THE CHARTERED SOCIETY OF PHYSIOTHERAPY

A clinical

guideline

for the use of

injection therapy by

physiotherapists

acpom

ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN ORTHOPAEDIC MEDICINE

This clinical guideline was endorsed by the Chartered Society of Physiotherapy in January 1999. The endorsement process has included review by relevant external experts as well as peer review. The rigour of the appraisal process can assure users of the guideline that the recommendations for practice are based on a rigorous and systematic process of identifying the best available evidence, at the time of endorsement.

Review date: 2001

Contents

List of tables

Guideline development group

The following members of the Association of Chartered Physiotherapists in Orthopaedic Medicine's (ACPOM) clinical guideline development panel have given generously of their time and energy in order to develop this guideline and their work is gratefully acknowledged.

Richard Baker MD FRCGP
Director of the Eli Lily National Clinical Audit Centre

Gordon Cameron MB BS MRCGP DMsMED
General practitioner and Instructor in Injection Therapy

Stephen Longworth MB ChB MRCGP DMsMED DPCR
General practitioner and Instructor in Injection Therapy

Christine Mallion MCSP
Chartered physiotherapist with Diploma in Injection Therapy

Stephanie Saunders FCSP
Chartered physiotherapist and Instructor in Injection Therapy

Carol Shacklady MSc MCSP Dip TP Cert Ed
Postgraduate tutor, Manchester School of Physiotherapy

The Panel thank the following who peer reviewed the document and assisted in its development.

Lyn Ankcorn MCSP

Penny Brown MCSP

Paul Fox MCSP

Vivienne Green MCSP

Simone Gritz MCSP

Jill Kerr MCSP

Kenny Martin MCSP

Alison Smeatham MCSP

Valerie Smith MCSP

Ruth ten Hove MSc MCSP (Professional Adviser, Chartered Society of Physiotherapy)

Judy Mead MCSP (Head of Clinical Effectiveness, Chartered Society of Physiotherapy)

Patient panels have not been included in this first document but it is the intention to do so when the guideline is reviewed in 2 years' time. Patient satisfaction forms have been designed and are used in practice but it was felt that their inclusion into the guideline was not appropriate.

1 Clinical guideline development process

1.1 In February 1996 ACPOM was successful in bidding for funding of £3000 from the Department of Health, through the Chartered Society of Physiotherapy (CSP), to develop evidence based clinical guidelines for the safe, effective practice of injection therapy by physiotherapists.

This was seen as an opportunity to develop an evidence-based guideline for a technique that has only recently been incorporated into the scope of physiotherapy practice (1995). At present there is inappropriate variation in practice, including safety issues[1].

Clinical guideline development panel

1.2 A panel was brought together to reflect the expertise required in preparing this guideline. This included medical practitioners for their knowledge of pharmacology, adverse reactions and experience in the use of steroid injections, physiotherapists practising injection therapy and experts in retrieving and reviewing the existing body of knowledge.

The panel recognised the policy stated in *Clinical guidelines*[2] published by the NHS Executive in 1996 (p10) "Clinical guidelines are systematically developed statements which assist clinicians and patients in making decisions about appropriate treatment for specific conditions. Even when endorsed by the relevant professional bodies or commended by the NHS Executive, clinical guidelines can still only assist the practitioner; they cannot be used to mandate, authorise or outlaw treatment options. Regardless of the strength of evidence, it will remain the responsibility of the practising clinicians to interpret their application taking account of local circumstances and the needs and wishes of individual patients".

Objectives

1.3 The objectives agreed for the project were therefore set out as follows:

- To present a review of the available literature to enable the clinician to identify proven benefits of injection therapy and the gaps in the evidence
- To make recommendations about the use of injection therapy in the treatment of peripheral intra-articular and peri-articular lesions
- To encourage high standards of practice in injection therapy
- To reduce variation in practice in injection therapy.

1.4 The panel considered that in order to set out practice recommendations, evidence should be sought which addressed the following issues:

- To what extent is steroid injection therapy clinically effective?
- What are the effective doses and volumes of drugs to be administered?
- What potential adverse reactions exist and how should they be avoided?
- What techniques are indicated for safe, effective practice?

