Technology in Practice: Promoting Participation in Patients with High Level of Spinal Cord Injury

Morgan Gill  
*Thomas Jefferson University, mxg044@jefferson.edu*

Kate Nuschke  
*Thomas Jefferson University, kmn012@jefferson.edu*

Kaitlin O'Sullivan  
*Thomas Jefferson University, keo003@jefferson.edu*

Casey Puvogel  
*Thomas Jefferson University, clp002@jefferson.edu*

Alex Sagnor  
*Thomas Jefferson University, ars012@jefferson.edu*

Let us know how access to this document benefits you

Follow this and additional works at: [http://jdc.jefferson.edu/createday](http://jdc.jefferson.edu/createday)

Part of the [Occupational Therapy Commons](http://jdc.jefferson.edu/createday)

Recommended Citation

Gill, Morgan; Nuschke, Kate; O'Sullivan, Kaitlin; Puvogel, Casey; and Sagnor, Alex, "Technology in Practice: Promoting Participation in Patients with High Level of Spinal Cord Injury" (2013). *Collaborative Research and Evidence shared Among Therapists and Educators (CREATE Day)*. Paper 4. [http://jdc.jefferson.edu/createday/4](http://jdc.jefferson.edu/createday/4)
Technology in Practice: Promoting Participation in Patients with High Level Spinal Cord Injury

Morgan Gill, Kate Nuschke, Kaithlin O’Sullivan, Casey Puvogel, Alex Sagnor

Contact: keosull@gmail.com

Faculty Mentor: Teal Benevides, MS, OTR/L

Presented in Partial Fulfillment of the Master of Science in Occupational Therapy degree at Thomas Jefferson University

Objectives: At the conclusion of this presentation, the learner will be able to:

- Evaluate different modes of technology used to improve participation in daily occupations with individuals with high-level spinal cord injury (SCI)
- Integrate current evidence into clinical practice
- Discuss implications for future practice, research, and education

PICO: Does the use of technology in individuals with cervical and thoracic level spinal cord injuries improve participation in daily occupations?

Methods:

<table>
<thead>
<tr>
<th>Population</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical SCI, thoracic SCI, tetraplegia, quadriplegia</td>
<td>FES, robotic, OT, eye gaze, hand, grasp, neuroprostheses, technology</td>
<td>Function, participation, social, leisure, work, ADL, occupation, driving, QOL, self-care, activity, upper limb, upper extremity</td>
</tr>
</tbody>
</table>

Search Limitations: English language, human subjects, adolescents and adults, published 2000-2013

Databases Used: PubMed and CINAHL

Total Articles Found: 1,530

Inclusion Criteria
- Cervical and thoracic level injuries
- Upper extremity interventions
- Functional electrical stimulation (FES)
- Neuroprostheses
- Electronic aids to daily living (EADL)
- Functional activity

Exclusion Criteria
- Paraplegia
- Co-morbid physical disabilities
- Only incomplete injuries
- Interventions related to mobility
- Pediatric populations

Final Article Count Based on Inclusion & Exclusion Criteria: 14

Qualitative article critical review form: Letts et al., 2007

Quantitative article critical review form: Law et al., 1998

Results & Clinical Significance:

Surface FES
- Improved performance in communication management, home management, grooming, and feeding
- Improved performance in leisure participation
- Research conflicts on ease of home use

Implanted FES
- Improved participation in feeding and grooming
- Improved participation in communication and home management
- Improved performance satisfaction in meaningful activities

EADL
- Increased independence in ADLs, leisure participation and comfort in the home
- Improved perception of self-efficacy, competency, adaptability, and self-esteem
- Reduced caregiver utilization and/or paid assistance

ASIBOT
- Improved participation in drinking and brushing teeth

Tooth-click technology
- TC provided faster and more reliable clicks than speech recognition
- Persons with tetraplegia performed better with TC/OHM than TC/GHM- explanation is unknown
### Implications:

<table>
<thead>
<tr>
<th>Practice</th>
<th>Research</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Implementation of implanted and surface FES in individuals with spinal cord injuries increase participation in ADLs</td>
<td>- Higher level of research to support use of technology in rehabilitation</td>
<td>- Explore training options to use various types of technology in practice</td>
</tr>
<tr>
<td>- Use of surface FES, implanted FES, and EADLs increases participation in IADLs</td>
<td>- Exploration of additional types of technology</td>
<td>- Provide patient and caregiver education on available technology</td>
</tr>
<tr>
<td></td>
<td>- Larger sample sizes for improved generalizability</td>
<td>- Advocate for systematic training protocols for clients using technology</td>
</tr>
<tr>
<td></td>
<td>- More research focused on technology for SCI populations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Need for standardized assessments and protocols</td>
<td></td>
</tr>
</tbody>
</table>

### References