



UNIVERSITY OF LEEDS

This is a repository copy of *Intra-articular therapies: patient preferences and professional practices in European countries*.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/183808/>

Version: Accepted Version

Article:

de la Torre-Aboki, J, Uson, J, Pitsillidou, I et al. (15 more authors) (2022) Intra-articular therapies: patient preferences and professional practices in European countries.

Rheumatology International, 42 (5). pp. 869-878. ISSN 0172-8172

<https://doi.org/10.1007/s00296-021-05045-5>

© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2021. This is an author produced version of an article, published in Rheumatology International. Uploaded in accordance with the publisher's self-archiving policy.

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

Intra-articular therapies: Patient preferences and Professional practices in European countries

Jenny de la Torre-Aboki; Hospital General Universitario, Alicante, Spain-ORCID 000-0002-4905-2034

Jacqueline Uson; Department of Rheumatology, Hospital Universitario de Móstoles, Universidad Rey Juan Carlos. Madrid, Spain – ORCID 0000-0002-2933-4878

Irene Pitsillidou; EULAR Patient Research Partner, Executive Secretary of Cyprus League Against Rheumatism

Valentina Vardanyan; Yerevan State Medical University, Mikayelyan University Hospital, Yerevan, Armenia - ORCID 0000-0002-8582-7837

Elena Nikiphorou; Centre for Rheumatic Diseases, King's College London, and Rheumatology Department, King's College Hospital, London, UK - ORCID 0000-0001-6847-3726

Sebastian C Rodriguez-Garcia; La Princesa University Hospital. Princesa Health Research Institute. Madrid, Spain - ORCID 0000-0002-7773-151X

Raul Castellanos-Moreira; Hospital Clínic I Provincial, Barcelona, Spain – ORCID 0000-0002-4104-4101

Hemant Pandit; University of Leeds, UK - ORCID 0000-0001-7392-8561

Terence W O'Neill; Centre for Epidemiology Versus Arthritis, University of Manchester & NIHR Manchester Biomedical Research Centre, Manchester University NHS Foundation Trust, Manchester, UK - ORCID 0000-0002-8896-4677

Michael Doherty; University of Nottingham, UK - ORCID 0000-0002-5763-8326

Mikael Boesen; Department of Radiology, Copenhagen University Hospital Bispebjerg-Frederiksberg, Frederiksberg, Denmark - ORCID 0000-0002-8774-6563

Ingrid Möller; Instituto Poal de Reumatología. Universidad de Barcelona. Barcelona, Spain - ORCID 0000-0002-9225-2568

Lene Terslev; Center for Rheumatology and Spine Diseases, Rigshospitalet, Glostrup, Denmark - ORCID 0000-0001-8193-9471

Maria Antonietta D'Agostino; Catholic University of Sacred Heart-Policlinico Universitario A Gemelli IRCCS, Rome ITALY - ORCID 0000-0002-5347-0060

Willm Uwe Kampen; Nuklearmedizin Spitalerhof, Radiologische Allianz, Hamburg, Germany. - ORCID 0000-0002-3500-9713

Francis Berenbaum; Sorbonne Université, INSERM CRSA, AP-HP Saint-Antoine Hospital, Paris France – ORCID 0000-0001-8252-7815

Esperanza Naredo; Department of Rheumatology, Joint and Bone Research Unit. Hospital Universitario Fundación Jiménez Díaz, IIS Fundación Jiménez Díaz and Universidad Autónoma de Madrid. Madrid, Spain. - ORCID 0000-0003-0017-0096

Loreto Carmona; InMusc, Madrid, SPAIN – ORCID 0000-0002-4401-2551

Corresponding author

Loreto Carmona

Instituto de Salud Musculoesquelética, InMusc

Calle Ofelia Nieto, 10

28039 Madrid, SPAIN

loreto.carmona@inmusc.eu

Acknowledgements

The authors are indebted to the associations that forwarded the surveys to their members and to those who retweeted or posted the links in social media. We also want to acknowledge the help of Alzbeta Gohmann at the EULAR house for translating the patient survey into Czech, Ilhab Diri for checking the German translation, and Concha Cantalapiedra for uploading all surveys to SurveyMonkey©.

ABSTRACT

To assess patient perspective and professional practice of intraarticular therapies (IATs) across Europe, an expert international multidisciplinary panel designed two open web-based surveys: one targeting people who had experienced at least two IATs (44 items); and one targeting health care providers (HCPs) (160 items). Surveys were disseminated via patient and professional associations and social media. A descriptive analysis was performed. The surveys were answered by 200 patients and 186 HCPs from 26 countries, showing that IAT is routinely performed by rheumatologists (97%) and orthopaedic surgeons (89%), with specific training being compulsory in a few countries. The most frequent indications for IAT are arthritis (76%), osteoarthritis (74%), crystal arthritis (71%) and bursitis (70%); the most frequently injected joints are knee (78%) and shoulder (70%); and the most used compounds are glucocorticoids. The majority of HCPs report informing patients about side-effects (73%), benefits (72%), and the nature of the procedure (72%), which coincides with 27% of patients reporting that they had not been informed about benefits or potential complications of IATs; 73% of patients had not been asked whether they wanted an anaesthetic. Few HCPs (10%) obtain written consent (56% get oral consent, being mandatory for 32%), a procedure deemed necessary by 41% of the patients. 50% of patients reported a clear benefit of IAT and 20% experienced complications including pain, impaired mobility, rashes, or swelling. In summary, the practice of IAT is variable across Europe, and although patients perceive it as relatively safe and usually effective procedure, some gaps were identified.

