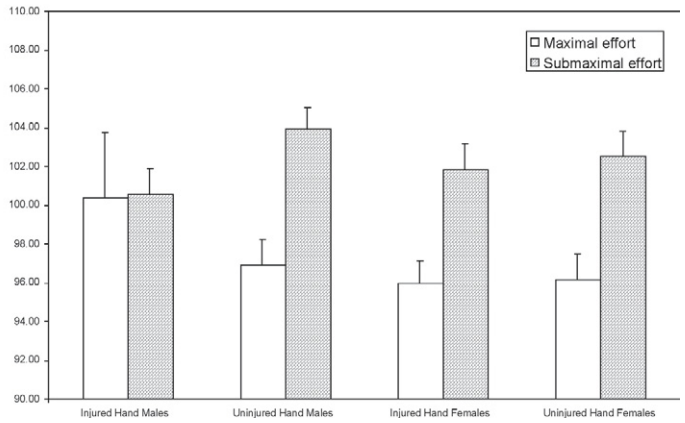

Figure 2: MF ratio values of extensor electromyographic signal

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HT-Paper 3

Thursday, September 3, 2009 * 9:07 – 9:21 AM
ASHT General Session

A Peak in Scar Characteristics during the Healing Period

Level 2 Evidence

♦ **Ronit Wollstein, MD, Pittsburgh, PA**
John Rodgers, CHT, Pittsburgh, PA
Julio Clavijo, MD, PhD, Pittsburgh, PA
Lois Carlson, CHT, Hartford, CT

HYPOTHESIS:

An increase in scar rigidity at six-eight weeks following surgery in the hand and wrist has been observed, but never documented. The "tightness" surrounding the surgical scar seems to improve with time. The purpose of this study was to document this phenomenon in surgical wounds in the wrist by evaluating the wounds over time. Specifically, we evaluated the scars of patients having open reduction and internal fixation of distal radius fractures over a three-month period. We present our interim results.

METHODS:

Inclusion criteria: All consecutive patients being treated for distal radius fractures through a volar scar over the flexor carpi radialis (FCR) tendon.

Exclusion criteria: Patients with previous surgery on the hand or wrist, other previous injuries to this region, such as burns and fractures, since these may change the healing patterns; patients who do not have a volar scar over the FCR tendon, open fractures with significant soft tissue injury, and/or associated nerve or vessel injury.

Following surgery, the patients were evaluated at two, six, eight, 10 and 12 weeks following surgery. Repeated measures of ANOVA and post Hoc Tuckey-Krammer tests were used to evaluate differences among time points. Regression and ANOVA tests were used to determine causality between tightness and objective variables. P was considered significant at 0.05.

Patients were evaluated for scar thickness, volumetric evaluation, the Vancouver scale for burns, tenderness, subjective tightness in the scar and range-of-motion.

RESULTS:

Nine patients were available for biweekly evaluation. Average age was 38 (20-78), seven males, two females. All were non-smokers, one patient had diabetes, one was treated with corticosteroids.

Scar pliability and subjective tightness showed a peak at four-six weeks (Figure 1). The Vancouver scale and edema decreased with time, range-of-motion increased with time.

A significant correlation was found between scar pliability and the subjective feeling of tightness.

SUMMARY POINTS:

- The phenomenon of a peak in scar tightness exists.
- The subjective peak in tightness seems to correlate with the more objective measure of pliability.
- These measures peak at four-six weeks following surgery.
- Since this time frame and characteristics do not coincide with skin-healing, this may represent a peak in the healing of deeper tissues, such as fascia.

