

Appendix I. Full text peer reviewed journal articles on training, curriculum design, and fellowship programs in regional anaesthesia. Listed by year of publication and first author. RA: regional anaesthesia; UGRA: ultrasound-guided regional anaesthesia; US: ultrasound.

Author (year)	Description	Comments
Chuan et al (2018) ¹	Narrative review of competency-based assessment tools for RA	Comprehensive review of assessment tools in RA
de Oliveira Filho & Mettrau (2018) ²	Study to evaluate effects of high-frequency, structured expert feedback on basic skills in UGRA	High-frequency, structured expert feedback resulted in shorter learning curves, smaller number of technical errors, but increased duration of training sessions
Allen & McEvoy (2017) ³	Editorial on how competence should be assessed RA	Sufficient procedural opportunities are required for training but they do little to advance trainees beyond minimal competence unless accompanied by quality assessment and educational feedback. Excellent graphical depiction of the relationship between quantity of blocks and quality of educational experience, and how they both correspond to competence
Chen et al (2017) ⁴	Systematic review on use of simulation in UGRA training	UGRA knowledge and skills significantly improved with simulation training
Chin et al (2017) ⁵	Study to evaluate the effect of a dedicated RA service incorporating a block room on the clinical effectiveness of RA	Done in an Australian setting, showed improved effectiveness of RA with a dedicated RA service
Eloy et al (2017) ⁶	Study to evaluate research productivity in anaesthesia	Identified a deficiency in research productivity in anaesthesia fellowships
Gleicher et al (2017) ⁷	Study to evaluate effect of a block room on workflow efficiency and block failure rate, specific to thoracic epidurals	Observed reduction of anaesthesia-controlled operating room time and decreased block failure rate
Ilfeld & Liguori (2017) ⁸	Editorial on Gleicher et al (2017) ⁷	Summary of the benefits and costs and instituting a block room/team for RA
Neal et al (2017) ⁹	Report on resident procedures and caseload in RA and Pain Medicine for 2015	While the proportion of RA cases has remained unchanged since 1990, more RA cases are now performed under peripheral nerve block and less cases performed under neuraxial blockade, compared to 2000
Chuan et al (2016) ¹⁰	Randomised controlled trial recruiting US novices. Comparison of low fidelity models (meat phantoms) versus high fidelity (human cadavers) when teaching US-guided needle tip visualisation skills	Low-fidelity models as useful as high-fidelity models for novice training
Gupta & Morton (2016) ¹¹	Editorial on Chuan et al (2016) ¹⁰	Wide-ranging editorial on competency, simulation in RA, United Kingdom approaches to training in UGRA
Kessler et al (2016) ¹²	Review article on UGRA training methods	Discusses evidence-based teaching methods for technical skills in UGRA, focusing on sonoanatomy,