Evidence review methods

1.5 A literature search was carried out using the databases EMBASE, CINAHL, MEDLINE, Rehab Index and the Cochrane Library. The search strategy used the keywords *steroid injections* in conjunction with *peri-articular*, *intra-articular*, *peripheral*, *local anaesthetic*, *adverse reactions*, *anaphylaxis*. Evidence from 1980 up to May 1997 has been considered. Since research methodology has advanced since 1980 it was felt applicable to set these parameters. Literature appertaining to inflammatory or suppurative conditions was disregarded.

1.6 Only two systematic reviews were identified with regard to appropriate clinical practice. Even there some of the studies within the reviews were rated with poor methodological scores and the delivery techniques of injection therapy varied between studies. Five relevant randomised controlled trials (RCTs) other than those in the systematic reviews were identified.

1.7 Important areas such as the beneficial and adverse effects of corticosteroids and specific injection techniques were referenced in clinical trials, literature reviews, clinical practice reviews, risk-benefit assessments and a survey. These therefore have more limited value but no evidence has been found to refute the recommendations within this literature and so it has formed part of the body of evidence.

1.8 Most literature was reviewed initially by the panel member with literature searching and appraisal skills whilst the pharmacological and medical literature was initially reviewed by the medical members of the panel. Papers were also assessed by the other panel members with many years of personal experience in reflective practice, instructors in the subject and the authors of a recent book on injection therapy[3]. To set standards and maintain consistency in the critical appraisal of the literature, the methodology as suggested by Greenhalgh[4] was used by all the panel members.

1.9 Where literature evidence was lacking, respected, expert opinion and practice have been accepted. (This was gathered from several medical practitioners and physiotherapists who used the technique in addition to the panel members, all of whom have many years of experience and clinical success as criteria for expert opinion.)

1.10 Pharmacological/pharmaceutical expertise was gathered from relevant published journals and textbooks[5] and from the medical members of the panel. Advice has been taken from the Royal Pharmaceutical Society of Great Britain with regard to implementing the requirements of the Medicines Act 1968.

1.11 Legal aspects of practice were clearly defined for the panel by the Medical Defence Union in a written statement in March 1996 (see Appendix).

Evidence rating

The levels of evidence have been set therefore as follows:

Table 1: Levels of evidence

Evidence	Rating
Systematic reviews and randomised controlled trials	***
Clinical trials and other evidence of limited scientific value (paragraph 1.7)	**
Respected, expert opinion (paragraph 1.9)	*

1.13 Following the review of the evidence, recommendations were drawn up and protocols devised based on the reviewed evidence. Where the evidence was weak or no evidence was found to direct the guideline, the recommendations are those of expert practitioners. The recommendations have been presented as flow charts and algorithms where appropriate.

Review of the guideline

1.14 The guideline was reviewed and redrafted several times by the panel in consultation with the CSP Professional Affairs Department. In addition the guideline underwent a process of peer review; it was scrutinised by 15 physiotherapists practising injection therapy who had successfully completed the ACPOM diploma course in injection therapy. Their suggestions for the draft guideline included a list of absolute contraindications, listing potential side effects in order of severity, and reference to aspiration, although this is not included in the current scope of physiotherapy.

There was also debate about the recommendation to keep the patient for 30 minutes following injection, but the panel felt this was justified as it has details of a case of severe anaphylactic reaction 25 minutes post-injection.

In March 1996 a questionnaire was sent to 42 physiotherapists who had corresponded with the CSP on injection therapy. 16 replied, of whom only two currently use the technique. Their responses were taken into account.

1.15 Since this guideline has been developed from the ACPOM Diploma Course in Injection Therapy, all participants in these courses have followed a version of it. Feedback has produced a continual piloting process leading to the format of this final document.

1.16 The guideline will be subjected to a process of audit. Criteria for audit have been developed and will be made available to clinicians, to enable them to identify the extent to which the guideline is being followed, and therefore determine the effectiveness of their practice. This audit will also monitor compliance. Review will be conducted using random selection of therapists involved in the audit process and those who have access to the guideline.

1.17 The guideline development panel plans to review the guideline two years from the date of publication using an extended peer review system and consumer involvement. Should the evidence or practice warrant it, the guideline will be updated.