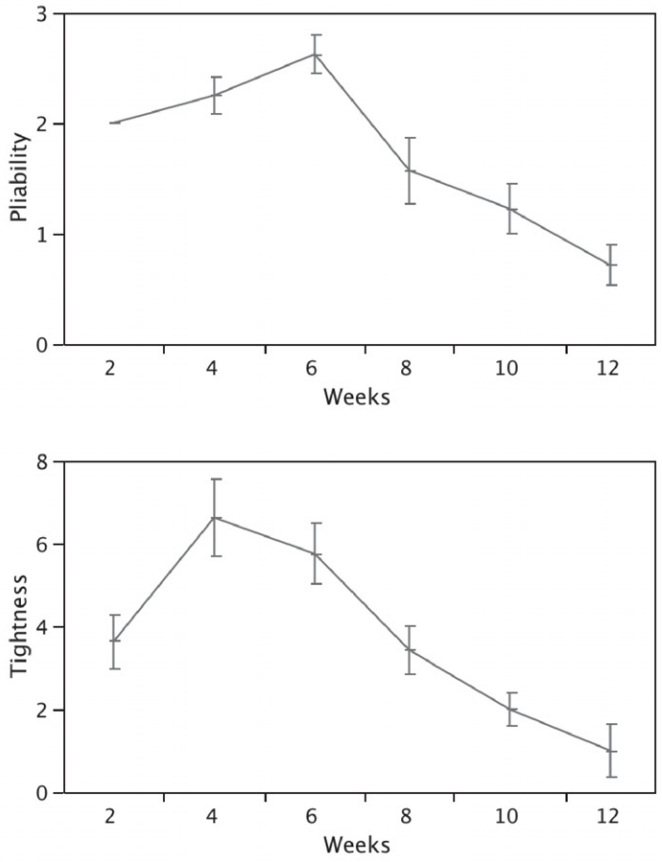

Figure 1: One-way analysis of scar pliability and tightness. There is a peak at four-six weeks.

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HT-Paper 4

Thursday, September 3, 2009 * 10:24 – 10:36 AM
ASHT General Session

Radiographic and Functional Analysis of Movement Allowed by Four Wrist Immobilization Devices

Level I Evidence

♦ **Timothy M. Mullen, PhD, OTR, CHT, Grand Rapids, MI**
Julian E. Kuz, MD, Grand Rapids, MI

INTRODUCTION:

Immobilization of the wrist is a common practice throughout the healthcare industry. There is a large variety of options for an even larger list of diagnoses. It is accepted that each form of immobilization allows for some movement, but the amount each device allows is unknown. Establishing data that accurately describes the inadequacies of each immobilization device will allow evidence-based decisions.

HYPOTHESIS:

The purpose of this study is to identify the specific amount of motion allowed within four different immobilization devices and to identify the level of function allowed within each device. It was hypothesized that circumferential wrist splints will allow the least amount of mobility, and the pre-fabricated splints will allow the most mobility. It also was hypothesized that by allowing the most amount of mobility, the pre-fabricated splint will allow the most function and perceived function.

METHODS:

For each splint the exact range of motion in wrist flexion, extension, radial deviation and ulnar deviation were explored through radiographic analysis. In addition, the QuickDASH, Timed In-hand Manipulation Exam and the Jebsen-Taylor test of Hand Function were performed.

A convenience sample of 24 participants was recruited. All subjects wore each of the four different immobilization devices for 24 hours and then were evaluated for range of motion and functional abilities.

RESULTS:

MANOVA and post-hoc testing were performed on the data to identify significant differences in anterior-posterior total active motion between the cast (31.3˚), the volar wrist splint (48.3˚), circumferential wrist splint (54.8˚) and the pre-fabricated wrist splint (88.5˚). Significant differences were also measured in lateral total active motion between the cast (27.7˚), the volar wrist splint (36.7˚), the circumferential wrist splint (35.4˚) and the pre-fabricated wrist splint (51.7˚). Comfort ratings indicated a significant difference with the best average rating for the pre-fabricated wrist splint (3.2/10). QuickDASH scores of perceived function indicated a significant difference with the best score for the pre-fabricated wrist splint (28.24). Similarly, the fastest score on the Timed In-Hand Manipulation Exam was significant for the pre-fabricated wrist splint with an average of 13.88 seconds.