



Postoperative Pain Scores, Opioid Consumption, and Mobility: Zynrelief Compared with Bupivacaine

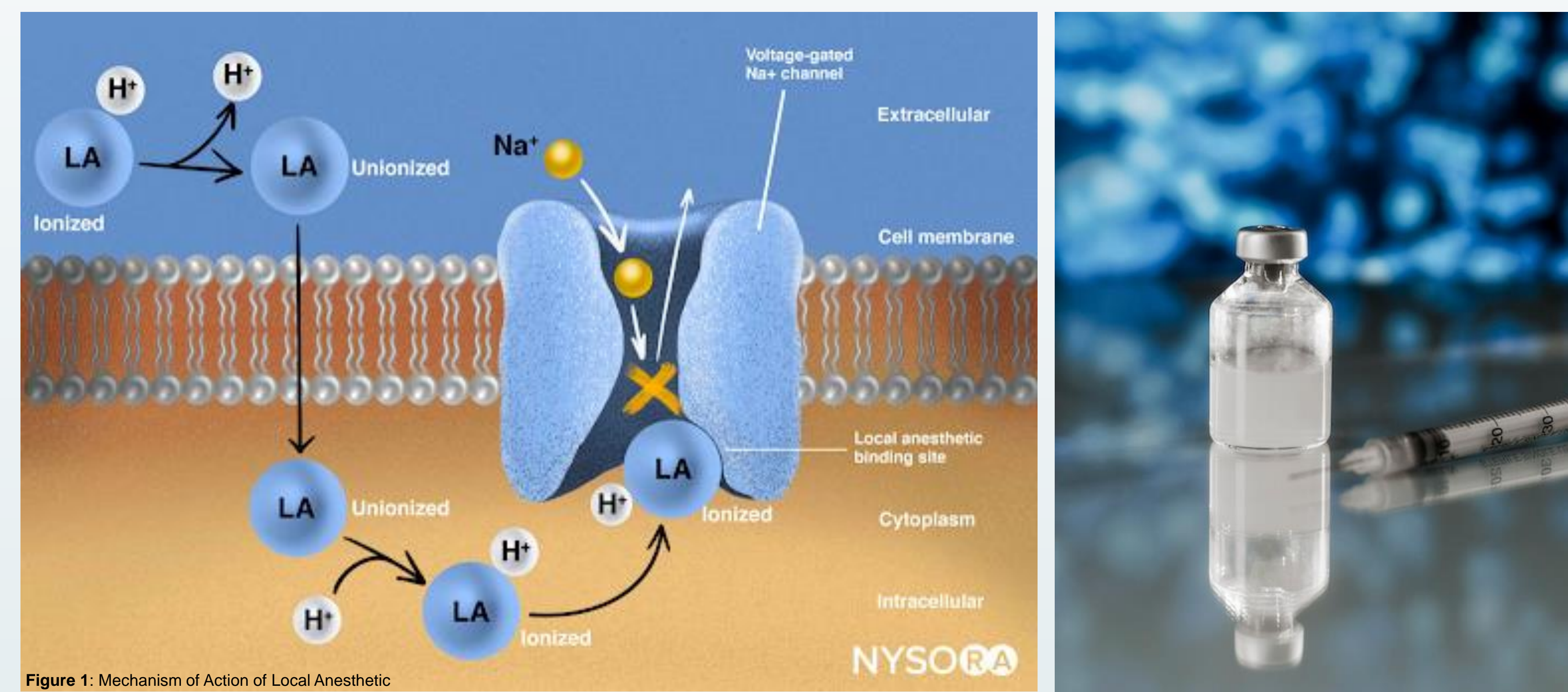
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Background:

- The immediate postoperative period following joint replacement can contain moderate to severe pain that is difficult to manage.
- Traditionally, pain has been managed with the use of opioids, which come with a variety of adverse effects for patients.
- Zynrelief** is a relatively new analgesic option. It is a **combination drug containing bupivacaine HCl and meloxicam** formulated in an **extended-release polymer** that is instilled in the surgical site, allowing for **slow release and absorption over a 72-hour period**.
- Zynrelief is more expensive than traditional bupivacaine, but may provide superior pain relief, decrease postoperative opioid use, and increase patient mobility.



