satisfaction from patients and physicians alike. We postulate that the preservation of native blood supply during ulnar nerve transfer results in less scar formation due to its decreased dependence on the surrounding structures for nourishment. This is especially important when the transfer involves a particularly significant length of the nerve. Preservation of the blood supply also prevents skeletonizing the nerve and thus scar formation, adhesion, and resultant clinical symptoms of chronic pain.

The present study evaluates the outcome of 100 patients who underwent vascularized ulnar nerve transfer in the sub-muscular position. This group of patients was compared with 25 patients who underwent traditional submuscular transfer. All patients were evaluated and treated at Temple University Hospital's section of Plastic and Reconstructive Surgery from 1985–2005. The vascularized transfer group's male to female ratio was 40:35. The age range was from twenty-three to seventy-eight years of age with an average of thirty-eight. Evaluation was performed by both a hand therapist and a physician prior to and after surgical decompression. The modified technique was performed through a standard skin incision, with standard preparation of the submuscular bed, release of the ulnar nerve, identification and preservation of the vascular supply of the ulnar nerve, mobilization of the ulnar nerve along with its blood supply and a rim of muscle.

Post-operatively, the patients were evaluated for relief of pain and paresthesias, return of two-point discrimination, grip strength, range of motion, degree of symptom relief, EMG results and return to work. Follow-up ranged from three months to 2 years. Evaluation of the data showed immediate improvement in pain, symptom relief of >80%, low incidence of scar tenderness, grip improvement, and an earlier return to work in the vascularized transfer group. The complication rate was <1% and the rate of recurrence was 0%. We propose that the modification of the standard anterior submuscular transposition technique produces superior results through the preservation of the blood supply and inclusion of a cuff of muscle.

Diagnosis for Hand-Arm Vibration Syndrome

Institution where the work was prepared: Medical College of Wisconsin, Milwaukee, WI, USA
Dennis Kao; ji-Geng Yan, MD; Hani S. Matloub; Lin-LIng Zhang; James R. Sanger; Yuhui Yan; Danny A. Riley; Michael Agrestic; David Rowe; Paula Galaviz; Judith Marechant-Hanson; Scott Lifchez; Medical College of Wisconsin

Introduction There has been controversy about which tests should be performed to diagnose early Hand-Arm Vibration Syndrome (HAVS).

Purpose To find the most valid and reliable tests to diagnose HAVS.

Material and Methods Group I Control group of 12 volunteers without using vibrating tools. Group II 12 workers using vibrating power tools for varying amounts of time. 1. Sensory nerve conductive tests. 2. Cold Stress-Temperature recovery time tests. 3. Blood test S-ICAM, Sera Thrombomodulin, Norepinephrine. 4. Finger Sensory Evaluation Semmes-Weinstein monofilament test and 2-point discrimination tests. 5. Digital blood pressure test.

Results 1. Median nerve sensory conductive amplitude from palm to wrist :GI mean 96±31 μm; GII mean 43±30 μm; GI vs GII P<0.001. Motor nerve conductive velocity (NCV) GI mean 60.8±8.5 m/s; GII mean 48.3±5.9 m/s; GI vs GII P<0.001. 2. Cold-Stress Test Temperature Recovery Rate (TRR)=T before test/T after 10 minutes. GI mean 85.36%± 14.22. GII More three years of using vibrating tools was a critical point, with vibration for 3 years, the TRR was 70%. Two subjects' TRR was 52% with 15 and 35 years of using vibrating tools. 3. Sera Chemical Test A. sICAM Standard Reference Range is 132.5–344.2 ng/mL. GII The value of 3 workers >344.2 ng/mL. Positive rate was 25.0%; B.Norepinephrine Standard Reference Range is 0.8–3.4; 4 workers' value was <0.8 mol/L. Positive rate was 33.3%. 4. Hand Sensory Evaluation A.Semmes-Weinstein monofilament test Standard criterion Normal 1.65–2.83; Diminished light touch 3.22–3.61; Diminished protective sensation 3.84–4.31; Loss of protective sensation 4.59–6.65. Results 3 workers (3.5 years) were normal; 9 workers (>5 years) were diminished. Positive rate was 66.98%. B. Two-point discrimination test: Normal is <6 mm. GI 119/120 tested fingers were less than 6 mm; GII 20/120 were <6 mm. Positive rate was 16.7%. 5. Digital blood pressure test Normal cut-off point <70 mmHg was abnormal. Results GI none was <70; GII 8/23 fingers ; positive rate was 35%.

Conclusions 1. Semmes-Weinstein monofilament test is a sensitive and simple test to assess HAVS. 2. Cold stress test gave a lower positive rate but did indicate later damage; however, it causes patient discomfort.3. Sensory nerve conductive and NCV were useful but need a control group value.4. The S-ICAM increased in 25%, and NE decreased in 33% of vibrated workers. 5. Digital BP test and 2-point discrimination ttest both have cut-off point value; they could be used to differentiate HAVS from simple carpal tunnel syndrome.