1.18 It is anticipated that the guideline will also be useful to general practitioners in the primary care setting.

Dissemination

1.19 The guideline will be disseminated in the following ways:

- to all physiotherapists undertaking the Diploma in Injection Therapy course
- to all physiotherapists who have completed the course in the past
- to all physiotherapy managers
- to the Chairmen of Extended Scope Practitioner groups
- through Orthopaedic Medicine courses countrywide
- to all Health Authorities
- to the Royal Colleges of General Practitioners, Surgeons, and Physicians
- through articles in appropriate physiotherapy and medical journals
- local in-service, branch meetings, OCPPP or other clinical interest group meetings
- exhibition and professional posters at CSP congress.

2 Clinical efficacy

2.1 Whilst intra-articular and soft tissue injections are the two most frequently used procedures in rheumatological practice in the UK[1] and are used for 20% of all episodes of shoulder disorders in the Netherlands[6], the evidence in support of their effectiveness is not conclusive.

2.2 The evidence in favour of the efficacy of steroid injections is scarce but in the **short term** is favourable for shoulder disorders[7,8]. In general, corticosteroid injections are an effective treatment for tennis elbow [9,10] although Labelle[11] found insufficient scientific evidence to support their use. Success was reported for De Quervain's tenosynovitis[12] and 'trigger finger'[13] but less consistently for carpal tunnel syndrome[12].

2.3 The benefits for osteoarthritis are not large or sustained enough to recommend the regular use of injection therapy[14,15] but acute self-limiting disorders do lend themselves best to this form of therapy[16]. Trials on the effects of injection therapy on other disorders have not been found but other types of evidence indicate that the effectiveness varies with the clinical condition, being especially useful for overuse[17] and athletic injuries[18].

2.4 Throughout the literature **short term** varies from two-six weeks[6], one month[7,8], two months[10], six months[19] and twelve months[12]. The **long term** effectiveness of corticosteroid therapy is not supported by scientific evidence[6,14].

2.5 The most consistent clinical benefit throughout the literature is the early and dramatic relief of pain[8,13,16,17,20,21,22,23]. This is reflected in the resolution of inflammation in soft tissue conditions[17] but Grillet[15] reports that there is little or no effect on the disease progression in osteoarthritis.

2.6 Other clinical benefits are used as outcome measures in the literature and are important to physiotherapists. These are improvement in range of motion[6,8] and increased functional capacity[6,9].

2.7 Steroid injections can sometimes avoid the need for surgical intervention in the management of certain conditions[18,24].

3

Clinical guideline recommendations

The following sections refer to the drugs used in injection therapy, their administration and patient management. For each section, referenced knowledge and practice are stated. Following this, the guideline recommendations are presented in shaded boxes. For each recommendation the level of evidence to support that recommendation is indicated according to the levels set out in paragraph 1.12. The recommendations themselves are not rated, as rigid application is thought to be inappropriate and it has not been proven that there is only one correct approach.

Drugs used in injection therapy

3.1 Corticosteroids

Effects

3.1.1 Injectable corticosteroids have the following **beneficial effects**:

- To suppress inflammation in joints and connective tissue
- To suppress inflammatory flares in degenerative joint disease
- To break up the cycle of inflammatory response in low grade re-injury of soft tissue.

These effects are well documented in the literature although the precise biochemical mechanisms are not totally understood [15,16,18,22,25,26]. However, they are not specifically referred to in the systematic reviews or RCTs pertinent to this guideline, which are primarily concerned with clinical effects.

3.1.2 The following are potential **adverse effects** of corticosteroids:

- Facial flushing
- Alteration in glycaemic control (relevant to diabetics)
- Joint sepsis
- Soft tissue infections
- Subcutaneous atrophy/skin depigmentation
- Post injection pain
- Tendon rupture
- Steroid arthropathy.

These are reported widely in the literature[15,16,17,18,22,24,25,26,27,28,29] with varied opinions as to the extent of their risk of occurrence. In controlled trials the only adverse effects to be reported were subcutaneous atrophy and post-injection flare[3]. The risk of any adverse effect can be minimised by avoiding contraindications.

Choice of corticosteroid

3.1.3 The literature reflects the variety of corticosteroid preparations being used for intra-articular and peri-articular injection. Selection of the appropriate drug is dependent upon its anti-inflammatory potency and its solubility. The benefits of these drugs are required locally and their solubility determines how long it remains in situ before being absorbed into the vascular system. In general the duration of the response correlates inversely with the solubility [17,18,22,25,26,27,30]. Most available RCTs state the composition of the injection used but not the rationale of that choice. Of the list in Table 2, the development group does not recommend methylprednisolone acetate because it appears to give more post injection pain [3].

