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Peripheral nerve blocks and postoperative physical therapy: a single-institution survey of physical therapists' preferences and opinions*

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Abstract

Background and Aims: Our aim was to ascertain the opinions and preferences of physical therapists with regard to use of peripheral nerve blocks and their impact on the recovery of patients undergoing total joint replacement.

Methods: We conducted an anonymous 24-question survey of 20 full-time inpatient physical therapists at a single tertiary care medical center.

Results: One respondent indicated they never work with patients who have undergone total joint replacement surgery. Nineteen questionnaires were included in the final analysis. Questions omitted by respondents or with write-in answers were not included in the analysis. A majority of respondents (15 [78.9%]) agreed nerve blocks somewhat to greatly improve a patient's pain after total joint replacement surgery. Most respondents answered that nerve blocks somewhat to greatly impede a patient's ability to participate in physical therapy (14 [73.6%]) and make therapy somewhat to very difficult for them as physical therapists (16 [84.2%]). When asked about specific surgeries, (17/18 [94.4%]) and (14/18 [77.8%]) of respondents would prefer that their patients receive periarticular infiltration or no block at all after total knee arthroplasty or total hip arthroplasty, respectively. All respondents (19 [100%]) answered that they thought lower extremity nerve blocks increased a patient's risk of falling after surgery.

Conclusions: According to the physical therapists we surveyed, nerve blocks impede patient recovery and increase the risk of falls, despite their positive impact on pain control. When considering surgery for themselves, therapists indicated they would not want a nerve block.

Keywords: peripheral nerve blocks; physical therapy; postoperative analgesia; postoperative recovery; total joint replacement

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Introduction

Early physical therapy (PT) is important to improve functional recovery following total joint replacement (TJR) surgery [1-8]. Adequate analgesia is essential for patients to participate in PT after TJR. Regional anesthesia in the form of a peripheral nerve block (PNB) can provide substantial pain control after TJR while also limiting the use of opioid medications [9]. However, PNB has the potential to produce muscle weakness, theoretically hindering PT after surgery [10]. These perceived shortcomings of regional anesthesia have led some providers to prefer periarticular infiltration of local anesthetic to improve analgesia while avoiding potential muscle weakness associated with PNB [11]. While there is no standard analgesic method for TJR patients, some providers have developed preferences for one method over another. Physical therapists spend a great deal of 1-on-1 time interacting with

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TJR patients postoperatively. Also, PT metrics are part of many protocols for enhanced recovery after surgery. To this end, we conducted a survey of our institution's physical therapists to ascertain their opinions on pain control modalities based on their experience working with patients who have undergone TJR. In addition, we asked the physical therapists what form of regional anesthesia they would prefer if they were to undergo a TJR surgery.

The perioperative plan for patients undergoing total knee arthroplasty (TKA) and total hip arthroplasty (THA) at our institution has changed over time. Prior to 2012, patients undergoing TKA, barring contraindications, received a spinal anesthetic with continuous femoral and sciatic (intermittent catheter bolus dosing) blocks for postoperative analgesia. In 2012, anesthesiologists began combining spinal anesthetics with continuous adductor canal and sciatic (intermittent catheter bolus dosing) blocks. As of 2014, patients undergoing TKA receive spinal anesthetics and periarticular infiltration by the surgeon for postoperative analgesia. Patients who underwent THA received spinal anesthetics combined with continuous lumbar plexus block with or without a single injection sciatic nerve block for postoperative analgesia. Total shoulder arthroplasty patients received general anesthetics combined with continuous interscalene brachial plexus block for postoperative analgesia.

Methods

This study was deemed exempt by the Mayo Clinic Institutional Review Board. An anonymous, multiple-choice, Likert-type scaled questionnaire (Appendix 1) was distributed to every full-time inpatient physical therapist at Mayo Clinic in Jacksonville, Florida. Once completed, the questionnaires were collected and answers tabulated.

Statistical Analysis

The nonparametric ordinal-type data set was analyzed by identifying associations between each question. Likert-type scaled survey questions were explored by constructed exact binomial 95% confidence intervals, a validated method for analyzing this type of data [12]. All analyses were performed using SAS version 9.3 software (Cary, NC, USA: SAS Institute Inc.).

