



# Patient-Specific E-mailed Discharge Instructions Improve Patient Satisfaction and Patient Understanding After Surgical Arthroscopy

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**Purpose:** The purpose of this study is to determine whether patient-specific e-mails after surgical arthroscopy improve patient satisfaction and patient understanding of their procedure compared to traditional, preprinted discharge instructions. **Methods:** Sixty patients who underwent surgical arthroscopy were prospectively, randomized into two separate groups. One cohort received a detailed e-mail of their procedure, discharge instructions, and labeled intra-operative arthroscopic images, while the second cohort received the standard preprinted instructions, while their arthroscopic images were discussed at the time of follow-up. The procedures were performed by a single surgeon. All patients were seen at 1-week follow-up and given a 14-question survey specific to their postoperative course, discharge instructions, and overall satisfaction using a 5-point Likert Scale. Demographic information was collected and data points comparing overall patient satisfaction, ease of understanding instructions, quality of information, and the number of times referenced were analyzed using nonparametric tests between the two cohorts. **Results:** Patients in the e-mail cohort were significantly more satisfied with their surgery than patients in the printed cohort (medians: 5 versus 4, Wilcoxon chi-square = 9.98;  $P = .002$ ). Patients in the e-mail cohort indicated that their instructions more greatly enhanced their overall understanding of their surgery (medians: 5 vs 3, Wilcoxon chi-square = 10.84;  $P = .001$ ) and were more helpful to their recovery (medians: 5 vs 3, Wilcoxon chi-square = 7.37;  $P = .007$ ). E-mail patients were significantly more likely to recommend similar instructions be sent to a friend undergoing surgery (medians: 5 versus 3, Wilcoxon chi-square = 11.10;  $P < .001$ ) and share their instructions with others 72% (18/25) versus 34.5% (10/29). There was no significant difference between the e-mail cohort and the print cohort for the number of times patients referred to their instructions (medians: 3 versus 3, Wilcoxon chi-square = 2.41;  $P = .121$ ). **Conclusions:** Patient-specific e-mailed discharge instructions improve patient satisfaction and overall understanding of the procedure compared with traditional printed discharge instructions after surgical arthroscopy. **Level of Evidence:** Level II, prospective randomized trial.

## Introduction

Patient satisfaction has been identified as a key factor in determining the overall success of Orthopedic Surgeries.<sup>1-3</sup> Patients who are satisfied with

their care have been found to have higher rates of follow-up, fewer hospital readmissions, and adhere to treatment plans.<sup>4-8</sup> Surgeon communication skills and information provided to patients at discharge are two modifiable factors that have been found to directly affect patient satisfaction.<sup>9-14</sup>

Historically, written discharge instructions have been the primary means of information for patients after same-day surgeries. Preprinted instructions are often generic, written in physician-centric language, and inadvertently thrown away when patients return home.<sup>12,15-17</sup> To improve patient satisfaction, physicians have incorporated technology to better patient-physician communication. This technology includes easily accessible webpages outlining postoperative rehab protocols, surgical and rehabilitation videos, and patient portals with direct access to medical records.<sup>18-20</sup> The purpose of this study is to determine whether patient-specific e-mails after surgical arthroscopy improve patient satisfaction and patient

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understanding of their procedure compared to traditional, preprinted discharge instructions. We hypothesize that patients receiving individualized discharge instructions via e-mail after arthroscopic procedures will report greater patient-reported outcomes compared to traditional, preprinted discharge instructions.

## Methods

Institutional Review Board approval was obtained in accordance with regulations required by 21 CFR Parts 50 and 56; IRB G21009. Institutional Review Board (IRB) approval was obtained prior to conducting the study. This was a prospective, single-center, randomized cohort study evaluating patient satisfaction after surgical arthroscopy. A power analysis was performed using a medium effect size, an  $\alpha$  of .05, and a power of 80%. The power analysis yielded a sample size goal of

60 participants, 30 patients per cohort. Inclusion criteria consisted of patients over 18 years of age undergoing surgical arthroscopy of their shoulder, hip, or knee, English-speaking patients, and must have had an active e-mail account. Exclusion criteria consisted of patients under 18 years of age, non-English speaking patients, lack of an active e-mail account, and those undergoing a procedure other than surgical arthroscopy of their shoulder, hip, or knee. All procedures were performed by a single, fellowship-trained sports medicine surgeon.

