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Lego Training Helps Improve Regionalists' Spatial Manipulation

A team of British anesthesiologists has developed what they describe as an "inexpensive, reproducible" method for improving anesthesiology students' visuospatial abilities as they learn to perform various tasks.

The surprising new method: use of the decades-old toy, Lego.

"We believe this type of training in anesthesia is completely novel," one of the developers, David W. Hewson, MBBS, a consultant anesthetist at Nottingham University Hospitals and an honorary assistant professor, Division of Clinical Neuroscience, University of Nottingham, in England, told *Anesthesiology News*. "Our team consists of experts in regional anesthesia and health psychology, and we were able to work together to design a training system to help improve patient safety."

According to Dr. Hewson, the training exercise asks students to re-create random Lego shapes using a mirror image of the original model. It's designed to help students improve their ability to "visualize and manipulate 3-dimensional objects on a 2-dimensional surface."

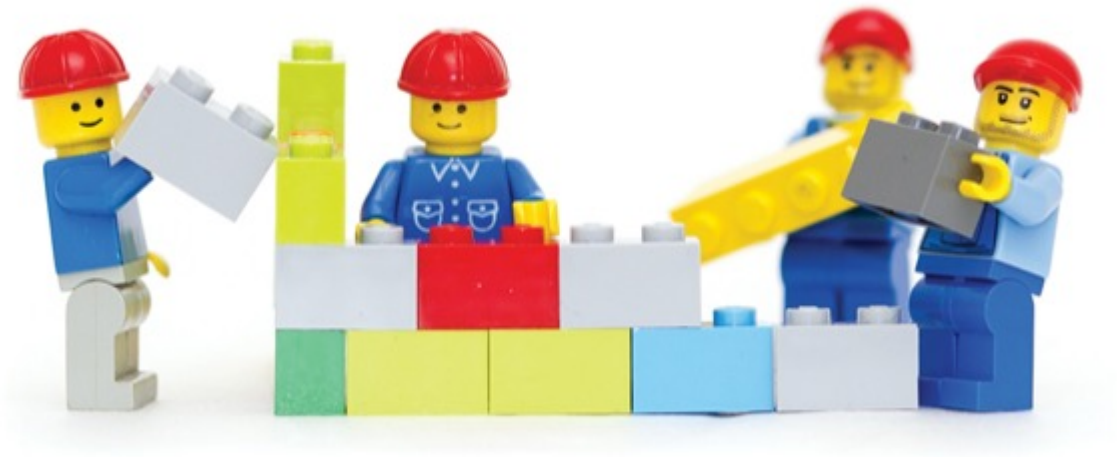
In clinical practice, this enhances the students' dexterity and accuracy as they "place a needle close to a nerve (3-dimensional objects) using an ultrasound screen (a 2-dimensional surface)," Dr. Hewson said.

Mental Rotation Training

In a study published in the *British Journal of Anaesthesia* (2020;125[2]:168-174), Dr. Hewson and his colleagues tested the training method on 94 anesthesiology students learning ultrasound-guided regional anesthesia (UGRA) for the first time. Following a baseline mental rotation test, their performance in a standardized UGRA needling task was independently assessed by two faculty members using the composite error score (CES) and global rating scale (GRS).

UGRA is performed worldwide to promote pain relief via nerve blocks. The approach carries a "small but potentially catastrophic risk of nerve damage" if the needle directly injures the target nerve, Dr. Hewson noted, causing the patient persistent pain, muscle weakness and loss of muscle function postoperatively.

Volunteers with low baseline mental rotation ability were randomized to a mental rotation training group or a no-training group. The UGRA needling task was repeated to determine the impact of the training intervention on task performance.



The researchers found that after analyses controlling for student age, sex and previous performance, participants exposed to the training intervention made significantly fewer errors (CES: *B*=−0.66; *P*<0.001) and displayed improved overall performance (GRS: *B*=6.15; *P*=0.048) when performing UGRA, Dr. Hewson said.

“By improving so-called ‘mental rotation skills’ using Lego, anesthetists made fewer errors and performed better when undertaking a regional anesthesia needling task,” Dr. Hewson said. “Anesthetists continue to seek new ways to train students in performing nerve blocks, and our system can be applied using minimal equipment to improve students’ performance in the lab before undertaking nerve blocks on patients.”

Educator Vincent Chan, MD, told *Anesthesiology News* that he would be interested to see how the findings of the Lego study translate into success once the trainee anesthesiologists begin clinical practice. Dr. Chan, who is a professor of anesthesia at the University of Toronto, was not part of the Lego study and has not worked with the approach.

“Given the study findings showing a positive impact of the mental rotation test on the ability of UGRA novices to perform [the] needling task on a bench model, it should be interesting to see if the training improves UGRA success in clinical situations; [if it] improves both in-plane and out-of-plane needle approaches, superficial- versus deep-needle insertion; and if UGRA experts invariably have good mental rotation test scores,” said Dr. Chan, who added that he is not an expert in mental rotation testing.

—Brian Dunleavy

Drs. Hewson and Chan reported no relevant financial disclosures.