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Original Research

## Postoperative Instruction Retention, Written Versus Audiovisual Adjuncts: A Prospective Randomized Study



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**Purpose:** Adherence to postoperative protocols is an integral perioperative intervention that impacts surgical outcomes. The focus of this study was to identify the baseline postoperative instruction retention of our traditional written format and compare that with the retention when using an audiovisual adjunct. We hypothesize that the addition of audiovisual adjuncts would result in greater patient retention of their postoperative instructions.

**Methods:** Sixty consecutive adult patients undergoing soft tissue procedures of the hand and wrist were enrolled prospectively at a single institution. Patients were randomized to receive postoperative instructions with either a written or an audiovisual adjunct format. Two days after surgery, a blinded investigator contacted the participants to administer a standardized phone questionnaire. Responses were recorded, and the data were analyzed by another blinded team member. Analysis was performed using  $\chi^2$  and Student *t* tests as appropriate.

**Results:** Fifty patients were included in the final analysis. The written group scored an average retention of 80%, whereas the audiovisual group showed a retention score of 85%. Demographic analysis of men versus women, and patients <60 versus >60 years of age did not demonstrate significant score differences. The subgroup analysis of patients receiving local anesthesia alone demonstrated significantly higher rates of percent correct and perfect recall in the audiovisual compared with the written-only group (87.5 vs 80.5 and 44% vs 7%, respectively).

**Conclusions:** For patients undergoing common soft tissue procedures of the hand, the addition of audiovisual supplementation to written instructions, especially in those undergoing wide awake, local anesthesia, no tourniquet procedures, is associated with higher rates of retention of a patient's postoperative instructions. The specific improvement in the local anesthesia cohort is especially relevant today due to an increased prevalence of wide awake, local anesthesia, no tourniquet style procedures, and the increasing reliance on patient engagement in postoperative care.

**Type of study/level of evidence:** Randomized control trial; Diagnostic Level 2b.

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Postoperative protocols are often considered a crucial part of the orthopedic perioperative experience. Designed to limit postoperative complications and improve functional outcomes, these protocols represent an area of significant importance to surgeons.

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Increasing rates of ambulatory surgery and correlation between patient-reported outcome measures to procedure success and reimbursement make patient understanding and compliance with postoperative instructions even more crucial. As of 2017, more than 70% of elective musculoskeletal surgeries take place in ambulatory rather than inpatient settings.<sup>1,2</sup> This increase in reliance on immediate, postoperative, self-administered patient care translates to greater reliance on the patient's understanding of postsurgical protocols. Patient compliance, comprehension, and retention of information are crucial modifiable factors that contribute to the success of surgical outcomes. Historically, noncompliance has been

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**Table 1**  
Comparison of Recorded Patient Demographic Information, Procedure Types, and Frequencies Between Control and Experimental Groups\*

	Written Only (n = 25)	Written + Audiovisual (n = 25)	P Value
Age (y)	55.4	52.3	.49
Gender (n, %)	13 women (52%)	17 women (68%)	<.05
Type of anesthesia: local (n, %)	22 (88%)	18 (72%)	.53
Type of procedure (n, %)			
Carpal tunnel release	13	15	.71
Cyst removal	4	4	1
De Quervain release	0	2	.16
Dupuytren's nodule excision	2	0	.16
Trigger finger release	6	7	.78

\* Statistical significance provided.

surprisingly high with reported rates of up to 27.5% after orthopedic procedures; however, the literature also suggests that these rates are modifiable by timing, delivery medium, and the environment in which postoperative instructions are communicated.<sup>3–9</sup> Although the literature identifies postoperative instruction delivery as influential, there remains little known regarding the best avenue for information delivery in the orthopedic patient population. Furthermore, the authors have not discovered any studies that compare the written versus written with audiovisual adjunct delivery of postoperative instructions on patient retention.

