



# Virtual Preoperative Education for Total Joint Replacement: Equivalent Outcomes & Lower Costs

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Comparison of Traditional vs. Virtual Preoperative Education in Functional Outcomes, Satisfaction, and Cost Among Total Joint Replacement (TJR) Patients

# Contents

Introduction

Method

Results

Conclusion

Appendix

About Force Therapeutics

# Introduction

The linear growth in the annual volume of total joint replacement (TJR) in the United States is expected to continue. Predicted annual volumes for total hip replacement (THR) by 2025 and 2030 are 692,000 and 850,000. Similarly, for total knee replacement (TKR), predicted annual volume for 2025 and 2030 are 1,272,000 and 1,921,000, respectively<sup>1</sup>.

To meet this expected increased demand, the Center for Medicare and Medicaid Services (CMS) and the Institute for Healthcare Improvement (IHI) implemented alternative payment models, with the intent to improve outcomes while lowering the per capita cost for TJR procedures<sup>2</sup>. Recent literature demonstrates that lower costs and higher quality of care could be correlated. For instance, a number of studies have shown that discharging patients directly home leads to lower rates of readmission<sup>3,4</sup>. Many of these studies identify preoperative patient education as a crucial element of the TJR clinical pathway and suggest that preoperative education should be done in conjunction with all other interventions<sup>5,6</sup>.

Force Therapeutics has taken the concept of preoperative patient education a step further and begun to offer it in a virtual setting. The ultimate goal of virtual preoperative education is to 1) provide patients with key information specific to their procedure, regardless of their geographic location and 2) give valuable hours back to FTEs – e.g. case navigators, nurses, nutritionists, physical therapists, social workers, etc.

In this paper, we aim to 1) establish that Force's virtual preoperative education class for joint replacement delivers equivalent outcomes (both in terms of functional outcomes and patient satisfaction) against a traditional in-person class and 2) highlight potential cost savings from switching from in-person to virtual preoperative education by looking at one of Force's client hospital systems as an example.

# Method

## Patient Population

Patients who answered Force Therapeutics' "Joint Class Questionnaire" between October 2019 and February 2020 were included. This survey was given to patients at 1-week post-op (POD 7) and used to determine which version of preoperative education class they participated in (in-person vs. virtual). Of 187 total patients, 98 reported attending an in-person preoperative class while the remaining 89 reported completing the virtual class.

## Data Collection

A self-administered Knee and Hip Injury and Osteoarthritis Outcome Score for Knee and Hip Replacement (KOOS Jr, HOOS Jr) were used to assess patients' level of pain and function before (day of surgery or earlier) and after surgery (between POD 64 and 104).

## Data Analysis

T-test analysis was used to see potential differences of means (patients who attended in-person vs. virtual class) All statistical analyses were performed using SAS University Edition (Cary, NC) and  $P < 0.05$  was deemed statistically significant.

## Cost Modeling

Interviews were conducted with one of Force's clients to provide a rundown of how their in-person preoperative education classes are set up, and how many FTE hours are being spent per week per role. Nurses (RN), Physical Therapists (PT), and Physicians (MD) were analyzed.

$$(RN \text{ hours}) * (RN \text{ hourly rate}) + (PT \text{ hours}) * (PT \text{ hourly rate}) + (MD \text{ hours}) * (MD \text{ hourly rate}) = \text{Total cost per week}$$

Using the national average salaries, a cost estimate of running an in-person joint class was calculated<sup>7,8,9</sup>.

# Results

## Virtual Education Provides Equivalent Outcomes

No statistically significant difference was found in patient satisfaction (12 weeks post-op) between the two groups of in-person and virtual education class (Table 1). Similarly, there was no statistically significant difference in functional outcomes based on KOOS Jr and HOOS Jr outcomes measurements (Table 2 and 3). These results indicate that Force's virtual preoperative education classes for joint replacement offer equivalent outcomes, in terms of both functional outcomes and patient satisfaction, when compared traditional in-person joint classes.

## Virtual Education Leads to Reduced Cost

The model described earlier roughly equates to what hospitals could save by switching to a virtual preoperative education class for joint replacement. Understanding every hospital has different preoperative class structures, cost saving estimates will vary. In the example used for this analysis, 7.5 FTE hours per week were spent on in-person preoperative education class (Table 4). Potential cost savings seen by implementing Force's virtual preoperative class equated to \$376.48 per week or \$18,071.04 annually.

# Conclusion

The findings support the idea that virtual preoperative education for TJR offers equivalent outcomes at lower costs. While there are some reports in favor of in-person education, their claims are based on the assumption that in-person educators are necessary to ensure that patients fully comprehend and retain the content being delivered<sup>10</sup>. However, evidence is beginning to show that comprehension can be replicated, and in some cases improved online. A recent study showed that 51% of patients fail to recall the information their providers give them during their in-person visits<sup>11</sup>. Force delivers key information aimed at effective comprehension and retention by utilizing video design best-practices (e.g. minimizing cognitive load, leveraging conversational presenters, driving consistency, etc.) and segmenting the education for adult learners. For instance, Force offers professionally produced videos with synchronized animations (Figure 2). The virtual class feature includes progressive knowledge checks (Figure 3) that measure patient comprehension and progress by having patients recall key learning goals and takeaways from each module. In conclusion, virtual preoperative education is an ideal solution that benefits: 1) Patients by offering equivalent outcomes at greater convenience, providers, 2) Providers by giving time back to focus on higher risk patients and situations in their respective practice, and 3) Administrators by representing an opportunity for cost savings and operational efficiency.

