

The Use of Rods&Cones® Medical Smart Glasses and Platform for Remote Mentoring of Residents in the Operating Room – A Proof-of-Concept Study

Yeo PY, Omar UF, Tong PY, Koh AEW, Rajaratnam V
Khoo Teck Puat Hospital, Singapore

Introduction and Objectives The integration of advanced technological tools into surgical education offers significant opportunities to enhance the training and proficiency of surgical trainees. The Rods&Cones® medical smart glasses and platform allow remote experts to guide trainees through surgeries via real-time multimedia synchronous communication.

Materials and Methods This mixed-methods study is designed to evaluate the feasibility of the Rods&Cones® medical smart glasses and platform for remote mentoring of residents within the context of surgical training in Hand Surgery residency. Surgical residents were recruited as trainees while Hand Surgery consultants were recruited as remote experts. The remote experts, physically situated in Khoo Teck Puat Hospital, then guided the trainees, located in Admiralty Medical Centre through commonly performed surgeries such as trigger finger release, carpal tunnel release and excision biopsy of lumps. Participants then completed the validated System Usability Scale (SUS) questionnaire that quantitatively measure factors such as ease of use, comfort, confidence, and overall satisfaction with the system. Additionally, they participated in qualitative interviews to share their lived experiences, perceptions and attitudes toward the technology.

Results The Rods&Cones® medical smart glasses and platform showed excellent perceived usability based on the average SUS scores from participants. Through the interviews, a majority of participants also expressed high satisfaction with the system and indicated strong interest in supporting the use of this technology in Hand surgery residency training.

Conclusion This study demonstrated the feasibility of the Rods&Cones® medical smart glasses and platform for remote mentoring of residents within the context of surgical training in Hand Surgery residency. The findings pave the way for future validation studies to explore the impact of this technology on training-related outcomes, surgical performance, and patient safety.

Finger PIP Joint Ankylosing Treatment

Andi Dhedie Prasatia Sam, M.Kes, Sp.OT (K), FICS

Proximal interphalangeal joint ankylosis is pathologic joints surface fusion that severely impairs the function of the hand and the quality of life. This usually is a result of rheumatoid arthritis, post-traumatic injury, or some congenital syndromes, including symphalangism. The PIP joint is very important in hand biomechanics; its mobility is crucially contributing to grasp strength and fine motor coordination. The loss of motion within this joint results not only in functional limitations but also in compensatory stress on adjacent joints, leading to progressive degeneration and deformity over time.^{1,2}

The progression of PIP joint ankylosis represents a combination of inflammatory, fibrotic, and osseous processes. In instances of inflammatory diseases like RA, the continued synovitis notably accelerates cartilage breakdown and joint destruction, culminating in bony fusion. This includes congenital forms such as symphalangism, which are due to genetic mutations involving bone morphogenetic pathways that cause fusion of joints early in life. Biomechanically, a stiff or ankylosed PIP joint will distribute forces differently across the hand and can lead to early osteoarthritis or deformity in surrounding structures.^{2,3}

Management of PIP joint ankylosis depends upon the extent of the condition, as well as the cause and functional needs of the individual. Traditional approaches, such as arthrodesis, stabilize the joint in a functional position, yet at the price of mobility. Advanced surgical techniques, especially silicone implant arthroplasty, have been developed to restore a functional arc of motion while addressing instability of the joint. The use of adjunctive procedures, such as collateral ligament reconstruction and extensor mechanism restoration, is crucial for maintaining proper biomechanical alignment and will help ensure longevity of the surgical result. These techniques are promising, with severe ankylosis that exhibits marked pain relief and functional gain.^{1,4,5}

A recent case report further exemplifies the potential of modern surgical methods in treating PIP joint ankylosis. A 17-years-old male presented with complete bony ankylosis of the ring finger PIP joint due to a septic joint infection. Following silicone implant arthroplasty, the patient achieved a remarkable 75° of active motion in the affected joint and experienced significant pain relief. The postoperative assessment, including a DASH score of 1.6, confirmed excellent functional recovery, enabling the patient to resume daily activities and academic pursuits. This case underscores the transformative potential of contemporary arthroplasty techniques, even in cases of advanced joint fusion

References:

- McGuire DT, O'Sullivan ME, Synnott K, Yao J. Shifting the paradigm: Ankylosis arthroplasty for the proximal interphalangeal joint with a novel collateral ligament reconstruction. *J Hand Surg Eur Vol.* 2019;44(3):295–301. doi:10.1177/1753193418807699.
- Kamnerdnakta S, Huetteman HE, Chung KC. Complications of Proximal Interphalangeal Joint Injuries: Prevention and Treatment. *Hand Clin.* 2018;34(2):267–288. doi:10.1016/j.hcl.2017.12.014.
- Pan T, Hoang D, Payatakes A. Proximal interphalangeal-level fracture in patient with symphalangism. *Case Rep Plast Surg Hand Surg.* 2022;9(1):214–219. doi:10.1080/23320885.2022.2123808.
- Awan HM, Imbriglia JE. Silicone Arthroplasty After Ankylosis of Proximal Interphalangeal Joints in Rheumatoid Arthritis. *Am J Orthop.* 2016;45(4)
- Awan HM, Imbriglia JE. Silicone Implant Arthroplasty for Severe Bony Ankylosis of the Proximal Interphalangeal Joints in Rheumatoid Arthritis: A Case Report. *Am J Orthop.* 2016;45(4)

Effectiveness of a Novel Finger Range-of-motion Brace for Extensor Tendon Injury (A Report of 10 Patients)

Dae-Geun Kim¹, Sung Choi² and Eugene J. Park³

¹Department of Orthopedic Surgery, Soonchunhyang University Gumi Hospital, Gumi, South Korea

²Department of Orthopedic Surgery, Daegu Fatima Hospital, Daegu, South Korea

³Department of Orthopedic Surgery, Kyungpook National University Hospital, Daegu, South Korea

Introduction/Objectives Extensor tendon injuries require surgical repair, followed by rehabilitation to ensure optimal outcomes. Immobilization has been the cornerstone of postoperative management. However, immobilization after surgery frequently makes the finger stiffness, often resulting in reduced functionality and quality of life for patients. Recent studies indicate that early controlled motion can significantly improve outcomes, but safe early range

of motion (ROM) exercise is a significant clinical challenge. This article aims to check the efficacy of the novel designed finger ROM brace for preventing finger stiffness for extensor tendon injuries with case series.

Materials and Methods A finger ROM brace was designed based on the natural finger movement. Like a real finger, there are two tiny hinge joints and three round-shape body components. The design aimed to be ergonomic dynamic splint assisting controlled motion to promote early motion, thus reducing tendon tension and preventing stiffness. Elastic resistant ROM exercise could be by inserting a silicone band into the groove on the components and free movement could be achieved by removing a silicone band.

Result/Discussion Between December 2022 and July 2023, 10 patients who underwent tenorrhaphy because of extensor tendon laceration were involved. Complete extensor tendon laceration was 3 patients, other seven patients had partial laceration of extensor tendons. Surgery was performed within 2 days of injury, and no infection was observed in all patients. After the extensor tendon was confirmed as healed state by ultrasound, the patients were permit the active exercise wearing finger ROM brace with a silicone band. Within 1–2 weeks after elastic resistant exercise, the patients could achieve free full ROM movement without any complication.

Conclusion The novel finger ROM brace combines the advantages of dynamic splinting and under-actuated mechanisms to offer a comprehensive solution for preventing stiffness after extensor tendon suture. Future studies should focus on clinical trials to validate the efficacy and safety of this brace in a larger population.