		and needle tip visualisation. Includes discussion on novel techniques such as web-based teaching and technical skills competency
McCartney & Mariano (2016) ¹³	Editorial on education in RA	Focus predominantly on technical skills in junior trainees, forming basis for competencies expected by fellowship
Niazi et al (2016) ¹⁴	Narrative review article on UGRA training	Article drawing on experiences in surgical training. Incorporates medical education theories of pre-training, competency-based training, and simulation training
Tuyakov et al (2016) ¹⁵	Narrative review of UGRA training in Europe	Discusses integration of the European Diploma of Regional Anaesthesia into the curriculum
Udani et al (2016) ¹⁶	Randomised controlled trial comparing simulation-based deliberate practice training versus discovery training of RA skills	No difference between groups, though deliberate practice training took more education resources. However, outcomes were self-reported by participants.
Chuan et al (2015) ¹⁷	Development and evaluation of a workplace-based assessment tool specific for RA	Valid and reliable tool to assess trainee performance in RA
Corvetto et al (2015) ¹⁸	Online survey of anaesthetists on types of RA to be included in curriculum	Discussion of specific blocks necessary to learn during training
Mariano et al (2015) ¹⁹	Longer-term outcomes in post-fellowship anaesthetists given a didactic training program in UGRA	Possible to train consultants in UGRA skills, but limitations to skill uptake is linked to case exposure
Neal et al (2015) ²⁰	2013 survey of ex-fellows and fellowship directors in RA	Wide-ranging article on current practice and career paths of previous RA fellows
Sujatta & Oberarztin (2015) ²¹	Review article on medical education concepts and simulation for RA teaching	Covers technical skills, simulation (including novel virtual reality studies), and core aspects of RA curricula
The Regional Anesthesiology and Acute Pain Medicine Fellowship Directors Group (2015) ²²	Third edition of accreditation guidelines for fellowship training in RA and acute pain medicine	List of characteristics and attributes of a RA fellowship. Includes learning objectives and time in fellowship. For the teaching faculty, a list of qualifications and responsibilities of the RA director, and qualifications and required expertise of the RA teaching faculty
Udani et al (2015) ²³	Narrative review of the use of simulation in teaching RA	Discussion of simulator types, effectiveness, and future directions
Woodworth et al (2015) ²⁴	Creation of a Type-K multiple-choice question bank on sonoanatomy based on item response theory	Novel design and validation of an assessment tool to test theoretical UGRA knowledge
Kheterpal (2014) ²⁵	Editorial on Memtsoudis et al (2014) ²⁶	Discusses integration of research/academic activity in a fellowship program
Memtsoudis et al (2014) ²⁶	Narrative article on single institution initiative to plan,	Discusses role of academic activity in a fellowship program

	implement, and run a research fellowship in RA	
O'Sullivan et al (2014) ²⁷	Randomised controlled trial on role of simulation training on axillary plexus UGRA	Trial stopped due to futility. Use of validated assessment tools to evaluate trainee performance of clinical procedures
Ouanes et al (2014) ²⁸	Narrative article on single institution initiative to develop a RA curriculum for residency	Adaptation of the John Hopkins centre curriculum. Comprehensive anatomy dissection and workshop, journal clubs, simulation sessions, web based learning, problem based tutorials, clinical assessment, and quality assurance activities
Slater et al (2014) ²⁹	Narrative review of theories underpinning technical skills uptake in RA	Thorough discourse of the theoretical educational models thought to influence motor skills learning relevant to RA. Practical examples of integrating these concepts into current teaching
Lansdown et al (2013) ³⁰	Online survey of international RA fellowship directors	Snapshot of RA fellowship programs worldwide: characteristics, clinical exposure, and assessment of skills within these fellowships
Moon et al (2013) ³¹	Survey of RA teaching in US graduating residents	Large variability in teaching and clinical exposure amongst trainees
Nix et al (2013) ³²	Narrative review of education in RA, with a focus on UGRA	Several aspects of UGRA covered, including sonoanatomy, technical skills, needle tip visualisation, simulation, and assessment
Barrington et al (2012) ³³	Study to quantify number of RA procedures required for novices to gain competency at US needle visualization	Competency is attained at a variable rate
Cheung et al (2012) ³⁴	Development of a checklist and global rating scale for UGRA	Utilised Delphi method to develop checklist
Narouze et al (2012) ³⁵	First consensus statement on education and training in ultrasound-guided interventional pain procedures	Guidelines on characteristics and core competencies of US-guided pain procedures, relevant to a pain fellowship. Characteristics of the fellowship covered: clinical competencies, asepsis, US knowledge, interpersonal / communication skills, professionalism, and systems based practice
Neal (2012) ³⁶	Transcript of lecture on education in regional anesthesia	Personal viewpoint of a RA expert, journal editor on RA education. Covered diverse topics as caseloads, critical analysis of evidence, politics
Kopp & Smith (2011) ³⁷	Randomised controlled trial on web-based RA education versus traditional methods	Investigates novel use of web-based resources to teach RA
Russell et al (2011) ³⁸	Exposure of trainees at a single (Australian) institution to RA	Exposure of local ANZCA trainees to RA
The Regional Anesthesiology and Acute Pain	Second edition of accreditation guidelines for US fellowship	Older version of RA fellowship guidelines for the US

