

TO STAND OR NOT TO STAND

CINDY SMITH, PT

Craig Hospital

Plan

1. Review the present research on standing/weight-bearing in SCI
2. Review perceived benefits of those with SCI who stand
3. Summarize Craig anecdotal study and potential predictive factors

Objectives

1. Attendees will have an understanding of the research that has been done on the benefits of standing for those with SCI
2. Attendees will be able to state both the benefits and the drawbacks of standing for persons with SCI
3. Attendees will be better equipped to predict those with SCI who will benefit from the acquisition of equipment for standing

Common Issues Associated with SCI

- a. Musculoskeletal
 - i. Demineralization and osteoporosis
 - ii. Contractures
 - iii. Decreased strength and atrophy
 - iv. Spasticity
- b. Renal and Urinary
 - i. Bladder Function
 - ii. Hypercalciuria
- c. Skin and Underlying Tissues
 - i. Changes in composition
 - ii. Sores
- d. Respiratory
 - i. Decreased FVC
 - ii. Compression on lungs
- e. Cardiovascular
- f. Digestive

Most Frequently Listed Benefits of Standing and the Research

- a. Positive effect on bone density
 - i. More than 14 major studies reviewed
 1. Physiology Studies
 - a. Significant BMD loss in LEs, but not in lumbar spine
 - b. Rapid initial loss with peak at about 8 months and very slow loss after 24 months

- c. Trabecular bone decreases first and most, cortical bone loss occurs for longer period of time
 - 2. Positives
 - a. More than 3 hrs/day of standing showed decrease in hypercalciuria
 - b. 60 mins 4-5 times per week showed slight increase in BMD
 - c. Increased proximal femur BMD in half and in distal femur in 7/8 with dynamic standing in CP
 - d. Less BMD loss at femoral shaft with one study
 - e. Turkey ulna showed increased total bone area with cycled loading, but porosity still decreased, though less than static
 - 3. Negatives
 - a. Study of people on bedrest for varied reasons showed greatest calcium loss in flaccid paralysis
 - b. Study of people with SCI in rehab with standing, with standing and walking, and immobilized showed cortical bone loss in all with no significant differences
 - c. 45 mins BID showed no change in fracture risk in LEs
 - d. No change in femoral neck density with parastep
 - e. 2 larger studies showed long-term SCI no difference in BMD with standing
- b. Reduction and prevention of contractures
 - i. Two laboratory studies
 - 1. Very slight increases in ROM
 - 2. Increases noted in ROM gone 45 mins later
 - ii. One follow-up study showed ability to maintain ROM in LEs in those who stood regularly
 - iii. One anecdotal study persons who stood reported increased ability to straighten legs
- c. Reduction of spasticity
 - i. Two separate studies showed decrease in DTRs, no significant change in modified Ashworth, and increases in ankle clonus – one test reported immediate results and one followed after 6 months of standing
 - ii. One showed decreased tone decreased immediately but no carryover to next day
 - iii. One showed 32% decrease in tone with tilt table versus 17% with bracing in supine
 - iv. One reported 46% felt decrease in LE spasticity with standing
- d. Strengthening of cardiovascular system -improvement of circulation
 - i. 2 studies
 - 1. One showed slight increase in heart rate while standing, but decrease in cardiac output, stroke volume, and blood pressure
 - 2. One showed reduced hypotension with standing but compared to supine
- e. Prevention of pressure ulcers
 - i. One study looked at 41 with SCI and ability to practice regular standing was one of four variables that was identified as significant when looking at pressure ulcers

- f. Positive effect on kidney, bowel, bladder, digestive
 - i. 4 studies
 - ii. Laboratory study showed indicator of renal function more normal in standing than in supine
 - iii. Case study showed increased frequency and decreased time in one person when standing was introduced
 - iv. Lab study showed activities involving weight-bearing reduced hypercalciuria
 - v. Anecdotal study of those standing reported 21 % better bladder emptying, 21% had fewer bladder infections, and 23% better bowel regularity
- g. Positive effect on self-image and quality of life
 - i. Study of 6 showed all felt better, but there was marginal effect on sleep and relaxation and no improvement in appetite
 - ii. Dunn study showed 69% of those who stand reported overall increase in quality of life, including improvement in morale

Where is the Research?

No studies on prevention of muscle atrophy, reduction of edema, positive effect on vocation, or improvement of circulation (although 71% of those in Eng study reported improved circulation)

Follow-up Studies on Usage

Dunn – People who had purchased Lifestand wheelchair or Mobile Easy-Stand
16 % no longer using
84% still using

Eng – mail survey to 463 members of B.C. Paraplegic Association
30% reported engaging in regular standing program
Reported benefits lasted only one day

What Still Needs to Be Investigated

Bowel/Bladder
Spasticity
ROM/Skin

Craig Survey

- a. 18% never stood after rehab
- b. Of the 72% who received standing equipment, 48% still stand
- c. No significant difference in gender
- d. Of those who didn't get equipment: 42% was due to lack of funding, 26% had no desire
- e. Of those who quit standing: 25 % due to time constraints, 23% medical reasons, 20% felt it was inconvenient, 18 % due to lack of assistance, 18% due to lack of space for equipment, 14% due to lack of motivation
- f. Perceived benefits – comparison of those who still stand versus those who used to
- g. New survey on bowel, bladder, spasticity, ROM

- h. Comparisons of those who still stand with those who used to stand
 - i. Age- current and at injury
 - ii. Level of Injury
 - iii. ASIA level
 - iv. Independence with standing
 - v. Amount of Attendant care
 - vi. Vocation

Funding

- Evaluation, documentation, and LMN
 - Why do they need
 - What else has been tried
 - What will be costly effect if they don't have
- Trials
 - Commitment
 - Independence
 - Documentation of Benefit

Options for Standing

- Orthoses/assistive devices
- Static standing frames
- Static or mobile hydraulic standing frames
- Standing wheelchairs

Conclusion and Questions

Speaker Bio

Cindy is the Out-Patient Therapy Coordinator at Craig Hospital in Englewood, CO. She has been a member of the Craig out-patient SCI team for over 17 years and is an integral member of both the Seating/Positioning Clinic and the Skin Clinic.