5

A Novel Finger Brace for Preventing Finger Stiffness after Trauma or Surgery (A Preliminary Report with a Case Series)

Dae-Geun Kim¹, Hyo Jun Park²

¹Department of Orthopedic Surgery, Soonchunhyang University Gumi Hospital, Gumi, South Korea

²N2 Corporation, Gimhae, South Korea

Introduction/Objectives Finger Stiffness is a common complication following hand trauma or surgery. Early finger range-of-motion (ROM) exercises have proven to be the most effective method for preventing finger stiffness. In this paper, we introduce a novel finger brace designed for safe and early active exercises and present preliminary results from a small case series

Materials and Methods Our innovative brace is designed for direct insertion into the injured finger, ensuring enhanced comfort during use. This brace features hinges that facilitate unrestricted movement in the proximal and distal interphalangeal joints, with each phalangeal component having a rounded shape to prevent rotation. Furthermore, grooves are integrated at the top of the phalangeal components for inserting bars; a straight bar to immobilize and a silicone band to provide elastic resistance exercises within a limited range.

Result/Discussion Among 26 patients, 17 presented with fractures, five had extensor tendon injuries, and three had dislocations. For patients not requiring surgery, we applied the brace as early as possible. In cases involving surgery, the brace was applied step by step. When fixation was necessary for the first time, a straight bar was applied, and when starting finger movement, a silicone band was applied. The silicone band was then released to allow free finger movement. Except for one patient necessitating extensor tendon reconstruction due to a neglected rupture, all patients achieved full ROM without any complications.

Conclusion Our novel ROM finger brace represents a safe and user-friendly option for effectively initiating finger ROM exercises.

6

Utilizing Spare Part Surgery Principles with a Fillet Flap and a Tibial Turn-up Procedure to Increase Functional Stump Length in Amputees

Jeyaratnam Shubashri (SJ)¹, Lee Peng², Rasappan Kumaran (KR)³, Tan En Si Ruth (RT)⁴

^{1,4} Department of Hand and Reconstructive Microsurgery

^{2,3} Department of Orthopedic Surgery

National University Hospital Singapore

Introduction Reconstruction and salvage procedures in young and functionally active patients is ideal for the restoration of function and form after trauma. The golden rule of “fix and flap” may not always be possible. Our patient was an athlete who presented with a Gustilo 3C open fracture with significant biocontamination and vascular compromise. Vascular repair was performed and a contralateral free latissimus dorsi flap was proposed with the possibility of staged functional reconstruction. The patient opted for a below knee amputation to avoid additional donor site morbidity and repeated surgeries with prolonged rehabilitation, which posed the challenge of a short tibial stump. Our team devised a novel method using the distal tibia and posterior calf skin to achieve lengthening and a functional stump length.

Materials/ Methods Distal tibial cuts were performed at the metaphysis just proximal to the joint line and fashioned to the proximal stump with correct alignment. Lateral collateral ligamentous reconstruction was performed for knee stability. The posteriorly based soft tissue flap was then draped anteriorly to cover the defect and indocyanine green was used intra-operatively to check perfusion. The flap healed with good contour.

Result/ Discussion The patient now has a 14cm tibial stump that is well padded and 0 – 90 stable of motion of the knee that is suitable for stump fitting. This would not have been possible without keying in the tibia and draping the soft tissue from the posterior calf. The additional morbidity of a free flap on a background of potentially tenuous vasculature and the morbidity of an above knee amputation or short tibial stump was similarly avoided.

Conclusion We recommend this procedure to be a consideration for the reconstructive and orthopedic team in patients presenting with a short stump to avoid the morbidity of an above knee amputation. Close interdisciplinary work and understanding patient specific demands are key.

7

Abdominal Flap in Extensive Hand Degloving Wound

Zainarda

Orthopaedi and Traumatology Department, dr. Dody Sardjoto Airforce Hospital, Makassar, Indonesia

Introduction Crush injury is usually caused by a high-energy mechanism that transiently increases the pressure of the body region and causes damage to multiple tissue types, including bones, blood vessels, nerves, and soft tissues. In this case report, we present a case of abdominal flap on crush injury of the hand with extensive degloving wound. A 21-year-old female-skinny patient was admitted to our emergency unit facility following a traumatic crush injury of the hand while working. The incident occurred when the patient inadvertently inserted her hand stuck into a meat grinder machine. The patient had a degloving wound at the distal index finger, the middle and ring finger, and also half carpal side.

Method Given the complexities of such a degloving wound, it is important to consider short and long-term strategies. After a proper assessment of the case, the patient had a few surgeries—first, open reduction, finger internal fixation, and debridement of all necrotic tissues (Fig 1.). After one month; we removed the wire and areas of skin loss (3rd, 4th, 5th and half carpal covered by an abdominal flap (Fig 2.). A month after; the flap was released (Fig 3.) and continued with finger rehabilitation (Fig 4.).

Result The middle, ring, and also little finger were stuck together and fully covered. The flap running well. The Range of Motion (ROM) at the index finger is limited. However, it was the best option to save a severely crushed hand as in this case. The upcoming plan is to wait for the optimum flap growth, and scheduled for separate the middle, ring, and little finger. The ongoing rehabilitation of the Range of Motion is index finger and thumb grasping exercises.

Conclusion The abdominal Flap is one of the methods of flapping the extensive degloving wound, especially on a poor bed recipient. Proper strategies and supervision to the growth of the flap, possible infection, and early rehabilitation are needed for perfect results and better functional outcomes.

Images



Fig 1. 1st



Fig 2. 2nd Surgery



Fig 3. 3rd Surgery



Fig 4. 1 month after flap released



8

Analysis of Eugenol as a Fibronectin (Fn) Inhibitor in Preventing Biofilm Formation Through Expression of Fn-mRNA, FnBPA-B Protein, Optical Density and Staphylococcus Aureus Culture on Contaminated Open Fracture

Zainarda

Orthopedic and Traumatology Department, dr. Dody Sardjoto Airforce Hospital, Makassar, Indonesia

Introduction Infection in Orthopaedics is a major problem often faced by an Orthopaedic clinician. One of them is postoperative infection (Surgical Site Infection/SSI). This makes antibiotics unable to work optimally due to the formation of biofilm on the implant surface. This study aims to prove the effect of eugenol as an inhibitor of Fibronectin (Fn)-Fibronectin Binding Protein AB (FnBPA-B) binding in preventing biofilm formation through mRNA and FnBPA-B protein expression as evidenced by biofilm optical density and staphylococcus aureus colony count in wistar rats with contaminated open fractures. Eugenol can be used as the best additional component in internal fixation that has the ability to prevent biofilm-producing bacterial infection.

Materials and Methods This research is a pure experimental (True-Experimental Design) using a completely randomized design (RAL) conducted in the laboratory. This research design uses a randomized design with a final test and control group (The randomized posttest only control group design). (The group will be divided into a control group and an intervention group. The experimental animals were divided into four treatment groups, namely the without fixation group (Po), which is rats conditioned with fractures that experience contamination without being given internal fixation. Positive control (P1) rats were conditioned with fractures that experienced infection and were given stainless steel internal fixation. The treatment group (P2) is rats conditioned with fractures that experience contamination and given 45% eugenol internal fixation, and the treatment group (P3) is rats conditioned with fractures that experience contamination and given 90% eugenol internal fixation.

Results This study proved that eugenol can inhibit biofilm formation by inhibiting Fibronectin binding and preventing the formation of staphylococcus aureus colonies. The concentration of eugenol added to the implant surface succeeded in reducing the amount of Fibronectin; which is an adhesin polysaccharide from the extracellular matrix so that it cannot bind to FnBPAB excreted by staphylococcus aureus. The use of 45% eugenol and 90% eugenol significantly reduced the expression of Fibronectin mRNA on RT-PCR, increasing the intrusion power of biofilms through Optical Density examination and reducing the number of colony counts in staphylococcus aureus culture.

Conclusion Eugenol significantly reduced biofilm production by inhibiting the Fibronectin protein and its binding to Protein AB. Further research on humans is required before application in an Orthopaedic surgery.