Results

Twenty full-time inpatient physical therapists at our institution received questionnaires, and all 20 questionnaires were returned (100% response rate). One respondent indicated they never work with patients who have undergone TJR surgery, so 19 questionnaires were included in the final analysis. Questions that were omitted by respondents or had a write in answer were also not included in the analysis.

While most respondents (15 [78.9%]) agreed that PNB somewhat to greatly improve a patient's pain after TJR surgery, most also answered that nerve blocks somewhat to greatly impede a patient's ability to participate in PT and make PT somewhat to very difficult for the physical therapist (14 [73.6%] and 16 [84.2%], respectively). When asked about specific surgeries, only 1/18 (5.6%) respondents answered that they would prefer their patients receive a nerve block after TKA, while only 4/18 (22.2%) felt the same about patients after THA. Responses were nearly identical when physical therapists specified which postoperative analgesia they would prefer if they themselves had TKA or THA surgery (0 [0%] and 3/18 [16.7%], respectively) (Table 1). All respondents (19 [100%]) thought lower extremity nerve blocks increased a patient's risk of falling after surgery. A visual representation of survey responses is provided in Figure 1. The proportion of physical therapists who preferred PNB over other analgesic options for postoperative pain is summarized in Table 1.

Discussion

To our knowledge, this is the first publication of opinions and preferences of physical therapists with

Table 1. Proportion of physical therapists who preferred nerve block over other* methods

Situation	Fraction (%)**	95% Confidence Interval**
When they are treating patients:		
Total knee arthroplasty	1/18 (5.6)	0.1%-27.3%
Total hip arthroplasty	4/18 (22.2)	6.4%-47.6%
If they were having surgery:		
Knee replacement surgery	0/19 (0.0)	0.0%-17.7%
Hip replacement surgery	3/18 (16.7)	3.6%-41.4%
Shoulder replacement surgery	10/19 (52.6)	28.9%-75.6%

* Other methods included periarticular infiltration or opioid-based analgesia
** Fraction (percent) of respondents and exact binomial 95% confidence intervals are given