Keywords

Intraarticular therapies; glucocorticoids; infiltrations; clinical practice; patient's experience; surveys

Declarations

Funding

This specific survey was not funded, but the recommendations they support were supported by EULAR grant CL 109.

Conflicts of interest

All authors declare no conflicts of interest in relation to the topic under study.

Availability of data and material

The surveys and material are available upon reasonable request to the corresponding author.

Code availability

The surveys were launched in the platform SurveyMonkey© and the analysis were run in Stata©. The statistical code is available upon request to the corresponding author.

Authors' contributions

JdIT and IP designed the first draft of the surveys with the help of JU and LC, which was reviewed by all other authors. The surveys were analysed by LC. JdIT, IP, LC, JU, and EN drafted the manuscript. All other authors contributed to the corrections and discussion.

Ethics approval

The study was exempt from ethics committee review, in accordance with national criteria, as it was not considered clinical research.

Consent to participate

The answer to the surveys was volunteer and consent was implicit in the answer. The first page explained the aims and contents, including the will to contribute.

Consent for publication

There was not specific consent for publication by survey participants. All authors gave consent for publication.

INTRODUCTION

Intra-articular therapies (IATs) are routinely used for many rheumatic and musculoskeletal diseases (RMDs) to treat resistant mono or oligoarticular pain and synovitis [1,2]. IATs encompass a variety of products, including glucocorticoids, analgesics, hyaluronic acid, autologous blood products and radiopharmaceuticals, among others, depending on the joint and the purpose of the treatment [3-7]. Rheumatologists and other health care providers (HCPs) use the above injectables in different modes, doses, and with different indications, with or without imaging-guidance (e.g., ultrasound, fluoroscopy) [4,8,9].

The common perception and hypothesis of this work, is that a large variability exists regarding current practice and delivery of IATs amongst health professionals [2]. Physicians and other HCPs have different views and habits depending on geographic locations, health care systems, training, and age. Furthermore, the patient's experience about the procedures has not been explored. In order to improve the effectiveness and safety of IATs, it is essential to understand patient perceptions and needs, as well as to describe the current practices of HCPs, with a general aim to identify and standardise best practice.

The objectives of this study were to assess the perspective of patients who have experienced IATs and to assess how HCPs use IATs across Europe.

METHODS

Under the auspices of European Alliance of Associations of Rheumatology (EULAR), an international panel of experienced rheumatologists, an orthopaedic surgeon, a radiologist, a rheumatology nurse, a nuclear medicine specialist, and a patient research partner (PRP) was established. The aim of the taskforce was to establish evidence-based recommendations for the use of IATs in people with RMDs [10]. Panel discussions led to suggest the need to know how patients experience IATs, how these are performed, whether anaesthetics are used, which compounds are injected, for what indications and with what aids, etc. Although such enquiries have been carried out in primary care and non-rheumatology settings, they have not been done in the rheumatology context and patient perspectives have not been obtained [11-13].

The decision was to design two open internet-based voluntary surveys with items considered important to patients and HCPs, respectively. The items were suggested by the steering committee and sent out for discussion to all the panel members. The professionals' survey consisted of 160 items and was open to any health professional treating people with RMDs, irrespective of performing IATs themselves. The patient survey contained 44 items, the target being people who had experienced at least two

intra-articular injections (the surveys are available as Supplementary material). Participants were informed up front of the contents and length of the survey, no question was mandatory, and no incentives were given.

The surveys were uploaded in SurveyMonkey®, tested and re-tested by the authors, and once deemed without errors, the patient survey was translated into 11 languages, and their links disseminated via professional societies and patient associations, as well as by social media (See Supplementary material for the text used to publicise it). Both were active for three months.

Descriptive statistics were used to summarise quantitative results, and inductive codification was used to synthesise results of open-ended questions by a single coder.

The study was exempt from research ethics committee review, in accordance with Spanish regulations, as voluntary surveys are not considered clinical research and it was completely anonymous.

RESULTS

Respondents' profiles

The survey of professionals was answered by 186 HCPs, the large majority of whom were rheumatologists (77%), followed by nurses (12%), general practitioners (2%), orthopaedic surgeons (2%) and others (one anaesthesiologist/pain specialist, two internists, two nuclear medicine specialists, two occupational therapists, one paediatric rheumatologist, two physiotherapists, as well as one sports medicine specialist). The sample was obtained from Spain (25%), Netherlands (23%), Belgium (11%), Portugal (6%), France (5%), Denmark (5%), Norway (4%), Albania (4%), United Kingdom (3%), Austria (2%), Germany (1%), Italy (1%), Slovenia (1%), Switzerland (1%), and one from each of the following countries: Czech Republic, Estonia, Luxembourg, Moldova, San Marino, Sweden, and Ukraine.