Keywords Eugenol, biofilm, Fibronectin, mRNA, Optical Density

9

A Novel Approach to Healing Triangular Fibrocartilage Complex Tears Through Umbilical Cord Mesenchymal Stem Cells and Secretome: A Case Report

Chandra J1, Sartika C.R2, Haifa R2*, Zulfani N2, Devi D.K2, Herdiani N.D2. 1Mandaya Royal Hospital Puri, Kota Tangerang, Banten 15159; jakymks@gmail.com (J.C) 2 PT Prodia StemCell Indonesia, Jakarta Pusat, Daerah Khusus Ibukota Jakarta 10430; c.sartika@gmail.com (C.R.S); rima.haifa@prostem.co.id (R.H); marketing.rbt@prostem.co.id (N.Z); ditta.kalyani@prostem.co.id (D.K.D); marketing.scis@prostem.co.id (N.D.H)
*Corresponding Author: rima.haifa@prostem.co.id

Introduction/Objectives Triangular Fibrocartilage Complex (TFCC) tears are a common cause of ulnar-sided wrist pain, often occurring in middle-age individuals. This case report describes the safety and efficacy of arthroscopy combined with umbilical cord mesenchymal stem cells (UC-MSCs) and UC-MSC-derived secretome therapy as adjuvant treatment for a 41-year-old male patient with TFCC tears. The therapy is administered through multiple injections via an intra-articular route. Materials and Methods: A comparison of the final examination results after six months of UC-MSCs and secretome administration will demonstrate their potential of UC-MSCs along with their secretome in addressing TFCC damage, as well as reducing pain, functional

outcomes, and structural integrity experienced by the patient Visual Analog Scale (VAS), Disabilities of the Arm, Shoulder and Hand (DASH) score and MRI were used for pre- and post-treatment assessments.

Result/Discussion After six months, the patient's VAS pain score dropped from 7 to 0, indicating a considerable improvement in pain management. The patient's DASH score also improved from a previous score of 51 (Poor classification) to 12 (Good classification). The TFCC region has improved structurally, according to MRI pictures. This case demonstrates the potential of UC-MSCs and their secretome as adjuvant therapy to arthroscopy. While arthroscopy addresses the mechanical aspects of the tear, UC-MSCs and their secretome provide additional regenerative support, enhancing healing and reducing inflammation.

Conclusion The combination of these treatments resulted in significant pain relief and structural improvement, as observed through MRI. Further studies are needed to validate these findings across larger patient cohorts and refine the therapeutic protocol for optimal outcomes.

Keywords Triangular Fibrocartilage Complex Tear, UC-MSCs, UC-MSCs Derived-Secretome, VAS Score, DASH Score.

10

Regional Anaesthesia for Distal Radius Fracture Fixation Reduces Immediate Post-operative Pain Compared to General Anaesthesia

Nah JH1, Teh HY1, Rin HY1, Kang GHY1, Yong FC1

1Hand and Microsurgery Section, Department of Orthopaedic Surgery, Tan Tock Seng Hospital, Singapore

Introduction Pre-emptive analgesia can reduce post-operative pain after distal radius fracture fixation. This study aimed to compare the post-operative analgesic effects of regional anaesthesia (RA) versus general anaesthesia (GA) and to evaluate whether supplemented opioids or Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) with GA reduces post-operative pain.

Materials/Methods Patients who had surgical fixation of distal radius fractures in our institution from 3rd August 2022 to 28th March 2024 were retrospectively studied. Exclusion criteria included additional limb fracture fixations, allergy to analgesic drugs, or chronic pain conditions. 100 patients, 44 male and 56 female, of mean age 55.9 ± 15.4 years were analysed. 57 patients had surgery under RA and 43 patients had surgery under GA. RA approaches included ultrasound guided axillary, infraclavicular, and costoclavicular brachial plexus nerve blocks. Any supplementary analgesics, intravenous or local, with GA were recorded. Numerical rating scale pain scores were evaluated at 1 hour, 6 hours, 12 hours, and on the first clinic visit following surgery.

Results RA was associated with significantly lower pain scores at 1 hour post-surgery compared to GA. No significant differences in pain scores were observed at 6, 12 hours, or the first clinic visit between groups. Within the GA group, there was no significant difference in the pain scores of patients that received supplemental operative site local anaesthesia versus those who did not. 24 patients within the RA group required augmentation with additional intravenous analgesics like fentanyl, ketamine, and paracetamol. All patients in the GA group received intra-operative supplemental analgesics, including intravenous opioids, NSAIDs, or paracetamol. Regardless of anaesthesia type, good control of pain was demonstrated in within the first 12 hours post-operatively.

Conclusion • RA for distal radius fracture fixation reduces immediate post-operative pain compared to GA.

• Supplemental intra-operative analgesia is recommended when the surgery is done under GA, as a pre-emptive analgesia, to reduce post-operative pain.

11

A Novel Technique for Dynamic External Fixation of Proximal Interphalangeal Joint Fracture-Dislocation

Sastravaha N, Limudomporn K, Taweewuthisub W

Department of Orthopedic Surgery, Queen Savang Vadhana Memorial Hospital, Chonburi Thailand

Introduction The pins and rubbers traction system are widely used to treat unstable proximal interphalangeal (PIP) joint fracture-dislocations. Nonetheless, handling rubber bands presents challenges due to their inherent elasticity and limited durability. This study aimed to present the outcomes of an alternative dynamic external fixator technique for the treatment of unstable PIP joint injuries.

Method A total of thirteen patients with acute unstable PIP joint fracture-dislocation (n=8), pilon fracture (n=2), or comminuted shaft fracture of middle phalanx with or without PIP joint extension (n=3) were enrolled. The alternative fixator used a plastic syringe to maintain distraction force, replacing the commonly use of rubber bands. Four patients underwent combined open reduction due to unsatisfactory reduction by closed mean. The fixator was removed upon radiographic confirmation of healing.

Results At six months postoperatively, the mean active ROM of the unstable PIP joint was 89° (range: 70° - 104°) and the mean Quick-DASH score was 9.8 (range: 0-40.9). The mean numeric rating scale score for pain prior to fixator removal was 1 (range: 0-4). One patient developed a pin tract infection, which necessitated debridement and fixator removal 33 days postoperatively. No cases of reduction loss or implant failure were observed in this study.

Conclusions The outcomes of this technique were comparable to those achieved with other dynamic external fixator methods for managing unstable PIP joint fracture-dislocations. The main advantages of this technique were strength of the system, procedure simplicity, the compact design and relatively low cost. Furthermore, this technique demonstrated versatility, being applicable to pilon fractures and comminuted shaft fractures of the middle phalanx with or without PIP joint involvement.

12

Minimally Invasive Endoscopic Palmaris Longus abductoplasty for Severe Carpal Tunnel Syndrome Thenar Muscle Paralysis Reconstruction

Chia D. S. Y, Aw A. A. L

Department of Orthopaedic Surgery, Sengkang General Hospital, 110 Sengkang E Way, Singapore

Introduction The palmaris longus (PL) opponensplasty is commonly performed to restore opponens function in severe stage carpal tunnel syndrome (CTS) complicated by thenar muscle atrophy. However, the transfer requires a long palmar incision, extensive dissection and post-operative immobilization. This study describes our experience with a novel minimally invasive technique for PL abductoplasty via an endoscopic approach.

Materials and Methods Patients with electrodiagnostically proven severe carpal tunnel syndrome, and complete thenar muscle atrophy were included into the study. A minimally invasive approach was adopted using endoscopic cubital tunnel release set. A standard single transverse wrist crease mini-incision is created for the endoscopic carpal tunnel decompression, and the same incision served as the portal for the endoscopic PL tendon harvest.

Results 8 hands in 8 patients with severe idiopathic CTS underwent the procedure under general anaesthesia. The average duration of follow-up was 6 months. The average surgical time 47 minutes, down from the initial duration of 2 hours 23 minutes. All patients had minimal post-operative pain. Pinch strength ranged from 1 to 3.5KgF (74.8% of contralateral side), grip strength ranged from 3.5 to 10.5KgF (73% of contralateral side) and web span 0-0.5cm difference from contralateral side. No wound complications, tendon bowstringing or median nerve injury were noted.

