- **Field (or combat) nerve blocks**: Field nerve blocks are specifically designed for combat situations and can be performed with portable ultrasound machines or nerve stimulators. These blocks are often used to provide immediate pain relief for injuries such as limb fractures or wounds. Field blocks are relatively simple to perform, require minimal resources, and can be done quickly in the field, reducing the need for evacuation to more extensive medical facilities.
- **Peripheral nerve blocks**: Peripheral nerve blocks involve injecting a local anesthetic near a specific nerve or group of nerves to provide targeted pain relief. These blocks can be performed for injuries or surgeries involving limbs or specific regions. Peripheral nerve blocks are relatively simple to perform and require minimal resources, making them suitable for war zones with limited medical supplies and personnel.
- **Fascial plane blocks**: Fascial plane blocks involve injecting a local anesthetic into the layers of tissue (fascial planes) surrounding nerves. These blocks provide broader coverage of pain relief and can be effective for procedures involving multiple nerves or injuries affecting larger areas. Fascial plane blocks are relatively easy to perform and can be utilized for surgeries or injuries involving the trunk or limbs.

In a war zone, the priority is often to provide rapid pain relief with limited resources and personnel. Field nerve blocks and peripheral nerve blocks are frequently preferred due to their simplicity, effectiveness, and suitability for combat settings.[4] However, the choice of nerve block should ultimately be made by experienced medical professionals who can assess the situation and determine the most appropriate technique based on the individual patient‘s needs and available resources.[5] The fascia iliaca block is a regional anesthesia technique that targets the nerves supplying the hip and upper thigh region. It involves injecting a local anesthetic near the fascia iliaca, a layer of connective tissue in the pelvic region. This block can provide effective pain relief for surgical procedures or injuries involving the hip, thigh, or lower abdomen. In a war or combat setting, the fascia iliaca block can be a valuable option for providing pain relief. It is relatively easy to perform, does not require specialized equipment, and can be done quickly with minimal resources. The block can be performed with landmark-based techniques or with the assistance of portable ultrasound machines if available (images 1,2,3).[6]

Abstract #36453 Image 1 A,B,C – leg blust injury D – performed catheter into fascia iliaca space

Benefits of the fascia iliaca block in a war zone include:
Targeted pain relief The block can provide effective analgesia for injuries or procedures involving the hip, thigh, or lower abdomen, helping to manage pain and facilitate necessary medical interventions.
Rapid onset The fascia iliaca block can provide rapid pain relief, reducing the need for systemic opioids and their potential side effects.
Simplicity The block is relatively simple to perform, requiring only basic knowledge of anatomy and needle insertion techniques. It can be performed by trained medical personnel in the field without the need for advanced medical resources.

However, it's important to note that the fascia iliaca block, like any medical procedure, should be performed by trained healthcare professionals who are familiar with the technique and potential complications. Adequate sterile technique should be followed, and precautions should be taken to ensure patient safety.[7]

Overall, the fascia iliaca block can be a useful regional analgesia technique during war or combat situations, providing targeted pain relief for injuries or surgical procedures involving the hip, thigh, or lower abdomen. Its simplicity and effectiveness make it a viable option in resource-limited environments.

In a war zone, the continuous infusion of a fascia iliaca block may pose challenges due to limited resources and the need for consistent monitoring and management. The equipment required for a continuous infusion, such as an infusion pump, may not be readily accessible. Additionally, the expertise and availability of medical personnel to properly monitor and adjust the infusion may be limited.

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#36923 WEB-BASED RESOURCES IN RA EDUCATION

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Introduction The global pandemic of COVID-19 had strong repercussions in healthcare education around the world. Different adaptations to imposed restraints such as quarantine and social distancing forced different adaptations to conduct educational programs, such as video conferencing software, social media platforms, and Free Open Access Medical education tools.[1]

Web-based solutions are increasingly helpful in supporting clinical and academic activities during the COVID-19 pandemic. Moreover, most of these educational methods emphasize the cognitive area of Bloom's Taxonomy, as psychomotor and attitudinal training becomes harder via remote education, with multiple barriers to deliver personalized feedback.
Definitions - Distance education: Also known as distance learning, refers to any education provided without the teacher and students being physically present together.

