Clinical Paper Session 12: Instability/Trauma
Paper 56 – Paper 60
2:15 – 2:50 PM
INTRODUCTION:
A swanneck deformity is a common and often invalidating defect in the fingers of patients with cerebral palsy. The deformity is characterized by hyperextension of the proximal interphalangeal (PIP) joint and flexion in the distal interphalangeal (DIP) joint and can be classified as non-locking or locking, whereas locking is more severe. Lateral band translocation is often advocated as the preferred method for correcting swanneck deformities. However, it is argued that the lateral band is too weak to withstand the extension torque at the PIP joint, and this would result in recurrence of the hyperextension deformity. Currently, no long-term follow-up data on outcome of lateral band translocation exist in patients with cerebral palsy. The goal of this study was to evaluate the effect of this surgical procedure at a minimum of 5 years follow-up.

HYPOTHESIS:
Lateral band translocation is a lasting solution for swanneck deformity in cerebral palsy.

METHODS:
Swanneck deformities of 42 fingers were corrected. The correction consisted of a lateral band translocation according to Zancolli. At one year and five years follow-up after surgery, any recurrence of hyperextension was recorded.

RESULTS:
Correction was successful for 79% of the operated fingers at the one-year follow-up. All but one of these recurrences were originally locking swan necks. Successful correction of swan neck deformity after one year appeared to withstand the test of time after five years.

SUMMARY POINT:
Overall can be concluded that successful correction of swan neck deformity with lateral band translocation has a lasting positive result in cerebral palsy.

REFERENCES:
HYPOTHESIS:
A solitary foveal tear of the triangular fibrocartilage complex (TFCC), which is characterized by disruption of its foveal insertion alone leaving its styloid insertion intact, should be recognized as one of the causes of chronic ulnar wrist pain.

METHODS:
We performed an open repair of the solitary foveal tear of TFCC via a palmar surgical approach (Fig. 1A) on 9 patients with chronic ulnar wrist pain. The mechanism of injury was a fall on the outstretched hand in 8 of the 9 patients. Diagnosis was made by presence of the ulnar fovea sign and pooling of dye at the fovea on the arthrography (Fig. 1B). After exposing the ulnocarpal and palmar radioulnar ligaments, the ulnar insertion of the TFCC was directly observed. Clinical results of repair were evaluated after a follow-up period of at least 24 months (average, 41 months).

RESULTS:
The foveal insertion of the TFCC was found to be a lifted proximal stump of the disrupted ulnocarpal ligament in all patients (Fig. 1C and 2C). The styloid insertion was found to be intact regarding its continuity and durability. After removing the scar tissue at the fovea, the proximal stump of the ulnocarpal ligament with the palmar radioulnar ligament was sutured onto the fovea using a suture anchor (Fig. 2D). After the follow-up period, 7 patients denied any wrist pain whatsoever, and 2 complained of only occasional pain. In all patients, range of wrist motion was full and final grip strength averaged 93% of the unaffected side.

SUMMARY POINTS:
• A palmar surgical approach was effective to repair the solitary foveal tear of TFCC.
• The foveal insertion was found to be a lifted proximal stump of the disrupted ulnocarpal ligament.
• A major mechanism responsible for this lesion appeared to be excessive traction of the ulnocarpal ligament caused by a fall on the outstretched hand.

REFERENCE:
Stable Central Carpal Column: Proximal Row Carpal Mechanics Based on Computer Derived Isometric Constraints

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HYPOTHESIS:
The study aimed to identify a unifying theory of carpal motion based on computer derived isometric constraints. This extends the previously reported concept of rules based animation which proposes that resultant motion is a net interplay of bone shape, isometric constraints, bone interaction, and applied load.

METHODS:
This study analysed the extreme positional relationships between bones of the proximal row and the radius, and identified isometric constraints, based on a computer derived analysis was reviewed using a 3-dimensional surface rendering, to create models from the CT scan data of 10 normal wrists taken in extremes of radial and ulna deviation as well as flexion and extension.

RESULTS:
Connecting lines were identified between specific points of the lunate and radius which corresponded to an isometric constraint through range. Similar pairs of points were found on the trapezium and scaphoid, and in the scapho-lunate, luno-triquetral and radiotriquetral joints. There was a clear discrepancy (p < .05) between those areas (typically either volar or dorsal depending on the bones) which remain isometric and those which did not and this corresponded to previous documented anatomical structures.

