

factors at all. Emergent lumbar MRI was requested but was delayed 36 hours for insurance reason. Lumbar MRI showed huge abscess from T10 to entire lumbar region and into psoas muscles bilaterally. Emergent multilevel decompression to evacuate the abscess was successful with no neurological sequel.

**Setting:** Tertiary medical center.

**Results:** Low back pain is common in outpatient practice. It was easy to consider him just like any other back pain patient especially when there were no neurological deficits at the time. I was puzzled by the subjective report of sudden transient positional weakness he had and thought he might have mass of some sort. I did not suspect abscess since there is no fever or other risk factor such as prior spinal injection, intravenous drug use or diabetes. He had positive outcome with our suspicion and early intervention.

**Discussion:** Epidural abscess of this magnitude is almost unheard of, especially when no source is identifiable. This case illustrates how crucial it is to consider mass lesion especially in a patient who gives peculiar/unusual history. In spite of negative risk factors, it is important to get imaging when the history and physical findings do not fit. There is no question a good history is the key. If the diagnosis was delayed for another day or two he could have died of sepsis or had major spinal cord compromise.

**Conclusions:** One should always suspect mass lesion when there is major weakness or sensory change with positional change. Look further if the history and physical findings do not fit. One or 2 additional delays can be disastrous.

**Keywords:** Rehabilitation, Spine, Abscess, Weakness.

## PROSTHETICS, ORTHOTICS, ASSISTIVE DEVICES

### Poster 320

#### An Uncommon Gait Abnormality After Short Trans-Tibial Amputation: A Case Report.

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**Disclosures:** A. Raghunandan, None.

**Patients or Programs:** A 21-year-old man, active duty U.S. Marine Corps.

**Program Description:** While conducting military operations during Operation Enduring Freedom, this patient suffered severe traumatic injuries to his right leg from detonation of an improvised explosive device. As a result of the extensive trauma, he required a very short right trans-tibial amputation (TTA) with removal of the fibula and its ligamentous attachment. The patient was cleared to start weight bearing 6 weeks postoperatively and progressed to walking without an assistive device by 10 weeks. Physical examination of his right knee revealed well healed surgical incisions, absent fibula, no gross instability of the knee joint,

normal range of motion, no tenderness to palpation and normal gait using his prosthetist. As part of the routine amputee medical care in the C5 program, the patient underwent an instrumented 3-dimensional gait analysis at 5 months post-operatively and was found to have a moderate to severe right knee varus thrust. Despite maximal conservative treatments such as strengthening, prosthetic adjustments and revisions, he continued to experience a significant right knee varus thrust.

**Setting:** Tertiary care hospital.

**Results:** The patient underwent a combined lateral collateral ligament (LCL) and posterior lateral corner reconstruction of the knee. Additionally, prosthetics lateralized the foot of his prosthetic to simulate a valgus proximal tibial osteotomy. Following these interventions, the patient's gait improved with significantly decreased right varus thrust.

**Discussion:** This is the first reported case, to our knowledge, of varus thrust at the knee following a very short TTA with proximal fibula excision that was effectively corrected by surgical and prosthetics intervention.

**Conclusions:** Clinicians should consider obtaining a thorough gait lab assessment of patients with very short TTA and proximal fibula excision to evaluate for possible varus thrust due to limitations in physical examination. Allograft reconstruction of the LCL and posterior lateral corner combined with lateralization of the prosthetic foot may decrease varus thrust and ultimately prevent early degenerative joint changes of the knee in these patients.

**Keywords:** Rehabilitation, Gait, Trans-tibial amputation, Lateral collateral ligament reconstruction.

### Poster 321

#### Calciphylaxis Disguised as Phantom Limb Pain: A Case Report.

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**Disclosures:** J. Kendall, None.

**Patients or Programs:** A 55-year-old woman with left transtibial amputation with calciphylaxis confirmed by biopsy of her residual limb and a 63-year-old woman with left transfemoral amputation with clinical calciphylaxis of her residual limb.

**Program Description:** Calciphylaxis is a rare condition seen most commonly in patients with end-stage renal disease (ESRD), resulting in vascular calcifications, thrombosis, and soft tissue necrosis. Though ESRD is often a co-morbidity in vasculopathic amputation, calciphylaxis has not been reported in this population. We present two cases of calciphylaxis after lower extremity amputation from peripheral vascular disease. The patients presented with residual limb pain consistent with phantom limb pain. Both patients had normal lab values for calcium, phosphorous, and parathyroid hormone. Computed tomography imaging demonstrated non-specific soft tissue stranding. Collaboration with dermatology and nephrology was necessary for diagnosis and treatment. The calciphylaxis was appropriately managed and

neither patient required amputation revision. The prosthetist played a key role in adjusting the prostheses to allow for wound healing yet maintain prosthetic use.

