



US DEPARTMENT OF DEFENSE

# BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

## Extremity Injury Management

### Targeted Muscle Reinnervation Shown to Reduce Amputee Pain and Phantom Limb Pain

Targeted Muscle Reinnervation (TMR) is an innovative surgery originally developed to enhance the use of advanced prosthetics. Researchers at Northwestern Memorial Hospital (Chicago, IL), Walter Reed National Military Medical Center (Bethesda, MD), The Ohio State University (Columbus, OH), University of Oklahoma Health Sciences Center (Oklahoma City, OK), and San Antonio Military Medical Center (San Antonio, TX) investigated the therapeutic effectiveness of TMR to reduce amputee limb pain and phantom discomfort (*Dumanian et al., 2018*). In a randomized clinical trial, 28 individuals with chronic major limb amputation pain received TMR or standard treatment. TMR treatment resulted in a significantly greater reduction in phantom limb pain and trended toward improved residual limb pain, compared to standard treatment for nerve and pain issues. The results were similar for patients with all mechanisms for limb loss, including blast injuries. As an adjunct to this clinical trial for the treatment of post-amputation pain, the successful prevention of amputee pain and phantom limb pain by using the TMR surgical technique during the initial amputation was also documented. TMR performed at the time of amputation was three times more likely to decrease pain and phantom severity compared to standard amputations.

This study raises awareness of TMR in the surgical community for the prevention of amputee pain and phantoms at the time of amputation and for treatment of established pain. The findings underscore the procedure's potential to revolutionize treatment and become the new standard of care for millions of individuals with amputations worldwide suffering from debilitating chronic pain.

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#### REFERENCES:

Dumanian G, Mioton LM, Potter BK, Douza JM, Cheesborough JE, Ertl WJ, Tintle SM, Nanos GP, Valerio I, Apkarian AV, and Jordan SW (2018), "Targeted Muscle Reinnervation Successfully Treats Neuroma Pain and Phantoms in Major Limb Amputees: A Randomized Clinical Trial," *Plastic and Reconstructive Surgery -- Global* 6(9S) pp. 141-141.