Patients were randomly assigned, in a 1:1 ratio, either into an e-mail or non-e-mail cohort. Patients in the e-mail cohort received a personalized detailed e-mail of their procedure, labeled arthroscopic images from their surgery, and discharge instructions on the day of surgery (Figs 1-5). Patients in the non-e-mail cohort received the standard, printed discharge instructions

Dear \_\_\_\_\_,

I wanted to send you a brief email to let you know that your surgery yesterday went fantastic. Attached is a PDF that will go over some of our post-surgical procedures as well as show you a few of the pictures from your surgery today. I have labelled the pictures to help you better understand what was done.

You are able to take your dressing off two days from the surgery. Once you do this, you are allowed to shower but please avoid bathtubs and pools for approximately 10-14 days. We encourage you to use ice and anti-inflammatory medications such as Motrin or Tylenol if you are allowed medically.

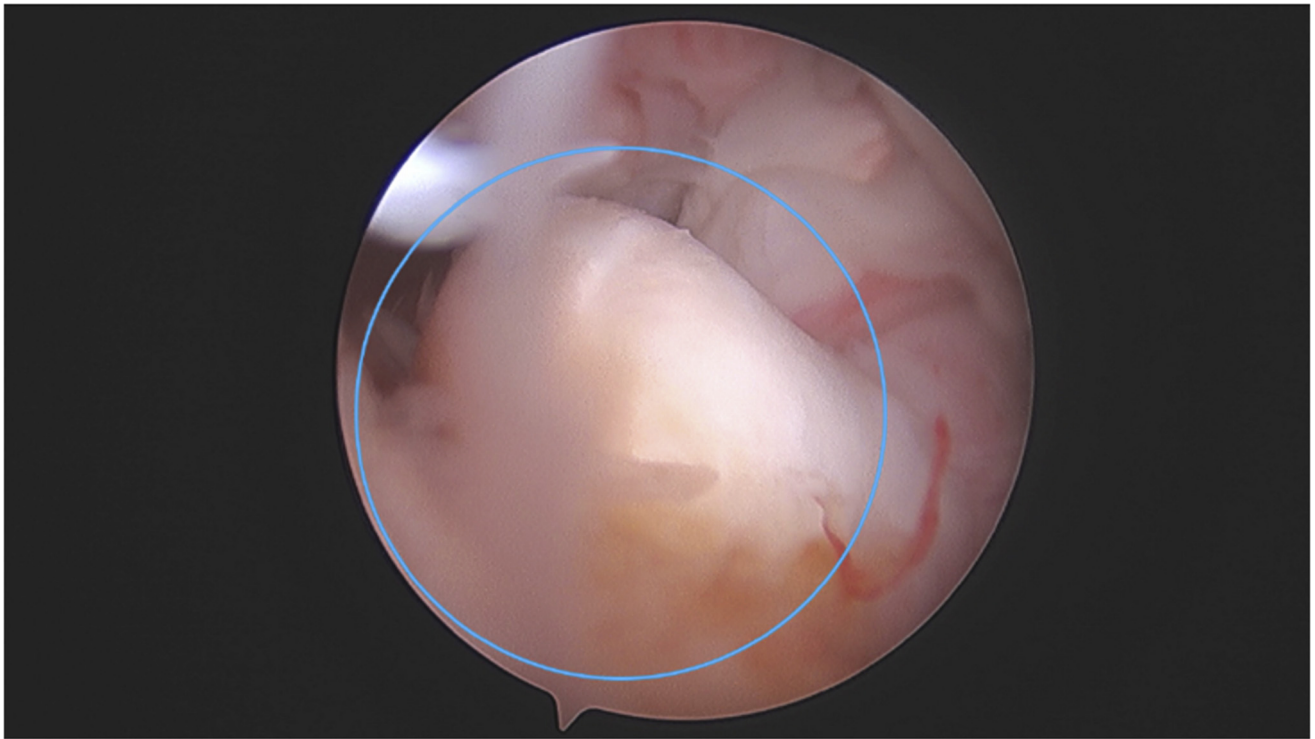
You do not need to start physical therapy before you are seen back in the office, however if you are feeling up to it, you are allowed to schedule your initial evaluation at physical therapy prior to our next appointment together.