**Setting:** Inpatient rehabilitation/hospital.

**Results:** With a multi-disciplinary team approach, both patients completed an acute rehabilitation course and were able to continue using their prostheses despite open wounds and swelling from calciphylaxis in their residual limbs. Amputee patients have unique concerns when diagnosed with this disorder. We present a review of calciphylaxis, with our recommendations for management in an amputee.

**Discussion:** Calciphylaxis carries a high morbidity and mortality rate. Prompt recognition of this disorder is critical to improve outcomes and quality of life for these patients.

**Conclusions:** The differential of residual limb pain should be expanded to include calciphylaxis as this disorder is more common than previously reported. Careful observation and wound management is necessary to minimize morbidity and mortality.

**Keywords:** Rehabilitation, Amputation, Calciphylaxis.

## Poster 322

### Development of a Gravity-Neutral Orthotic for Patients with Spinal Muscular Atrophy: A Case Report.

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**Disclosures:** C. Interdisciplinary Neurorehab Team, NIH CTSA Award, Research grants The SMA Foundation, Research grants

**Patients or Programs:** An interdisciplinary project team with members from physical medicine and rehabilitation, neurology, biomedical engineering, physical therapy, and public health collaborating to develop a gravity-neutral orthotic (GNO) prototype that will enable upper extremity task performance in patients with spinal muscular atrophy.

**Program Description:** Testing trials are conducted by physical therapists with ongoing prototype modifications by engineering. The GNO augments patient-initiated movement, enabling functional tasks against gravity in those with < 3/5 proximal arm strength. Gravitational force is neutralized by an arm shelf and Matlab-designed software, which calibrates the weight of the arm in real time. Force vector changes, created by patient-attempted vertical arm movements, engage a stepper motor when exceeding a set threshold. The motor drives vertical movement of the arm shelf, automatically assisting the patient's movements. The GNO is portable, attaches to wheelchair components, and allows for unassisted horizontal movements.

**Setting:** Neuromuscular diseases center at a university hospital.

**Results:** Subjects (n = 2) have successfully performed GNO-mediated functional tasks including writing, page turning, manipulation of small objects, and stacking of objects at a 'modified independence' level. Time to task com-

pletion with the GNO was greater than task performance via learned, compensatory strategies without the GNO.

**Discussion:** While time to task completion may make the device seem cumbersome at present, it is hoped that future modifications will address this issue. Potential benefits include greater quality of life and independence, which may be especially important in the young adult population. Future trials and broader data gathering on quality of life, functional independence, relief of caregiver burden, and cost-effectiveness will need to be performed.

**Conclusions:** We hypothesize that GNO will improve upper extremity functional independence and quality of life while decreasing caregiver burden for patients with SMA. Further prototype modifications and data gathering are indicated.

**Keywords:** Rehabilitation, Orthotic devices, Muscular atrophy, Spinal, Self-help devices.

## Poster 323

### Prosthesis Outcome in Lower-Limb Amputees with Late Prosthesis Fitting Due to a Delay in Wound Healing.

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**Disclosures:** D. Berbrayer, None.

**Objective:** To determine impact of delay in prosthetic fitting (>30 days) due to wound infection on QOL and mobility in amputees

**Design:** Two groups of patients were considered for this study; 1. complete wound healing and prosthesis within 30 days of surgery 2, delayed wound healing resulting in late prosthesis fitting (healed = 4, not-healed = 6). Questionnaires completed after receiving 6 weeks of outpatient prosthesis training.

**Setting:** Physiatry amputee clinic in university teaching hospital.

**Participants:** Adult sustained lower limb amputation

**Interventions:** The Prosthesis Evaluation Questionnaire (PEQ). This included Ambulation, Frustration, Perceived Response, Residual Limb Health, Social Burden, Prosthesis Utility, Well-being, Transfer, Satisfaction and Self-Efficiency. The Houghton Score, which is used to evaluate prosthetic use in people with lower-extremity amputation, was also used in both groups.

**Main Outcome Measures:** The degree of wound healing at the time of discharge from the inpatient clinic was determined by reviewing the patients' charts and consulting the wound-care specialist nurse.

**Results:** There were no significant differences between the two groups in the following PEQ measures: Prosthesis Utility, Perceived Response, Social Burden, Ambulation, Transfer, Self-efficiency and Satisfaction. There was a significant difference among the two groups in the PEQ scales of Residual Limb Health ( $P = .017$ ), Frustration ( $P = .035$ ) and Well-being (.019), with the group who had complete wound