Participants worked mainly in National Health Service centres (75%), followed by private practice (14%), community/primary care practices (6%), and university hospitals (not in the National Health Service, 5%).

The patient survey was answered by 200 people in 9 of the 11 languages: 70 (35%) in English, 49 (25%) in Dutch, 25 (13%) in Czech, 21 (11%) in Greek, 12 (6%) in Spanish, 11 (6%) in French, 6 (3%) in Portuguese, and 2 (1%) in Polish. No one answered the survey in German or Russian.

The diseases reported by the participants were (in order of frequency): rheumatoid arthritis 131 (66%), osteoarthritis 41 (21%), spondyloarthritis 20 (10%), psoriatic

arthritis 18 (9%), fibromyalgia 7 (4%), juvenile idiopathic arthritis 6 (3%), lupus 5 (3%), Sjögren's syndrome 5 (3%), and other RMD 18 (9%)—including scleroderma (n=3), SAPHO (n=2), gout (n=1), Behçet's syndrome (n=1), chondromalacia (n=1), diffuse idiopathic skeletal hyperostosis (n=1), mixed-connective tissue disorder (n=1), meniscus tear (n=1), and vasculitis (n=1).

Professionals who deliver IATs and their training

Most of the HCPs per country or region that deliver IATs are rheumatologists and orthopaedic surgeons (Table 1).

Table 1. Professionals in charge of performing IATs.

Professionals	Yes	No	Unsure
Rheumatologists	180 (97%)	1 (1%)	5 (3%)
Orthopaedic surgeons	166 (89%)	4 (2%)	16 (8%)
General practitioners	106 (57%)	45 (25%)	35 (18%)
Sports medicine specialists	104 (56%)	21 (11%)	61 (33%)
Radiologists	103 (55%)	45 (24%)	38 (20%)
Nuclear Medicine specialists	33 (18%)	80 (43%)	73 (39%)
Physiotherapists	25 (13%)	128 (69%)	33 (28%)
Nurses	11 (6%)	146 (78%)	29 (16%)
Occupational therapists	6 (3%)	125 (67%)	55 (30%)
Other specialists (open-ended)			
Pain medicine specialists	2 (1%)		
Paediatric rheumatologists	1 (1%)		
Physician assistants	5 (3%)		
Rehabilitation specialists	1 (1%)		

Cells represent absolute and (relative frequencies).

Eight percent of HCPs who responded to the survey (11 nurses, 2 physiotherapists, 1 rheumatologist, and 1 occupational therapist) had never performed an IAT nor referred a patient to an HCP to have one.

Forty-seven percent (n=87) of HCPs reported having received specific training to perform IATs. Thirty-two percent (n=60) had not, and 21% (n=39) did not answer.

Indications, target joints, and compounds used

In order of frequency, the indications to deliver IATs are inflammatory arthritis/synovitis 76% (n=142), osteoarthritis 74% (n=137), crystal arthritis 71% (n=132), bursitis 70% (n=130), capsulitis 48% (n=90), haemarthrosis (n=2) and synovitis after joint replacement (n=1). Thirty six percent of the HCPs (n=67) performed intra-articular injections also for diagnostic purposes, namely, to determine the origin of pain.

The most commonly injected joints in order of frequency were knees (78%, n=145), shoulders (70%, n=131), wrists 125 (67%, n=127), finger joints (124, n=67%), ankles (63%, n=118), elbows (62%, n=116), toes (52%, n=97), and hips (34%, n=63). Other injected joints were the acromioclavicular or sternoclavicular (n=4), sacroiliac (n=2), and temporomandibular joints (n=2).

The mean number of intraarticular injections per patient was 7, ranging from 1 to 60. Patients responded in similar order of frequency as HCP when asked what joints had injected, specifically: knees (66%, n=132), shoulders (42%, n=83), wrists (28%, n=55), fingers 21%, n=41), elbows (20%, n=40), hip (20%, n=39), ankles (19%, n=38), and toes 15 (8%, n=15).

Glucocorticoids (GC) were the most used compounds by the HCPs, followed by hyaluronic acid and saline/dry puncture. Several participants specified that they only use GC for injections (n=4). A nuclear medicine physician mentioned that GC are always co-injected with radioisotopes. Several rheumatologists specified that in their setting, platelet rich plasma is not available.

When patients were asked whether they remembered what substance was used in their last joint injection, they responded in order of frequency: GC (83%, n=166), hyaluronic acid (16%, n=31), platelet-rich plasma (4%, n=7), radiopharmaceuticals (4%, n=7), anaesthetic only (3%, n=6) and others (3%, n=6), such as stem cells, ozone, Botox, collagen, glucose or dry puncture. Thirty (15%) did not know or could not remember what compound was injected.

Specific situations

One of the objectives of the survey was to test how often HCPs use IATs in certain clinical settings where evidence is lacking. To answer these questions, they were asked to think of an accessible joint, like the knee, without considering the reason for performing IAT. Table 2 shows the percentage of injectables used in different clinical situations.