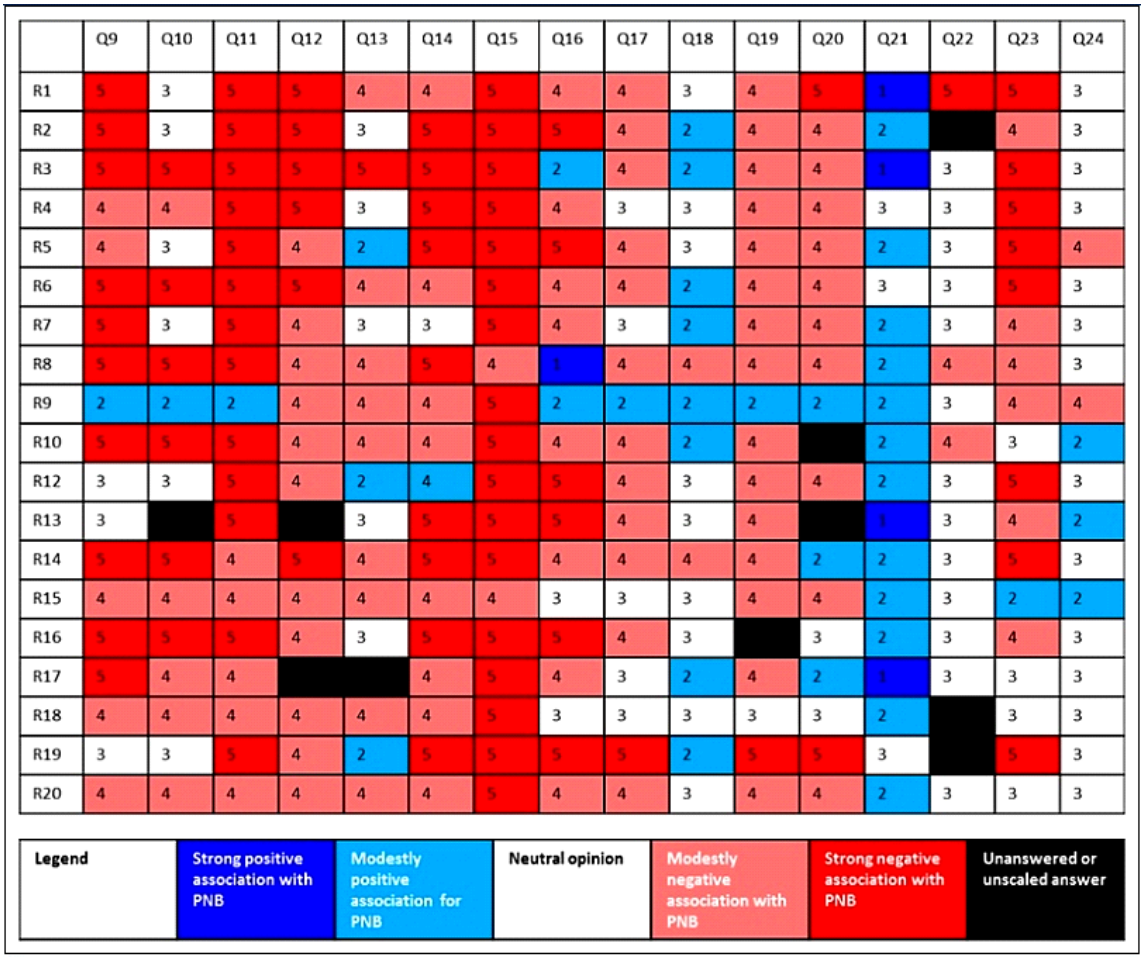

Fig. 1. Color Coded 'Info-Graphic" of Scalded Likert-type Questions. Respondent 11 indicated that they had never treated patients after total joint surgery and did not complete the survey. PNB indicates peripheral nerve block; Q, question; R, respondent

regard to use of regional anesthesia after TJR surgery. Based on our results, physical therapists at our institution believe nerve blocks impede patient recovery and increase the risk of falls, independent of their beneficial effects on analgesia. When considering surgery for themselves, the majority of physical therapists indicated they would not want a nerve block. This is a curious finding in the face of evidence that PNBs provide excellent analgesia, facilitate PT, and improve recovery, while not increasing the risk of falls [9, 13-17]. For example, Hebl et al. [17] reported that lower extremity TJR patients who had PNB experienced a shorter hospital length of stay and a reduction in urinary retention and ileus.

The risk of falling associated with PNB is a controversial topic. In a 2013 systematic review and meta-analysis, Johnson et al. [18] found an increased risk of postoperative falls in patients undergoing lower extremity orthopedic surgery receiving continuous lumbar plexus block compared to those not receiving block or only receiving a single-injection nerve block. However, their study had several limitations. First, the frequency of falls in orthopedic patients undergoing continuous PNB was similar to another observed group of surgical patients not receiving nerve blocks. Second, a letter to the editor included in their analysis did not evaluate fall frequency as an end point. Lastly, they did not normalize the data for pre-, peri-, and postoperative factors that might have influenced the risk of fall (e.g., advanced age, comorbid status, ambulation without supervision).

Ilfeld et al. [19] analyzed pooled data from 3 previously published, randomized, triple-blinded, placebo-controlled studies of continuous femoral nerve block after TKA and THA, finding a causal relationship between continuous femoral nerve block and the risk of fall. Again, there were significant limitations to their findings. Of the 6 patients reported to have fallen, 3 did so while ambulating unsupervised, and 1 fell while walking a dog 4 days after TKA. The authors stated the falls occurred in the absence of any muscle weakness. This is perhaps the most important finding in the paper because the argument against the use of regional anesthesia in relation to fall risk is that a nerve block

produces excessive muscle weakness responsible for gait instability [19].

A recent publication by Memtsoudis et al. [14] retrospectively analyzed data from more than 191,000 patients who underwent TKA. Patients who had falls tended to be older with more comorbidities and were associated with more major complications. Use of neuraxial anesthesia had lower adjusted odds of fall compared with the use of general anesthesia alone, and the use of a PNB was not significantly associated with falls. The authors concluded that no association was found between PNB and inpatient falls [14].