Table 2: Corticosteroid selection criteria
(adapted from the British National Formulary, No 35 Mar 98, p312)

Generic drug	Anti-infammatory potency	Timescale: effective for approximately[1]
Hydrocortisone acetate	+	36 hours
Methylprednisolone acetate	++++	Weeks, months
Triamcinolone acetonide	+++++	Weeks, months
Triamcinolone hexacetonide	+++++	Weeks, months

Dosage and volumes of injected drug

3.1.4 Precise specifications vary in the literature and the choice is often based on the clinician's familiarity with a certain compound and their experience of its effectiveness. Consensus is that selection should be based on joint size, severity of pain, chronicity and previous response if appropriate [17,18,26,30]. Price [31] compared different dosages of triamcinolone to treat tennis elbow, with equal benefit.

Table 3: Recommendations for corticosteroids used in injection therapy

Generic name	Proprietary name	Available concentration
Triamcinolone acetonide	Adcortyl Kenalog	10mg/ml 40mg/ml
Triamcinolone hexacetonide	Lederspan	20mg/ml
Hydrocortisone acetate[2]	Hydrocortistab	25mg/ml

The smallest dose that is effective should be used to limit the risk of adverse effects:

- 10mg for small structures eg De Quervain's tenosynovitis
- 20–30 mg for large structures eg shoulder joint

1 Times are approximate as the literature varies in its estimates
2 Shorter acting corticosteroid may be used on darker skinned or very thin people if injecting subcutaneously to avoid depigmentation or subcutaneous atrophy.

3.2 Local anaesthetic

Effects

3.2.1 Local anaesthetic is used in conjunction with corticosteroids for the following **beneficial effects**[13,17,32].

Therapeutic

- Immediate inflammatory pain inhibition achieved
- Widens the field of steroid effect by increasing the volume of the injection
- Dilutes the steroid which in turn may reduce the risk of tissue atrophy
- Alleviates steroid-induced tissue irritation which may occur in the 24hrs post-injection.

Diagnostic

- Immediate resolution of pain confirms differential diagnosis.

3.2.2 A possible but rare **adverse effect** is an allergic reaction.

Choice of local anaesthetic

3.2.3 The most commonly used anaesthetic preparation is lignocaine (lidocaine) which is a short-acting drug. The longer-acting drug bupivacaine is also used. The literature relating to local anaesthetic is very sparse. Kannus [32] recommended dilution of the corticosteroid with local anaesthetic and found bupivacaine more effective in pain relief for up to six hours. Nelson [17] suggests a combination of short-acting and long-acting anaesthetic could be better. Vecchio [21], in a small study of an acute lesion, found no significant difference between steroid-anaesthetic combination and anaesthetic alone.

3.2.4 Ready-made steroid-anaesthetic mixtures are available but they limit individual clinical judgement of the correct steroid-anaesthetic dose - volume ratio. We do not recommend use of bupivacaine because of its long duration of action. As recommended by the British National Formulary, number 34, September 1997, pp541-2 [33], maximum doses of lignocaine (lidocaine) for an average adult male are 20mls (200mg) 1% local anaesthetic. We have deliberately reduced this recommended maximum to 10mls (100mg) of 1% in order to be well within the safety limits. It is suggested that clinicians adhere to the doses recommended in table 4.

3.2.5 Local anaesthetic can include adrenaline. Adrenaline is a profound vasoconstrictor and it is recommended that this mixture is not used for musculoskeletal injections. Accidental intra-vascular administration of adrenaline prolongs the local effect of the anaesthetic and could cause peripheral ischaemic necrosis or central cardiac side effects [34].

Table 4: Recommendations for local anaesthetic used in injection therapy

Generic name	Proprietary name	Available concentration	Maximum dose
Lignocaine (Lidocaine)	Xylocaine	0.5%	up to 20 ml
		1%	up to 10 ml
		2%	up to 5 ml
Never use this drug manufactured with added adrenaline			

Table 5: Recommendation for storage of drugs

	Evidence rating
The panel recommend that all drugs should be securely stored in a safe place.	*

4 Indications for corticosteroid injection therapy

4.1 Population

4.1.1 This guideline is intended to be used in the clinical management of peripheral conditions only, both peri-articular and intra-articular. In the absence of obvious contraindication any patient with a diagnosis listed in paragraphs 4.4 and 4.5 below can be regarded as suitable.