Conclusion Endoscopic PL tendon transfer is feasible and results in smaller wounds, minimal pain and good functional outcomes compared to the conventional open procedure. However, limitations include a steep learning curve resulting in longer surgery duration, lack of availability of specific instruments and equipment handling.

13

The Outcome of Hinged External Fixation: My Experience and Preferred Technique: A Case Series

Asmara, Anak Agung Gde Yuda 1

1Consultant of Orthopaedic and Traumatology Department, Faculty of Medicine, Udayana University/Prof. Dr. I.G.N.G. Ngoerah General Hospital, Denpasar, Bali, Indonesia

*Corresponding author: Anak Agung Gde Yuda Asmara; Orthopaedic and Traumatology Department, Faculty of Medicine, Udayana University/Prof. Dr. I.G.N.G. Ngoerah General Hospital, Denpasar, Bali, Indonesia; Email: yudaasmara17@yahoo.com

Introduction Chronic unreduced elbow dislocation is a challenging condition resulting from delayed treatment of elbow dislocations. Elbow dislocations are the second most common major joint dislocations in adults and the most frequent in individuals over ten years of age. Chronic dislocations (>2 weeks unreduced) often involve triceps contracture, collateral ligament contracture, capsular fibrosis, and associated fractures, contributing to significant functional impairment. This case series highlights outcomes using hinged external fixation and associated soft tissue arthroplasty for neglected elbow dislocations.

Material and Methods/Case presentation We present 9 patients (aged 13–51 years) presenting with neglected elbow dislocations. Data were collected retrospectively from 2018 to 2024. All cases were over 4 weeks old, with pain and elbow stiffness. Patients had varying degrees of stiffness and deformity resulting from untreated injuries and failed traditional treatments. Management involved surgical interventions tailored to individual pathologies, including open reduction, soft tissue release, ligament reconstruction, triceps lengthening, and stabilization using hinged external fixation. Surgical approaches prioritized the paratricipital technique to preserve triceps integrity, combined with capsular release and fibrosis debridement for joint restoration.

Results/Discussion Postoperative outcomes were evaluated using the Mayo Elbow Performance Score (MEPS). Improvements were noted in all cases, with MEPS ranging from 75 to 95 at follow-up. The average arc of motion improved significantly, with final flexion-extension arcs between 70° and 155°, depending on the extent of initial damage and intervention. Complications such as pin tract infections were managed successfully, with no severe adverse events reported. Complex cases requiring triceps lengthening or extensive ligament reconstruction had slightly reduced functional outcomes. Early intervention and hinged external fixation allowed for improved joint congruency and motion while minimizing stiffness and instability.

Conclusions Management of chronic elbow dislocations requires a comprehensive, stepwise surgical approach tailored to each patient's unique pathology. Hinged external fixation provides dynamic stability, facilitating functional recovery. However, prognosis is influenced by factors such as the duration of dislocation, the need for triceps lengthening, and postoperative immobilization. Successful outcomes depend on meticulous surgical technique, individualized treatment planning, and preoperative counseling to manage expectations.

Keywords: chronic elbow dislocation, hinged external fixation, soft tissue arthroplasty, ligament reconstruction, case series

14

Two Stages Flexor Tendon Reconstruction : Is it the Only Option for Neglected Case

Bramantya INASHUM (Indonesian Society for Hand Upper Limb and Microsurgery)

Primary repair of flexor tendon in zone 2 is indicated to give the best results, but secondary tendon reconstruction can still serve as an option for neglected cases. Secondary reconstruction using tendon graft in one or more stages is usually required if the injury occurred for more than 3 weeks. During these time, retraction and shortening of tendon ends occurred and fibrous tissue surrounding the tendon will prompt additional release. Staged reconstruction is usually preferred if the pulleys are found to be scarred and/ or collapsed, further requiring reconstruction. In addition, interphalangeal joint stiffness would also need to be released. The risk of tendon rerupture increases if scar tissue formed around the tendon. A multidisciplinary team involving surgeon and physiotherapist will be needed to provide the patient with good and safe therapy protocols to improve the end result.

15

Unusual Case of Ring Finger Neuroma in Patient without prior Trauma History: A Case Report

Wibawanto, Irasqin1; Prakoso, Arif1; Muammar1; Anwar, Aditya Rosid Dwi1

1Prof. dr. Soekandar General Hospital, Mojokerto, East Java, Indonesia

Introduction Neuromas may develop anywhere in the body and comprise non-neoplastic masses of Schwann cells, connective tissue, and regenerated axons. The most common clinical presentation of neuroma is pain and paresthesia¹. Clinical assessment is sufficient to diagnose digital neuroma; however, diagnostic imaging studies are beneficial to evaluate the location and severity of nerve injury². Most neuromas are asymptomatic; symptomatic digital neuromas commonly result from hand injury or following hand amputation³. We present a case report of an unusual ring finger neuroma case which is affect radial and ulnar digital nerve predominantly at level of proximal phalanx.

Case Report A 33-year-old female came to the outpatient clinic with the chief complaint of pain in her ring finger for 2 years. Pain characterized by a burning sensation started in her proximal phalanx and radiated into the distal phalanx. A painful sensation occurs when the middle border of her proximal phalanx left ring finger is touched. Patient denies any history of trauma or overuse on her ring finger. Non-operative management, such as intralesional steroid injection, has performed but not been beneficial. Physical examination showed a positive Tinel sign on both the radial side and ulnar side at the level of the left proximal phalanx ring finger. The scratch collapse test was also positive in her radial side and ulnar side of the left proximal phalanx ring finger. Surgical neurectomy with nerve transposition was performed with complete resolution of symptoms observed 6 months post-surgery. The diagnosis of neuroma-in-continuity was supported by a postoperative microscopic examination that revealed a neuroma surrounded by healthy nerve fascicles. Postoperatively, the scratch collapse test also found negative.

Discussion Hand neuromas can be extremely painful and incapacitating, frequently prohibiting patients from carrying out normal daily activities. According to one hand injury study, the incidence was 7.8% after finger amputation and 1% after nerve restoration. An incidence of 6.6% following finger amputation was observed by another hand injury study^{3,4,5}. It is widely accepted that injury of perineurium can cause nerve fiber damage, disorganization, and neuroinflammation. A study by Yuksel and colleagues suggests that fascicular escape might occur when the perineurium is destroyed, but when it is intact, it acts as an impassable barrier for regenerated axons. The end result is unregulated regeneration of nerve endings resulting in an unorganized growth. The signals produced and sent by this growth will be interpreted by the central nervous system as pain^{4,6}. We reported an unusual case of bilateral digital

neuroma without any known prior injury. A diagnosis criteria that was proposed by Arnold et al². was fulfilled in this case. Currently, there are few case reports or literature reviews that discuss non-traumatic digital neuroma. Nevertheless, surgical management showed excellent results in this patient.

Conclusion We reported a case of a unusual digital neuroma with no history of prior trauma. Even though the surgical outcome was found remarkable, further studies are required to understand the detailed pathophysiology of digital neuroma.

Keyword digital neuroma, non-trauma

16

Outcomes of Simultaneous Open Triangular Fibrocartilage Complex Repair with Extensor Carpi Ulnaris Stabilization

Gupta M, Lee EY, Tan DMK

Introduction Triangular fibrocartilage complex (TFCC) disruption and extensor carpi ulnaris (ECU) instability are common concomitant injuries. The aim of this study is to present outcomes of simultaneous open TFCC repairs with ECU stabilization.

Methods This retrospective cohort study reviewed patients with symptomatic distal radio-ulnar joint instability and ECU subluxation who underwent simultaneous open repair of the TFCC and ECU stabilization between 2014 and 2016. Patients were diagnosed clinically and TFCC tear and ECU subluxation were confirmed using magnetic resonance imaging (MRI) and ultrasound (US) respectively. All patients initially underwent therapy, and surgery was offered to those with persistent symptoms. Open foveal repair of the TFCC was performed using suture anchors, while ECU stabilization was done by deepening of the ECU groove and subsheath reconstruction. Data collected included demographics, injury details and pre- and post-surgical symptoms, range of motion, grip strength and modified Mayo wrist score (MMWS).

