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A new generation of simulator for teaching the new wall blocks

Pierfrancesco Fusco[1], Gian Marco Petroni[2*], Astrid U. Behr[3], Stefania Tullj[2], Gilberto Fiore[4], Alessandro Vergallo[5], Franco Marinangeli[2]

1 Department of Anesthesia and Intensive Care, Ospedale San Salvatore, L'Aquila, Italy

2 Department of Life, Health and Environmental Sciences, University of L'Aquila, L'Aquila, Italy;

3 Operative Unit of Anesthesia and Resuscitation, Hospital of Camposampiero, Padua, Italy

4 Department of Anesthesia and Intensive Care, Hospital of Santa Croce di Moncalieri, Turin, Italy

5 Department of Anesthesia and Intensive Care, Spedali Civili di Brescia, Brescia, Italy

***Corresponding author:** Gian Marco Petroni, Department of Life, Health and Environmental Sciences, University of L'Aquila, Via Vetoio, 67100, L'Aquila, Italy. Telephone number +393392197226 Fax: no one E-mail address: gianmpetr@gmail.com

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Ultrasound guided regional anesthesia (UGRA) is an invasive procedure that involves complex motor skills.[1] As ultrasound-guided regional anesthesia (UGRA) represents the gold standard for performing regional blocks, there is a need for learning the technical skills associated with this technique To successfully perform a UGRA procedure, a triad of three distinct but interrelated skills are required: image acquisition, anatomical interpretation, and hand-eyes coordination.

Although there are simulator models for learning how to perform UGRA, but they are not anatomically based and do not use.

We developed a innovative and high-fidelity system simulator for ultrasound-guided fascial blocks based on real ultrasound images, named Block Sim™, made by Accurate, that is able to provide the opportunity to acquire and practice technical skills in a safe, controlled, and reproducible environment. Block Sim allows us to practice on: anterior thoracic wall blocks (PECS I, PECS II, serratus plane block and parasternal block), paraneuraxial nerve blocks (Paravertebral block and erector spine plane block (ESP), and abdominal wall blocks (transversus abdominis plane block (TAP) [FIG.1-2], quadratus lumborum block (QLB I e II).

The simulator includes three very realistic ultra-durable inserts including traditional anatomical landmarks, a lightweight, compact and easy to store box equipped with high-fidelity sensors for movement detection, and a virtual ultrasound monitor. Thanks to the ultrasound probe software, this new simulation system allows the physician to view real ultrasound images. Users can move the ultrasound probe in different directions on the available insert and observe a coherent real-time modification of the scene, allowing to examine the sonoanatomy and to choose the correct entry plane for the needle. Users can perform a simulated injection of the local anesthetic, using an external syringe, when the tip of the needle is inside of the fascia . The user can also learn the sonoanatomy and acquire or improve the coordination capacity between the needle and the probe.

Simulation accelerates skill acquisition, improves skill retention, and reduces the extinction of skills. It has become an integral part of anesthesiology residency training.[2,3]

Thanks to the software of Block Sim™, the execution of the fascial blocks, is very close to reality

It has got inexpensive inserts/pads and it can provide tactile feedback, thanks to its realistic insert, coherent simulation of the resistance to penetration of the different tissues traversed by the needle during fascia block procedures. These inserts, including traditional anatomical landmarks that provide

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precise tactile feedback to the user while he's inserting the needle as well as the feel of the typical fascial "pops".

The user can practice and develop competency using simulation scenarios based on real clinical images and, at the end of the procedure, an indicative global score will be given to the user based on his performance

Drawbacks include the initial cost of the manikins and the replacement costs of inserts

Although these simulators offer significant educational opportunities , first of all for patient safety, and could be used in workshops for training UGRA techniques, in agreement with the recommendations by the European Society of Regional Anaesthesia [4]. Data of educational and training outcomes will be needed.