Common hand surgery procedures represent a cross-section of orthopedic procedures performed. In the United States, muscle, tendon, and soft tissue surgical procedures are the second most common category of surgery in the ambulatory setting with an incidence of 238.2 per 100,000.<sup>2</sup> Although these procedures, such as carpal tunnel release, De Quervain release, trigger finger release, and soft tissue mass excisions, carry low overall rates of complication, the large number of cases performed each year translates to a large effect size with even small percentage changes. Increasing patient retention of postoperative protocols has the potential to mitigate complications and increase satisfaction.<sup>6,10–12</sup> Our study seeks to identify the level of patient retention of their traditional written postoperative instructions compared with the use of written instructions with an audiovisual adjunct. We hypothesize that the addition of an audiovisual aid provided to the patient in the preoperative holding area on the day of their procedure would increase the overall level of retention of their postoperative instructions.

## Materials and Methods

After receiving institutional review board approval, a prospective, randomized, control study following Consolidated Standards of Reporting Trial guidelines for reporting was performed comparing retention rates between consecutive adult patients receiving standard written postoperative instructions versus written postoperative instructions with an audiovisual adjunct. Demographic data including age, sex, surgical procedure, and anesthesia selection (wide awake local anesthesia versus general anesthesia) were recorded. Inclusion criteria for the study included consecutive patients 18 years of age and older, who can read and understand English, who underwent primary, and who underwent same-day outpatient soft tissue hand surgeries. Exclusion criteria included patients who were non-English speaking, currently incarcerated, unable to provide their own consent, significantly visually impaired, and unwilling to comply with follow-up interviews. The procedures listed in Table 1 were included due to the homogeneity of postoperative protocols and operating room conditions. All procedures were performed by the same fellowship-trained orthopedic hand surgeon, and all postoperative instructions were administered by trained members of the healthcare team.

Informed consent was obtained for all patients before enrollment in the study. Patients then underwent randomization to their intervention arm by drawing the assigned study arm from a sealed envelope, to which the surgeon was blinded. Patients in the control arm were provided the standard written postoperative protocol, which included a written instruction sheet that was verbally discussed with the patients before discharge. Patients in the experimental arm received an audiovisual adjunct in lieu of a verbal review of the written instruction sheet as shown in Figure 1. This adjunct consisted of slides displaying relevant images and diagrams with an audio overlay combined into a video format that reviewed the information provided in the standard written postoperative instruction sheet. Visual aids included in the instruction video are demonstrated in Figure 2. After their surgery, patients were contacted 48–72 hours after surgery by a member of the research team, blinded to the patient assignment arm, to assess the retention of important components of the postoperative instructions. If a patient was not reached during the initial follow-up call, a second attempt was made within the predetermined follow-up timeframe. All patients who were not successfully contacted after 72 hours were excluded from the analysis. During the telephone follow-up interview, patients were asked a standardized series of questions related to their postoperative instructions and were assigned 1 point for a correct answer or 0 points for incorrect answers. The total score was calculated at a maximum of 7, as shown in Figure 3. Patients were instructed to not look at their instruction sheets during questioning.

## Statistical analysis

Once data collection was complete, the data were deidentified and analyzed using  $\chi^2$  and paired Student *t* tests as appropriate. Significance was set to an alpha value of  $P = .05$ . Demographic analysis was performed to evaluate homogeneity between control and intervention arms of the postoperative instruction groups. Further subanalysis was then performed comparing the two postoperative instruction groups to detect differences between the administered anesthesia types, surgical procedures, patient sex, and patient age. The deidentified data were provided to an unaffiliated statistician, and the analysis results were confirmed.