Table 2. Percentage of health professionals who would use IATs under specific clinical situations.

Clinical situation	% Compounds				
	GC	HA	RI	PRP	PBO
Pre-surgical patient	32	19	5	3	10
A joint with a prosthesis	8	4	3	1	6
Cellulitis near the joint to inject	4	1	1	0	6
A psoriasis plaque near the joint to inject	31	7	4	3	5
A joint infected in the past	23	12	5	3	10
A septic joint	3	1	0	0	16
A pregnant woman	55	11	1	3	8
A patient with diabetes	58	31	8	7	9
A patient with hypertension	63	32	8	7	9
An obese patient	66	33	8	7	9
A patient with clotting impairment	42	14	3	3	7
A patient taking classic anticoagulants	55	19	5	4	8
A patient taking modern anticoagulants	56	20	5	4	8
Joints with a Kellgren-Lawrence IV	30	10	2	2	5

Abbreviations: GC, glucocorticoid; HA, hyaluronic acid; RI, radioisotope; PRP, Platelet-rich plasma; PBO, placebo, saline, or dry puncture.

Cells represent % of health professionals who would use the specific compound in the specific situation.

Several professionals highlighted that orthopaedic surgeons usually advice not to inject steroids three months prior to arthroplasty to decrease prosthetic infection risk, and that in some countries rheumatologists are not allowed to inject prosthetic joints.

Regarding IAT in previously infected joints, one professional added that the decision to inject depends on the time elapsed since infection, the reason for IAT, as well as the type of injectable. In septic joints, some professionals mentioned that they perform arthrocentesis, i.e., for diagnostic purposes, and one said that GC could be injected a few days after starting intravenous antibiotic drugs. Another one added that IAT during pregnancy should be performed when necessary and in agreement with the gynaecologist and the patient. When delivering IA GC in diabetic patients, several professionals pointed-out the importance of knowing whether diabetes was controlled and informing about the need to monitor glucose blood levels after injection. Similar

comments (controlled disease, and monitoring) arose with IA GC in hypertensive patients. In patients with clotting impairments, one professional specified that he would inject only in the presence of joint effusion and only in patients taking classic anticoagulants. Three said that the decision to inject depends on the joint, and that they would only inject the knee or large joints in those patients with safe INR levels.

Finally, several professionals said that IATs provide no benefit in patients with Kellgren-Lawrence grade IV OA, except when there is joint effusion or when the joint space is easily visualised with imaging. Additionally, some said that the threshold to perform IATs is higher in patients with diabetes, clotting impairment, pregnancy, and anticoagulation therapy, suggesting the need for additional safety measures and monitoring.

Image guidance: Ultrasound (US) and Fluoroscopy

US can be used in many steps of the intra-articular procedure. Forty-one HCP (22%) never use US, 90 (49%) sometimes or often and 4 (2%) always (27% did not respond to this question). One commented that US should be only used to help inject difficult joints. Fluoroscopic guided injections were never used by 68% and always used by 2 (both nuclear medicine experts).

As to the patients, 65% never received an US-guided IAT. Those that had experienced IAT both with and without US guidance (63%, n=42) preferred to have US guidance, although some patients (28%, n=19) had no preference. Patients who favoured US-guided IAT said they felt more confident with the procedure. Some patients suggested that the use of US to help guide IAT may be associated with the doctor's injection skills and experience. Thus, those more skilled in performing injections would perform less US-guided procedures.

HCPs considered that the reason to perform US-guided IAT is the ability to perform an US examination and the experience with the US-guided injection procedure. Many suggested that it makes the patient feel more confident as well as the doctor. In addition, some said that, in their experience, US-guided IAT was more effective than injections without image-guidance. Others added that more difficult joints such as shoulder, hip and temporomandibular are easier and safer injected when US is used. Furthermore, many believed that US guidance is not needed if synovial fluid is aspirated before injecting the compound, especially at the knee.

Accuracy

The importance of accurately placing the needle in the joint was asked depending on the joints size. Table 3 shows that most HCPs believed that it is important and very important to accurately inject small joints.

Table 3. Importance of accurately placing the needle in the joint.

Size of joint	Not at all	Little	Moderately	Largely	Very	(missing)
Large	2 (1%)	4 (2%)	32 (17%)	98 (53%)	-	50 (27%)
Small	1 (1%)	13 (7%)	-	59 (32%)	62 (33%)	51 (27%)

Cells represent absolute numbers and relative frequencies (%).

Aspiration

Aspiration can be used to diagnose, treat, and confirm that the needle is inside the joint. In patients with effusion, 19% (n=36) of the HCPs aspirate synovial fluid as much as they can while 2% (n=3) simply aspirate small amounts, and 1 never aspirates synovial fluid (27% did not answer this question).

Re-injecting

The appropriate number of IATs when using GC, from a benefit-risk standpoint, is a controversial issue. When asked whether HCPs had ever injected GC into the same joint more than three times per year, 47% (n=88) responded affirmatively, 31% (n=58) negatively, and 22% (n=40) did not respond. The majority of the HCPs (65%) considered that maximum number of safe GC injections in the same joint per joint would be 2 to 3 (10% 4 to 6, 2% 6 to 12, 2% unlimited, and 22% did not respond).