- Distance simulation: Simulation performed with either the facilitator, learners or both in an offsite location separate from other members to complete educational or assessment activities. Facilitation and assessment can be performed either synchronously or asynchronously using video or web conferencing tools.[2]

- Applications or apps: Software programs designed to run on a computer/tablet/mobile phone to accomplish a particular purpose. Today, mobile applications play an integral role in medical education, as healthcare professionals and students use these emerging technologies during their training and practice.[3]

- Web resource: A web resource is any identifiable resource (digital, physical, or abstract) present on or connected to the World Wide Web. Web-based instructional methods are often categorized as e-learning, or the use of Internet technologies to enhance knowledge and performance.[4]

- E-learning: Methods of e-learning include self-paced tutorials, webcasts, podcasts, and interactive learning modules. e-learning has advanced from textbooks in electronic format to a highly interactive medium to enhance education for students and postgraduate learners.[4]

- Educational outcome levels: Based on the Kirkpatrick hierarchy, there are 4 outcome levels. The reaction level determines the level of satisfaction; the learning level measures the level of knowledge, skills, and values acquired by the participants from the program; the behavior level ascertains the changes in the participants' behaviors in the work environment because of the program; and the impact level examines the institutional outcomes that demonstrate a good return on investment and can be attributed to the training program.[5]

State of distance healthcare education:

Studies suggest that more than 85% of healthcare professionals and medical students use a smartphone, and 30–50% use medical apps for learning and collecting information. In a survey done recently, most respondents (70%) reported that their simulation center was conducting distance simulation. Significantly more respondents indicated long-term plans for maintaining a hybrid format (82%), relative to going back to in-person simulation.[6]

Web-based resources. What level of learning can we reach?

They have become inevitable in clinical educational settings, particularly as they are accessible for learning anywhere. Integrating web-based learning resources in medical education can enhance interactivity and has been demonstrated to improve satisfaction as well as facilitate learning efficiency.[4]

A good example is the implementation of distance-based procedural skills training through a computer platform (https://c1do1.ai/) with asynchronous feedback for suturing, paracentesis, thoracocentesis, endotracheal intubation and other procedural skills.[1 7] Participants logged into the platform, reviewed material, practiced while recording the session, and uploaded the video through the training platform. The expert tutor remotely delivered asynchronous feedback. Participants trained remotely until achieving course approval.

Regarding evidence, the effectiveness of smartphone applications in improving knowledge and skills in healthcare professionals and students, have been shown recently in a systematic review and meta-analysis (Level 2). The pooled effect of 15 studies with 962 participants showed that the knowledge score improved significantly in the group using mobile apps, compared to the group who did not use mobile applications. Regarding skills, 19 studies (11 RCTs, 3 quasi-experimental and 5 interventional cohort studies) reported that mobile applications were effective in improving skills among the participants.[3]

Comparisons with traditional face-to-face education:

The COVID-19 pandemic caused an increase of different procedural skills training at distance and generated an opportunity to include technology and computer platforms in training. The effectiveness of this modality and comparisons with traditional face-to-face teaching with direct feedback have not been deeply evaluated.

We have developed a prospective randomized study to compare two different training modalities for peripherally inserted central catheters (PICC) under ultrasound guidance: traditional face to face training with synchronous direct feedback versus distance training through an online platform with asynchronous distance feedback. We chose installation of PICCs as the standard procedure for this study because this critical skill is in high demand. It also has a high level of difficulty because the current standard of care includes mandatory use of real-time ultrasound during catheter insertion. This procedure is comparable with a continues peripheral nerve block under ultrasound. This simulation-based training program significantly improves residents PICC placement skills with both modalities (traditional training and online platform with asynchronous feedback). The asynchronous feedback training modality seems to be a comparable alternative to traditional face-to-face training methodologies, opening a new and innovative possibility for teaching procedural skills in healthcare.[8]

Evidence in RA The University of Toronto is developing a research project: Online Regional Anesthesia Resources – Are They Effective? They hypothesize that the use of those online educational materials will give medical students non inferior ability and knowledge for image acquisition and anatomical interpretation of ultrasound image for supraclavicular brachial plexus block, when compared to conventional in person teaching.

Despite the evidence shows the acquisition of skills through applications is possible, and even though learning could be in some specific procedures comparable to traditional face-to-face training, the evidence in regional anesthesia is scarce.

Future research can be oriented towards clarifying whether both methodologies are comparable in specific regional anesthesia procedures.

Another innovative idea could be piloting crisis management and non-technical skills training (LAST for example) through web applications, and later to compare this training with traditional training.

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Networking session

#36910 HOW DO WE DEFINE SUCCESS IN REGIONAL ANESTHESIA (RA)?