If you have any issues, please call [REDACTED] and you can reach either myself or the on-call doctor at all times. Please note, this is a one-way email account and replies to this email account typically are not returned.

Dr. [REDACTED]  
 www.[REDACTED].com  
 Twitter: [REDACTED]  
 Facebook: <http://Facebook.com/profile.php?id=1609762070>

Have a great day and I am confident that you will have a tremendous outcome.

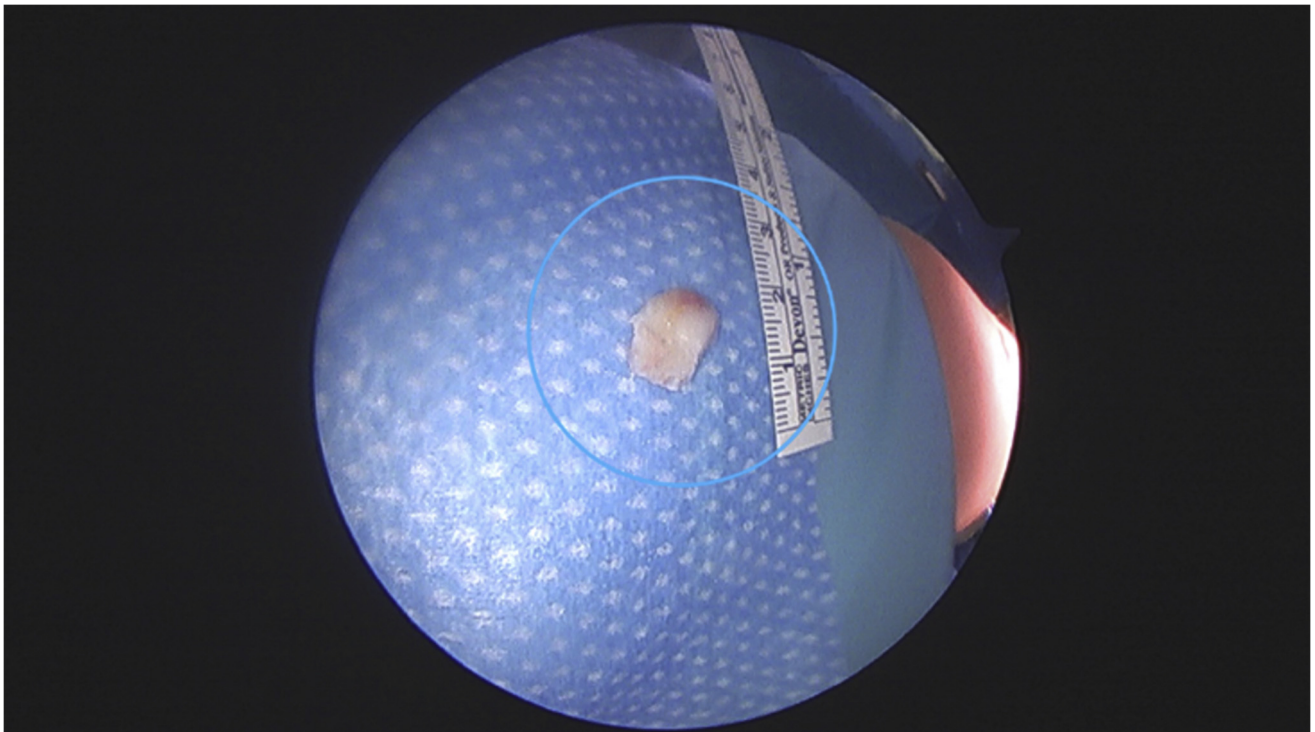
**Fig 1.** Patient-specific discharge instructions after knee arthroscopy. This is an introduction of the e-mail every patient receives after surgery. E-mail introductions include brief overview of dressing care, physical therapy instructions, and a phone number to contact if there are any concerns.



