SERVICE MEMBERS AND VETERANS WITH TRANSHUMERAL OSSEOINTEGRATION: INITIAL REHABILITATION EXPERIENCES FROM THE DOD OI PROGRAM AT WRNMMC

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BACKGROUND

Since September 11, 2001, the Armed forces sustained a total of 1,706 combat amputations in which 296 had upper extremity involvement. In 2010 it was identified that 22% of the Operation Iraqi Freedom/Operation Enduring Freedom Veterans with unilateral upper-limb amputations have completely abandoned their prosthetic devices and the percent of Vietnam Veterans who abandoned their prosthesis was 30%. Prosthetic abandonment is due to many factors including pain, weight, skin breakdown, and lack of consistent function.

Osseointegration has been performed internationally for facial injuries, hearing aids, finger joints, and limb prostheses over the last two decades. Initial procedures in United States were performed for lower limb amputations beginning in 2015 with the first FDA approved devices becoming available in 2016.

Walter Reed National Military Medical Center is working to reduce the rate of abandonment through the implementation with Osseointegration (OI); using a direct skeletal attachment technique developed by P-I Brånemark from Gothenberg, Sweden called Osseointegrated Prostheses for the Rehabilitation of Amputees (O.P.R.A.). Initial enrollees in the clinical trial for transhumeral amputees have had long standing issues with prosthetic functionality leading to abandonment or limited use, but desire to use their prosthetic device. This abstract is intended to describe the rehabilitation protocol, rehabilitation timeline, and lessons learned from the first three upper limb OI participants.

METHODS

The rehabilitation protocol between the two surgeries includes wound care, range of motion (ROM), and strengthening with a clinical ROM evaluation conducted every two to three weeks. The goal between the first and second surgeries is to maintain ROM and strength. Three to four weeks after the second surgery a training prosthesis is incorporated into the treatment plan to gradually increase weight tolerance. Assessments are performed pre and post-operatively over a 24 month timeframe. Evaluations include Goniometric and Biomechanical ROM measurements, ACMC, UNB, Box & Blocks, and pinch pins.

RESULTS

Preliminary results of the first three participants self-report using the Visual Analog Pain Scale, DASH, and PROMIS Questionnaires minimal discomfort in between surgeries. ROM and strength were regained following their home exercise program (HEP). No clinical setbacks (infection, surgical complications, or excessive pain) impacted the rehabilitation progress of the initial participants. All three reverted back to their previous prosthetic use between Stage 1 and Stage 2 surgeries.

CONCLUSION

The OI procedure has given patients the opportunity to explore new avenues, improve prosthetic functioning, and quality of life.