Results The 11 patients included in the study presented with ulnar sided wrist pain that limited their activities of daily living. All patients had improvement in measured outcomes after surgery. The difference in mean arc of motion between injured and un-injured wrist (in degrees) improved from extension 6.4, flexion 5.0, supination 9.5, and pronation 8.6 to extension 0.0, flexion 0.5, supination 1.8, and pronation 0.9 after surgery. The mean grip strength of the injured wrist compared to the uninjured wrist improved from 72% to 93% and the mean MMWS improved from 66.4 to 92.7. 10 of 11 patients were pain free at last appointment, and all of them could carry out activity of daily living comfortably.

Conclusion The outcomes of simultaneous open repair of the TFCC and stabilization of the ECU are excellent. Patients with DRUJ instability should be screened for ECU instability and both pathologies addressed at the same sitting.

17

Systematic Review and Meta-analysis on Optimal duration of Immobilization for Conservatively Treated Displaced Distal Radius Fractures

Lim ZX, Jeyaratnam S, Lim JX, Das De S, Sebastin S, Lusa V, Karjalainen T

Introduction Distal radius fractures (DRFs) are common. Undisplaced fractures are treated conservatively with immobilization, while displaced fractures are initially managed with manipulation and reduction, followed by immobilisation, before determining whether surgery is beneficial. Evidence indicates that elderly patients with displaced DRFs often achieve comparable outcomes with conservative management. While the indications for surgery in DRFs are well-established, the optimal duration of immobilisation remains unclear. To address the uncertainty regarding immobilisation duration and its impact on outcomes for displaced DRFs, we conducted a systematic review and meta-analysis of randomized controlled trials, focusing on outcomes and complication data for non-operatively treated cases.

Material & Methods We searched MEDLINE (via PubMed) and the Cochrane Central Register of Controlled Trials (CENTRAL) for randomized controlled trials and quasi-randomized trials that compared outcomes of displaced DRFs of different immobilisation duration, regardless of type or position of the immobilization device. Our primary outcome of interest was hand function, while secondary outcomes included pain, grip strength, range of motion, and secondary displacement. We focused on analysing outcomes over the long term (6 months to 2 years) and reviewed outcomes at short-term and medium-term when data was available.

Results Seven studies met the inclusion criteria, comprising 637 participants with an average age range of 60 to 73 years, 88% of whom were female. This systematic review and meta-analysis found moderate to low certainty evidence that patients with displaced DRFs achieved comparable long-term outcomes with shorter (3 weeks) immobilization in terms of patient reported outcomes and range of motion. Furthermore, shorter immobilization may provide a small transient benefit in function between 3-6 months. There was also no evidence to suggest worse radiographic displacement or higher pain scores with shorter periods of immobilization.

Conclusions These findings suggest that there is no benefit in extending the immobilisation duration for displaced DRFs beyond 3 weeks.

18

Improving Surgical Training in Congenital Hand Surgery: Role of Simulation Based Training and Entrustable Professional Activities (EPAs)

Liu Chunxi¹, Chang Min Kai¹, Lim Jin Xi¹, Chong Alphonsus Khin Sze¹, Das De Soumen¹

¹Department of Hand and Reconstructive Microsurgery, National University Hospital, Singapore

Introduction Congenital hand surgery training requires comprehensive curriculum that includes surgical proficiency and peri-operative management. It should also focus on clinical skills such as decision-making and communications. Notably, teaching of technical aspects presents unique challenges. Due to rarity and complexity of these conditions, hands-on exposure is limited. As a result, technical training often relies heavily on simulation. This study aims to (i) identify gaps in simulation learning through a scoping review, (ii) propose a simulation-based curriculum to enhance technical skills, and (iii) use Entrustable Professional Activities (EPAs) as a comprehensive assessment framework that evaluates both technical skills and the broader competencies required for management.

Materials and Methods A scoping review was conducted following PRISMA guidelines. Databases including Medline, Embase and Cochrane Library were systematically searched. Using results of the review and surgical pedagogical concepts, we propose a simulation-based curriculum to address identified gaps.

Result/Discussion There is scant literature on simulation training models. Of 6278 articles identified, only five met inclusion criteria. These papers described models using latex glove (4), hydrocolloid sheet (1) cadaveric studies (1); with a focus on thumb hypoplasia (3), syndactyly (2), and cleft hand (1). Only two included brief assessments using modalities such as operative time, satisfaction score and expert evaluations. None evaluated outcomes within broader context of overall competency. To address these gaps, we propose a three-day simulation based, modular space learning training curriculum involving Cognitive Phase, Integrative Phase and Autonomous Phase. Additionally, we suggest the integration of EPAs as a clinically relevant, structured approach to assess trainee's progress across all domains.

Conclusion This study identifies existing gaps in simulation-based training for congenital hand conditions; and proposes a simulation-based teaching curriculum to address these deficiencies. The integration of EPAs ensures structured and holistic evaluation of both technical and clinical competencies.

19

Augmentation with Internal Bracing in Elbow Posteromedial Instability

Rajalingam K. , Karpudewan J.
Hospital Kuala Lumpur

Introduction Complex elbow injury associated with valgus posteromedial elbow instability usually involves lateral ulnar collateral ligament(LUCL) and medial collateral ligament(MCL). Often accompanied with associated fractures, most experts recommend internal fixation of the fractures alongside primary repair of the ligaments to restore stability and support functional recovery. The augmentation of the collateral ligament repairs with suture tape as internal brace is a technique which allows for the early ROM rehabilitation of elbow by providing additional support for the repaired ligament without the use of external brace, thus preventing post traumatic elbow stiffness and earlier return to work.

Discussion A total of 5 patients were involved in this study. All of them had elbow dislocation and concomitant elbow fractures. All underwent osteosynthesis and ligament repair with anchor sutures and further augmentation of the repair with internal brace. Arm sling was applied postoperatively for the purpose of pain and swelling management. Range of motion (ROM) rehabilitation were started as early as day three post operatively. Patient was also evaluated the progress on improvements and how early were they able to return to their occupation. On our follow up with the patients that had internal bracing total of 3 patients have achieved achieved active flexion of elbow up to 120 ° in postoperative follow up to 3 months. 2 patients have achieved the flexion until 90° . Out of the 5 patients who contributed to the study, 3 were able to return to work at 3 months postoperative period. The posterior band of the anterior bundle of the UCL is the main stabilizer against valgus stress. UCL repair techniques involve placing anchors at the sublime tubercle and medial epicondyle, with the proximal medial epicondyle anchor tensioning the suture that acts as an "internal brace." Romeo et al. found that suture tape internal bracing improved cyclic loading tolerance and reduced gap formation compared to anchor sutures in cadaveric elbows [1]. This increased in cyclic loading tolerance allows for early ROM training of elbow. This earlier rehabilitation of elbow ROM improves the outcome functionally by achieving greater range of motion within a shorter period of time . According to Giannicola et al. , following surgery for complex elbow instability , rehabilitation should begin promptly and continue for at least six months, as significant improvement in ROM typically occurs during this critical period [2]. Anvari et al. report that up to 13% of patients fail to return to sport after UCL surgery, primarily due to difficulties in achieving an isometric repair, which is essential for protecting the ligament during the throwing cycle in baseball [3]. The usage of the internal brace system allows earlier return to work for our patients with less complications as their nature of work doesn't require much higher intensity as the athletes in the study.

Conclusion The use of an internal brace to augment UCL ligament repair or reconstruction provides significant benefits, particularly for patients with complex elbow instability. The stability provided by the internal brace allows for earlier elbow mobilization and eliminates the need for external bracing after surgery. This enables a faster rehabilitation process, reducing the risk of complications like post-traumatic elbow stiffness. The improved range of motion (ROM) also supports a quicker return to work for patients.

