

# A National Survey On Practice Patterns In The Use Of Peripheral Nerve Stimulators In Regional Anesthesia

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## Abstract

### INTRODUCTION

Peripheral nerve stimulators (Figure 1) have become indispensable as clinical and teaching tools in regional anesthesia practice. The advantage of using nerve stimulator over paresthesia technique include the ability to confirm the correct needle placement without inducing paresthesia. This, in turn, allows anesthesiologists to perform the block in sedated or anesthetized patients (1,2). Additionally, some have argued that avoiding paresthesias may reduce the risk of nerve damage, a frequently feared complication of neuronal blockade (3,4,5,6,7,8). Despite the common use of nerve stimulators, the common perception is that the techniques of peripheral nerve blockade (Figure 2) vary widely among anesthesiologists. Thus, in an attempt to assess the techniques of nerve stimulator-assisted peripheral nerve blockade we conducted a nation-wide survey on their use.

### Figure 1

Figure 1. Several commercially available nerve stimulators for peripheral nerve blockade



**Figure 2**

Figure 2. An example of peripheral nerve stimulator-guided peripheral nerve block. An insulated block needle attached to a nerve stimulator is advanced until the close proximity of the needle tip to the nerve is identified as contractions of the muscle groups innervated by the nerve being blocked. The current of the peripheral nerve stimulator is adjusted to the lowest current at which the contractions are still present (ideally <0.4mA)



**METHODS**

Questionnaires regarding the use of peripheral nerve blocks in their practices were mailed to 683 American anesthesiologists randomly selected from the ASA membership directory. Responses from attending anesthesiologists who reported performing peripheral nerve blockade in their practices were analyzed with respect to peripheral nerve stimulator utilization.

**RESULTS**

Among the 413 attending anesthesiologists who responded to the survey (an overall response rate of 60.5%), 268 (64.8%) reported that they use peripheral nerve stimulators when performing PNB. Although the majority (54.8%) (Figure 3) set their initial current between 0.3 mA and 1.0 mA, 34.7% use settings outside this range and 10.4% use the peripheral nerve stimulator without current display (Figure 4). More than half of the respondents (59.3%) achieve the optimal current on the peripheral nerve stimulator by selecting a high current initially and then decreasing the current according to the response elicited as the needle is advanced toward the nerve. Fewer anesthesiologists (32.7%) select a low current initially and then increase the current according to the elicited response (Figure 5). Nearly all anesthesiologists using peripheral nerve stimulator (81.5%) either always, or most of the time, seek the lowest current at which the appropriate response is still obtainable. Among

those who perform more than 10 peripheral nerve blocks per month, 36% always seek the lowest stimulating current, and 47.4% do so most of the time. Anesthesiologists who perform more than 10 peripheral nerve blocks per month are more likely to manipulate the current output than anesthesiologists who less frequently perform peripheral nerve blocks (24.7% vs. 18%; p=0.008).

**Figure 3**

Figure 3. The use of nerve stimulators in peripheral nerve blockade: The initial current setting



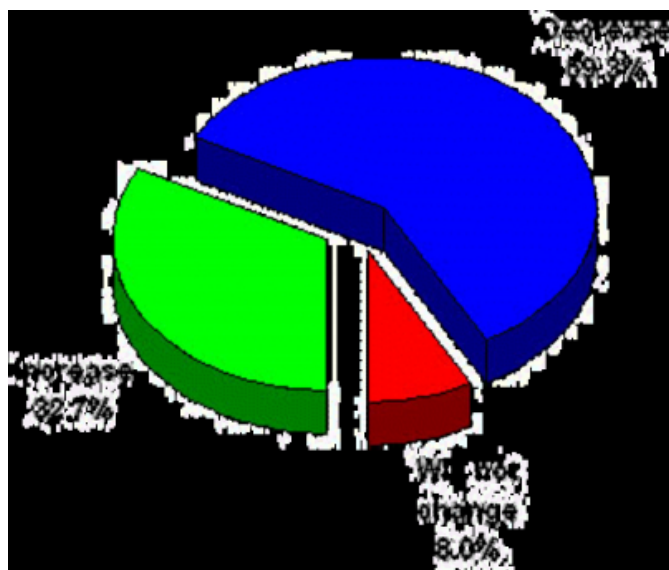
**Figure 4**

Figure 4. An example of a peripheral nerve stimulator without an indicator of the current intensity. The current output is roughly estimated by looking at the position of the dot on the current dial knob



**Figure 5**

Figure 5. The majority of anesthesiologists change their initial current setting while performing peripheral nerve block



## DISCUSSION

The results of this survey indicate that the majority of

American anesthesiologists use peripheral nerve stimulators in their regional anesthesia practice. However, there does not seem to be a uniform technique of using peripheral nerve stimulator during performance of peripheral nerve blockade. For instance, the choice of initial current settings widely vary among anesthesiologist as does the manner in which the optimal current is sought. Further studies designed to evaluate the efficiency of the various approaches are warranted as they may maximize the effectiveness of peripheral nerve stimulator in performing peripheral nerve blockade. Since anesthesiologists continuously manipulate the current from the initial setting to the low current before injection of local anesthetics, a search for a nerve stimulator with a better current control and more user-friendly control of the current is clearly indicated in order to facilitate performance of nerve blockade (9,10). (Figure 6).

**Figure 6**

Figure 6. An example of a user-friendly nerve stimulator. The stimulating current is adjusted using a foot pedal. Adjusting the output of the nerve stimulator by a foot pedal allows uninterrupted performance of the block by a single anesthesiologist



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