Medicine Fellowship Directors Group (2011) ³⁹	training in RA and acute pain medicine	
Tsui & Ip (2011) ⁴⁰	Editorial on formalised training for using ultrasound as a diagnostic tool	Using example of an incidental diagnosis on US, whether a set curriculum endorsed nationally will be of benefit to improve the competency of practitioners using ultrasound as a diagnostic tool
Ivani & Ferrante (2009) ⁴¹	Editorial on Sites (2009) ⁴²	Discussion on need for guidelines for UGRA education
Sites et al (2009) ⁴²	Joint American and European Society of Regional Anaesthesia guidelines on UGRA education	Outlines learning objectives in UGRA, characteristics of trainee and post-graduate education pathways, with a focus on technical skills
Smith et al (2009) ⁴³	Narrative review of single institution approach to RA education	Discusses integration of pre-training, needle tip skills, didactic teaching, simulation, cadaver dissection, and clinical teaching at the Mayo Clinic
Ilfeld et al (2007) ⁴⁴	Editorial on extending RA fellowships to 2 years' duration	Primary reason for extension is to incorporate academic activity. Discussion on the merits and disadvantages
Broking & Waurick (2006) ⁴⁵	Narrative review on essential components of a RA curriculum	Covered several components, raised the importance of administration and infrastructure to help support learning
Brown (2005) ⁴⁶	Editorial on Hargett et al (2005) ⁴⁷ and Neal et al (2005) ⁴⁸	Raised nuances on interpretation and conclusions from those studies
Hargett et al (2005) ⁴⁷	First edition of accreditation guidelines for fellowship training in RA and acute pain medicine	Original version of RA fellowship guidelines
Neal et al (2005) ⁴⁸	Survey of ex-RA fellows	20-year cohort of ex-fellows. Discussion on strengths and weaknesses of the RA curriculum
Brown & Boezart (2002) ⁴⁹	Editorial on Kopacz & Neal (2002) ⁵⁰	Large variability in case load and exposure amongst RA fellows
Hadzic et al (2002) ⁵¹	Narrative review of the RA curriculum	Argument that a core set of clinically appropriate blocks be well taught, as this provides the best set of tools for trainees in independent practice
Kopacz & Neal (2002) ⁵⁰	Retrospective review of an administrative database to determine use of RA by trainees	Discussion on the variability of case exposure between trainees and between institutions

Appendix 2. Articles of interest, consisting of non-peer-reviewed sources. Listed by year of publication and first author. RA: regional anaesthesia; UGRA: ultrasound-guided regional anaesthesia; US: ultrasound.

Author (year)	Description	Comments
Chuan (2016) ⁵²	PhD thesis on education and training in UGRA	A combination of six studies, investigating the psychometric properties of the direct observation of procedural skills (DOPS) tool, a specific workplace-based assessment tool for RA, and methods to improve UGRA training
Shafqat (2016) ⁵³	PhD thesis on education and training in UGRA	A combination of three studies, investigating visuospatial ability as a predictor of novice performance in UGRA, an objective structured assessment tool, and the impact of video games on RA skills
Thomas & Kaur (2016) ⁵⁴	Survey of trainee confidence after learning RA in a block room	Direct supervision by expert faculty best determinant of confidence
Gonzales et al (2015) ⁵⁵	Study to determine if institutions with RA/Acute Pain fellowships had better patient pain satisfaction scores	Slight advantage in one outcome measure, but none overall
Lim et al (2015) ⁵⁶	Survey of UGRA education and training programs	High variability of exposure to RA and UGRA in Singapore
Maniker et al (2015) ⁵⁷	Description of a web-based RA curriculum for residents	Curriculum analytics allows for continual monitoring of trainee progress and for improving curricular structure
Sodha & Sengupta (2015) ⁵⁸	Survey of RA education and training	High variability of exposure to RA and UGRA in the United Kingdom
Wilson (2015) ⁵⁹	Survey of RA and Acute Pain fellows	RA fellowship programs in the United States are consistent with respect to duration, volume, level of supervision, involvement in research/teaching, and acute pain rounds. However, lacking in simulation sessions, cadaver dissection, and formal competency assessment
Wordsworth et al (2015) ⁶⁰	Survey of RA education and training	High variability of exposure to RA and UGRA in the United Kingdom
De Andres (2014) ⁶¹	Lecture on evolution of training and education in RA and pain medicine	Discusses change from apprenticeship to competency-based teaching models
Gomes et al (2014) ⁶²	Survey of RA education and training	High variability of exposure to RA and UGRA in Portugal
Khan et al (2014) ⁶³	Survey of academic activity and fellowships	Link between exposure to research projects during fellowship to post-fellowship research and academic activity
McConville & Skibowski (2014) ⁶⁴	Survey of trainee confidence after institution of didactic and hands on UGRA workshops	Highlights importance of local faculty and trainees participating together to enhance the training experiences

