Methodology

Representatives from the American Society of Regional Anesthesia and Pain Medicine (ASRA Pain Medicine) and European Society of Regional Anaesthesia and Pain Therapy (ESRA) collaborated to perform an international Delphi consensus study to standardize the names and anatomical definitions of regional anesthetic techniques for upper and lower limb nerve blocks. The study was conducted by an Executive Committee (KE, NE, EA, ERM, MW, SK), a Steering Committee (KE, NE, EA, JG, ERM, MW, SK, AP, AT), and an expert panel of Collaborators. This study received IRB exemption from Stanford University (ID 58535).

We replicated a methodology used in a previous study, which is reported in detail elsewhere.² In brief, a modified three-round Delphi approach was used, with two rounds of electronic questionnaires and a third round-table discussion round.

Collaborator selection and scope

We invited a diverse group of international collaborators, from a broad range of ethnic and demographic backgrounds representing varied practices. Further detail on selection of collaborators is reported elsewhere.² Participants were invited on 14 December 2021, and those who declined or did not respond were not included.

We aimed to achieve consensus on two characteristics of common upper and lower limb peripheral nerve blocks: names by which they are referred to, and anatomical descriptions for the position of the needle-tip during injection for each of these regional anesthetic techniques. Names were defined as the word or set of words by which each technique is known, addressed, or referred to. Anatomical descriptions were defined by the anatomical location of the needletip. This meant that non-ultrasound-guided methods of needle-tip localization were not considered (e.g. landmark-based techniques). The type of needle used, needle trajectory, patient position, the position of the ultrasound transducer, use of catheters, or any other technical elements related to the performance of regional anesthetic techniques were not considered unless there was a fundamental requirement for doing so (e.g. two techniques with identical needle-tip position but significantly different needle trajectories). Similarly, efficacy, safety, feasibility, surgical anesthesia, or any other clinical element of each regional anesthetic technique were not considered. For the purposes of this study, we defined upper limb nerve blocks as any regional anesthetic technique aiming to provide anesthesia or analgesia to any area of the neck, clavicle, shoulder, arm, wrist, hand and fingers. We defined lower limb nerve blocks as any regional anesthetic technique aiming to provide anesthesia or analgesia to any area of the hip, thigh, knee, leg, ankle and foot. Techniques that have already been addressed in a previous study were not included here.²

Long-list formulation

Following a qualitative literature review, the Steering Committee produced a long list of regional anesthetic techniques of the upper and lower limb. This included variations in names or anatomical descriptions of different approaches. All regional anesthetic techniques were collated in a Microsoft Excel (Microsoft Inc., Redmond, CA, USA) spreadsheet that was then reviewed by all members of the Steering Committee to refine, clarify and reference. Techniques were excluded if they were unclear, duplicates, or outside the scope of the current project.

First round

As per previously-described methodology,² the long-list of all names, anatomical descriptions and clarifying questions was electronically distributed to all Collaborators, who were invited to "Agree", "Disagree" or be "Unsure" for each. Each name could be voted on independent of the anatomical description and vice versa, and uncertainty was accepted. Collaborators were also invited to make free text written comments on each term and clarifying question. All responses were collated and anonymized by the project administrator (AS). These anonymized responses were analyzed and revised by the Steering Committee aiming to increase the potential for consensus in the second round as follows (Figure 1):

- 1. ≥ **75% agreement:** include. Terms proceeded to the next round unchanged.
- < 75% agreement: revise. Terms were revised for clarity in the absence of multiple names or anatomical descriptions.
- 3. < 75% agreement: harmonize. If multiple names or anatomical descriptions were deemed to be similar enough to warrant harmonization, this was done using either a novel anatomically descriptive term or an existing name or anatomical description encompassing multiple block descriptions.
- 4. < 50% agreement: exclude. Terms were excluded if they were outside the scope, if they were too similar to alternative terms, or were unclear. However, if there were multiple terms for similar blocks with <50% agreement, these were also eligible for harmonization.</p>

Given potential areas of uncertainty, clarifying questions were asked to facilitate decisionmaking by the Steering Committee, who then used all the information to generate a revised list of names and/or descriptions with justification for the changes implemented.

Second round

Anonymized results and proposed changes were shared with all Collaborators who participated in the first round. Methodology mirrored the first round, both for Collaborator voting and result handling (Figure 1), with further clarifying questions asked. Management of the consensus regarding nerve block names and anatomical descriptions were as follows:

- 1. ≥ **75% agreement: accept**. Terms accepted in the final list of agreed nomenclature.
- 2. 50–74% agreement: discuss. Terms proceeded for discussion in the third round.
- 3. < 50% agreement: exclude. Terms not discussed further due to similar approaches with different names or anatomical locations achieving higher agreement or remaining an area of future research. An exception was made in the event of a recognized group of blocks or a clarifying question in which none of the options achieved a threshold of >50%, in which case the two highest-scoring names, anatomical descriptions, or responses to clarifying questions proceeded to the third round.

In this round, it became apparent that consensus on the exact anatomical description of each peripheral nerve block was unlikely to be secured, as there are many individual peripheral nerves and numerous locations for blocking them. Thus, a proposal was made to produce a template for naming and describing individual peripheral nerve blocks that are uncommonly performed, associated with multiple approaches, or did not achieve consensus in naming or Supplemental material

describing. This proposal formed one of the clarifying questions and was added for individual peripheral nerve blocks. In this round, it also became clear that needle approaches (insertion site and trajectory) may have a role in distinguishing different block techniques, and thus a decision was made by the Executive Committee to consider including needle approaches within the scope of this nomenclature project. Whilst this was a deviation from our previous methodology, it was warranted given the nature of some peripheral nerve blocks (e.g. retroclavicular vs. infraclavicular brachial plexus block).

Third round

Collaborators who completed the first two rounds were invited to participate in a virtual round table discussion aiming to achieve consensus for names, anatomical descriptions, and clarifying questions, using videoconferencing software (Zoom Video Communications, San Jose, CA, USA) that allowed live polling. The session was chaired by one member of the Executive Committee (KE). Each name or anatomical description that had yet to achieve consensus but proceeded from the second round was allocated 5 min for discussion, followed by 1 min of anonymous voting. The possible outcomes for the nerve block names and anatomical descriptions were one of the following:

- ≥ 75% agreement: accept as strong consensus. Terms accepted in the final list of agreed nomenclature.
- 50–74% agreement: accept as weak consensus. Terms accepted but proceeded for discussion in the manuscript.

 < 50% agreement: exclude. Terms not accepted and considered areas for future research.

Statistical analysis

We used a convenience sample of 94 Collaborators, which is greater than most Delphi studies²⁷ and adds to the strength of our results. Data were reported descriptively. When percentages are reported, they refer to the proportion of Collaborators that agreed with the inclusion of a proposed name or anatomical description, unless otherwise stated (i.e. stating '50%' means '50% agreement for inclusion without further modification'). All denominators for percentages reported were based on responses, rather than participants.