Purpose:

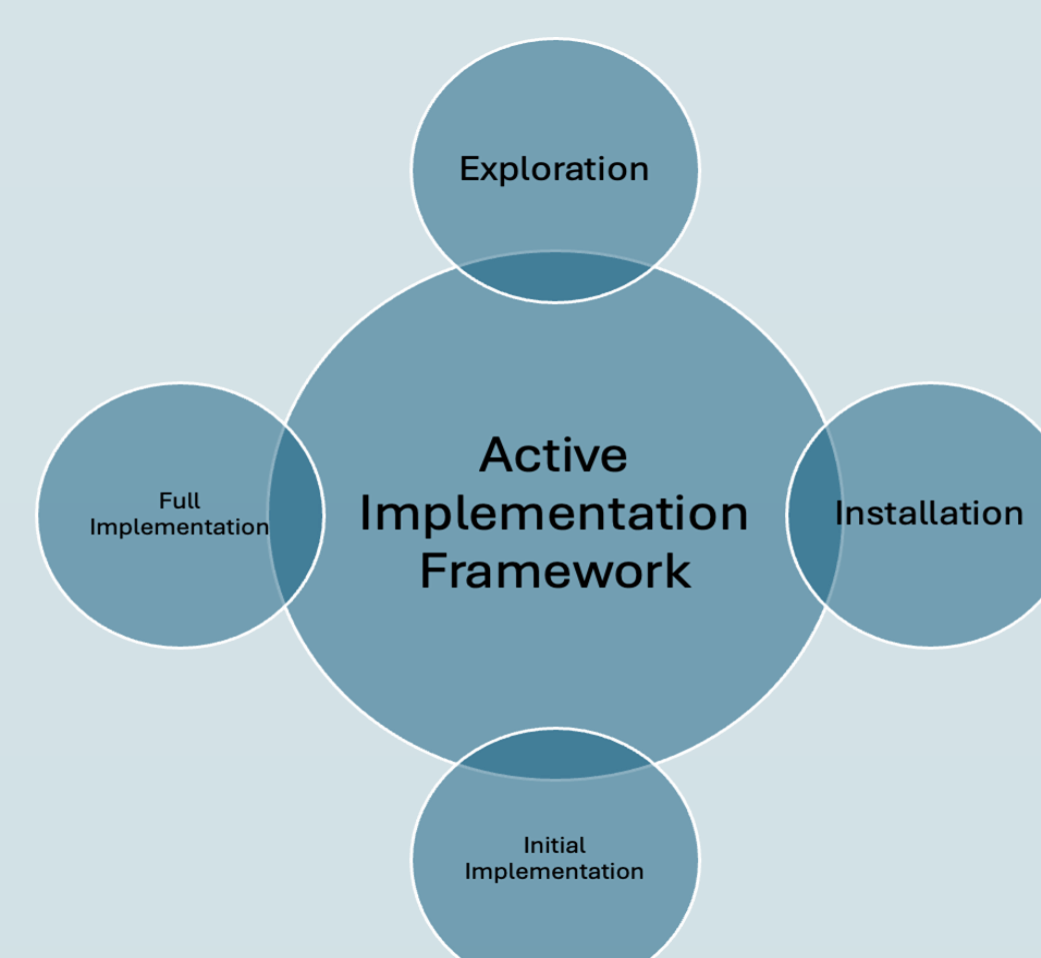
The purpose of this project is to **investigate the relationship between Zynrelief and postoperative pain scores, opioid use, and mobility** for patients undergoing total knee replacement surgeries at a small community hospital.

Methodology:

- Retrospective observational cohort study
- Chart review of patients between August 2020 and September 2022 who underwent **total knee arthroplasty** at a small community hospital and received either intraarticular bupivacaine or Zynrelief intraoperatively
- Outcomes observed included: pain scores at three timepoints, opioid consumption in morphine equivalents, and mobility data including degrees of flexion and extension.
- A power analysis indicated that a sample size of 64 subjects per group (total of 128) would be sufficient for an alpha level of 5%