Injection therapy is used as a treatment technique for musculoskeletal pain mainly in the adult population. Although there is no strong evidence that distribution of corticosteroid in small amounts is harmful to children, the recommendation of the panel is that it should not be used except in very rare circumstances in those under 18 years of age. Children and adolescents usually recover rapidly and spontaneously from their injuries and there is a potential risk that deposition of corticosteroid near the growth plate could interfere with the laying down of bone[35].

4.1.2 From the evidence reviewed, the use of injection therapy is indicated for documented symptoms and certain clinical conditions, as follows:

4.2 Symptomatic indications

Pain

- local or referred
- at rest, at night, or on movement

Inflammation

Reduced range of movement.

4.3 Diagnostic indications

Arthritis
Bursitis
Capsulitis
Entrapment neuropathy
Ganglia
Impingement syndromes
Ligamentous injury
Myofascial pain syndromes
Tendinitis
Tenosynovitis

4.4 Specific diagnoses (***, **, * – evidence rating as stated in paragraph 1.12)

4.4.1 Upper limb

*** Acromio clavicular joint injury[30]
*** Shoulder capsulitis/peri-arthritis/frozen shoulder[6,7,19,20, 26,36]
*** Rotator cuff tendinitis: supraspinatus, subscapularis and infraspinatus tendons[6,8,17,26,30]
*** Lateral epicondylitis[9,10,26,30]
** Tenosynovitis of the hand: De Quervain's tenosynovitis, 'trigger finger', carpal tunnel syndrome[12,13,17,24,26,30]
** Bicipital tendinitis[17,30]
** Golfers elbow[18,24,26]
** Osteo-arthritis of the first carpometacarpal joint[15,30]

4.4.2 Lower limb

*** Osteo-arthritis of the knee (some evidence indicates injection therapy is no better than other interventions)[14,15,16,25, 37,38]
** Osteo-arthritis of the hip[16,25,26,30]
** Trochanteric bursitis[17,18,25,26,30]
** Iliotibial band syndrome[18,25,26]
** Knee bursitis: prepatellar, anserine bursae[17,18,25,26,30]
** Medial patellar plica syndrome[18,25,26]
** Retro-calcaneal bursitis[18,30]
** Sinus tarsi syndrome[18,26]
** Plantar fasciitis[18,26]
** Achilles tendinitis (injection to the paratenon)[17,26,39]
* Sprained ligaments of the ankle[3]
* Psoas bursitis[3]

4.5 Informed consent

4.5.1 Informed consent should always be obtained and documented.

Information to be given to the patient should include:

- nature of their condition
- details of proposed treatment and alternatives
- nature of drugs to be given
- possible side effects and incidence
- likely benefits
- plans for follow-up and after care.

4.5.2 All patients must be allowed the opportunity to decline treatment.

5

Contra-indications

5.1 The physical medicine literature describes established contra-indications to local corticosteroid therapy. Usually referred to as either *absolute* or *relative* contra-indications, the recommendations stated here have been drawn up as a consensus of the literature [17,24,25,26,28].

5.2 Several RCTs provide evidence of adherence to the medical viewpoint in their stated subject exclusion criteria. Specifically referred to are