## Results

At the completion of the study, sixty patients were enrolled in the trial. Fifty patients were included in the final analysis (25 per group) due to 10 (16.7%) patients who did not respond to the phone survey postoperatively. The mean age of the study participants was 55.2 years and 38.3% were men. No significant differences were observed between the control and intervention groups regarding age, type of procedure, or type of anesthesia (Table 1). More women were present in the audiovisual adjunct group than in the written-

### Post Operative Instructions

You have had surgery on your arm today, please read and follow the information below:

- Elevate your hand above your elbow during the next 24–48 hours to help with swelling.
- Place your hand and arm over your head with motion at your shoulder three times a day.
- Do not apply any cream/ointment/oil to your incisions including antibiotics.
- Do not soak your hands in standing water (dishwater, tubs, Jacuzzi's, pools, etc.) until given permission (typically 2–3 weeks after injury)

Call the office if you notice any:

- Increased numbness or tingling of your hand or fingers that is not relieved with elevation.
- Increasing pain that is not controlled with medication.
- Difficulty chewing, breathing, swallowing.
- Chest pains or shortness of breath.
- Fever over 101.4 degrees.

### Bandages:

- Please keep your bandages clean and dry. Do not get dressings wet as this may increase your risk of wound complications.
- You may remove your bandages on post operative day 5.
- No sling is required after your surgical procedure.

### Motion and Weight Bearing:

- You are encouraged perform range of motion of the wrist and fingers to prevent stiffness.
- Do not lift anything heavier than 5 lbs.

### Ice:

- You may ice as needed the first day after surgery. Icing the affected extremity can decrease swelling and improve your comfort.

### Medications:

1. Naproxen 220 mg two times daily
2. Tylenol extended release 650 mg every 8 hours
3. Norco/hydrocodone 1 tab every 6 hours only as needed for pain

**Follow-up Appointment:** Your first postoperative appointment will be in 7–10 days.

Please call the office if you have any questions or concerns regarding your post-operative care.

**Figure 1.** Standardized written postoperative instructions provided to patients, regardless of the treatment arm.

only group, 68% versus 52%, respectively ( $P < .05$ ). The subgroup analysis of combined male versus combined female postoperative retention scores demonstrated no statistical difference between men and women for postoperative retention with the male mean retention scores of 5.69 versus female mean retention score of 5.72 ( $P = .2$ ).