Taking patients into account

Sixty three percent of the HCPs consider patient-centred outcomes when using IATs (12% do not consider patient-centred outcomes, and 24% did not respond). Regarding what outcomes are considered, the majority specified benefits (62%, n=116) and then harms (49%, n=9), patient preferences (44%, n=81), post-injection self-care (25%, n=46) and costs (20%, n=38). Some professionals considered systemic drug adherence and fears.

Information

Prior to consent to perform IAT, patients need to be informed about the nature and possible benefits and risks of the procedure. The different aspects surveyed, and HCPs responses are described in Table 4. Interestingly, 27% (n=54) of the patients said that they were not informed prior to their last IAT about the benefits and potential complications.

Table 4. Different concerns that HCPs deal with patients before an IAT procedure.

	HCP positive responses
Side effects	136 (73%)
Benefits	134 (72%)
The nature of the procedure	133 (72%)
Post-injection care, including rest, dressing	112 (60%)
Infections	102 (55%)
Post-injection flash	83 (44%)
Atrophy or other skin disorders	73 (39%)
Post-injection arthritis	60 (32%)
Vagal reactions and Syncope	37 (20%)
Interactions	37 (20%)

Abbreviations: HCP, health care providers.

Cells represent absolute numbers and relative frequencies (%).

Related with GC injectables, some HCPs added that they informed about post-injection palpitation, hyperglycaemia, the need to monitor glucose in diabetes, hypopigmentation of dark skin, risk of bleeding, arthritis, and atrophy especially in those patients who want repeat injections and more so when the indication to inject is unclear. One professional commented that depending on the dose of GC certain side-effects may never occur. Related with radioisotopes, several pointed out the importance of informing about radionecrosis, a rare complication of injectable radiopharmaceuticals.

Consent

To perform IAT, 66% (n=123) of the HCPs asked for patient consent either orally (56%) or written (10%). Patient consent was mandatory in 32% of the professionals' settings. At their most recent IATs, 84% (n=168) of the patients gave some consent (69% orally, 15% signed a written form), 10% (n=19) were not formally asked for consent and 7% (n=13) could not remember. Forty one percent (n=83) of the patients felt that written consent should be mandatory, however, 59% (n=117) felt that usually it was not needed. Some thought that a formal consent is not needed in a long-term patient-doctor relationship, when it is not the first injection, or when the doctor is highly experienced. On the other hand, they felt that a formal consent might be needed when the injection has potential adverse effects, when requested by the patient, when

receiving the first IAT, when doctors want to avoid later claims or when using an experimental drug.

Shared decision-making

Fifty two percent (n=97) and 23% (n=42) of the HCPs said, respectively, that they would very likely or likely share with the patient the decision to perform IAT (25% did not respond). Patients clarified that regardless of whether or not they sign a consent form, they want to know from the practitioner what is being injected, the expected benefits, after care, and potential harms of the injection.

Injection setting and procedure

A few questions for the HCPs enquired about the setting and procedure used in IAT. Table 5 shows how often IAT procedures met different important questioned aspects.

Table 5. IAT procedure setting issues.

	Never	Seldom	Often	Always	Missing
Quiet room	1%	4%	27%	44%	25%
Privacy	1%	4%	17%	54%	24%
Professional image	1%	4%	20%	51%	25%
Clean room	-	1%	12%	63%	24%
Adequate lighting	-	1%	15%	59%	25%
Resuscitation equipment at hand	20%	19%	11%	24%	25%
Patient in an appropriate position*	-	1%	15%	58%	25%
Health professional aid	18%	27%	18%	10%	26%
Gloves	10%	13%	8%	41%	27%
Mask	49%	15%	2%	6%	27%
In an operating theatre	53%	10%	3%	6%	28%
Use additional asepsis for US-guidance	33%	9%	10%	13%	35%

* Ideally in a couch / examining table, easy to lie flat.
Cells represent relative frequencies (%)

Regarding vasovagal reactions, 11% (n=21) of the HCPs had never witnessed one, and 63% (n=118) seldom had. When asked what is done to avoid a vasovagal reaction the HCP answered: to have the patient lying flat (n=54); to reassure and inform, (n=14); to perform distraction manoeuvres and relaxation (n=11); to rest after procedure and to stand up slowly (n=7); to check the patient during injection (n=4); to ask about a previous syncope (4); to avoid a hot room (n=3); to have aid from another health professional (n=2); to place the patient in the Trendelenburg position (n=2); and to take time (n=1). The majority of the HCPs (68%) did not use non-pharmacological intervention prior or during the IAT. Those that did, used breathing techniques, relaxation or visualizations techniques, and others included above.

Anaesthetics

HCPs never, seldom, often, or always used local anaesthetics in 35% (n=65), 16% (n=30), 10% (n=18) and 11% (n=29) of the cases, respectively (29% did not answer). Topical anaesthetics were never used in 38% (n=70) and local anaesthetic, such as lidocaine, was always used in 10% (n=19) and often used in 23% (n=42).