Neurochemical Response in Forelimb Tendons in a Rat Model of Upper Extremity WMSD

Institution where the work was prepared: Temple University, Philadelphia, PA, USA
Jane M. Fedorczyk, MS, PT, CHT[1]; Ann E. Barr, DPT, PhD[2]; Mamta Amin[2]; Marcus J. Handy[2]; Mary F. Barbe, PhD[2]; (1) Drexel University, (2) Temple University

Incidence of upper extremity tendinopathies increases with exposure to forceful repetitive motion. Increased presence of neurochemicals has been observed in patients with tennis elbow. Young adult female Sprague-Dawley rats were used to examine the neurochemical response to repetitive forceful work tasks in forelimb flexor and elbow tendon tissues. Eighteen rats performed a high repetition high force task (HRHF; 60% maximum grip) in which grasping a lever occurred at a target rate of 4 reaches/min. Eight rats performed a low repetition low force task (LRLF; <15% maximum grip) at a target rate of 2 reaches/min. These tasks were performed 2 hrs/day, 3 dys/wk for up to 12 wks. Ten rats were controls. To examine for increased neurochemical production and their localization in distal flexor tendons, animals were euthanized with Nembutal, tissues collected, fixed in paraformaldehyde, and frozen-sectioned prior to immunohistochemistry using antibodies against NMDAr1 (BD PharMingen), SP (Chemicon) and CGRP (Chemicon). A microscope-linked bioquantification computer program was used to determine mean area fraction of neurochemical immunoreactivity (IR) in flexor endotenon, epitenon, and paratenon, bilaterally. Four-way ANOVA (group, week, limb, region) was used to determine differences. To examine for level of neurochemical production at the elbow, distal humerus and attached tendons/muscles were collected from 12 week HRHF and control rats, homogenized, flash frozen and stored at-80°C. Enzyme-linked immunosorbant assays (ELISA) were then performed for SP (MD Biosciences) and CGRP (Alpco Diagnostics). Two-way ANOVA (week and limb) was used to determine differences. SP-IR was significantly increased in flexor peritendon (epitendon+paratenon) at 3 and 12 weeks and endotenon at 3 weeks in HRHF rats. SP-IR was not increased in the LRLF flexor tendons, nor was NMDAr1-IR. However, NMDAr1-IR was significantly increased in flexor peritendon and endotenon at 6 weeks in HRHF rats. CGRP-IR was significantly different in flexor tendons regions, with peritendon> endotenon, but not between exposure groups. In elbow tissues, ELISA CGRP levels were decreased significantly in week 12 HRHF compared to controls, while SP was not significantly different. The inclusion of bone with the elbow tendon tissues may have diluted the neurochemicals to below detectable levels. Our findings demonstrate that SP and NMDAr1 immunoreactivity increases in distal flexor tendon as a consequence of performing highly repetitive and forceful tasks. The response is tissue (peritendon>endotenon) and duration dependent. Increases in neurochemicals may be linked to persistent pain associated with tendinopathies of the upper extremity. Grant support CDC-NIOSH(MB), NIAMS(AB), and AAHS(JF).

Comparison of Return to Work: Endoscopic Cubital Tunnel Release Versus Anterior Subcutaneous Transposition of the Ulnar Nerve

Institution where the work was prepared: Orthopaedic Specialists, Davenport, IA, USA
TYSON Cobb, MD; Patrick T Sterbank, PA-C; ORTHOPAEDIC SPECIALISTS, P.C

Endoscopic Cubital Tunnel Release (ECTR) is an emerging technique with speculated advantage of a smaller incision and earlier return to activity. Several earlier studies have demonstrated clinical efficacy of ECTR but early return to activity has not been clearly documented. The purpose of the study was to compare the return to work time for patients undergoing ECTR versus Anterior Subcutaneous Transposition of the Ulnar Nerve (ASTUN).
Methods A retrospective review of 30 consecutive cases was used to determine the time from surgery to return to work. Follow-up time averaged one year for both groups. All patients had electrical studies prior to surgery. All patients had positive Tinel's and Elbow Flexion test. Severity of symptoms was rated preoperatively using Dellon's classification. Postoperative results were graded using Bishop 12 point rating system.

The ECTR study group consisted of 15 patients, 6 females and 9 males, 11 workmen's compensation and 4 group insurance; average age was 49 years, range 28 to 69. Dominant side surgery occurred in 8 cases (54%). Average length of preoperative symptoms was 26 months. 10 (68%) patients had a positive electrical study for Cubital Tunnel. Preoperative symptoms based on Dellon's classification were 10% Mild, 60% Moderate and 30% Severe.

The ASTUN group consisted of 5 males and 10 females, 12 involved workmen's compensation and 3 private insurance, average age was 44 years, range 23 to 57. Dominant side surgery occurred in 9 cases (60%). The average length of preoperative symptoms was 28 months. 9 (60%) patients had positive electrical studies for Cubital Tunnel. Preoperative symptoms based on Dellon's classification was 7% Mild, 63% Moderate and 30% Severe.
Results The ECTR results were 10 (68%) Excellent, 3 (20%) Good, 1 (6%) Fair and 1(6%) Poor utilizing the Bishop12 point rating system. The average return to modified work was 2 days (range 1 to 3) and to regular work 7 days (range 5 to 9).

The ASTUN group average return to modified work was 17 days (range 12 to 22) and for full duty 70 days (range 60 to 80). Results based on the Bishop 12 point rating system was 10% Excellent, 62% Good, 22% Fair and 6% Poor.All patients returned to their usual preoperative activities.
Conclusion Endoscopic Cubital tunnel release provides good to excellent symptom relief in most patients with an

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ABSTRACTS

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