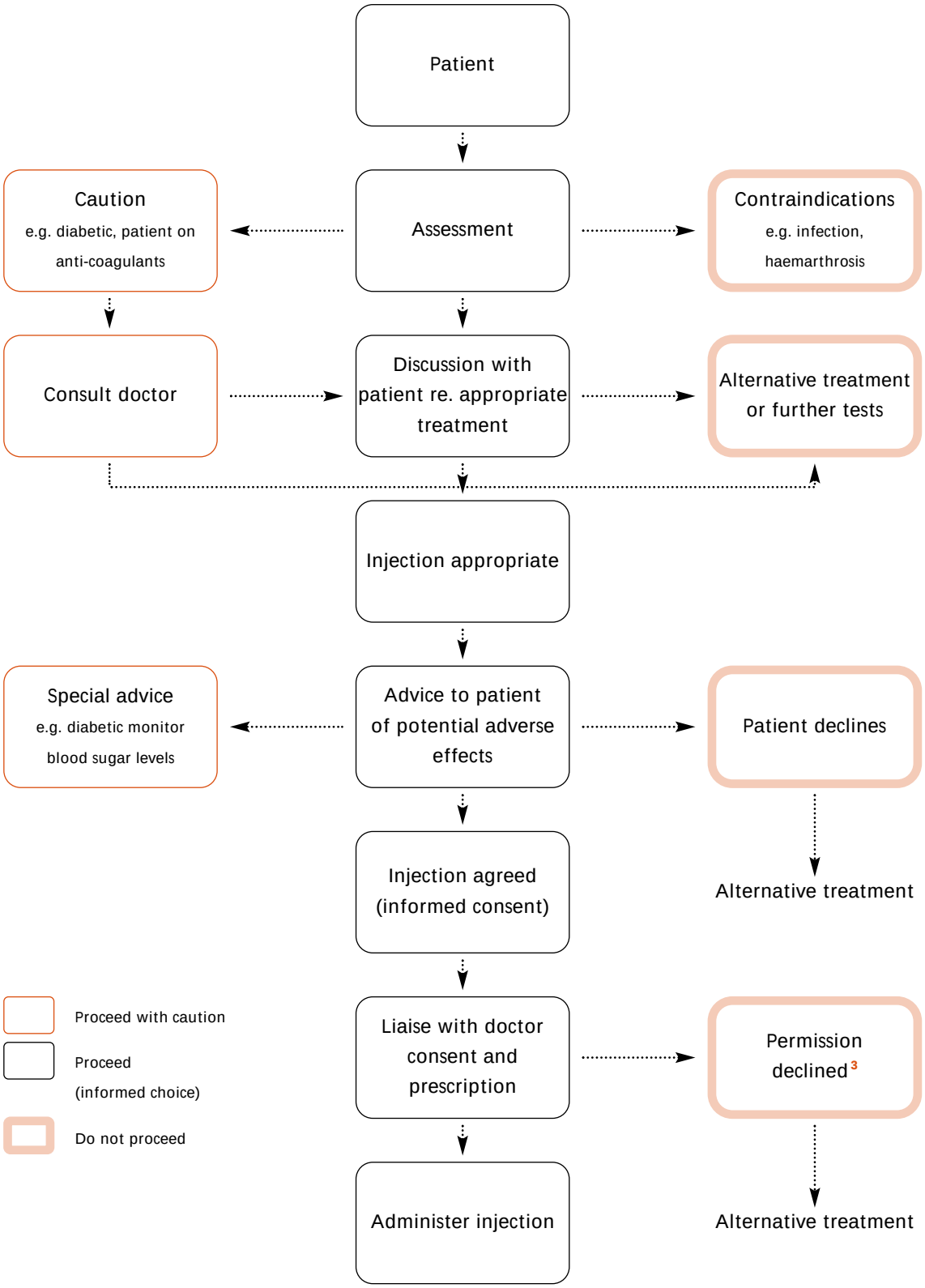
- The presence of infection [19,32,37]
- Allergy to injectable drugs [32]
- Coagulation disorders [32]
- Recent trauma [10,12]
- Psychological overlay [10,40].

Table 6: Contraindications to injection therapy

Absolute contraindications	Evidence rating	Relative contraindications	Evidence rating
Infection in the joint	***	Recent trauma	***
Local or general sepsis	***	Anti coagulant therapy	***
Hypersensitivity to steroid or local anaesthetic	***	Bleeding disorders	***
Adjacent osteomyelitis	**	Poorly controlled diabetes	***
		Prosthetic joint	**
		Haemarthrosis	**
		Psychogenic or anxious patient	***
		Concurrent oral steroid therapy	*

No physiotherapist should use injection therapy without medical approval where *relative* contraindications exist

Clinical decision flowchart



[3] In certain situations medical approval may not be forthcoming and since (at date of publication) physiotherapists do not have prescribing rights under the terms of the Medicines Act (1968), injection cannot be given.