The morbidity, mortality, and economic impact associated with chronic opioid use, both prescription and nonprescription, in the United States has reached epidemic proportions in recent years. Surgery is a well-documented risk factor for development of chronic opioid dependence [20-22], especially in TKA and THA patients [23]. Providers are obligated to make a strong and concerted effort to use alternative and adjunctive methods to control postoperative pain whenever possible. Regional anesthesia techniques have long been shown to reduce the amount of opioids patients would otherwise require to control perioperatively pain [24-26]. This has been used as an argument to perform nerve blocks in TJR patients. However, newly published data has called into question this previously held axiom that performance of PNB reduces chronic opioid use after surgery. Sun et al. [27] retrospectively analyzed health care utilization data from more than 120,000 TKA patients over a 10-year period, concluding that, although the use of PNB for TKA may improve short-term outcomes, PNBs do not appear to decrease the risk of persistent opioid use. Notwithstanding, adverse events from opioid-based analgesia, such as severe nausea and vomiting, postoperative ileus, respiratory depression, and delirium, can negatively impact patient satisfaction, hospital length of stay, and morbidity [28].

In our study, we discovered that some physical therapists' preferences appeared to come from perceived benefits of periarticular infiltration over PNBs. For example, with regard to [Q14] (Appendix 2), 95% of our physical therapists think periarticular infiltration is somewhat or greatly superior to nerve block for THA. No patients at our institution received periarticular infiltration for THA during this time period, so there does not appear to be an experiential basis for this overwhelming perception.

We suspect the basis for the survey data we collected is a presumed muscle weakness following PNB in patients who require PT. What is missing here is a blinded comparison of patients undergoing general surgery with no PNBs or patients undergoing lower extremity surgery without PNBs or even with sham blocks. We do not have these data to present. However, it appears a majority of physical therapists at our institution believe nerve blocks impede patient recovery and increase risk of falls without providing any clinically relevant improvement in analgesia over periarticular infiltration techniques.

This apparent disconnect presents an opportunity for anesthesiologists to educate physical therapists on the data referenced above. It also presents an opportunity to open a dialogue, as physical therapists may have relevant data that is siloed in the PT literature that may not reach anesthesiologists. The needs of the patient outweigh the preferences of both physical therapists and anesthesiologists.

Study Limitations

Our study is based on anonymous survey data at one institution. It is possible the respondents did not understand the questions as written or the answer choices provided. This survey has not been validated or used previously. The survey responses reflect opinion only and are not meant to imply causal relationships between PNB and PT. The data are derived from one hospital setting, and the opinions of the physical therapists at our institution may vary widely from other practice settings.

Conclusions

PT remains a clinically important factor in the recovery of patients following TJR surgery. The opinions of the physical therapist on postoperative analgesia regimens, particularly with regard to use of PNB, may influence assessment of recovery and influence surgeons' opinions as to how patients are recovering. We have found that inpatient physical therapists at our institution believe nerve blocks impede patient recovery and increase risk of fall, analgesia notwithstanding. An opportunity exists to *un-silo* relevant data on these issues for all parties involved in management of patients who have undergone TJR.

Conflict of interest

Nothing to declare

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APPENDICES

Appendix 1

Survey Questionnaire: Influence of Nerve Blocks on Postoperative Physical Therapy
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How long have you practiced as a physical therapist?

<1 year	1-5 years	5-10 years	10-15 years	15-20 years	>20 years
☐	☐	☐	☐	☐	☐

How often do you treat total joint replacement surgical patients?

Never	Rarely	Sometimes	Frequently	Every Day
☐	☐	☐	☐	☐

When I am treating patients following TOTAL KNEE REPLACEMENT surgery, overall I would prefer that they receive:

Femoral Nerve Block Only	☐
Adductor Canal Block Only	☐
Sciatic Nerve Block Only	☐
Femoral and Sciatic Nerve Blocks	☐
Adductor Canal and Sciatic Nerve Blocks	☐
Periarticular Infiltration	☐
No Nerve Blocks	☐

When I am treating patients following TOTAL HIP REPLACEMENT surgery, overall I would prefer they receive:

Femoral Nerve Block Only	☐
Lumbar Plexus Block Only	☐
Sciatic Nerve Block Only	☐
Femoral and Sciatic Nerve Blocks	☐
Lumbar Plexus and Sciatic Nerve Blocks	☐
Periarticular Infiltration	☐
No Nerve Blocks	☐

If I had a lower extremity joint replacement surgery, I would prefer:

