CRITICALLY APPRAISED TOPIC

QUESTION:
What is the state of the evidence for the use of supported standing devices in a school based setting?

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CLINICAL BOTTOM LINES:
1. Evidence in support of supported standing device use specifically in school is lacking.
2. Strong evidence exists for the use of standing devices on body structure and function. Standing devices can effect bone mass density, ROM, hip biomechanics and spasticity.
3. Anecdotal evidence shows that supported standing devices may have an effect on making it easier to perform transfers, pressure relief, alertness, bowel function, participation, independence during activities in home and school setting, self-image, social life and accessing educational materials.
4. Proper dosing and implementation is important. Standing programs regardless of purpose, should be between 60 -90 minutes per day over a 5 day period.
5. No research to date has been conducted in a school setting.

BEST EVIDENCE
The following studies were identified as the “best” evidence and selected for critical appraisal.
Reasons for selecting the following two studies were:
- The studies focused on pediatric supported standers for various diagnoses.
- The studies included quantitative and qualitative data from physical therapists, children and caregivers.
- The outcomes can be applied for use in a school environment.

SUMMARY OF KEY EVIDENCE:

Aim/Objective:
To provide suggestions for therapists in designing and implementing supported standing programs through evidence based literature and expert opinion.
Charbonnet, M.

Study Design: **Systematic review**

Various search engines were used to conduct a search for articles written from January 1954 to August 2012, using eight search terms. Thirty articles met the inclusion criteria terms of English language, peer reviewed, participants 0-21 years of age with atypical development, described some form of standing device and measured quantifiable outcomes. The Oxford Centre for Evidence-Based Medicine levels of evidence and the American Academy of Neurology levels of evidence were used to evaluate the strength of the articles. Include herein that the systematic review utilized the ICF framework to categorize results.

Results:

**Body Functions/Structures:** The evidence was strongest for the use of supported standing devices to improve ROM and decrease spasticity. The evidence was good for the use of standing devices to improve muscle strength and bone mass density when standing for 60 to 90 minutes. The evidence was fair for standing devices to improve hip stability when standing for 45 to 60 minutes. Evidence was poor and insufficient for the use of supported standing devices on mental function, bowel function and skin related structures. Supported standing devices may not be effective in improving alertness, social participation, test scores, self-esteem, pressure relief and bowel function when standing for a minimum of 30 minutes a day. No research articles assessed standing devices and their effects on functions of the cardiovascular or respiratory systems.

**Activities and Participation:** The evidence for the use of supported standing devices for activity and participation overall was categorized as good by the authors. However, the highest level of evidence according to the Oxford Centre for Evidence-Based Medicine, in this category was for one article that discussed gait and one article that discussed transfers. There was one article discussing the effects of supported standing on feeding, which was a level three evidence and two articles discussing participation both of which were level five evidence. Standing devices can probably be effective in increasing the speed of feeding, making it easier to perform transfers, and increasing walking speed and base of support during gait. But the evidence is poor for supported standing devices improving participation. No dosing information was given for activity and participation.

Critical Appraisal and Application:

**Strengths:** 1) Used two levels of inclusion criteria and included all children with disabilities. 2) Article search included earliest dated articles to provide a historical perspective. 3) Used valid and reliable guidelines for determining the level of evidence. 4) Used ICF model to categorize the results. 5) Multiple articles on the same topic in the body function/structure category.

**Threats:** 1) Used expert opinion to derive considerations due to lack of pediatric specific evidence. 2) Most of the evidence was in the area of body structure/function. 3) Lack of high levels of evidence. 4) Interrater reliability and quality control data not included. 5) One article each topic in the activity/participation section.

**SUMMARY OF KEY EVIDENCE:**

**Citation:**

"Commented [SL(2)]: Citation...and spell out before using abbreviation..."

"Commented [SL(3)]: Needs a citation."

"Commented [SL(4)]: Consider adding in citations from the systematic review regarding specific articles as you comment herein."

"Commented [SL(5)]: Among all of the studies reviewed?"

"Commented [SL(6)]: Was reviewed for each topic? Meaning – insufficient numbers?"

**Aim/Objective:**
Describe children’s and parents’ experiences with standing devices and the significance of standing.

**Study Design:**
Qualitative interview study design with a content analysis approach

**Sample:**
Participants were selected from a previous comprehensive survey in five counties in Sweden. Purposive sampling was used to ensure the participants represented different counties, ages, genders and diagnoses. Six children between 7-19 years old and 14 parents were included in the study. Three children had Cerebral palsy and three children had chromosomal abnormalities. Parents who participated in the study had children who had Cerebral palsy, Spina Bifida, Duchene’s muscular dystrophy, chromosomal abnormalities and microcephaly. The participants who were children had to have experience in a stander and the ability to communicate.