6

Aseptic technique

6.1 Much of the literature refers to the need for an aseptic procedure to reduce the risk of infection but with either none or very scant description of what this means [16,18,22,23,25,26,28,41,42,43]. No reference was found in the systematic reviews and only two RCTs referred to the use of aseptic techniques [10,21].

6.2 Two aspects of the procedure are of concern:

- The preparation of the skin over the injection site
- The use of a 'no touch' technique by the injector.

Haslock [1] reported wide variation in personal preparation. Hand washing was the commonest procedure but full surgical scrub was used by 10% of his respondents. In all the other literature scrutinised this aspect of an aseptic technique is not detailed.

6.3 The survey by Haslock [1] also found that 'Hibiscrub' or 'Mediswabs' were used by the majority to cleanse the skin. The American literature advocates preparation of the point of entry with 'Betadine' or alcohol [13,16,25,26,41]. Jacobs [7] used alcohol impregnated swabs as advocated by Cyriax [44]. Cawley [45], in a single blinded trial found a 'Mediswab' swipe effective and economic and therefore preferable to a chlorohexadine one minute soak.

6.4 No references have been found which state or recommend a specific aseptic technique although Haslock found the use of a 'no touch' technique was the most frequent spontaneous response in his survey.

6.5 Use of one needle per injection is recommended [45].

Table 7: Recommendations for aseptic technique

	Evidence rating
Wash hands thoroughly then assemble equipment	**
Prepare skin by cleaning with a 70% alcohol impregnated swab in a spiral motion	***
Wipe the top of the drug vial (if pre-used) prior to drawing up with same type of swab	*
Use different needles to withdraw the steroid and anaesthetic into the syringe	*
Use new needles for each injection and discard after use	**
Place plaster over puncture wound when procedure is finished *unless allergic*	*

Injection technique preparation flowchart

Procedure	Rationale
Assemble the necessary equipment Check name, strength, volume and expiry date of corticosteroid and local anaesthetic with another member of staff	To ensure that the correct in date drug and strength of drug is administered
Expose and mark the area to be injected on patient	Accurate needle placement
Wash hands	To ensure asepsis
Clean area for injection with 70% alcohol impregnated swab in a spiral motion	To ensure asepsis
Shake the corticosteroid vial Remove seal	To ensure solution is mixed
Withdraw appropriate amount of corticosteroid using a sterile needle. Withdraw appropriate amount of local anaesthetic from the ampule. Discard needle in sharps box.	To ensure sterile mixing of corticosteroid and local anaesthetic drugs
Attach appropriate gauge needle for the injection to syringe. Ensure no air bubbles are present	To ensure patient comfort

7

Delivery technique

7.1 Specific features of injection technique are often poorly reported in the research literature. Clinic and practice reviews present the most relevant indications of good practice.

7.2 **Accurate needle placement** is important for both clinical efficacy and to avoid adverse reactions[15,28,38]. Accuracy was confirmed by Jones et al[38] by using radiographic evidence and senior rheumatologists were found to be only 53% accurate.

7.3 Knowledge of local anatomy is critical to the proper placement of needles[17,18] but actual anatomical injection sites are often not reported in research trials. Specific anatomical references for needle placings can be found in studies on the shoulder[7,8,20,21,46], elbow[10], hand[13] and the knee[37]. Description, diagrams and photographs of actual anatomical locations in both upper and lower limb conditions are used to assist the practitioner by Kerlan[18] and Pfenninger[30].

7.4 Selection of **needle size** appropriate to the anatomical area being injected is noted by some authors[13,18,25,28,30,46]. Consensus is that the narrowest gauge needle possible should be used for the structure being injected with the length of needle determined by the relative depth of that structure. The more rigorous RCTs state the parameters of the needles used[6,7,19,20]. The most commonly used gauges of needles are 21g, 23g and 25g. Suitable lengths range from 25mm to 50mm[3].

7.5 Clinical evidence on the importance of **needling techniques** is scarce although inaccurate technique might contribute to poor clinical outcomes[6]. Specific techniques referenced are fanning[4] for certain sites eg trochanteric bursa[30] and a perpendicular approach to the skin is recommended with appropriate redirecting once the skin has been punctured[24,30]. Swain[26] recommends care not to depress the plunger until the target area is reached in order to reduce adverse skin changes.

7.6 Before delivering the injection, **aspiration** is carried out to ensure intra-articular siting[14] and prior to administering the injection, to balance the fluid levels within joints[30], and to check whether or not blood or pus is present.