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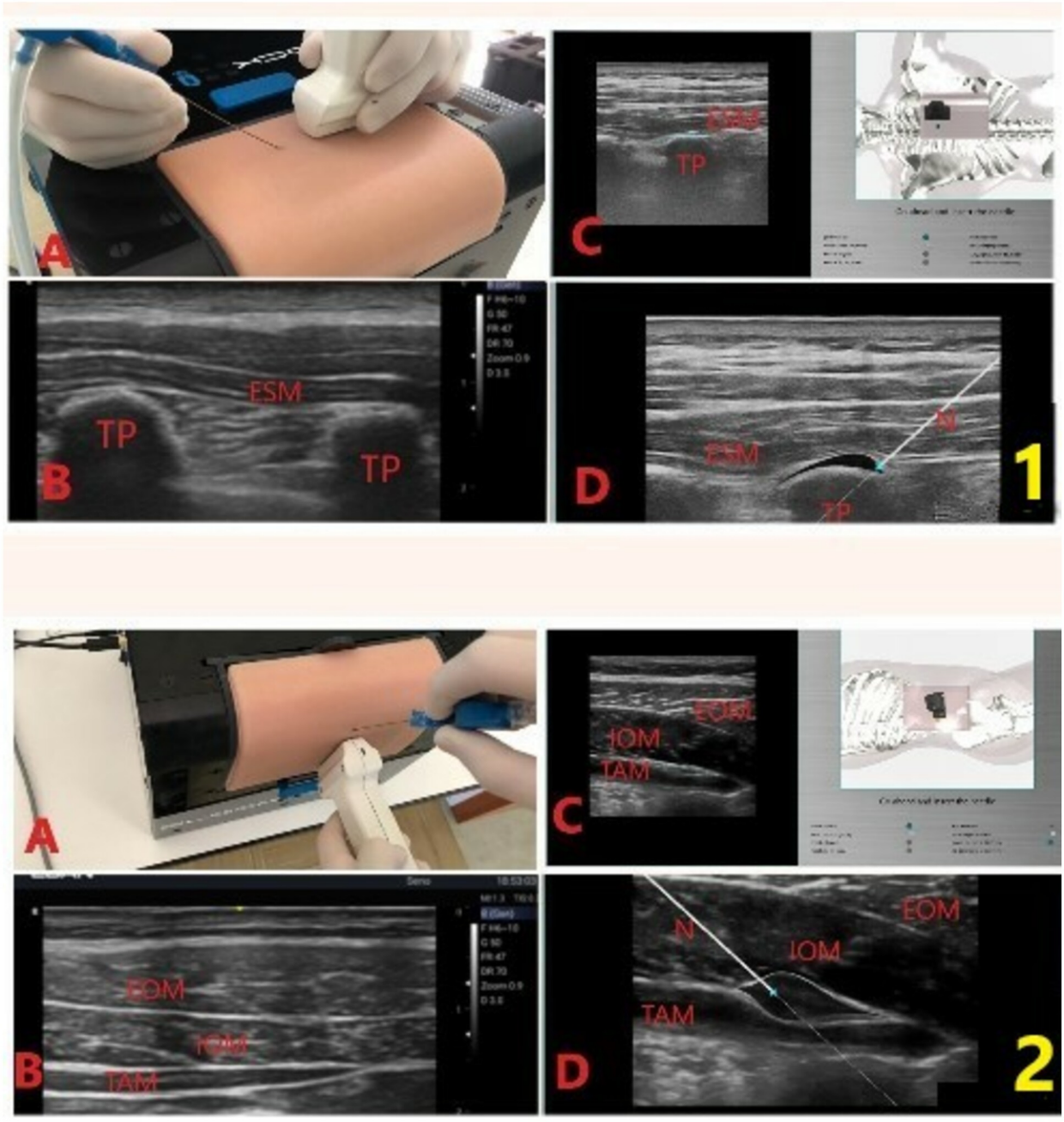
FIGURE. 1-2

1- A, BlockSim ™ with insert for practicing UGRA is shown. B, Real Ultrasound images of paraneuroaxial area is shown. C, Ultrasound image of BlockSim ™ with target is shown. D, ESP Block of BlockSim ™ with the needle on the target and opening of fascial plane is shown TP indicates, transverse process; N: needle; ESM: erector spine muscle

2- A, BlockSim™ with insert for practicing UGRA is shown. B, Real Ultrasound images the abdominal wall is shown. C, Ultrasound image of BlockSim™ with target is shown. D, Tap Block of BlockSim™ with the needle on the target and opening of fascial plane is shown. N indicates, needle; EOM: external oblique muscle; IOM: internal oblique muscle; TAM: transversus abdomen muscle

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