**Procedures:**
Individual telephone interviews were conducted and digitally recorded by the primary author. The interviews started with open ended questions, followed by probing questions to obtain further explanation. Interviews lasted between 40-60 minutes with the exception of two interviews only lasting 15 minutes.

**Data Analysis:**
Verbatim transcripts were analyzed in order to determine underlying themes. Interview texts were read repeatedly to obtain a sense of the material. The texts were divided into units (words, sentences and paragraphs) then condensed and coded. Coded context was compared and sorted into themes and sub-themes.

**Results:**
Three themes emerged from the data.

*Instrumental dimension of standing:* Upright standing was perceived as a necessary function of the body. Standing was seen as something the body was made to do and as a form of exercise that was beneficial and normal. Standing was also seen as painful and pointless when the device was not customized or used frequently. Families also reported that they did not get sufficient support from the PT in how to properly implement the standing program.

*Social dimension of standing:* Standing can promote independence and variation while performing certain activities. Standing devices allow for children to have the same opportunities and be on the same level as typical children. However, standing needs to be combined with a meaningful activity otherwise it may be too boring. Standing was felt to improve intestinal activity, but led one child to not want to stand as they would frequently not make it to the restroom on time.

*Ambivalent dimension of standing:*
The children did not feel standing was going to change who they were. While the parents stated they wanted their child to have the choice of being able to stand and to improve/maintain quality of life, both the children and parents felt the use of standing devices may lead to future walking ability.

**Critical Appraisal/Application:**

**Strengths:** 1) Perspective of parent and child. 2) Inclusion of participants of different ages, genders, and diagnoses. 3) Use of open-ended questions. 4) Interviewer appeared to have no prior relationship with subjects. 5) Identified relevant themes surrounding standing devices.

**Threats:** 1) No descriptive statistics performed. 2) Saturation of data doesn’t appear to have occurred. 3) Lack of standardized questions during interviews. 4) Limited generalizability.

**IMPLICATIONS FOR PRACTICE AND FUTURE RESEARCH:**

This critical appraisal included two articles that examined the effects of supported standing devices on various aspects according to the ICF model and parent/child perspective. While the articles did not directly evaluate standing devices in a school based setting, the dimensions and characteristics discussed in the two articles have implications for students when using standers in school. The evidence assembled is strong for the use of standers on body functions/structures. However, school based physical therapists often have to place greater emphasis on academic accessibility, participation, social interaction, and keeping up with peers (Taylor, 2009). While it is thought that interventions directed at body function/structure activities will improve the activities and participation of a child, it is often not known whether improvement in impairments will lead to improvement in participation levels (Freeman J, Marsden J, Rapson R and Kent B, 2014). Therefore it is important to identify evidence that justifies the implementation of standing programs for the improvement of participation and activity as it applies to a school based setting. The systematic review revealed good but minimal evidence for the use of standing devices to improve a child’s ability to perform transfers, which can be beneficial for aides and teachers in a classroom. The evidence was also good but minimal for improving gait speed and base of support, which could lead to greater ability for independence and a child’s ability to keep up with peers.

While there were more articles discussing social participation, the level of evidence was poor for improving social participation as well as self-esteem and academic performance. Social participation, self-esteem and academic performance are educationally relevant, and possibly easier for administrators and teachers to understand compared to physical health needs when it comes to supporting recommendations for expensive assisted technology devices. Based on the evidence, it could be debated that the use of a stander in the home environment can be just as effective as the use of a stander in the school environment, thus placing the financial burden on the family and insurance rather than the school district.

Physical therapists appear to rely on clinical expertise and experience rather than evidence based research when justifying the use of a standing program (Taylor, 2009). When looking at typical developing children, standing desks in the classroom have been reported to have a positive effect on energy expenditure, executive functioning and working memory (Mehta, Shortz, Benden, 2015; Blake, Benden, Wendel, 2012). No such studies have been done with children with physical or cognitive disabilities. However, one could argue that the purpose of school based therapy is to attempt to “normalize” a child’s functioning ability as best possible, therefore strengthening the argument for the use of supported standing devices for social participation and academic performance activity. Despite the fact that qualitative and descriptive data are not considered the strongest evidence, they should still
be considered when justifying equipment and program recommendations. The therapist needs to consider the evidence, the family’s educational concerns, and the primary need, responsibilities and abilities of the student in the school setting with the IEP team when considering the recommendation of supported standing devices and programs.

Evidence quantity and rigor are lacking for the use of supported standing devices specifically in a school setting. More research in the school environment, with high level study designs and quantifiable and measurable outcomes needs to be conducted to determine the effectiveness of the use of supported standing devices in the school environment as it relates to the ICF model and the purpose of school based therapy.

REFERENCES:


Nice work, overall Monique! Your implications for use of standing devices based on this literature, and your evaluation of the evidence is good – did you use the Oxford Center for Evidence-Based Medicine to evaluate both studies? Couldn’t tell. Couple of citations or APA recommendations. 23/25