Spinal Anesthesia	☐
General Anesthesia	☐
No Preference	☐
Other (please specify)	

If I had a KNEE replacement surgery, I would prefer:

A Nerve Block	☐
Periarticular Infiltration	☐
Neither	☐
Other (please specify)	

If I had a HIP replacement surgery, I would prefer:

A Nerve Block	☐
Periarticular Infiltration	☐
Neither	☐
Other (please specify)	

If I had a SHOULDER replacement surgery, I would prefer:

A Nerve Block	☐
Periarticular Infiltration	☐
Neither	☐
Other (please specify)	

In my opinion, for KNEE replacement surgery, PERIARTICULAR INFILTRATION of local anesthetic is _____ to a nerve block for postoperative PAIN CONTROL.

Greatly Inferior	Somewhat Inferior	Equivalent	Somewhat Superior	Greatly Superior
☐	☐	☐	☐	☐

In my opinion, for HIP replacement surgery, PERIARTICULAR INFILTRATION of local anesthetic is _____ to a nerve block for postoperative PAIN CONTROL.

Greatly Inferior	Somewhat Inferior	Equivalent	Somewhat Superior	Greatly Superior
☐	☐	☐	☐	☐

In my opinion, for KNEE replacement surgery, PERIARTICULAR INFILTRATION of local anesthetic is _____ to a nerve block for postoperative PHYSICAL THERAPY.

Greatly Inferior	Somewhat Inferior	Equivalent	Somewhat Superior	Greatly Superior
☐	☐	☐	☐	☐

In my opinion, for KNEE replacement surgery, adductor canal/saphenous nerve block catheters are _____ compared to a femoral nerve block catheter for postoperative PHYSICAL THERAPY.

Greatly Inferior	Somewhat Inferior	Equivalent	Somewhat Superior	Greatly Superior	I Do Not Have an Opinion
☐	☐	☐	☐	☐	☐

In my opinion, for KNEE replacement surgery, adductor canal/saphenous nerve block catheters are _____ compared to a femoral nerve block catheter for postoperative PAIN.

Greatly Inferior	Somewhat Inferior	Equivalent	Somewhat Superior	Greatly Superior	I Do Not Have an Opinion
☐	☐	☐	☐	☐	☐

In my opinion, for HIP replacement surgery, PERIARTICULAR INFILTRATION of local anesthetic is _____ to a nerve block for postoperative PHYSICAL THERAPY.

Greatly Inferior	Somewhat Inferior	Equivalent	Somewhat Superior	Greatly Superior
☐	☐	☐	☐	☐

In my opinion, lower extremity nerve blocks_____ the risk of patients falling.

Strongly Decrease	Somewhat Decrease	Neither Increase nor Decrease	Somewhat Increase	Strongly Increase
☐	☐	☐	☐	☐

In my opinion, nerve blocks_____ the patient's ability to participate in physical therapy.

Strongly Impede	Somewhat Impede	Neither Impede nor Facilitate	Somewhat Facilitate	Strongly Facilitate
☐	☐	☐	☐	☐

In my opinion, nerve blocks _____ a patient's recovery after LOWER EXTREMITY (knee and hip) joint replacement surgery.

Strongly Impede	Somewhat Impede	Neither Impede nor Facilitate	Somewhat Facilitate	Strongly Facilitate
☐	☐	☐	☐	☐

In my opinion, nerve blocks _____ a patient's recovery after TOTAL SHOULDER joint replacement surgery.

Strongly Impede	Somewhat Impede	Neither Impede nor Facilitate	Somewhat Facilitate	Strongly Facilitate
☐	☐	☐	☐	☐

In my opinion, nerve blocks make physical therapy _____ *for me as a physical therapist*.

Very Difficult	Somewhat Difficult	Neither Difficult nor Easy	Somewhat Easy	Very Easy	It Depends on the Surgery Type
☐	☐	☐	☐	☐	☐

In my opinion, nerve blocks make physical therapy _____ *for the patient*.

Very Difficult	Somewhat Difficult	Neither Difficult nor Easy	Somewhat Easy	Very Easy	It Depends on the Surgery Type
☐	☐	☐	☐	☐	☐

In my opinion, nerve blocks _____ the patient's *pain* after joint replacement surgery.