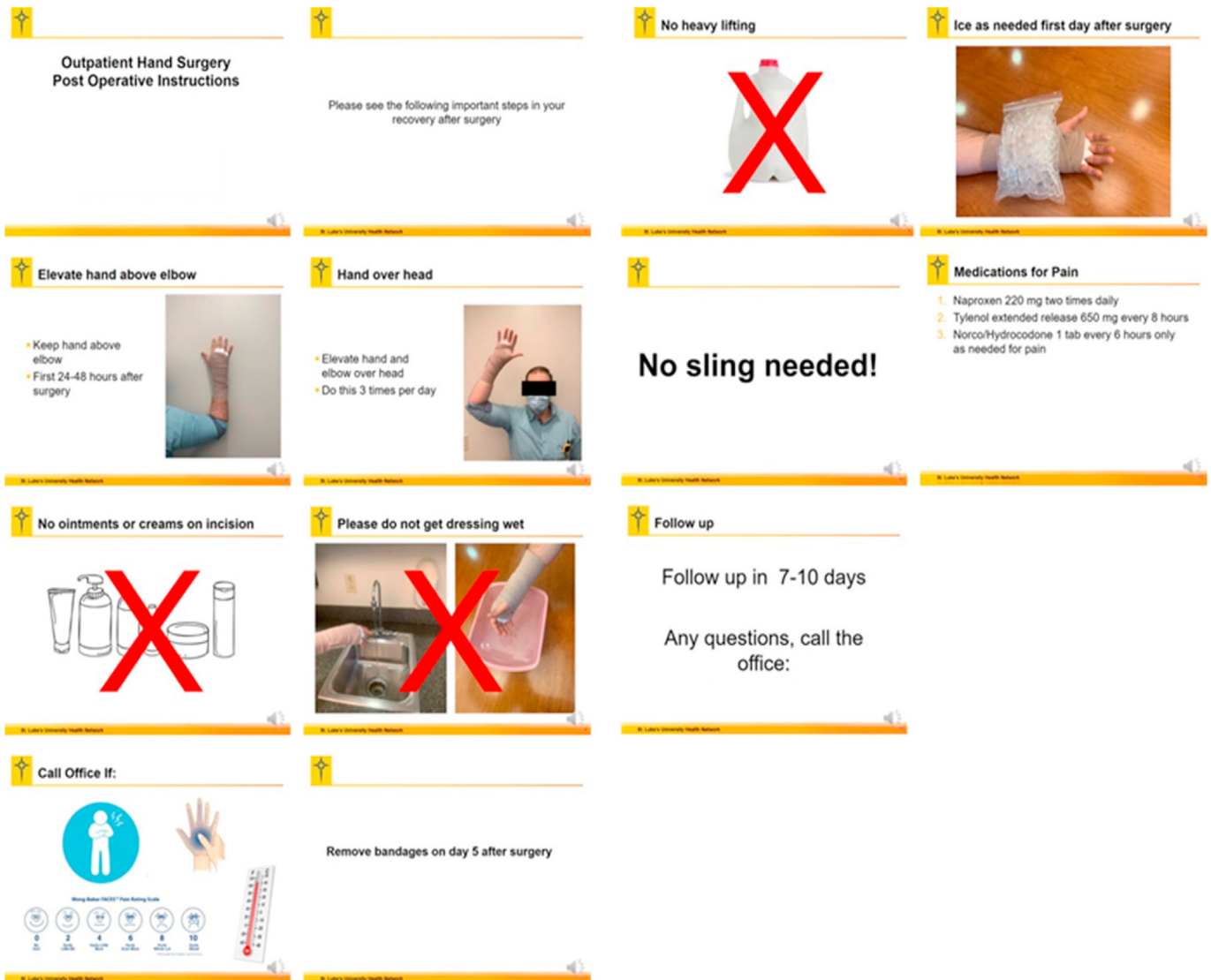
When comparing the total retention scores between the groups, the audiovisual augmented group had a mean score of 84.6% versus the written group score of 80.0%, ( $P = .13$ ). The number of patients having a perfect recall in the audiovisual group compared with the written-only group was 36% versus 8%, respectively ( $P < .05$ ). Further subgroup analysis to determine the effect of anesthesia on retention scores was then performed. The audiovisual versus written-only groups within the local anesthesia subpopulation had a significantly higher percentage of patients who had perfect recall scores (44.4% vs 7.1%,  $P = .04$ ). The average correct score in the local anesthesia audiovisual group also exceeds the local anesthesia written-only group (87.5% vs 80.5%,  $P = .03$ ). This trend was also noted in the general anesthesia subpopulation but did not reach significance with 16.7% of the patients in the audiovisual group obtaining perfect scores compared with 0% in the written group ( $P = .071$ ), with the average correct of 75% in each group.

Age was not found to be a significant factor in retention scores because patients <65 years of age scored an average of 81% correct on the follow-up surveys versus an average score of 85% correct in patients ages greater than 65 years ( $P = .13$ ).

## Discussion

Overall, little focus has been noted within the orthopedic literature related to the assessment of patients' understanding and recall of postoperative instructions and the ideal methods of providing patients with this information. In literature for anesthesia and other surgical subspecialties, patient satisfaction scores were found to be higher for patients who received combined methods of delivering postoperative instructions, but conflicting results were noted regarding the overall retention rates.<sup>7,11,12</sup>

Ambulatory surgery is becoming increasingly the most common setting for orthopedic surgery, with soft tissue procedures of the hand representing a significant percentage of those procedures.<sup>2,13</sup> As the incorporation of wide awake, local anesthesia, no tourniquet (WALANT) procedures continues to grow in the United States,<sup>13</sup> this vast subset of patients represents a unique opportunity to engage patients in their own care. Our study highlights that for patients who undergo WALANT procedures, a benefit exists to using audiovisual adjuncts to improve recall, demonstrated by perfect recall rates and higher percent correct when those adjuncts were employed compared with written instructions alone (36% vs 8%,  $P < .05$  and 87.5% vs 80.5%,  $P = .03$ , respectively). These findings are consistent with the existing nonorthopedic literature, which suggests that the addition of written or visual adjuncts to postoperative instructions increases patient information retention.<sup>5,14</sup> The benefit of audiovisual adjuncts to patient recall is a postoperative instruction vehicle with significant potential; however,



