Table 11 Guidelines for clinical trials vs clinical practice

Factor	Clinical trial	Clinical practice
Patient selection		
Failure of conservative treatment	At least 3 months	Preferably 3 months, but may be less in certain circumstances (eg, incapacitating pain with strong suspicion of facetogenic origin, competitive athlete, military deployment)
Physical examination	No recommendation	No recommendation
Diagnostic imaging	No recommendation	No recommendation
Facet block technique		
Injectate volume:		
Medial branch block	≤0.5 mL	≤0.5 mL
Intra-articular block	<1.5 mL	<1.5 mL
Imaging:		
Medial branch block	Fluoroscopy	Fluoroscopy
Intra-articular block	CT	Fluoroscopy or CT
Contrast	0.1–0.3 mL	With or without contrast
Sedation	None	Not routinely
Patient-reported outcomes		
Pain relief cut-off	≥50%, consider subgroup analysis for higher thresholds in efficacy studies	≥50%, with lower cut-offs considered in certain circumstances (eg, other metrics of improvement achieved)
Multiple blocks	Strongly consider for efficacy studies	Not routinely
Repeat diagnostic MBB for repeat RFA	No	No
RFA techniqueRFA technique		
Stimulation	Motor necessary; sensory recommended in the absence of multiple lesions	Motor strongly recommended; sensory at discretion of practitioner
Needle size	Large (preferably at least 18-gauge)	Large
Temperature	80°C–90°C	80°C–90°C
Duration	Preferably at least 2 min	At least 1.5 min
Multiple lesions and/ or other techniques to increase lesion size	Necessary in the absence of clear-cut stimulation benchmarks	Depends on circumstances

MBB, medial branch block; RFA, radiofrequency ablation.

QUESTION 17: IN WHICH PATIENTS SHOULD REPEAT RADIOFREQUENCY ABLATION BE CONSIDERED, AND WHAT IS THE LIKELIHOOD FOR SUCCESS? DO REPEAT DIAGNOSTIC BLOCKS NEED TO BE REPEATED?

Rationale for repeating RFA and likelihood of success

Pain relief after RFA of the facet joint nerves is durable compared with steroid injections, but still time-limited.[18 23 311–313] As a result, in current clinical practice RFA is commonly repeated on recurrence of pain. Educating patients about the possibility of temporary relief and the potential for repeated treatment is a part of the informed consent process for this treatment, and information about the likelihood of success with repeated treatment is central to this discussion. A 2012 systematic review by Smuck *et al* examined the literature on the success of repeat lumbar RFA.[314] From seven qualifying studies that provided data on repeat RF outcomes, the unweighted average success rate of repeat RFA was approximately 80% in patients who experienced a good outcome from the first RFA procedure, typically defined as at least 50% relief of pain at 3 months. The 3-month cut-off for designating an RFA procedure as a success is based on a study by Cohen *et al* in which 15 patients and 5 pain physicians were surveyed in preparation for a randomized trial of RF outcomes.[7] These repeat RFA results differed somewhat between lumbar and cervical RFA studies, with a 59% success rate based on the two qualifying lumbar studies (n=29) and an 88% success rate based on the five qualifying cervical studies (n=114). The average duration of pain relief was also similar following repeat RFA compared with the initial RFA response (10 months). Alternatively, when response to the first RFA did not meet the 3-month cut-off for a positive outcome, repeat RFA was less successful (38% based on data from the five cervical spine studies, lumbar data not available).

Additional studies that were not included in the above-mentioned systematic review, because of publication date or not meeting selection criteria, shed further light on the effectiveness of repeat RFA. A prospective cohort study by Rambaransingh *et al*[315] examined outcomes in patients with successful response to an initial lumbar medial branch RFA who underwent a second (n=58) and third (n=29) RFA treatment, demonstrating the repeatability of treatment success. Clinically meaningful mean improvements in pain and disability were observed after each of the RFA treatments, and without statistical differences in treatment duration or effect size between the first, second and third RFAs (mean pain score reductions of 3.2, 3.3 and 4.1, respectively). Son *et al* performed a retrospective analysis in 60 patients who received one or two repeat lumbar medial branch RFAs after an earlier successful treatment.[316] The first and second repeat RFAs were successful in 91% and 80% of cases, respectively, with no statistical differences in the duration of relief (mean duration 10.9 and 10.2 months after the initial and repeat procedures, respectively). Similar results were reported by Kim *et al* (95% success rate with repeat RFA) in a retrospective cohort study evaluating 56 patients with facet joint pain following lumbar microdiscectomy who were treated with a repeat RFA when pain returned following a previously successful RFA.[317] In this study, the proportion of patients with >50% pain relief was 91% for the second procedure (mean duration of relief 10.2 months) and 80% after the third procedure (mean duration 9.8 months). More recently, MacVicar *et al*[216] described outcomes from a prospective consecutive cohort (n=106) treated with lumbar RFA whereby 56% experienced complete relief of pain, full restoration of function and no need for analgesic medications or other back pain treatments for a median duration of 15 months. Fifty-six per cent of these patients received repeat RFA (between one and five treatments) with all experiencing similar robust treatment effects and durations of benefit (median 13 months) following the repeat procedures.

In summary, there is good evidence to support repeat medial branch RFA, with a high likelihood of success (at least 80%) in patients who experience at least 50% pain relief for a period of 3 months or longer following their initial RFA treatment. According to multiple studies, improvements in pain and function and duration of benefits are similar between repeat and initial lumbar facet RFA treatments.

Rationale for durability and repeatability of RFA

The mechanisms that underlie the durability of RFA outcomes remain under debate. The electrode temperature and duration of the RF delivery are intentionally chosen to cause axonal destruction and Wallerian degeneration of the medial branch nerve, but are not sufficient to injure the collagenous tissues that form the nerve sheath (ie, third-degree peripheral nerve injury based on the Sunderland nerve injury classification).[248 318] As a result, the proximal surviving axons can regenerate via the intact neural tube and re-establish facet joint innervation and pain perception. This is the most likely reason that some patients experience return of pain and need to repeat the procedure. What is