**Fig 2.** Intraoperative, arthroscopic image of intra-articular loose body, within the knee, viewed from the anterolateral portal.

the day of surgery and had their arthroscopic images reviewed at their 1st follow-up appointment. Patients were seen 1 week after surgery and be given a 14-

question survey (Figs 6 and 7) specific to their post-operative course, discharge instructions, and overall satisfaction using a 5-point Likert Scale.



**Fig 3.** Clinical picture of the loose body seen in Fig 2 after removal.



**Dressing:**

1. Please remove bandages post-operative day 2.
  - You do not need to place a new dressing on, however if you would like to place an ACE wrap back on for comfort or to prevent clothes rubbing you may.
2. Please leave the steri-strips (band-aids) on for 2 weeks. They will fall off their own. If they have not fallen off by 2 weeks from surgery you may remove them.
3. You may shower post-operative day 2, however do not apply soap to the incision area or forcefully scrub (let water run over the incision. It is ok to let the steri-strips get wet.) Pay dry your incisions after showering.

**Weightbearing/Crutches:**

1. Your weightbearing status on your operative limb is as tolerated.
2. You should use your crutches for 1-2 days after surgery as needed.

**Analgesia:**

1. You will be provided a pain prescription upon discharge. If you had a nerve block, it is important to take Tylenol 500mg PRIOR to the block wearing off.
  - The narcotic medication is to be used a "rescue" medication if the pain becomes too great
2. You are advised to take a full-strength aspirin 325mg once daily for 2 weeks after your surgery to minimize the risk of blood clots.
3. You may use ice as needed; however never apply ice directly to the skin.

**Fig 4.** These are the actual discharge instructions provided within the e-mail for each patient. This set of discharge instructions is specific patients undergoing meniscectomy and include dressing/wound care, how to bathe oneself, weight-bearing restrictions (if any), and pain management.

Data analyses were performed with JMP Pro, version 16.0.0. SAS Institute, Inc., 1989-2019 (Cary, NC). The purpose of this research was to compare whether an e-mail was an effective medium to disseminate information to patients about their surgery. Data points comparing overall patient satisfaction, ease of understanding instructions, quality of information, and the number of times referenced between e-mail and print cohorts were analyzed using a nonparametric Wilcoxon test.<sup>21</sup> For each comparison, a significance level of  $P < .05$  was set.<sup>22</sup>

**Results**

A total of 60 patients were enrolled in the study. Thirty patients were assigned to the e-mail cohort, and 30 patients were assigned to the print cohort. Three

patients in the e-mail cohort did not complete the survey in its entirety and were excluded from analyses, yielding a final sample size of 27 patients in the e-mail cohort and 30 patients in the print cohort. A total of 24 female and 33 male patients participated with a mean age of 41.26 years (range: 19-72). Further demographic analysis was undertaken for gender and age for e-mail and print cohort and found no significant differences between subgroups (Table 1). Surgically, there were 31 shoulder arthroscopies (15 e-mail, 16 print), 23 knee arthroscopies (11 e-mail, 12 print), 3 hip arthroscopies (1 e-mail, 2 print).