Greatly Worsen	Somewhat Worsen	Neither Worsen nor Improve	Somewhat Improve	Greatly Improve
☐	☐	☐	☐	☐

In my opinion, patients having had *spinal anesthesia* fall _____ than patients having had *general anesthesia*.

Much Less Often	Somewhat Less Often	Neither More nor Less Often	Somewhat More Often	Much More Often
☐	☐	☐	☐	☐

I feel that routine use of a knee immobilizer after knee replacement surgery would _____ patient safety in patients *receiving a nerve block* for postoperative pain relief.

Strongly Decrease	Somewhat Decrease	Neither Decrease nor Increase	Somewhat Increase	Strongly Increase
☐	☐	☐	☐	☐

I feel that routine use of a knee immobilizer after knee replacement surgery would _____ patient safety in patients *receiving periarticular infiltration* for postoperative pain relief.

Strongly Decrease	Somewhat Decrease	Neither Decrease nor Increase	Somewhat Increase	Strongly Increase
☐	☐	☐	☐	☐

Appendix 2

Summary of Responses

Regarding General Questions:

[Q1] 85.0%, 17/20 indicated they have practiced as a physical therapist for 10 years or longer, with (35.0%) 7/20 having between 15 and 20 years of practice experience.
[Q2] 52.6%, 10/19 indicated they treat patients who have undergone TJR surgery frequently or every day.
[Q3] 94.4%, 17/18 indicated they prefer that patients receive periarticular infiltration or no block at all for TKA.
[Q4] 77.8%, 14/18 indicated they prefer that patients receive periarticular infiltration or no block at all for THA.
[Q5] 63.2%, 12/19 would prefer a spinal anesthetic if they themselves had a lower extremity joint replacement surgery.
[Q6] 94.7%, 18/19 would prefer periarticular infiltration if they had knee replacement surgery.
[Q7] 72.2%, 13/18 would prefer periarticular infiltration if they had hip replacement surgery.
[Q8] 52.6%, 10/19 would prefer a nerve block if they had shoulder replacement surgery.

Regarding Postoperative Pain Control:

[Q9] 78.9%, 15/19 believe periarticular infiltration is somewhat to greatly superior to a nerve block for knee replacement surgery.
[Q10] 61.1%, 11/18 believe periarticular infiltration is somewhat to greatly superior to a nerve block for hip replacement surgery.
[Q13] 52.6%, 10/19 believe adductor canal block catheters are somewhat to greatly superior to femoral nerve block catheters for knee replacement surgery.

Regarding Postoperative Physical Therapy:

[Q11] 94.7%, 18/19 believe periarticular infiltration is somewhat to greatly superior to a nerve block for knee replacement surgery.
[Q12] 94.4%, 17/18 believe adductor canal block catheters are somewhat to greatly superior to femoral nerve block catheters for knee replacement surgery.
[Q14] 94.7%, 18/19 believe periarticular infiltration is somewhat to greatly superior to a nerve block for hip replacement surgery.
[Q15] 100%, 19/19 believe lower extremity nerve blocks somewhat to greatly increase the risk of patients falling.
[Q16] 73.7%, 14/19 believe nerve blocks somewhat to strongly impede that the patient's ability to participate in PT.
[Q17] 68.4%, 13/19 believe nerve blocks somewhat to strongly impede recovery after lower extremity joint replacement surgery.
[Q18] 47.4%, 9/19 believe nerve blocks neither impede nor facilitate patients' recovery after shoulder replacement surgery.
[Q19] 84.2%, 16/19 believe nerve blocks make PT somewhat to very difficult for the physical therapist.
[Q20] 63.2% 12/19 believe nerve blocks make PT somewhat to very difficult for the patient.
[Q21] 78.9%, 15/19 believe nerve blocks somewhat to greatly improve patients' pain after joint replacement surgery.
[Q22] 81.3%, 13/16 believe patients fall no more often after spinal anesthesia than after general anesthesia. The other 18.8%, 3/16 believe patients fall somewhat to much more often after spinal anesthesia.
[Q23] 73.7%, 14/19 believe routine use of knee immobilizers would somewhat to strongly improve safety in patients with nerve blocks.
[Q24] 73.7%, 14/19 believe routine use of knee immobilizers would neither worsen nor improve safety in patients with periarticular infiltration.