Patients were asked whether their HCP offered anaesthetic with their last IAT. Seventy three percent (n=145) said no, 22% (n=43) yes and 6% (n=11) did not remember. Those who were given anaesthetics received more often a local anaesthetic mixed with the injectable, followed by topical anaesthetic (spray, gel, or cream) and both topical and local anaesthetics.

After care

HCPs most often suggested rest post-IAT, such as a 24-hour home rest (59%, n=109, range 0-72 h), a short rest at the clinic (27%, n=50), or an in-patient rest (3%, n=6). Support dressing in weight-bearing and non-weight bearing joints was recommended (19% and 4%, respectively). Other after-care measures mentioned were ice pads, no heavy physical activity and use of paracetamol/anti-inflammatory drugs. One professional suggested that post-IAT care may differ depending on the joint and injectable used.

Perceived efficacy of IAT

The placebo effect of IAT was thought by the HCPs to be in order of frequency as follows: "15-30%" (45%), "0-15%" (17%), "30-45%" (13%), and "45-60%" (3%).

Fifty percent (n=98) of the patients said that they had improved very much after having their last IAT, 32% (n=63) had experienced some improvement, while 17% (n=34) experienced no improvement at all. Improvements were regarded as pain reduction (from very little to completely) increased joint mobility (facilitating post-injection physical therapy), reduced stiffness, improved flexibility, and reduced arthritic activity (less

swelling or less fluid in the joint). Improvement was either immediate or within 36 hours or after 3 weeks and lasted from as little as days or weeks to years.

Safety

Twenty percent (n=40) patients experienced post-IAT complications, such as dizziness, fever, fluid leakage and swelling below the joint, hair loss, hematoma, hives, hyperglycaemia, ice spray burned skin, impaired mobility, inability to use the injected joint for longer than expected, increased pain in the joints after the procedure, increased swelling, insomnia and mood changes, joint blockage, pain during the procedure, panic attack, paralysis, post-injection crystallisation, rash, redness in the injection area, respiratory arrest, severe oedema, skin thinning, syncope, tachycardia, and weakness.

Suggestions for improvement

Finally, patients were encouraged to suggest, in their own words, what issues or things about IAT they would most like to improve. Their suggestions are listed in Table 6.

Table 6. Suggestions to improve the experience of IAT by people who have experienced at least two IAT procedures.

Domain	Description / detail	Patient quotes
Accessibility / availability	<ul style="list-style-type: none"> Allow to have more often IAT in patients in whom IAT works Include among potential treatments Use early enough in problematic joints. Do not wait to have more pain Use affordable efficacious compounds Have intra-articular medications in stock to avoid waiting 	<ul style="list-style-type: none"> <i>'They should be used more because they save the rest of the body from so much medicine'.</i> <i>'Reimbursement or at least support for the hyaluronic acid syringe'.</i> <i>'Should be able to be offered directly at home or closer to home to avoid overusing the joint right after injection'</i>
Less painful procedures	<ul style="list-style-type: none"> Local anaesthetics Optional Nitrous oxide (breathing anaesthetic) Better injection procedures Smaller and thinner needles 	<ul style="list-style-type: none"> <i>'If they could be painless that would be great!'</i>
More efficacy	<ul style="list-style-type: none"> Faster Longer lasting 	<ul style="list-style-type: none"> <i>'That they were more beneficial'</i>
Less side-effects	<ul style="list-style-type: none"> In general Less or no long-term side effects (with multiple injections) No harm in the joint (cartilage, ligaments, tendons) 	<ul style="list-style-type: none"> <i>'I got dizzy in both. I think it was because it was after lunch. I'd rather have them finish quickly than slowly trying not to hurt me'</i>
Better shared	<ul style="list-style-type: none"> A clear diagnosis beforehand 	<ul style="list-style-type: none"> <i>'Have information about the product'</i>

Domain	Description / detail	Patient quotes
decision making with the HCP.	<p>More effective communication</p> <p>Indications and benefits</p> <p>Decision between IAT or intra-muscular</p> <p>Different types and forms of corticosteroids</p> <p>Clear information about</p> <p>Chances of success and failure</p> <p>Complications</p> <p>Side-effects</p> <p>Symptoms you may experience after the procedure</p> <p>Worsening of pain a few days after the injection before it subsides.</p> <p>The type of compound injected</p> <p>Anaesthetic and options</p> <p>The procedure</p> <p>Precautions like</p> <p>Avoid after large food intake (vasovagal reactions)</p> <p>Care after the procedure</p> <p>How to act afterwards</p> <p>What is not allowed</p> <p>Unambiguous advice on whether the joint should rest or not after injection</p> <p>When and what physiotherapy exercises can be done</p> <p>Whom to contact if there is a problem</p> <p>Standardised documents with things useful to patients (leaflets)</p> <p>Written consent</p>	<p><i>used, its side effects etc.'</i></p> <p><i>'Sometimes a little more explanation and more humane treatment'</i></p> <p><i>'Giving patients a full description of the process if they want to know'.</i></p>
Follow up to check whether the procedure worked.	<p>Information on what to do if it does not work</p> <p>Telephone follow-up calls or planned visits</p>	<p><i>'Follow up to see if it worked. More time to plan as wasn't advised would not be able use joint'</i></p>
Better accuracy	<p>Have ultrasound available in case is needed.</p> <p>Confidence that the person delivering has experience and specific training in how to do the procedure</p>	<p><i>'Confidence that the person delivering knows how to give them'</i></p> <p><i>'Standardised approach'</i></p>
During the procedure,	<p>Be more reassuring</p> <p>Stay more relaxed</p>	<p><i>'Sometimes a little more explanation and more humane treatment'</i></p>