References 1. Anthony A. Romeo, Brandon J. Erickson, Sarah J. McClish, Samantha Shirk, Coen Wijdicks, Biomechanical comparison of novel ulnar collateral ligament reconstruction with internal brace augmentation vs. modified docking technique, Journal of Shoulder and Elbow Surgery, Volume 31, Issue 10,2022,Pages 2001-2010
2. Giuseppe Giannicola, David Polimanti, Gianluca Bullitta, Federico M. Sacchetti, Gianluca Cinotti, Critical time period for recovery of functional range of motion after surgical treatment of complex elbow instability: Prospective study on 76 patients, Volume 45, Issue 3, 2014
3. A. Anvari, A. Fathi, I.K. Bolia, et al. Utilization of internal bracing in elbow medial UCL stabilization: From biomechanics to clinical application and patient outcomes Orthop Res Rev, 13 (2021), pp. 201-208

20

Adaptation of the Ten Test for Digital Nerve Injury

Parthiban S, Foster M, Madura T, Power D

University Hospital Birmingham NHS Foundation trust

Introduction Reliable quantitative evaluation of sensation in the hand following trauma may guide surgical intervention. The ten test (TT) is reported in the setting of compression neuropathy, however its ability to predict nerve transection injury has not been determined. This study examines the TT utility in predicting nerve transection injuries that require surgical repair when combined with other independent variables.

Methods Three year prospective data was collected at a tertiary UK hand centre. TT score, injury mechanism, intra-operative findings and patient demographics for minimum documentation standards in a bespoke electronic patient record (EPR) developed for the assessment and management of hand injuries. Statistical modelling was applied to identify significant factors.

Result In total, 881 assessments met the inclusion criteria. TT score and injury mechanism were significant factors predicting nerve damage ($p < 0.001$). Specifically, all mechanisms of injury except animal bites were significant ($p < 0.05$). Analysis also demonstrated that patients without a nerve laceration are unable to provide an accurate assessment. However, for patients with a nerve laceration as a comparator, assessments are more accurate ($p < 0.001$). Using this data, we were able to create an adaptation to the TT score which includes mechanism of injury to improve the accuracy of the assessment.

Conclusion This study highlights the subjective nature of sensation. The TT score in conjunction with the injury mechanism is a valid test of sensation, however some adaptations need to be made to improve the accuracy of this assessment method. Our adaptations to the TT score will help patients better understand their injury and for clinicians to better tailor treatment for these patients.

21

Radial Nerve Paralysis : When to Choose Nerve Transfers vs Tendon Transfers?

Ma, X1, Bussieres, N1 and Lin, J.C. 1 Division of Plastic and Reconstructive Surgery, Université de Montréal, Montréal, QC, Canada

Background Radial nerve paralysis is a common complication following humeral fracture. Patients that do not recover spontaneously can be treated for restoration of wrist, finger and thumb extension by either tendon or nerve transfers or a combination of both. Many studies have demonstrated that either technique can satisfactorily restore function. However, the best treatment choice to offer each patient may differ depending on time from trauma, age of the patient and their functional needs. To determine criteria for offering one treatment over the other, we performed a retrospective chart review of patients treated in our institution and a comprehensive review of the current literature.

Materials & Methods The retrospective study included patients treated at the Montreal Neuroplastics Clinic with radial nerve paralysis between 2010-2024 with minimum 6 months follow-up. Chart review collected demographic and surgical data, including age at time of surgery, type of reconstructive surgery, as well as post-operative results at subsequent follow up visits.

Results A total of 127 patients were seen at the Neuroplastics clinic with a diagnosis of radial nerve paralysis or palsy between 2010 and 2024. 30 patients underwent surgical treatment; 5 by microneurolysis; 4 by nerve grafting; 6 by tendon transfers and 14 by nerve transfers. Functional recovery was followed clinically and also using DASH questionnaires.

Conclusions Patients with radial nerve palsy can be successfully treated with either tendon transfers, nerve transfers, or a combination of both techniques. Tendon transfers require more frequent visits and more intensive hand therapy following surgery, while nerve transfers take a longer time to recover lost function, but strength increases over time. The decision making for which treatment to offer should carefully consider the specific circumstances of each patient.

22

Palmar Z-Osteotomy for Distal Radius Fractures

Lim, Hui Neng MBBS, MRCS (Ireland)

Satku, Mala, MBBS, MRCS (Edin), MMed (Ortho)

Xu, Jieying, MBBS, MRCS (Edinburgh), FRCS (Hand Surgery)

Teoh, Lam-Chuan, MBBS, MMed(Surg), FRCS(Glasg), FAMS

Tan Tock Seng Hospital

Introduction Distal radius fractures are a common injury with fracture parameters guiding surgical treatment. While palmar approach has become standard method of fixation, in fractures with a complete or nearly intact volar context, reduction of the fragments may be challenging with this approach. We propose a novel Z-osteotomy technique to address this issue and report on our outcomes.

Methods Retrospective review of all patients which utilized this volar Z-osteotomy technique was performed. We assessed pre-, intra- and post-operative radiographic parameters, fracture union and final wrist range of motion of all patients.

Results 12 Distal radius fractures in 11 patients were analysed. All fractures were successfully plated palmarly with volar tilt 9-14° (average 11.3°) and all achieved fracture union. This was maintained in the final radiographs with good clinical wrist range of motion.

Conclusion The volar Z-osteotomy technique described allows surgeons to achieve anatomical reduction of volar tilt in distal radius fractures where the volar cortex is intact with good clinical and radiological outcomes.

23

Ulna Shortening Osteotomy and Arthroscopic Foveal Repair of Triangular Fibrocartilage Complex Peripheral Tear in Neglected Chronic Distal Radioulnar Joint Instability: A Case Report

Ting RJ, Karpudewan J Department of Orthopaedic Surgery, Hand and Microsurgery Unit, Hospital Kuala Lumpur

Introduction Distal radioulnar joint (DRUJ) instability can cause ulnar-sided wrist pain and significant impairment in grip strength and wrist movement. It can happen as a result of bone deformity, cartilage defect, triangular fibrocartilage complex (TFCC) injury, and/or unstable (extensor carpi ulnaris) ECU. Effective treatment requires management of all contributing factors. We present a case of chronic DRUJ instability with bone deformity and TFCC tear that was treated successfully with ulna shortening osteotomy and arthroscopic transosseous foveal repair.

Case Vignette A 25-year-old woman with history of united right distal end radius fracture presented with ulnar-sided right wrist pain after a fall. She had a prominent right ulna head, exacerbated by the injury, and pain when carrying loads. Examination revealed positive foveal sign and ballottement test with anteroposterior radioulnar translation more than 10mm. Plain radiograph showed ulna styloid fracture, positive ulnar variance and widened DRUJ, while MRI showed foveal tear with ECU tendon subluxation. Diagnostic arthroscopy, the gold standard investigation confirmed a complete (Atzei 2) TFCC tear involving both distal and proximal components. She underwent ulna shortening osteotomy and TFCC foveal repair using an arthroscopic transosseous technique described by Nakamura. One month post-surgery, she reported significant pain reduction and better functional outcomes, as reflected in improved MMWS and DASH scores.

Conclusion DRUJ dysfunction can be caused by disruption to more than one component of the joint. All entities must be addressed in order to ensure an optimal outcome and patient satisfaction. Arthroscopic foveal repair of TFCC injury offers superior results compared to open surgery. Its precision, magnification, and minimally invasive nature make it ideal for treating chronic DRUJ instability with TFCC injury and concurrent bone deformity, as demonstrated by the patient's successful recovery with shortening osteotomy and transosseous foveal repair.

