by physiotherapists in a rehabilitation setting by determining:

- Therapist perceived ease of use, practicality, value
- Patient interest, value and enjoyment

Methodology

- Physiotherapists
 - Selected 1 patient from caseload with balance problems
 - Attended 2x 30-minute training sessions with a technician
 - Supervised 4 exercise sessions with the patient
 - Documented barriers/facilitators
 - Repeated with a second patient
 - Attended a focus group to discuss

Methodology 2

- Therapists
 - Chose one of three levels of difficulty and selected up to 5 different activities for each 40-minute exercise session
 - Suggested appropriate modifications of activities to the technician for the next session

Methodology 3

- Measurement
 - Patients rated enjoyment, interest, value
 - Therapists rated ease of use, feasibility of integrating into practice, amount and type of assistance required
 - Focus groups

VR system



VR system



Participants

- Inclusion criteria for patients
 - Decreased balance but able to sit for 10 minutes, weight shift, use at least one arm for an activity
 - Understand simple commands
 - See a television screen

Therapist demographics

- 10 female, 2 male
- Years of experience: Mean 14.6 (1.5-26)
- Areas of practice: general (2), orthopaedic (3), neurology (7); in- and out-patient
- Comfort with computers: Mean 3.33 (low 0-5)
- Innovative: 75% self-described
- Reasons for trying new technology in practice: user-friendly, efficient and beneficial to patient

Therapist reported ease of use

- Those with initial lowest confidence level with their ability to run the system after first training session(1-2/5) improved the most after second session (4-5/5)
- All therapists found it easier following second training session

Patient demographics

- 8 female, 10 male
- Age: mean 43.6 (19-65)
- Conditions:
 - Amputee (5)
 - Stroke (4)
 - Spinal Cord injury (4)
 - Other (5)

Who is a good candidate for this intervention? (as identified by therapists)

- Younger people
- Diagnosis: amputation, stroke, spinal cord injury
- Perceived ease of use with the person
- Those with limited treatment options

What are some of the simple challenges?

- Technical
 - Order of set up
 - Turning system on/off
 - Adjustments: difficulty level, pause, sound
- Physical
 - Glove fit (paralysis)
 - Colours (patient wore red or blue)
 - Scheduling (patient arrived late)

What were some of the difficult challenges?

- Technical
 - Adjusting parameters
 - Camera range
 - Clicking wrong button causing machine to reboot
- How much help was needed?
 - Mean # requests/session .28
 - Range of # requests/session 0-4
 - % sessions requiring help 18%

What do you think went well? (therapist perception)

- Patient enjoyed the experience (13/18)
 - Exercising without thinking of discomfort or weakness
 - “The VR approach takes you away from the comfort zone and gets you focussing on something else as opposed to falling or balance”

What do you think went well? (therapist perception)

- Patient enjoyed the experience (13/18)
 - Exercising without thinking of discomfort or weakness
 - “The VR approach takes you away from the comfort zone and gets you focussing on something else as opposed to falling or balance”
- Technical parts (11/18)
 - Preparation time helped (training, setup)
 - Better able to fine tune the settings
 - More comfortable with the program

What was the worst thing about the experience?

- Technology limiting therapeutic goal
 - “Creativity was sometimes limited by technology, but there were possibilities that could be explored when there was more comfort with the technology.”

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- Having to call for help
- Frustration if patient did not perform as well as expected

What changes did therapists ask for?

- Time 1
 - 35 specific activity and general intensity changes
- Time 2
 - 4 increase difficulty level, decrease rest period
- Time 3-4
 - 2 very specific

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Recommendations by therapists

- Train Physiotherapy Assistants to supervise program planned out by PT
- Conditions for VR use:
 - Orthopaedic or neurological problems
 - Patients who are deconditioned
 - Those with decreased balance
 - allows good weight shift and use of affected side
 - especially those needing high level balance training

How did the patients rate their experience?

- Enjoyment: mean 2.4 (range 1-5)
- Interest: mean 2.8 (range 1-6)
- Benefited balance: mean 2.4 (range 1-5)

What barriers to integrating into practice did therapists identify?

- Barriers:
 - Technology - complicated, difficult to operate
 - Physical limitations: e.g. time

What facilitators to integrating into practice did therapists identify?

- Facilitators
 - Enjoyment expressed by patient
 - Technical support (system would need regular upgrades)
 - Convenient location of equipment
 - Ease of learning application

Conclusions

- Equipment must be
 - close to treatment area
 - user (therapist)-friendly
 - flexible and simple to use
- Technical aid must be readily available
- Technology must be kept current

Conclusions

Therapist with learning skills, willingness to change
+ Appropriate problem list + treatment goals
+ Equipment proximity, user-friendly, technical assistance, regular upgrades

= Feasible to integrate this modality into practice



Thank you

Questions?