Domain	Description / detail	Patient quotes
the doctor should	<p>More humane treatment</p> <p>Go neither too fast nor too slow</p> <p>Make sure anaesthetic has worked</p>	<p><i>'When supporting the knee from below, the injection was much less painful, when the knee was placed on the mat, I tended to bend it reflexively, which made the injection difficult. Not every doctor practices it that way, I don't know if they even know about it.'</i></p>

DISCUSSION

These surveys inform about common practice aspects of IAT across Europe, and about patient perspectives on the procedure. Besides describing common practice, they also reflect different experiences, protocols, and regulations, and, importantly, opinions and even beliefs about IAT.

By presenting both surveys together we wanted to highlight both perspectives and confront experiences. Inevitably, the populations and questions differ between surveys, and so it is not possible to make direct comparisons. That is the reason why perspectives in the same topic are presented one after the other. Importantly, the sample included responses from a wide range of HCP roles drawn from many countries and also patients with a wide range of rheumatic diseases.

Many responses reflect marked variability among HCPs and their training to perform IAT. Both professional background and specific training have been shown to be diverse across Europe. This could be due to the marked variability in aims, structure, and content of postgraduate training programmes [14-20]. In a European survey, residents and young rheumatologists felt quite confident in performing knee aspiration (average 9/10), although confidence was statistically greater in those who had received formal training [19]. Other more challenging IA procedures were not surveyed, and the difference would probably be larger. Also, the competencies among other professionals, such as rheumatology nurses, is unclear, and it is likely that the differences between countries for other professionals is even more marked. Training should guarantee minimum quality standards and aim for best practices. However, IATs, despite being common practice in rheumatology, are not part of standardised training in all HCP curricula [15].

Many responses might reflect the unclear evidence on these procedures, for which gaining technical experience is usually the goal of training, and not really challenging practice by appraising evidence. In a series of systematic reviews on IAT we were able

to confirm the existence of some potential misconceptions or enlarged risks around IAT, such as the need of asepsis or of ultrasound-guided IAT, glucose monitoring in diabetes, and risk of hypertension, among others [21]. Of note, very few studies had been done by rheumatologists, who undertake these IAT most frequently. Also, the large placebo effect of IAT seems not to be taken enough into account [22]. Clearly, there are many contextual factors that may contribute to the effect of IAT, and both HCPs and patients have identified a few, like local regulations/protocols, the perceived experience of the HCP performing the procedure, or post-injection behaviour.

In addition to professional practices, our study shows for the first time, to the best of our knowledge, the perspective of patients who have experienced IATs, including perceptions on benefits, risks, and safety. Despite considering IAT useful and safe, patients would like better IAT therapies, less painful injections and procedures performed by trained specialists. IAT should be patient-centred, however, training is mostly oriented to the technique itself and not to the broader procedure of IAT, and there were many gaps on what patients felt should be done, and what is being done. An example is the use of anaesthetics. The majority of patients wanted at least to be involved in deciding whether they should have prior local anaesthetics or not, while some professionals never use anaesthetic for IAT.

In conclusion, there is variability and important gaps in several factors related to the practice of IATs. Patients perceive IATs as relatively safe, though painful, and with varying effect. This information has been instrumental in informing the recommendations to guide HCPs using IAT in adult patients.

REFERENCES

1. Canoso J, Naredo E (2011) Aspiration and injection of joints and periacicular tissue intralesional therapy. In: Rheumatology, 5. 5 edn. Mosby Elsevier, Philadelphia, pp 617-627
2. Maricar N, Parkes MJ, Callaghan MJ, Felson DT et al. (2013) Where and how to inject the knee--a systematic review. *Semin Arthritis Rheum* 43 (2):195-203.
<https://doi.org/10.1016/j.semarthrit.2013.04.010>
3. Bowden DJ, Byrne CA, Alkhayat A, Eustace SJ et al. (2017) Injectable Viscoelastic Supplements: A Review for Radiologists. *AJR Am J Roentgenol* 209 (4):883-888.
<https://doi.org/10.2214/AJR.17.17847>
4. Fischer M, Modder G (2002) Radionuclide therapy of inflammatory joint diseases. *Nucl Med Commun* 23 (9):829-831.
<https://doi.org/10.1097/00006231-200209000-00003>

5. Hetland ML, Ostergaard M, Ejbjerg B, Jacobsen S et al. (2012) Short- and long-term efficacy of intra-articular injections with betamethasone as part of a treat-to-target strategy in early rheumatoid arthritis: impact of joint area, repeated injections, MRI findings, anti-CCP, IgM-RF and CRP. *Ann Rheum Dis* 71 (6):851-856.