24

Fixation of Ulnar Styloid Base Fracture with Headless Compression Screw in Distal Radius Fracture

Abby Choke, Audrey Aw, Chung Sze Ryn

Department of Hand & Reconstructive Microsurgery, Singapore General Hospital

Introduction Ulnar styloid fractures are frequently associated with distal radius fractures, occurring in up to 60% of cases. If left untreated, an ulnar styloid fracture can result in symptomatic non-union or instability of the distal radioulnar joint (DRUJ). We sought to analyze a cohort of patients with concomitant ulnar styloid base fractures treated with headless cannulated compression screw (CCS) to assess its effectiveness in stabilizing the fracture and restoring DRUJ stability.

Methodology Between 2021 and 2024, a total of 23 patients with surgically treated distal radius fractures and concomitant ulnar styloid base fractures were included in the study. These fractures were identified as unstable based on the DRUJ ballottement test following the fixation of the distal radius. The surgical approach involved the use of a 1.7mm cannulated compression screw (Medartis, Basel, Switzerland) for fixation of ulnar styloid base fracture. Post-operatively, all patients were placed in a resting wrist splint and began gentle flexion and extension exercises. After 2 weeks, pronation and supination exercises were introduced. Clinical and radiographic assessments were conducted at 6 weeks, 3 months, and 6 months following surgery.

Results Out of the 23 cases treated, 20 achieved radiological bony union of the ulnar styloid base fracture. The mean range of motion (ROM) for pronation was 80 degrees, and for supination, it was 70 degrees. Additionally, all patients had a stable DRUJ. 6 out of 23 patients developed sensory neuropraxia of the dorsal sensory branch of the ulnar nerve, which gradually resolved over time. There were no cases of implant breakage or screw backout. All patients demonstrated satisfactory recovery, with most returning to work within 6 months post-surgery.

Conclusion The cannulated compression screw (CCS) provides a low-profile, minimally invasive, and reliable method for the anatomical fixation of unstable ulnar styloid fractures associated with distal radius fractures. The procedure resulted in a high rate of union and stable DRUJ, with minimal complications. The use of this technique is recommended as an effective treatment for patients with concomitant distal radius and ulnar styloid fractures requiring surgical intervention.

25

Brief Electrical Stimulation for Chronic Peripheral Nerve Injury in The Upper limb: A Systematic Review of Randomized Controlled Trial

Aprilya D1, Satria O1, Handidwiono R2

1Department of Orthopedic and Traumatology, Fatmawati General Hospital, Jakarta, Indonesia

2Department of Orthopedic and Traumatology, Cipto Mangunkusumo National Hospital, Jakarta, Indonesia

Introduction/Objectives Chronic peripheral nerve injuries (PNI) in the upper limb significantly affect quality of life, often causing pain, sensory and motor deficits, and functional limitations due to the peripheral nervous system's limited regenerative capacity. While treatments range from conservative approaches to surgical interventions, achieving optimal recovery remains challenging, influenced by factors like nerve damage extent and timing of surgery. Brief electrical stimulation (ES) has emerged as a promising adjunct to enhance axon regeneration and functional recovery. This systematic review evaluates randomized controlled trials on intraoperative and postoperative ES for chronic PNI in the upper limb, focusing on its efficacy in improving outcomes.

Materials and Methods This PROSPERO-registered review (CRD42024558519) follows PRISMA guidelines and includes only randomized controlled trials (RCTs) on intraoperative or postoperative brief nerve stimulation for chronic upper-limb peripheral nerve injuries. Searches spanned PubMed, CENTRAL, Scopus, Web of Science, Springer, PLOS, and Sage, with bias assessed using a revised RCT risk tool. We include a total of 5 studies with a total of 313 patients.

Result/Discussion Brief ES significantly improves motor, sensory, and electrophysiological outcomes in PNI surgery, showing its potential as a safe adjunct treatment. Protocols varied, with most studies using 1-hour ES at 20 Hz or shorter durations, both yielding positive results. Electrophysiology findings showed increased MCV, MUNE, and CMAP values, aligning with preclinical studies suggesting mechanisms like enhanced neurotropic factors and axonal regeneration. No adverse effects were reported, even with long-term use. Further high-quality research with standardized protocols is needed to confirm these findings.

Conclusion Brief ES significantly improves motor, sensory, and electrophysiological outcomes in chronic upper-limb PNI, highlighting its potential as an adjunct treatment for nerve regeneration.

26

Successful Recovery of Neglected Lunate Dislocation with K-Wiring: A Case Report

Anas Hadis, Chua Wei Siong, Manoharan Krishnan, Hospital Raja Permaisuri Bainun, Perak, Malaysia

Introduction Neglected lunate dislocations are uncommon injuries that may lead to chronic pain, wrist instability, and impaired function if left untreated. Surgical management poses challenges due to chronic soft tissue changes. This report highlights the successful treatment of a one-month-old lunate dislocation with open reduction and K-wire fixation, achieving pain relief and functional recovery.

Materials and Methods A 61-year-old male presented with wrist pain, deformity, and limited motion and carpal tunnel syndrome three months after a fall. Radiographs confirm a neglected lunate dislocation with dorsal subluxation but no avascular necrosis. Surgery involved a volar approach for carpal tunnel release, flexor tendon adhesiolysis and also dorsal approach for open reduction, scapholunate and lunotriquetral ligament repair, and stabilization using K-wires. Postoperative immobilization lasted six weeks, followed by structured physiotherapy.

Results and Discussion At the 24-month follow-up, the patient exhibited significant functional improvement: wrist flexion of 60°, extension of 55°, and grip strength at 90% almost similar to the contralateral side also with carpal tunnel syndrome resolved. Radiographs showed proper lunate alignment without signs of avascular necrosis. Carpal alignment and recovery were aided by ligament restoration and k-wire stabilisation. This case underscores the potential for open reduction and K-wire fixation to manage neglected lunate dislocations effectively.

Conclusion Open reduction with K-wire fixation is a viable approach for neglected lunate dislocations, offering significant pain relief, functional restoration, and alignment in cases with chronic soft tissue changes.

References 1. Herzberg G, Comtet JJ, et al. Perilunate dislocations and fracture-dislocations: A multicenter study. *J Hand Surg Am.* 1993;18(5):768-779.
2. Garcia-Elias M, Dobyns JH, et al. Perilunate dislocations: Reconstructive techniques. *J Hand Surg Am.* 1984;9(5):725-733

27

An Improved Pain Score and Satisfaction in Carpal Tunnel Release under WALANT with Epinephrine: A Randomized Controlled Study

Najib O1, Sri Kumar SK1, Hanifah J1, Nawfar SA1

1Department of Orthopaedics, Universiti Sains Malaysia, Kubang Kerian, Malaysia

Introduction Carpal tunnel release (CTR) is a common procedure for hand surgery which is effectively treated by the division of the transverse carpal ligament. It's a standard procedure that is performed under local anaesthesia with a tourniquet and has given consistent results. However, this procedure inflicts some complications like scarring, pain, thenar and hypothenar pain and weaknesses. A newer technique – Wide-awake Local Anaesthesia without Tourniquet (WALANT) – provides good pain control & haemostasis during minor hand surgery which reflects its potential with its usage during CTR.

Materials & Methods 60 patients scheduled for CTR between July 2023 and April 2024 were randomized into a control group (1% lignocaine with arm tourniquet) and an intervention group (1% lignocaine, 1:100,000 of adrenaline and 8.4% sodium bicarbonate; given 30 min prior to procedure), with a total of 10 ml of solution injected around surgical site. Pain scores pre-, intra- and postoperatively using the Visual Analog Scale (VAS), duration of surgery, and patient satisfaction scoring towards WALANT comparatively with LA + tourniquet were recorded.

Results The injection pain in the WALANT group was significantly lower ($p < 0.001$) where it showed no differences even after four hours postoperatively. Surgery satisfaction was significantly higher in the WALANT group, while there was no statistical difference in the duration of surgery.

Discussion WALANT outperformed LA + tourniquet during CTR in terms of injection pain and overall satisfaction. Therefore, it is a more convenient and safer alternative instead of local anaesthesia + tourniquet.