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A successful RA block is the accomplishment of providing a satisfactory central neuraxial, peripheral nerve or plane block using local anesthetic solutions to enable the surgeon/obstetrician to perform certain operations on patients in a safe (devoid of complications), efficient (how easily or quickly placement is performed) and effective (pain free) way with a positive outcome.

These blocks are typically performed by well-trained anesthesiologists who have expertise in the field. They need to know all necessary safeguards to avoid potential negative consequences of a loco-regional block, i.e., toxicity and high/total spinal anesthesia, as a complication of an epidural puncture.

The use of ultrasound guidance for inserting peripheral nerve blocks has become the standard practice, as it allows for more accurate needle placement. Blind-insertion techniques should become more the exception. Proper training, adherence to hygienic standards, and the availability of necessary equipment and drugs are crucial for performing RA blocks safely in a monitored environment supported by nursing staff.

Complications associated with RA blocks can arise, including toxicity or high/total spinal anesthesia as a result of epidural puncture. Anesthesiologists need to be prepared and take necessary precautions and have resuscitation equipment and drugs need readily available. In case of local anesthetic overdose or toxicity, the immediate availability of 20% intralipid can be crucial for treatment. RA has its specific complications often related to its reliance based on subjective feelings (loss-of-resistance to air as in epidurals), e.g., postdural puncture headache, where others may have neurological complications (peripheral blocks puncturing nerves). Even supervisors can not see what is happening at the other end of the needle and never can be sure whether the true loss-of-resistance is being felt. Training RA techniques in simulation circumstances is essential.

Like other areas of healthcare, anesthesiologists should also strive for environmentally sustainable practices. The healthcare industry as a whole contributes between 4 and 5% of the global greenhouse gas emissions. While RA techniques themselves are environmentally friendly, the administration of extra oxygen during the procedure can contribute to carbon dioxide production. Anesthesiologists should be mindful of minimizing unnecessary oxygen use and adopting eco-friendly practices wherever possible.

Overall, the goal is to achieve successful RA blocks that provide pain relief, allow for efficient surgical procedures, and prioritize patient safety while also considering environmental sustainability and minimizing potential complications.

#36938 TRACKING MOTION DEVICES IN ANESTHESIA PROCEDURES

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Tracking motion devices in anesthesia procedures

1. Introduction Hand motion analysis through specific devices has been successfully used for years in the surgical field. (1) More recently, they have been used in anesthesia as assessment tools for procedural skills.

2. Motion-Tracking Technology Motion-tracking devices may be divided into two forms: optical and nonoptical.

- Optical systems typically use high-speed cameras to detect either infrared light reflection or emission, from which three-dimensional positional data can be extracted and postprocessed.

- Nonoptical systems typically rely on one of three methods of data acquisition to determine orientation and movement: electromagnetic, mechanical, and inertial mechanisms.

- Two main different devices using electromagnetic fields have been described in the anesthesia literature[1]:

1.- The Imperial College Surgical Assessment Device (ICSAD) is a device that tracks operator's hand-motion. It uses an electromagnetic tracking system (Isotrak Il; Polhemus Inc., Colchester, VT, USA) consisting of an electromagnetic field generator and sensors placed on the back of the operator's hands. Three dexterity scores can be measured: total distance travelled by each hand, number of movements, and total time.

2.- The HMA hardware consisted of a DriveBay electromagnetic field generator and control box (Ascension, VT, USA), one reference sensor, and two hand sensors (Model 800, 7.9 mm, 6-DOF). Three-dimensional position data from the electromagnetic sensors are registered using an open - source software. Metrics used to evaluate motion efficiency are the same: total time of procedure, total path length (distance travelled) and number of translational motions. Both systems collect the x, y, z Cartesian coordinate information from each sensor at a determined resolution and frequency. Most reports of ICSAD use an accuracy of 1mm at 20 Hz. On the other hand, DriveBay device reports an accuracy of 1.4 mm at 50 Hz.

Finally, the use of this motion device in the evaluation of motor skills allows obtaining quantitative data complementing previous validated visual scales. Having as many instruments as possible for evaluating motor skills could improve the learning process. In the future, if we want to set up metrics or cutoff scores to be achieved with motor skills training, a previous standardization of both parameters to be used and calibration thresholds should be established for each setting.

3. Value of Motion Metrics:

The ICSAD has demonstrated construct validity in many surgical procedures, including open, laparoscopic, and microsurgery. Additionally, in the anesthesia field, its construct and concurrent validity has been established in labor epidural placement, spinal anesthesia, ultrasound-guided supraclavicular block, and jugular CVC placement.[3-7]