Patients in the e-mail cohort were significantly more satisfied with their surgery than patients in the printed cohort (medians: 5 versus 4, Wilcoxon chi-square = 9.98;  $P = .002$ ). Patients in the e-mail

## Physical Therapy

1. You may begin physical therapy as soon as possible. Your physical therapy referral is attached. It may be used at any facility you choose.

For More information about your surgery and your rehab, please visit:

www. [REDACTED] .com click on "resources"; and select your corresponding surgery.

If you have any issues, please call [REDACTED]

Your follow-up appointment is scheduled for \_\_\_\_.

**Fig 5.** Physical therapy information and referral within the e-mail for each patient. This physical therapy form/referral is specific for patients undergoing meniscectomy.

cohort indicated that their instructions more greatly enhanced their overall understanding of their surgery (medians: 5 versus 3, Wilcoxon chi-square = 10.84;  $P = .001$ ) and were more helpful to their recovery (medians: 5 versus 3, Wilcoxon chi-square = 7.37;  $P = .007$ ). E-mail patients were significantly more likely to recommend similar instructions be sent to a friend undergoing surgery (medians: 5 versus 3, Wilcoxon chi-square = 11.10;  $P < .001$ ) and share their instructions with others (72% [18/25] vs 34.5% [10/29];  $P < .005$ ). There was no significant difference between the e-mail cohort and the print cohort for the number of times patients referred to their instructions (medians: 3 versus 3, Wilcoxon chi-square = 2.41;  $P = .121$ ) (Table 2).

## Discussion

E-mailed discharge instructions were associated with higher rates of patient satisfaction, a better understanding of their procedure, were found to be more helpful in patient recovery, and more likely to be shared with others. Differences in patient satisfaction were not noted on the basis of demographics related to gender, age, and body part undergoing surgical arthroscopy. This further strengthens the notion that patients, regardless of these demographics, felt that the patient-specific e-mail related to their surgical procedure was beneficial.

Patient satisfaction after undergoing surgery is a metric that has been often overlooked by clinicians and medical providers. Historically, clinical success after

**Research Questionnaire: Dr Mc Millan**


Date of Surgery: \_\_\_\_\_

Today's Date: \_\_\_\_\_

Type of Surgery Performed: \_\_\_\_\_

**Patient Satisfaction Study Survey Questions: Email Cohort**

- 1) Did you receive an email after surgery from Dr. Mc Millan?
  - a. Yes
  - b. No (If no, please skip to Q14)
- 2) On what device did you read the email? (Select all that apply)
  - a. Computer/Laptop
  - b. Mobile Phone
  - c. Tablet
  - d. I printed it out to read
  - e. Other
  - f. I did not read the email (if did not read, please skip to Q14)
- 3) How much do you agree the email was easy to understand?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 4) How was the quality of content of the email you received?
  - f. Very Poor
  - g. Poor
  - h. Fair
  - i. Good
  - j. Excellent



- 5) How much do you agree the pictures in the email were clear to see?
  - k. Strongly Disagree
  - l. Disagree
  - m. Undecided
  - n. Agree
  - o. Strongly Agree
- 6) How much do you agree the labels for the pictures were easy to read?
  - p. Strongly Disagree
  - q. Disagree
  - r. Undecided
  - s. Agree
  - t. Strongly Agree
- 7) How much do you agree this email enhanced your overall understanding of your surgery?
  - u. Strongly Disagree
  - v. Disagree
  - w. Undecided
  - x. Agree
  - y. Strongly Agree
- 8) How likely are you to recommend a similar email to be sent to a friend undergoing surgery?
  - a. Definitely
  - b. Very unlikely
  - c. Unlikely
  - d. Indifferent
  - e. Likely
  - f. Very likely
- 9) How much do you agree the instructions were helpful for your recovery?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 10) How many times did you refer to the email?
  - a. Write a number here

