Ablative Fractional Photothermolysis for the Treatment of Upper Extremity Contractures
Joanne Elston, LCDR, MC, USN; Adam Perry, LCDR, MC, USN; Leo Kroonen, MD; Peter Shumaker, CDR, MC, USN; Hanna Kirby, LT, MC, USN; Lesley Hawley, LCDR, MC, USN; John Rose; Eric Hofmeister, CAPT, MC, USN
Naval Medical Center San Diego, San Diego, CA

Introduction
- Ablative Fractional Photothermolysis (AFP) traditionally used for cosmetic treatments of scars, burns, and acne.
- It has recently been applied in the treatment of debilitating scars and contractures that limit satisfactory motion primarily involving the upper extremity.

Methods & Materials
- Retrospective case review October 1, 2009 to October 1, 2012.
- Inclusion Criteria:
  - Patients treated at NMCCSD
  - Limited digital finger ROM as a result of hand scars
  - Treated with at least one AFP treatment
  - Patients that plateaued with occupational therapy and non-operative modalities

- Exclusion Criteria:
  - Age less than 18 years
  - History of or current connective tissue disease
  - Non-compliance with rehabilitation
  - Measures of Efficacy:
    - % finger total arc of motion (TAM)
    - Grip strength
    - Patient satisfaction

- Complications
  - There were no unexpected complications
    - No tendon ruptures
    - No skin sloughing
    - No dystrophic changes
    - No nerve injury
    - No infections

- Regression Analysis:
  - Pain improvement was less as the number of AFP treatments in an individual increased
  - The worse the patient’s TAM was at baseline prior to starting AFP treatments, the more improvement the patient was able to achieve

Results

- Patients
  - 19 patients, 30 fingers met inclusion criteria
  - 24 fingers had adequate comparable motion data
  - 13 patients had adequate comparable grip strength data
  - Mean age of patients = 28 years old

- AFP Treatments
  - Mean number of treatments = 2.7
  - Time from injury to the first AFP treatment = 9.6 months

- Motion
  - Median improved % TAM was 20.4% (p=0.00001)
  - Only 1 patient had worse motion after AFP
  - Range -10% to 69%

- Grip Strength
  - Median improved strength was 21 pounds (p=0.006)
  - 2 patients had decreased strength after AFP
  - Range -11 lbs to 90 lbs

- Patient Satisfaction
  - 100% subjective improvement
  - All patients noted satisfaction with their motion, scar pliability, and texture after AFP treatments

- Pain
  - 13 patients had pain prior to the first AFP treatment
  - Average pain level was 7 on a 10 point scale
  - 100% patients with pain had improved pain
  - Average postoperative pain level was 1.7 on a 10 point scale
  - 6 of the 13 patients reported no pain after final treatment

- Complications
  - There were no unexpected complications

- Regression Analysis:
  - Pain improvement was less as the number of AFP treatments in an individual increased
  - The worse the patient’s TAM was at baseline prior to starting AFP treatments, the more improvement the patient was able to achieve

Conclusions
- After AFP treatments:
  - Improved TAM
  - Improved grip strength
  - Subjective improvement and patient satisfaction

- Results suggest that early AFP treatments might improve functional outcomes
- Less mature scars within 1 year of injury seem to be more susceptible to breakdown with aggressive multimodal AFP treatments

- Limitations:
  - Retrospective study design
  - No control
  - Variation of injuries
  - Subjective outcomes

- Promising outcomes although no direct correlation between improved TAM, grip strength, and patient outcome to AFP treatments can be drawn
- Results suggest improved functional outcomes
- Future research indicated

References

Disclosures
- We have no disclosures.

The views in this poster are the views of the authors and these are not the official policy of the United States Navy, Department of Defense, or the U.S. Government.