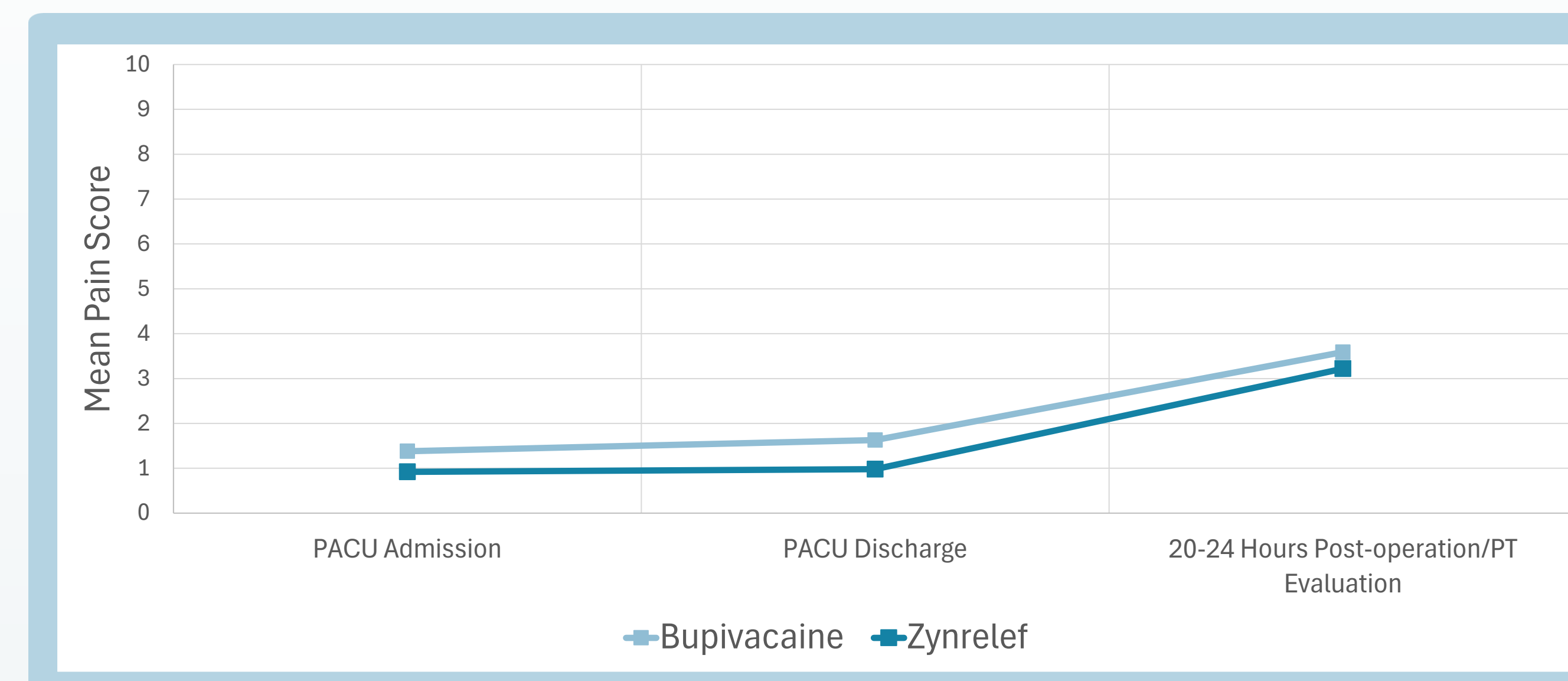
Theory:

The Active Implementation Framework is a conceptual framework that consists of four stages: Exploration and Planning, Installation, Initial Implementation, and Full Implementation. This project is part of the Initial Implementation phase, as it evaluates outcomes, concerns, and challenges regarding the use of Zynrelief in total knee replacement patients.



Results:

Pain Scores



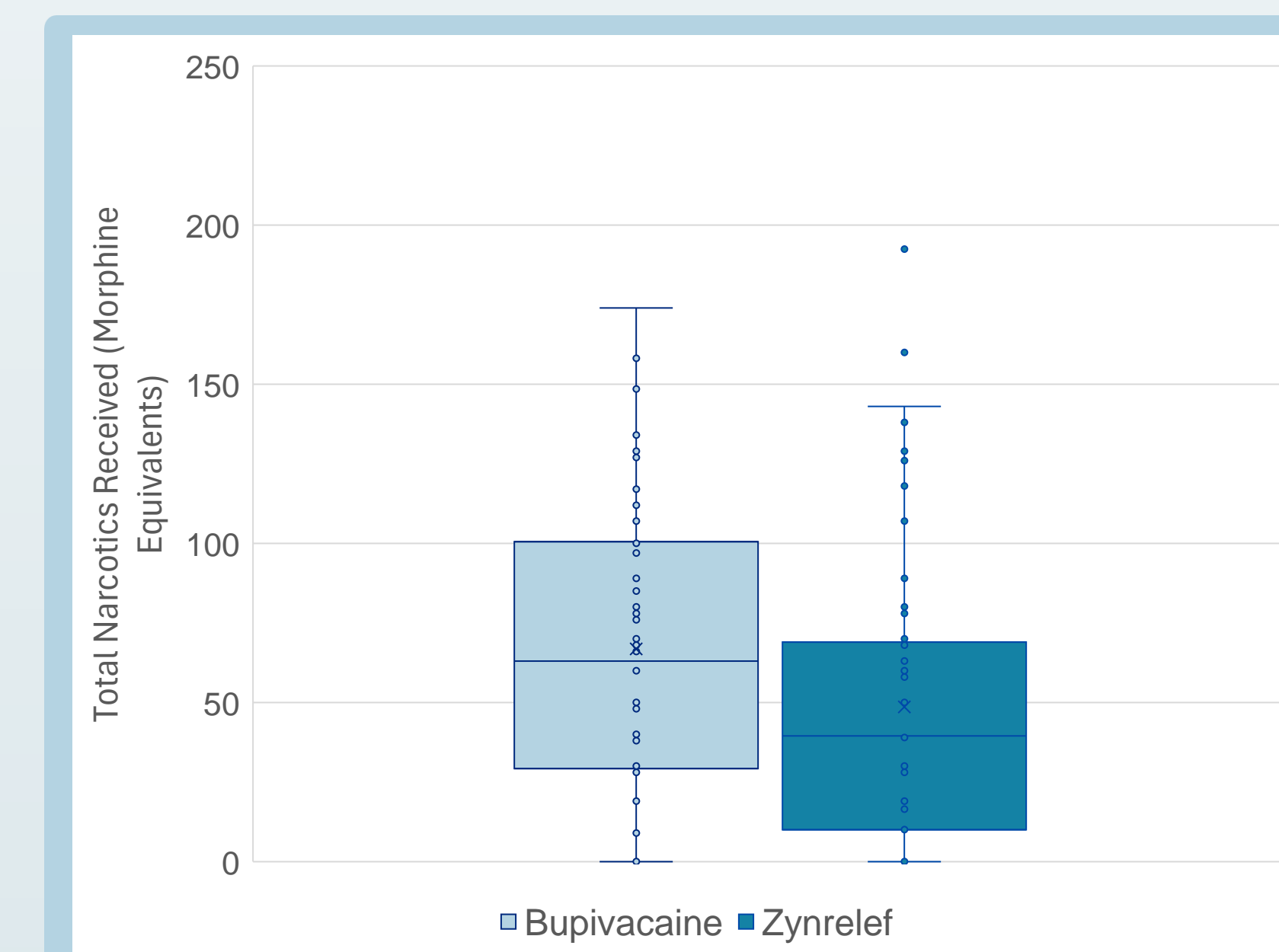
	Mean Pain Score on PACU Admission	Mean Pain Score on PACU Discharge	Mean Pain Score 20-24 Hours Post-Op/PT evaluation
Bupivacaine (n=64)	1.38	1.63	3.59
Zynrelief (n=64)	0.92	0.98	3.22

F Test: $p=0.1186$

There is **no significant difference in average pain scores** between patients who received Bupivacaine and patients who received Zynrelief at all three time points.