- 11) Did you share the email or pictures with anyone?
  - a. Yes
  - b. No (If no, please skip to Q14)
- 12) How did you share the email or pictures? (Select all that apply)
  - a. Email
  - b. Text message
  - c. Social media
  - d. In person
  - e. Other (please specify)
- 13) Why did you share the email or pictures? (Select all that apply)
  - a. I wanted to help others understand the procedure
  - b. It's cool to share surgical images
  - c. It helped my physical therapist to design appropriate rehab plan for me
  - d. Other (please specify)
- 14) How satisfied are you with your surgery experience to date?
  - a. Very dissatisfied
  - b. Dissatisfied
  - c. Indifferent
  - d. Satisfied
  - e. Very satisfied

**Fig 6.** E-mail Cohort Survey.

**Research Questionnaire: Dr Mc Millan**


Date of Surgery: \_\_\_\_\_

Today's Date: \_\_\_\_\_

Type of Surgery Performed: \_\_\_\_\_

**Patient Satisfaction Study Survey Questions – Non-Email Cohort**

- 1) Did you receive your postoperative instructions after surgery?
  - a. Yes
  - b. No (If no, please skip to question 14)
- 2) How much do you agree or disagree that the instructions are easy to understand?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 3) Did your surgeon provide you with pictures of your surgery postoperatively?
  - a. Yes
  - b. No (If no, please skip to question 7)
- 4) If your surgeon provided you with pictures, how much do you agree they were clear to see?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 5) Were the pictures labeled?
  - a. Yes
  - b. No (If no, please skip to question 7)



- 6) If the pictures were labeled were, how much do you agree they were easy to read?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 7) How much do you agree these printed instructions enhanced your overall understanding of your surgery?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 8) How likely are you to recommend similar instructions to be sent to a friend undergoing surgery?
  - a. Very unlikely
  - b. Unlikely
  - c. Indifferent
  - d. Likely
  - e. Very likely
- 9) How much do you agree the instructions were helpful for your recovery?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 10) How many times did you refer to the instructions?
  - a. Write a number here
- 11) Did you share the instructions with anyone?
  - a. Yes
  - b. No (If no, please skip to Q13)
- 12) Why did you share the post-operative instructions? (Select all that apply)
  - a. I wanted to help others understand the procedure
  - b. It's cool to share surgical images
  - c. It helped my physical therapist to design appropriate rehab plan for me
  - d. Other (please specify)
- 13) How much do you agree an email after surgery outlining postoperative instructions and including labeled pictures of your surgery would be more helpful?
  - a. Strongly Disagree
  - b. Disagree
  - c. Undecided
  - d. Agree
  - e. Strongly Agree
- 14) How satisfied are you with your surgery experience to date?
  - a. Very satisfied
  - b. Satisfied
  - c. Indifferent
  - d. Dissatisfied
  - e. Very dissatisfied

**Fig 7.** Non-E-mail Cohort Survey.

surgery has been defined as a lack of complications or by specific clinical parameters; however, more recently, patient satisfaction has been recognized as the most important measure of success.<sup>1</sup> Shirley et al. noted increased consideration for linkage between reimbursement rates and patient outcomes.<sup>23</sup> More specifically, acute care hospitals are required to submit patient satisfaction data to maintain eligibility for full reimbursement from the Centers for Medicare and Medicaid Services (CMS). Additionally, patient satisfaction metrics are also being used by health-care facilities for self-assessment and accreditation requirements.<sup>23</sup>

Prior studies have demonstrated that a clear understanding of home care at discharge, after surgery, is a key factor in patient satisfaction.<sup>9</sup> Mira et al. surveyed nearly 8,000 patients who underwent outpatient surgery and found a strong correlation between quality of home care information at discharge and patient satisfaction. Higher postoperative satisfaction scores have been seen in patients who believed the physician spent adequate time with them.<sup>24-26</sup> Oftentimes, the lingering effects of anesthesia may lead to a patient not recalling the specifics discussed with their physician regarding their procedure. This may, in turn, lead to frustration on the part of the patient and decreased satisfaction with their overall surgical experience. Dissatisfaction with the patient experience has been correlated with decreased postoperative follow-up appointment attendance and decreased adherence to postsurgical treatment regimen.<sup>27-29</sup> Furthermore, low patient satisfaction scores have been associated with higher

