

**Orthopedics Abstracts**

**Title:** ENHANCED SENSORY INFORMATION AUGMENTS STEP OUTPUT: TREADMILL STEPPING IN INFANTS WITH SPINA BIFIDA

**Presenting Author:** Victoria Moerchen, University of Wisconsin-Milwaukee

**Additional Authors:**

- Mina Saeed, University of Wisconsin-Milwaukee
- Jeffrey Konrad, University of Wisconsin-Milwaukee
- Kelly Lynett, University of Wisconsin-Milwaukee

**Background:** The plastic potential of the infant system impacted by spina bifida (SB) requires very early and ongoing opportunity for physical activity and complex motor behavior. Treadmill intervention during infancy supports early and complex leg movement, and introduces task-specific leg activity well in advance of traditional physical therapy approaches. We have shown that although infants with SB respond to the treadmill context by taking steps, they take fewer steps overall and they shift to more complex alternating stepping at later ages than infants without SB (Teulier et al, in review). The challenge, thus, was to identify methods to augment stepping in this unique context. This present study examines sensory enhancement during treadmill stepping as a mechanism to increase step frequency and step complexity at younger ages in infants with SB.

**Method:** Six, 2-5 month and 7-10 month old infants with SB were supported over an infant treadmill and exposed to single and combined sensory contexts, including increased friction, rapid unloading of the ankle, loading of the shank, visual flow, and velcro. Order of single and combined sensory exposures and conditions within each were randomly assigned. A 6-camera motion capture system was used to record step behaviors across 30 second trials. Step types and frequencies were quantified using behavior coding (Thelen & Ulrich, 1991). Individual and group responses to single and combined exposures were examined.

**Results:** Infants with SB do respond to sensory enhancement with increased stepping. Preliminary analyses show combined sensory inputs result in greater augmentation of stepping than the corresponding single sensory inputs alone.

**Conclusion:** The availability of enhanced sensory information during treadmill stepping augments step responsiveness of infants with SB. These results are part of an ongoing series of multi-site studies that are being used to develop initial conditions for a treadmill intervention.