SUMMARY POINTS:
• The carpus functions as a stable central column (L-C-H-Tz-Tm) with a supporting lateral column (Scaphoid), which is more of a crossed four bar linkage than the traditionally described slider crank pattern.
• On the medial side of the central column, the triquetrum acts principally as an ulna translation restraint.
• The trapezoid places the trapezium anterior to the transverse plane of the radius and ulna, and thus rotates the principal axis of the central column to correspond to that used in the Dart Thrower Motion.
• A unifying theory of wrist motion based on isometric constraints and rules based motion is proposed, where the wrist acts as a stable central carpal column, with a lateral column stabiliser, and medial column translation restraint.
Use of Acellular Dermal Matrix for Soft-Tissue Reconstruction in Hand Injuries

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HYPOTHESIS:
Traumatic hand injuries often leave tissue defects with exposed bone, joints, or tendons requiring coverage. Various types of pedicled flaps have commonly been used to treat these injuries. The objective of this study was to demonstrate acellular dermal matrix to be an effective skin substitute in complex hand injuries with soft tissue defects.

METHODS:
Acellular dermal matrix was used to reconstruct 27 hand injuries in 20 patients with exposed bone, tendon, joints, and/or hardware. Acellular dermal matrix, which includes a temporary silicone epidermal substitute and an artificial dermal layer, was sutured directly over the soft tissue defect. In all patients, a neodermis formed within 10 – 14 days, and the silicone layer was removed. Patients then underwent full thickness epidermal autografting with cotton bolster.

RESULTS:
Twenty-seven applications of acellular dermal matrix were performed on 20 patients (average age 45.6, range 21-85 years) (18 digital amputations, 7 dorsal degloving injuries, and 2 dorsal hand infections). The mean postoperative follow-up period extended 4 months. All patients had exposed bone, 1 patient had multiple exposed joints, 1 patient had exposed hardware, and 7 patients had exposed tendon. The area of application ranged from 4 - 14 cm2. All patients demonstrated 100% vascularization of the skin substitute. Full-thickness epidermal autografting was performed an average of 22.4 days (range: 14 – 35 days) after skin substitute application and demonstrated a 100% take in 24 sites and partial graft loss of 15-25% in 3 sites that did not require further treatment. All patients were followed until healing was determined to be clinically complete.

SUMMARY POINTS:
• Acellular dermal matrix is an effective treatment for skin substitute in complex hand injuries with soft tissue defects involving exposed bone, tendon, and hardware.
• The neodermis facilitates epidermal autografting with hand injuries that otherwise would require flap coverage.
HYPOTHESIS:
Hand surgeon availability, not insurance status or the need for a higher level of care, is the primary reason for the transfer of hand trauma patients to our Level 1 Hospital.

METHODS:
52 patients transferred to our Level 1 Trauma Center for acute hand injuries were assessed prospectively by means of a physician-to-physician telephone referral line. The indication for transfer, the specialty of the referring physician, the diagnosis, the case severity, and the insurance status were obtained prior to transfer and were reassessed after arrival. The ultimate need for both the hand surgeon and the Level 1 trauma center were assessed.

RESULTS:
A hand surgeon or orthopaedic surgeon was on staff at the transferring hospital in 36 cases but only 11 of 52 transfer patients were examined by these surgeons prior to transfer. The patient was transferred due to case difficulty in 18 patients, lack of a specialist in 17 patients, and because the on-call surgeon was unavailable in 15 cases. The case severity was accurately assessed prior to transfer. Patient insurance status was accurately provided prior to transfer in 45 of the 52 patients. The insurance was private or Workers’ Compensation in 34 patients, Medicare or Medicaid in 14 patients, and 4 patients were uninsured. Based on the severity of injury, we felt that 47 of the 52 patients required the care of a hand surgeon but only 26 of the 52 patients needed the resources of a Level 1 trauma center.

SUMMARY POINTS:
• Most hand trauma patients are transferred without the evaluation of a hand surgeon.
• Almost all of these patients required the care of a hand surgeon.
• Patient insurance status did not seem to drive patient transfer.
• Only half the patients were felt to need the services of a Level 1 trauma.