rates or complaints against physicians and malpractice lawsuits.<sup>30</sup>

Technological advances with surgical arthroscopy have grown exponentially in the past decade. One of the biggest patient-centric advances is the ability to send customized information pertaining to a patient's surgery directly to the patient after their procedure. Through The Health Insurance Portability and Accountability Act of 1996 (HIPAA) compliant means, surgical images, discharge information, wound care instructions, follow-up appointment information, and even personalized video messages from the surgeon can be sent directly to the patient's e-mail after surgery. Depending on the surgical arthroscopy tower system used, customized templates can be made for the surgeon specific to their patient's surgery and adjusted, as needed. Other information, including rehabilitation protocols, office contact, and social media handles are also able to be provided through this platform. Cumulatively, this personalization can allow

**Table 1.** Patient Demographics

	E-mail Cohort	Print Cohort	P Value
Total Survey Respondents	27	30	.780
Male participants	51.9% (14/27)	63.3% (19/30)	.625
Female participants	48.1% (13/27)	36.7% (11/30)	.625
Average female age	39.0 years	41.4 years	
Average male age	45.6 years	39.5 years	
Shoulder arthroscopies	55.6% (15/27)	53.3% (16/30)	.868
Knee arthroscopies	44.4% (12/27)	36.7% (11/30)	.553
Hip arthroscopies	3.7% (1/27)	6.7% (2/30)	.625

**Table 2.** Median Survey Responses

E-mail Cohort and Print Cohort Survey Questions:	Median ( <i>n</i> )		Chi Square	<i>P</i> Value
	E-mail Cohort	Print Cohort		
How satisfied are you with your surgery experience to date?	5 (26)	4 (30)	9.98	.002
How much do you agree these e-mailed instructions enhanced your overall understanding of your surgery?	5 (26)	3 (30)	10.84	.001
How much do you agree these printed instructions enhanced your overall understanding of your surgery?				
How much do you agree the instructions were helpful to your recovery?	5 (26)	3 (30)	7.37	.007
How likely are you to recommend a similar e-mail be sent to a friend undergoing surgery?	5 (23)	3 (30)	11.10	<.001
How likely are you to recommend similar instructions to be sent to a friend undergoing surgery?				
How many times did you refer to the e-mail?	3 (23)	3 (25)	2.41	.121
How many times did you refer to the instructions?				
% ( <i>n</i> )				
Did you share the e-mail or pictures with anyone (Yes/No)	72% (18/25) Yes	34.5% (10/29) Yes	7.78	.005
Did you share the instructions with anyone (Yes/No)				

for additional points of contact and deeper connection between the surgeon and the patient during the surgical experience.

With nearly 2 million surgical arthroscopies performed annually, it is important patients understand their procedure and what they should expect postoperatively to maximize patient satisfaction.<sup>31</sup> The study findings support our hypothesis that e-mailed discharge instructions improve patient satisfaction after surgical arthroscopy. Customized e-mails sent at the time of discharge containing instructions, pertinent surgical images, and links to helpful recovery tools can help provide patients a succinct and easily accessible method to reference after-care information. Enhancing the patient experience may have numerous intrinsic and extrinsic benefits to both the patient and the physician.

### Limitations

This study is not without limitations. The overall sample size is relatively low, with only 60 patients participating in the study. The survey was made by the authors and not based on a prior validated survey. There was a different question in the printed cohort survey that was not matched with a question in the e-mail cohort survey, possibly introducing a bias of feeling left out by the printed cohort group. Patient responses were self-recorded with surveys at first postop follow-up, which can introduce recall bias.

### Conclusion

Patient-specific e-mailed discharge instructions improve patient satisfaction and overall understanding of their procedure after surgical arthroscopy compared to traditional printed discharge instructions.

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