Amount of Narcotics Received 36 hours Post-Operatively

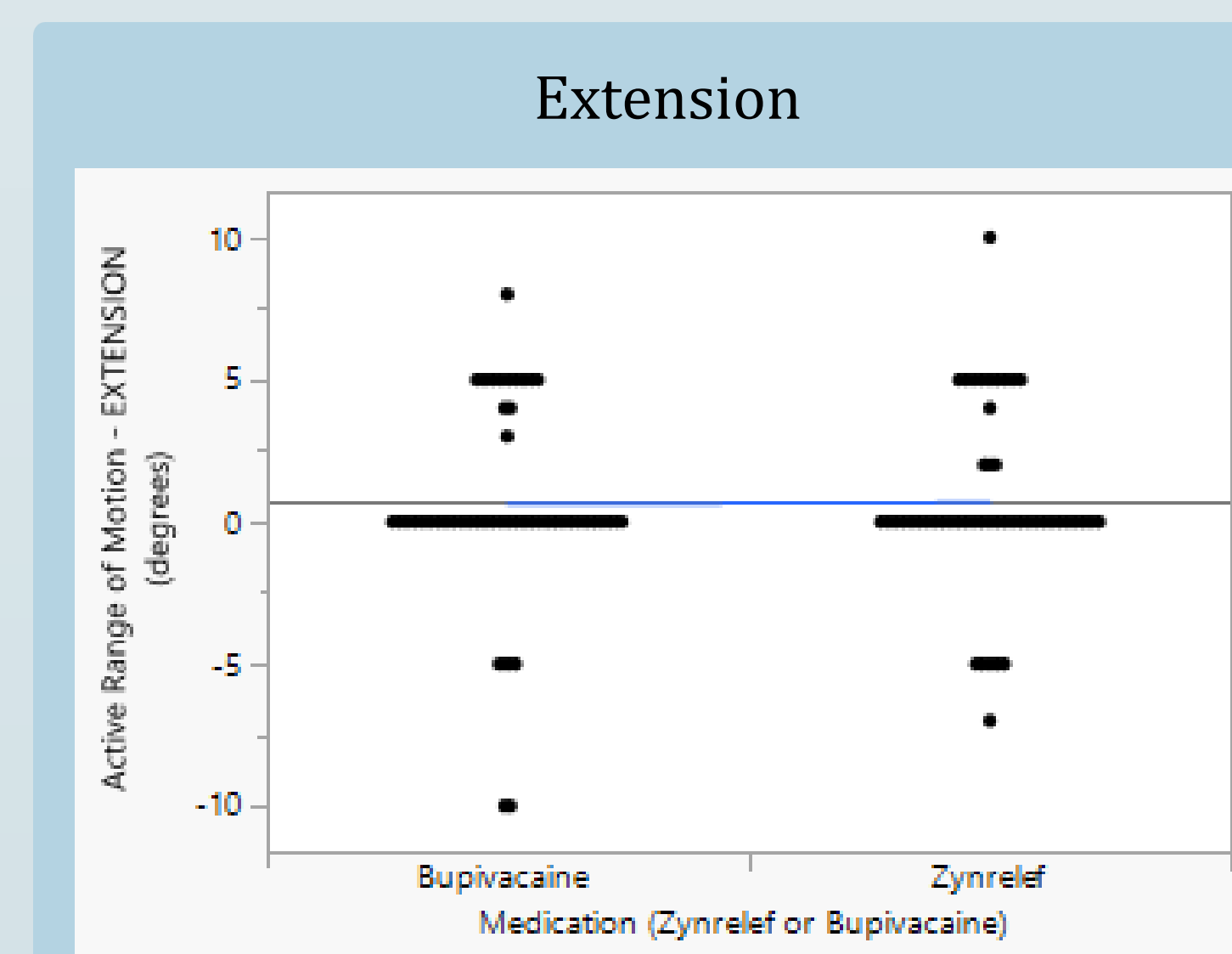
	Mean Morphine Equivalents
Bupivacaine (n=64)	66.8
Zynrelief (n=64)	48.6