Keywords: Carpal tunnel syndrome, hand, surgery, tourniquet, WALANT.

Factors Influencing Implant Removal of Volar Locking Plate for Distal Radius Fractures

Alys Chia Zhi Qin¹, Abby Choke¹, Chung Sze Ryn¹

¹ Department of Hand and Reconstructive Microsurgery, Singapore General Hospital, Singapore

Introduction In the recent decade, internal fixation using volar locking plates (VLP) is the gold standard for treatment of unstable distal radius fractures. Due to the plate's low profile and anatomically contoured design, there is no strict recommendation for removal of hardware other than for a Soong 2 grading where there is a higher risk of tendon attritional rupture. We sought to examine the risk factors, including fracture and implant characteristics influencing the indication for removal of implant.

Methodology We conducted a retrospective review of all patients who underwent removal of volar locking plate for distal radius fracture from 2018 to 2021. Data collected included patient demographics, fracture characteristics implant choices and various factors influencing the decision for implant removal including the Soong's grading.

Results A total of 62 patients underwent removal of the VLP after distal radius fixation, comprising 24 males and 38 females with a mean age of 59 years. The average duration from surgery to implant removal was 9.5 months, with the latest removal occurring at 19 months. Notably, three patients required flexor tenolysis, while four underwent carpal tunnel release during the same procedure. Additionally, one patient received a tendon transfer for a ruptured flexor pollicis longus (FPL). The primary reasons for implant removal were as follows: symptomatic irritation (12), wrist stiffness (2), Soong Grade 2 (11), median neuropathy (6), patient preference (31).

Conclusion Among patients with distal radius fractures treated with VLPs, the most common indications for implant removal are patient preference and symptomatic irritation. Our findings underscore the importance of addressing patient concerns and the subjective nature of determining the necessity of hardware removal.

Clawed Hands: A Case Series of Paediatric Supracondylar Humerus Fracture related Iatrogenic Ulnar Nerve Injuries

Savarirajo JC¹; 1; Liau CJ¹ ¹Hand and Microsurgery Unit, Department of Orthopaedics, Malacca General Hospital, Jalan Mufti Haji Khalil, 75400, Melaka, Malaysia

Introduction Supracondylar humerus fractures are the most common paediatric elbow injuries.¹ The established treatment for displaced fractures is closed reduction and percutaneous pinning.² The pinning method remains debatable. Cross pinning offers superior biomechanical stability, but with a risk of iatrogenic ulna nerve injury.² There is no definite consensus regarding its treatment, with early wire removal and nerve exploration advocated.^{2,3}

Materials and Methods The patients presented to Malacca General Hospital in 2024, ranging from 7-9 years old. They sustained closed displaced supracondylar humerus fractures (Gartland III). Closed reduction and percutaneous crossed pinning was done. Post-operatively, 1 patient had normal examination findings. During follow up 6 weeks later, ulna claw hand, sensory loss, intrinsic and hypothenar muscle atrophy was detected. Patient underwent an ultrasound assessment followed by ulna nerve exploration, adhesiolysis and transposition. The 2nd and 3rd patient developed sensory loss post-operatively. Medial K-wire removal was done for the 2nd patient. For the 3rd, after a duration of observation, the patient underwent ulna nerve exploration and revision pinning. All 3 patients showed complete recovery within 2-3 months.

Discussion Iatrogenic ulna nerve injuries occurs in around 4% of cases involving medial percutaneous pinning.¹ Cross pinning is still used however, as it strongly resists axial rotational forces.⁴ Incidences can be reduced by 0.4-1.8%, utilising a mini-open approach.^{1,2} Woo et al proposed recommendations to complement existing techniques with good results.⁴ Treatment options include expectant or operative management. Operative management involves Kirshner wire removal or revision, early exploration or a combination of both.¹ The majority of patients showed full recovery following both expectant and operative management. The mean time to full recovery was within 4 months,¹ similar to the outcome duration shown in our patients.

Conclusion Iatrogenic ulna nerve injuries following cross pinning of supracondylar fractures can have good outcomes with early wire removal and nerve exploration.

Case Report: A Rare Case of Glomus Tumor Mimicking Onychogryposis

Woo QN (1) (2) (3) Coauthor : Chua WS (1) (3) (1) Hospital Taiping , Perak , Malaysia (2) University Malaya Medical Centre , Malaysia (3) Hospital Raja Permaisuri Bainun , Perak , Malaysia

Introduction Glomus tumor is a benign and vascular hamartoma that originates from the neuromyoarterial cells of the normal glomus apparatus in the reticular dermis [1] The glomus bodies are contractile tissue and are primarily responsible for local temperature and blood pressure modulation, and they accomplish this by controlling blood flow through microvasculature (2) Glomus bodies are found in great numbers in the fingers and toes, and this distribution offers a plausible explanation for the over-riding propensity for the tumours to occur in the distal aspects of the digits.(3) This tumor typically presents with cold hypersensitivity, pain, tenderness, and sometimes nail deformities or nail discoloration (4). Onychogryposis is a disorder of the nail plate growth that is clinically characterized by an opaque , yellow- brown thickening of the nail plate with associated gross hyperkeratosis , elongation and increased curvature.

Case Report Ms S is a 15 years old lady presented with right index finger pain since 1 year ago and worsening for the past 2 months. She seek treatment from general practitioner and the nail was removed. However , the problem recurred. Upon Examination , hyperkeratinized of the nail with nail bed elevation noted from right index finger . The nail appear to be uneven and dull coloured. Finger tip appear to be erythematous and tender upon palpation. No bony deformity from radiograph . Ultrasound reported to be soft tissue density at nailbed region. MRI was inconclusive. Intraoperatively , Globular structure size 5x5x4mm appear underneath the nailbed causing scalloping of the bone. Hence , proceed with matricetomy. Histopathology reported to be benign glomus tumour. Symptoms resolved post operative.

Discussion Classical triads of presentation of glomus tumour includes localised tenderness , severe pain and cold sensitivity. The treatment for this case was delayed in view of rare presentation mimicking onychogryposis. Clinical test such as Love Pin Test and Hildreth Test remained to be the backbone for the diagnosis. We should remain highly suspicious and proper examination and investigation should be done. Mainstay of treatment include surgical excision.

A New Subgroup Analysis of Wassel Type IV Thumb Polydactyly: A Comprehensive Review of anatomical Features, Surgical Management, and Outcomes

Cheng, Ka Wai; Chow Esther Ching San

Background Based on the commonly used Wassel classification for thumb polydactyly, the current study aimed to review the incidence, characteristics and clinical outcomes of the different subtypes of Wassel Type IV thumb polydactyly while focusing on a new identified subtype.

Methods This was a retrospective study reviewing cases from a single center between 2014 and 2023. Features of polydactyly including classification, laterality and presence of associated congenital anomalies were analyzed. X-ray films were reviewed. Synchondrosis index was measured by ratio of distance between two proximal phalanxes and summation of width of two proximal phalanx bases. Surgical outcomes were measured using the Tada score, which measured range of movement, malalignment, and instability.

Results Seventy-three cases with a total of 84 thumbs were identified with an average follow-up time of 38.1 months. Among the 37 Type IV polydactyly cases identified, there were 8 cases of type IVA, 19 cases of type IVB, and 6 cases of type IVD. Four cases were identified as the newly proposed type IVE, characterized by hypoplastic radial digit with parallel bone alignment for both major and minor digits, resembling the appearance of 'chopsticks'. For all IVE cases identified, synchondrosis was often observed and surgical reconstruction produced good clinical outcomes with an average Tada score of 5. The synchondrosis index <0.205 was predictive of synchondrosis.

Conclusion A new classification of type IV polydactyly was proposed in facilitation of its surgical treatment and clinical outcomes. The proposed new subtype with synchondrosis showed distinctive radiological features and often presented favorable surgical outcomes.