Bedforth (2013) ⁶⁵	Lecture on guidelines for UGRA training	Discusses importance of the guidelines and the UGRA program director to improve the training of fellows
Borgeat (2013) ⁶⁶	Lecture on learning curves and accreditation in UGRA	Discusses differences between log book competency and true learning objectives in competency-based accreditation
Koscielniak-Nielsen (2013) ⁶⁷	Lecture on the European Diploma of Regional Anaesthesia	Accreditation of UGRA skills based on competency-based assessment
Neal (2013) ⁶⁸	Lecture on learning curves and accreditation in UGRA	Discussion on moving away from log books to focus on competency of skills in determining accreditation
Boretsky (2012) ⁶⁹	Lecture on development of an additional year fellowship in paediatric RA	Description of integration into an existing adult RA fellowship structure, but with specific paediatric applications
The Zuers Experts (2007) ⁷⁰	Expert consensus statement on describing, performing, and teaching UGRA	Formulated various definitions for UGRA that are commonly used today

Appendix 3. Documents published by institutions involved in RA training and education. Listed by institution and year of publication. AAGBI: Association of Anaesthetists of Great Britain & Ireland; ACGME: Accreditation Council for Graduate Medical Education; ANZCA: Australian and New Zealand College of Anaesthetists; CCT: Certificate of Completion of Training; EDRA: European Diploma in Regional Anaesthesia and Acute Pain Management; ESRA: European Society of Regional Anaesthesia & Pain Therapy; RCoA: Royal College of Anaesthetists; RCPSC: Royal College of Physicians and Surgeons of Canada; UEA: University of East Anglia.

Institution (Year)	Document
AAGBI et al (2011) ⁷¹	Ultrasound in Anaesthesia and Intensive Care: A Guide to Training
ACGME (2016) ⁷²	ACGME Program Requirements for Regional Anesthesiology and Acute Pain Medicine
ACGME (2016) ⁷³	Frequently Asked Questions: Regional Anesthesiology and Acute Pain Medicine
ANZCA (2017) ⁷⁴	Handbook for Training and Accreditation (ver. 1.5)
ANZCA (2017) ⁷⁵	Anaesthesia Training Program Curriculum (ver. 1.7)
ANZCA (2014) ⁷⁶	PS03 – Guidelines for the Management of Major Regional Analgesia
ANZCA (2013) ⁷⁷	PS41 – Guidelines on Acute Pain Management
ESRA (2017) ⁷⁸	EDRA extended Syllabus / Curriculum
ESRA (2017) ⁷⁹	EDRA application requirements
RCoA (2010) ⁸⁰	CCT in Anaesthetics: Annex B - Core Level Training (ver. 1.8)
RCoA (2010) ⁸¹	CCT in Anaesthetics: Annex C - Intermediate Level Training (ver. 1.8)
RCoA (2010) ⁸²	CCT in Anaesthetics: Annex D - Higher Level Training (ver. 1.8)
RCoA (2010) ⁸³	CCT in Anaesthetics: Annex E - Advanced Level Training (ver. 1.8)
RCPSC (2014) ⁸⁴	National Curriculum for Canadian Anesthesiology Residency
UEA (2016) ⁸⁵	MSc in Regional Anaesthesia: Student Handbook 2015-2016

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