Timing of Nerve Blocks for Major Knee Reconstruction Surgery in Adolescents
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Introduction
The safety of nerve block placement after induction of general anesthesia for pediatric patients is well documented\(^1\). In our institution it has become as common for nerve blocks to be placed prior to surgery or at the conclusion of surgery, while the patient is still under general anesthesia. The driving factors in the timing of the nerve blocks for orthopedic procedures are usually surgeon preference, availability of anesthesia staff and availability of space in which placement of a nerve block under general anesthesia is appropriate. Preemptive/preventative analgesia has been taught to anesthesia providers mostly on grounds of evidence from animal studies, though human studies have been inconsistent\(^2\). A recent meta-analysis suggested that future studies need to focus on clinical outcomes rather than on markers of surgical stress response\(^2\). We sought to determine differences in opioid requirements and post-anesthesia care unit (PACU) time when nerve blocks were placed prior to or after the surgical stimulation occurred.

Methods
A retrospective chart review of all anterior cruciate ligament (ACL) and medial patellofemoral ligament (MPFL) surgeries at the main campus and the outpatient surgery center of our hospital for the past two years was completed. Opioid requirements in the operating room and in the PACU were compared, as were tourniquet time, total time required for placement of nerve blocks, and total PACU time. All opioid doses were converted to morphine equivalents for ease of comparison. Data were collected for use of co-analgesics such as acetaminophen, NSAIDs, and diazepam.

Results
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Discussion
Nerve block placement prior to surgical repair of knee ligaments is more efficient from a time standpoint and results in significantly less opioid administered to the patient and a shorter length of stay in PACU. Rates of post-operative nausea and vomiting as detected by rates of additional anti-emetics administered in PACU did not differ according to block timing. As expected, tourniquet time and surgeon’s time were not altered by block placement timing.

Our study time period happened to coincide with the practice change in our institution of administering IV acetaminophen (April 2011) to orthopedic patients. Interestingly in this study, administration of IV acetaminophen to a patient did not result in a decreased amount of opioid analgesic medication administered to the patient. We had hoped to analyze operating room efficiency when blocks were placed before or after surgery, but there were too few days with multiple surgeries and too much inconsistency regarding timing of block placement to allow for this analysis. This analysis did not include opioid requirements after discharge from the PACU, thus making any broad statement about preventative analgesia outside the scope of this study.

Learning points
♦ In our institution, nerve block placement prior to surgical repair of ligamentous knee injury results in significantly shorter time to complete the block procedure, significantly less opioid medication needed by the patient, and a significantly shorter stay in PACU.
♦ The time savings are not large enough to significantly affect operating room efficiency or to allow for an additional case to be done on a given day. However the time savings do improve the efficiency of the staff performing the nerve block.

<table>
<thead>
<tr>
<th></th>
<th>Blocks before surgery</th>
<th>Blocks after surgery</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Number</td>
<td>126</td>
<td>83</td>
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<tr>
<td>Time to perform block (min)</td>
<td>27.6</td>
<td>36.7</td>
<td>&lt;0.0001</td>
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<tr>
<td>PACU time (min)</td>
<td>129</td>
<td>144</td>
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<td>Morphine equivalents/kg</td>
<td>0.124</td>
<td>0.158</td>
<td>0.002</td>
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</tbody>
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References