# Appendix

## Figures and Tables:

Table 1: 12-Week Procedure Satisfaction (Scale: 0-5)

	N	Mean Score	95% Confidence Interval		Std Dev	P Value
In-person	35	4.71	4.54	4.89	0.52	0.67
Virtual	28	4.64	4.34	4.95	0.78	

Table 2: Pre-op (Baseline) KOOS Jr and HOOS Jr

	N	Mean Score	95% Confidence Interval		Std Dev	P Value
In-person	94	54.40	51.93	56.86	12.03	0.78
Virtual	87	54.92	52.05	57.79	13.46	

Table 3: 12-Week KOOS Jr and HOOS Jr

	N	Mean Score	95% Confidence Interval		Std Dev	P Value
In-person	53	78.17	74.66	81.68	12.73	0.92
Virtual	53	78.43	74.51	82.34	14.20	

Table 4: Example Hospital Time and Dollars Spent on In-Person Preoperative Education

Role	Average Time Spent	Average Salary
RN	5 hours	\$36.36 per hour
PT	2 hours	\$41.59 per hour
MD	0.5 hours	\$223.00 per hour

$5*(36.36) + 2*(41.59) + 0.5*(223) = \$376.48$  per week or  $\$18,071.04$  annually

Figure 1

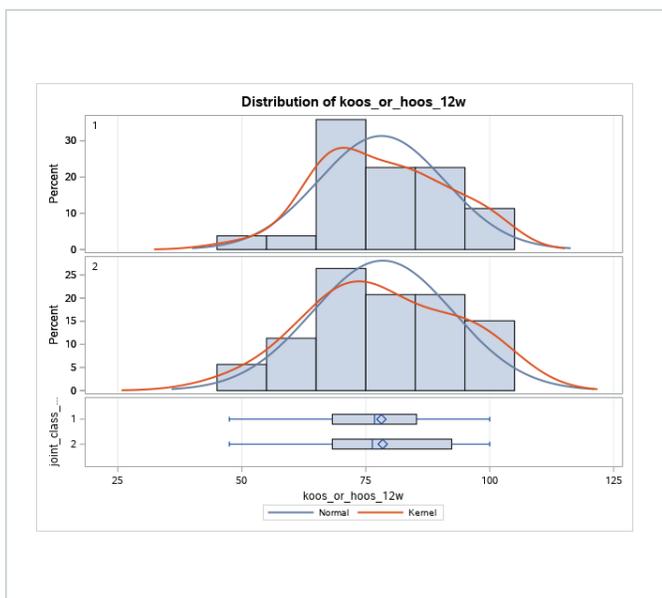


Figure 2

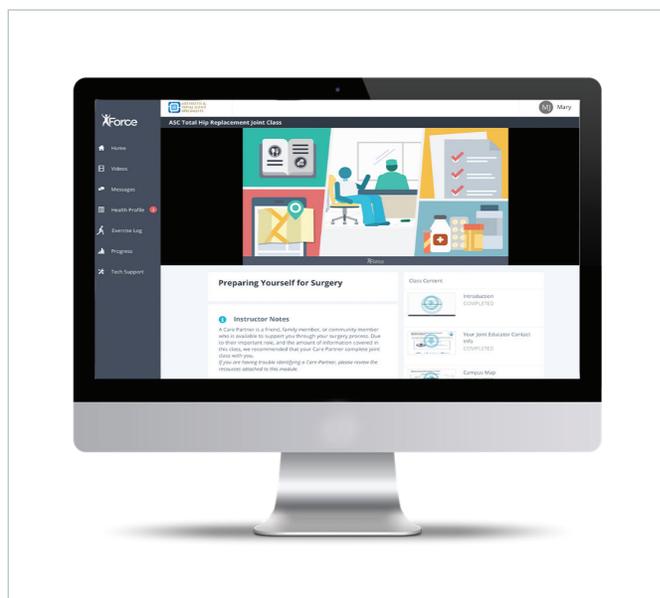
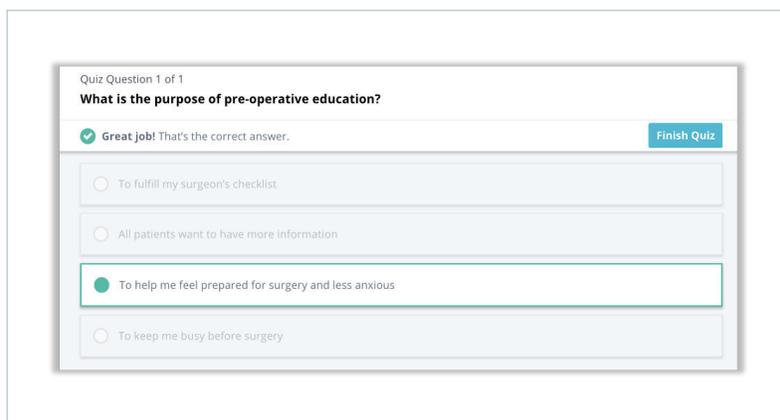


Figure 3



# About Force

Force Therapeutics is a powerful, episode-based digital care platform and research network designed to help clinicians intelligently extend their reach. Our platform leverages video and digital connections to directly engage patients at every step of the care journey – from the point of surgery scheduling, to post-op recovery and beyond. Backed by the insights of more than 60 leading healthcare centers across the country, Force is proven to drive more effective recovery, lower costs, and achieve better patient outcomes.

## References

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