compared to delayed mobilization of the elbow after operative management of cubital tunnel syndrome.

METHODS: We conducted a systematic review of studies using Embase, MEDLINE, and The Cochrane Central Register of Controlled Trials from database inception to January 2020. Randomized controlled trial (RCT) and non-RCT were selected based on meeting the inclusion criterion of being a comparative study of adult patients who underwent either early mobilization (defined as mobilizing within 3 days postoperation) or late mobilization (after 3 days postoperation). When appropriate outcome data were pooled and analyzed with meta-analysis.

RESULTS: Of the 1,932 studies identified and screened, 5 studies (2 RCT and 3 observational design) totalling 224 patients (232 elbows) were included for review. Two studies included patients who underwent anterior subcutaneous transpositions, whereas patients in the other 2 studies underwent cubital tunnel release with medial epicondylectomy. The evidence from 2 RCTs (100 patients) suggest that early mobilization may result in a large reduction in the amount of time need to return to work (mean difference, 40.1 days; 95% CI, 63.6 days to 16 days earlier; I², 85%, low-certainty evidence). Pooled results from 3 observational studies found similar findings (very low-certainty evidence). Pooled results from RCT evidence (100 patients) demonstrated that early mobilization may results in little to no difference in grip strength (0 kg; 95% CI, −0.17 to 0.17; I² = 0%, low-certainty evidence). Furthermore, the evidence suggests that the mobilization strategy employed (early versus late) may have little to no differences in adverse events or range of motion (very-low to low-certainty evidence). Outcomes such as upper extremity quality of life measures were not evaluated in the included studies.

CONCLUSION: While there is considerable uncertainty around the effect estimates, immobilizing patients for periods longer than 3 days does appear to delay patients’ return to work with no appreciable clinical benefit. There is a lack of robust evidence to guide plastic surgeons on the postoperative management of cubital tunnel syndrome patients. There is a need for high-quality, well-reported, randomized controlled trials evaluating the potential effects and harms associated with early mobilization. Future trials should measure patient-reported outcomes related to upper limb-related quality of life. Considering the low-certainty evidence, plastic surgeons should engage in a shared decision-making process with patients when deciding to immobilize them postcubital tunnel release.

Factors Associated With 30-day Soft Tissue Complications and Reoperation Following Upper Extremity Sarcoma Surgery

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PURPOSE: To identify risk factors for the occurrence of 30-day soft tissue complications and reoperations following upper extremity sarcoma excision.

NULL HYPOTHESIS: There are no pre- or perioperative factors associated with a soft tissue complication or reoperation during the first 30 days following upper extremity sarcoma surgery.

N AND FOLLOW-UP: Six hundred twenty patients, 30-day postoperative follow-up.

METHODS: Using the American College of Surgeons National Surgery Quality Improvement Program (NSQIP) database, a total of 620 patients were identified who underwent surgical treatment of an upper extremity (UE) sarcoma between 2005 and 2018. The primary outcomes were the 30-day occurrence of a soft tissue complication (including surgical site infections, wound dehiscence, and soft tissue-related reoperations) and any unplanned reoperation. The median age was 62.5 years (interquartile range [IQR], 49–73), and most tumors were soft tissue sarcomas (n = 496; 80%) with the upper arm being the most commonly affected location (n = 424; 68%). Tumor extirpation was the most common surgical treatment (n = 559; 90%), and amputation was performed in 61 patients (10%). To evaluate the factors associated with reoperation, a bivariate analysis was performed, and to evaluate the factors associated with soft tissue complication, a multivariable analysis was performed.

RESULTS: The 30-day soft tissue complication rate was 4.7%, and the 30-day unplanned reoperation rate was 5.5%. The reoperation rate was higher in patients who underwent preoperative radiotherapy (30% versus 6.1%; P = 0.027) and in those with longer operative times (median, 129
minutes [IQR, 59–280] versus 88 minutes [IQR, 50–156]; \( P = 0.035 \)). Soft tissue complications were more common in patients with a higher BMI (\( \beta = 0.048; P = 0.047 \)) and following longer operations (\( \beta = 0.003; P = 0.002 \)) based on the multivariable analysis. In the subset of patients who underwent soft tissue tumor extirpation (\( n = 451 \)), bivariate analysis of tumor characteristics showed that a tumor size \( \geq 5 \text{ cm} \) (12% versus 3.8%; \( P = 0.015 \)) was associated with a soft tissue complication.

CONCLUSIONS: The risk of developing a soft tissue complication or undergoing an unplanned reoperation is approximately 1 in 20 following upper extremity sarcoma surgery. Longer operative time and patients with a higher BMI are at higher odds of developing a soft tissue complication following upper extremity sarcoma surgery. Preoperative radiotherapy and longer operative procedures are risk factors for unplanned reoperations. Larger tumor size seems to be a risk factor in developing a soft tissue complication following tumor extirpation.

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Development of 3-dimensional Printed Distal Finger Prosthesis With Assembly-free Joint

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PURPOSE: Finger and fingertip amputation is common, with tens of thousands of cases occurring yearly in the United States.\(^1\) Distal fingertip amputation occurs more frequently than complete finger amputation and often in young and productive populations.\(^2\) Apart from loss of sensation, the loss of one or more fingertips often results in drastic functional deficits. Current options for functional finger prostheses are often cost-prohibitive and generally require additional refinement after fabrication. The purpose of this study was to design an option for prosthesis made exclusively via 3-dimensional (3D) printing. In doing so, we hoped to restore an adequate level of function to patients while keeping costs low and requiring minimal postproduction refinement and maintenance.

METHODS: Our prototype was made for a patient with amputation at the distal interphalangeal joint (DIJ) of the left ring finger. The patient’s intact ring finger was measured in order to produce a digital model using computer-aided design (CAD) software. Measurements utilized included metacarpophalangeal (MCP) joint to distal tip, and the widths of proximal, middle, and distal phalanx segments. The length of the amputated digit was also measured from MCP joint to amputation stump. This CAD design was finally submitted to an online 3D printing service (Shapeways) to allow for replicas to be ordered by the patient directly while maintaining low production cost.

RESULTS: Our final model utilized a single, flexible joint consisting of 2 pins molded directly into the medial and lateral aspects of the prosthesis immediately after 3D printing. High grade nylon material was used during the fabrication process to confer low cost while maintaining comfort and durability. Quality range of motion and improved anatomical grasping of objects was achieved, creating significant return of function.

CONCLUSIONS: Our device accomplishes the goal of creating a functional prosthetic fingertip using exclusively 3D printing. In addition, while other 3D printing prosthetics have required significant postproduction customization and maintenance, this device’s intrinsic joint system makes it essentially maintenance free and can be used immediately following printing. The use of high-grade nylon confers stability and durability at a fraction of the cost of previously used materials. Utilizing a third-party 3D-printing company and freely available CAD plans, a patient will be able to upload their measurements and a device can be created and shipped to them for around $20 USD. We see particular utility of our device in pediatric populations as the customizable design and economical production allow for several devices to be used throughout a child’s development.

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