<https://doi.org/10.1136/annrheumdis-2011-200632>

6. Jevsevar D, Donnelly P, Brown GA, Cummins DS (2015) Viscosupplementation for Osteoarthritis of the Knee: A Systematic Review of the Evidence. *J Bone Joint Surg Am* 97 (24):2047-2060.

<https://doi.org/10.2106/JBJS.N.00743>

7. Ornetti P, Nourissat G, Berenbaum F, Sellam J et al. (2016) Does platelet-rich plasma have a role in the treatment of osteoarthritis? *Joint Bone Spine* 83 (1):31-36.

<https://doi.org/10.1016/j.jbspin.2015.05.002>

8. D'Agostino MA, Schmidt WA (2013) Ultrasound-guided injections in rheumatology: actual knowledge on efficacy and procedures. *Best Pract Res Clin Rheumatol* 27 (2):283-294.

<https://doi.org/10.1016/j.berh.2013.04.001>

9. Naredo E, Cabero F, Beneyto P, Cruz A et al. (2004) A randomized comparative study of short term response to blind injection versus sonographic-guided injection of local corticosteroids in patients with painful shoulder. *J Rheumatol* 31 (2):308-314.

10. Uson J, Rodriguez-Garcia SC, Castellanos-Moreira R, O'Neill TW et al. (2021) EULAR recommendations for intra-articular therapies. *Ann Rheum Dis* 80 (10):1299-1305.

<https://doi.org/10.1136/annrheumdis-2021-220266>

11. Gormley GJ, Corrigan M, Steele WK, Stevenson M et al. (2003) Joint and soft tissue injections in the community: questionnaire survey of general practitioners' experiences and attitudes. *Ann Rheum Dis* 62 (1):61-64.

<https://doi.org/10.1136/ard.62.1.61>

12. Liddell WG, Carmichael CR, McHugh NJ (2005) Joint and soft tissue injections: a survey of general practitioners. *Rheumatology (Oxford)* 44 (8):1043-1046.

<https://doi.org/10.1093/rheumatology/keh683>

13. Ekhtiari S, Horner NS, Simunovic N, Ayeni OR (2020) The PRECISION Survey: Preferences of Physicians Regarding Ultrasound-Guided Intra-Articular Injections. *Clin J Sport Med* 30 (4):372-377.

<https://doi.org/10.1097/JSM.0000000000000612>

14. Alunno A, Najm A, Sivera F, Haines C et al. (2020) Assessment of competences in rheumatology training: results of a systematic literature review to inform EULAR points to consider. *RMD Open* 6 (2).

<https://doi.org/10.1136/rmdopen-2020-001330>

15. Bandinelli F, Bijlsma JW, Ramiro MS, Pia E et al. (2011) Rheumatology education in Europe: results of a survey of young rheumatologists. *Clin Exp Rheumatol* 29 (5):843-845.

16. Beyer C, Ramiro S, Sivera F, Mandl P et al. (2016) Educational needs and preferences of young European clinicians and physician researchers working in the field of rheumatology. *RMD Open* 2 (2):e000240.

<https://doi.org/10.1136/rmdopen-2015-000240>

17. Najm A, Alunno A, Sivera F, Ramiro S et al. (2020) Strategies for the assessment of competences during rheumatology training across Europe: results of a qualitative study. *RMD Open* 6 (2).

<https://doi.org/10.1136/rmdopen-2020-001183>

18. Sivera F, Alunno A, Najm A, Avcin T et al. (2021) 2019 EULAR points to consider for the assessment of competences in rheumatology specialty training. *Ann Rheum Dis* 80 (1):65-70.

<https://doi.org/10.1136/annrheumdis-2020-218015>

19. Sivera F, Ramiro S, Cikes N, Cutolo M et al. (2016) Rheumatology training experience across Europe: analysis of core competences. *Arthritis Res Ther* 18 (1):213.

<https://doi.org/10.1186/s13075-016-1114-y>

20. Sivera F, Ramiro S, Cikes N, Dougados M et al. (2015) Differences and similarities in rheumatology specialty training programmes across European countries. *Ann Rheum Dis* 74 (6):1183-1187.

<https://doi.org/10.1136/annrheumdis-2014-206791>

21. Rodriguez-Garcia SC, Castellanos-Moreira R, Uson J, Naredo E et al. (2021) Efficacy and safety of intra-articular therapies in rheumatic and musculoskeletal diseases: an overview of systematic reviews. *RMD Open* 7 (2).

<https://doi.org/10.1136/rmdopen-2021-001658>

22. Rodriguez-Garcia S, Castellanos-Moreira R, Uson-Jaeger J, Naredo E et al. (2019) Quantifying the Placebo Effect After Intra-Articular Injections: Implications for Trials and Practice. *Arthritis Rheumatol* 71 (suppl 10 (2019 ACR/ARP Annual Meeting)):1878.