**Figure 2.** Visual presentation slides used in the postoperative instruction video presented to audiovisual adjunct patients on the day of surgery.

implementations for timing and delivery methods are the areas that require further study. The effectiveness of this approach requires further study as a portion of the patient population may experience access difficulty due to variance of technical literacy. Another consideration for future study includes the timing of audiovisual aid use during the perioperative period. In multiple studies, patients receiving sedation for their procedures demonstrate the lack of recall of perioperative events in the anesthesiology literature, thus altering the timing of information delivery to that subset of patients could be of particular interest.<sup>11,15</sup> To date, no studies discuss this effect because it relates to audiovisual aids or the orthopedic patient population. In our study, we provided all instructions in the preoperative holding area to standardize the protocol and prevent any effect that residual sedation may have on processing or remembering instructions.

Strengths of the above study include the prospective, blinded, and randomized design that accounted for confounding factors such as procedure type, differences in postoperative requirements, and limiting of observer and selection biases. Additionally, further control of the homogeneity of the postoperative protocols was possible due to the procedures being performed by a single hand

surgeon. The internal validity of our results was improved as no variation exists in postoperative protocols. Finally, all patients were presented with the information in a standardized fashion by trained professionals, limiting the possibility for bias at the time of information presentation.

Limitations of the study include the relatively small sample size of the study and inability of the study to account for score retention improvements due to pre-existing patient health literacy. To account for this, future studies could include a head-to-head trial of pre and postoperative written instructions versus pre and postoperative audiovisual instructions. Additionally, although it is standardized among patients, our recall retention assessment has not been externally validated. With the administration of telephone versus in-person follow-up questionnaires, the study was limited in that it was not able to ensure that patients were not referencing their copy of the discharge instructions to answer the questions. However, with the study design and explanation to patients that their involvement in the study was voluntary, would not change their postoperative care, or provide them with any financial or other incentives, it was reasoned that the motivation to do so would be quite low.



### Post-Operative Instructions Questionnaire

1. How many days after your surgery should you remove your dressings? (answer 5 days)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points
2. Should you apply any cream/ointment/oils to your incisions including antibiotics until your follow up appointment? (answer no)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points
3. Should you soak your hands in standing water (dishwater, tubs, Jacuzzi's, pools, etc.) until given permission (typically 2-3 weeks after injury)? (answer no)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points
4. If you experience any fevers, new numbness or tingling, pain uncontrolled with medication, who should you call? (answer our office/surgeon)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points
5. What is the maximum amount of weight you can lift with your operative hand? (answer 5lbs)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points
6. How many times per day should you be moving your fingers into a fist to decrease stiffness in the hand? (answer 5)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points
7. When how many days after your procedure will you be seen for your follow up appointment? (answer 7-10 days)
  - a. Correct answer \_\_\_ 1 point
  - b. Incorrect answer \_\_\_ 0 points

**Figure 3.** Standardized postoperative questionnaire used for follow-up retention assessment. Items were selected based on pertinence to patient experience and surgeon ranking of item importance in the postoperative protocol.

For patients undergoing common soft tissue procedures of the hand, the addition of an audiovisual supplement to provide postoperative instructions is associated with higher rates of perfect retention. The finding of specific improvement in the local anesthesia cohort is especially relevant today due to the trend in hand surgery toward WALANT-style procedures with a higher percentage of percent correct and perfect recalls. Although not explicitly examined in our study, the existing body of literature suggests that by improving patient retention, audiovisual adjuncts may affect patient compliance with postoperative protocols and improve perioperative satisfaction. This study may serve as a starting point for future efforts to fine-tune the above process and procedures to provide patients with the information in the most appropriate manner.

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