T Test: $p=0.0238$

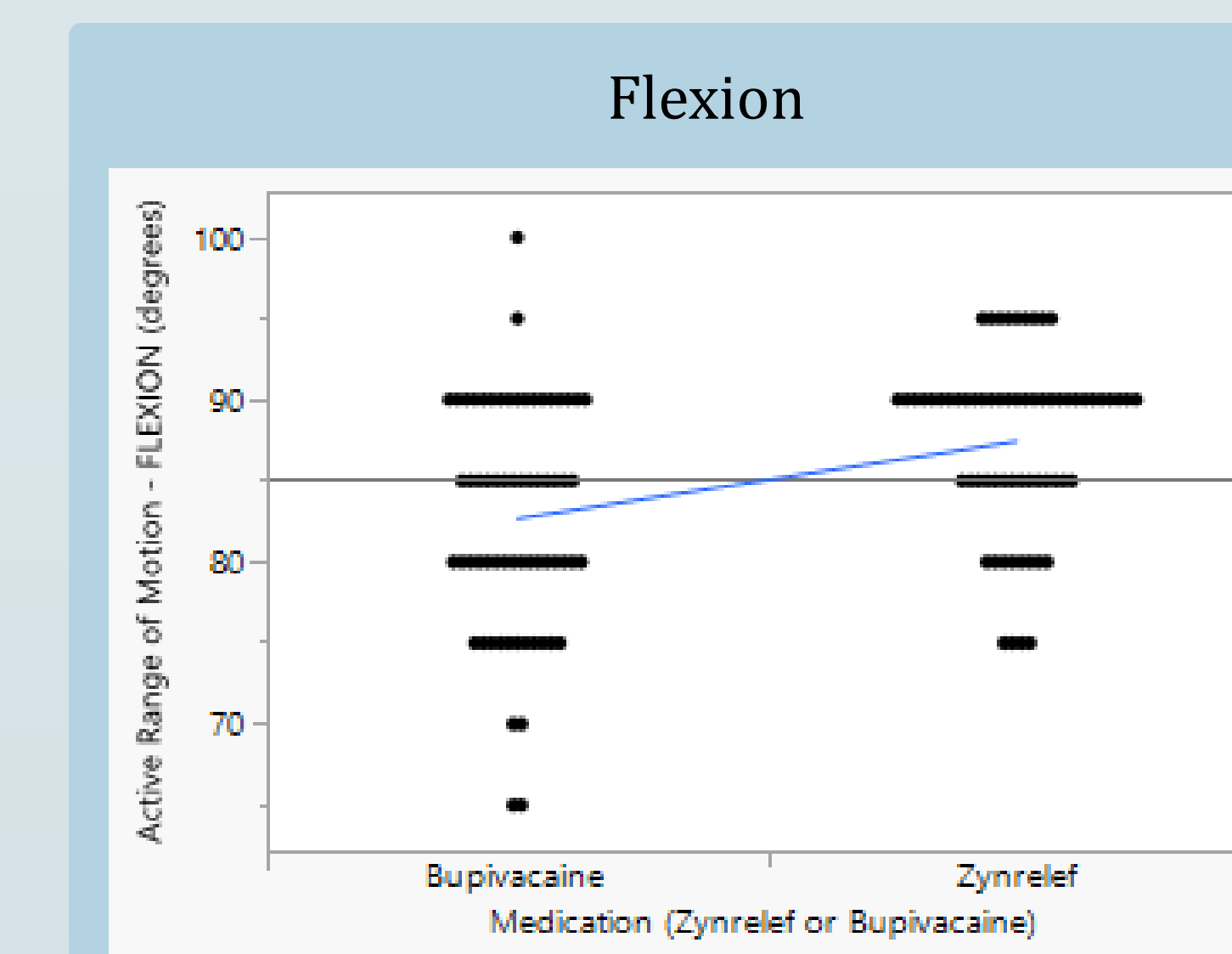
Patients who received Zynrelief had a **statistically significant decrease in opioid consumption** in the 36-hour post-op period compared to patients who received Bupivacaine.

Range of Motion



$p=0.9595$

There was **no statistically significant difference** in average extension between the two groups



$p<0.0001$

On average, **patients who received Zynrelief achieved 4.8 degrees more flexion** than patients who received Bupivacaine

Demographics

There were **no statistically significant differences between the control and exposure groups** based on gender ($p=0.7097$), ASA score ($p=0.1802$), BMI ($p=0.6924$), or age ($p=0.6425$)

Discussion:

Mean pain scores by time points

There was **no significant reduction in mean pain scores** at any of the three time points collected.

- The consistently low PACU admission pain scores among both groups can likely be attributed to the use of regional nerve blocks.

Change in Pain Over Time

There may still be a clinically relevant reduction in pain for Zynrelief recipients.

- Fewer Zynrelief patients (57.8%) experienced an increase in pain scores between PACU admission and 24-hours post-operation** compared to the control group (64.1%).

Opioid Consumption

There was a **significant reduction in postoperative opioid consumption** in the 36-hour period post-operation for the exposure group.

- This is true despite 2 outliers for the Zynrelief group which likely skewed the mean upwards.
- More Zynrelief patients (15.6%) remained opioid free in the 36-hour postoperative period** than bupivacaine patients (4.7%)

Mobility

There was **no significant change in degrees of extension achieved in active range of motion** between the groups.

There was a **statistically significant increase in degrees of flexion achieved in active range of motion in the exposure group (87.4°)** compared to the control group (82.7°).

Strengths and Limitations:

Strengths:

- Strict inclusion and exclusion criteria
- Statistically similar control vs. exposure groups
- Standardized unit for narcotics
- Consistency in data collection
- Statistical significance of secondary outcomes

Limitations:

- Post-hoc power analysis suggests a much larger sample size would be needed to achieve adequate power related to pain scores.
- Limited generalizability due to specific procedure and single hospital study design
- Variation in length of stay among patients
- Does not account for full 72-hour postoperative time period
- Inconsistencies in charting: missing data, erroneous documentation, conflicting documentation
- Did not consider proximity of analgesic administration to documented pain score

Future Studies:

Future studies are needed to explore and evaluate postoperative pain scores, opioid consumption, and mobility for patients **at and beyond the 72-hour mark**. Analyzing **patient satisfaction** with pain control after surgery with the use of Zynrelief may also be relevant.

References:

