INTRODUCTION
During World War I, Janos von Ertl, MD successfully used bone grafts consisting of periosteum and cortical bone chips to heal craniofacial fractures. The flexible bone graft would regenerate as a solid, osseous structure. The application of this bone graft soon included transtibial amputations. For transtibial amputations, Dr. Ertl combined myoplasty and osteoplasty surgical techniques to create the osteomyoplastic amputation. The operation benefits persons with transtibial amputations for prosthetic fitting in several ways including preventing excessive fibular motion via synostosis between the distal fibula and distal tibia and providing end-bearing potential (J.W. Ertl, J.P. Ertl, W. Ertl, & Stokosa). This poster presents a case series on two patients who underwent a transtibial osteomyoplastic amputation. The case series will include pre-operative indications, surgical technique, and post-operative outcomes.

CASE ONE
A 39-year-old female injured in a bomb explosion with heavy trauma to her right lower extremity. Surgeons were able to keep the fibula and foot intact, but the distal tibia was shattered. For nearly 20 years, the patient ambulated with the absence of a functional tibia with extreme pain. She underwent several amputation revision surgeries before being referred to Dr. Ertl for osteomyoplastic reconstruction surgery. At the patient’s initial evaluation she complained of sharp, throbbing pain and phantom sensations, and she was unable to be fit for any prosthesis. The patient tolerated the procedure well and was discharged home five days after the operation. Evidence of a bone-bridge fusion was visible on her X-rays after six months, and the patient was soon able to ambulate for several hours per day in a prosthesis.

CASE TWO
An 18-year-old male who sustained a crush injury to his right lower extremity that led to a transmetatarsal amputation and an internal fixation of the tibia. The patient also sustained right lower extremity compartment syndrome, requiring fasciotomies and a wound VAC placement. At his evaluation, the patient presented with painful, non-healing wounds and had been unable to ambulate for six months. The patient underwent osteomyoplastic reconstruction and tolerated the procedure well. Evidence of a bone-bridge fusion was visible on his X-rays after only one month. The patient was fit with a prosthesis and is currently very active, enjoying running and playing basketball.

DISCUSSION
There are five components of the osteomyoplastic amputation that are important to ensure successful prosthesis fit and use. First is the creation of the bone-bridge, which prevents painful "chopsticking" between the tibia and the fibula, as well as preventing excessive force from being exerted on the tibia. Second, the blood vessels are individually suture-ligated to prevent the formation of a painful fistula or hematoma. Third, the nerves are identified, distracted, injected with a pain reducing medication, transected, and allowed to retract into the soft tissue area that has not been traumatized. This decreases the opportunity for a symptomatic neuroma to form. Fourth, a myoplasty is performed between the agonist and antagonist muscle groups. This reestablishes a muscle pumping action, giving greater control of the limb and adding muscular padding over the distal end. Lastly, the skin is given special attention to allow for a smooth, even closure to aid in the fit of a prosthesis.

CONCLUSION
The residual limb is a multi-organ system that requires the reconstruction of several structures. Transtibial osteomyoplastic amputation reconstructs both soft and bony tissue, resulting in a residual limb that allows for efficient rehabilitation, improved long-term health, and more functional prosthesis use. This poster presented two cases where transtibial osteomyoplastic amputation resulted in successful prosthesis use.