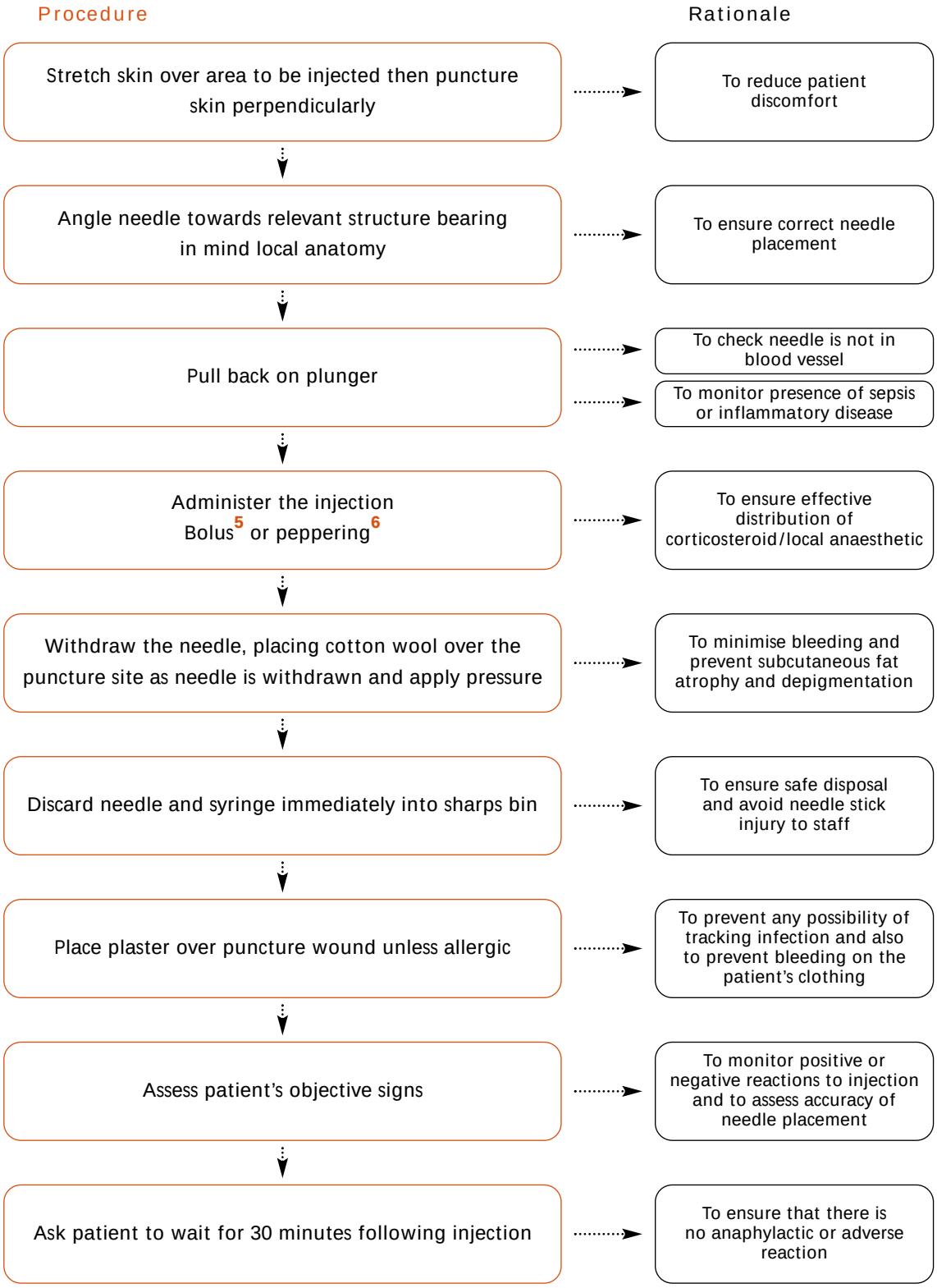
7.7 With reference to specific structures being injected, the literature is consistent in stating that forceful injection into the substance of a tendon should be avoided in favour of gentle filling of the tendon sheath[15,17,24,25,26,30]. This is despite only a few reported cases of tendon rupture[15]. Injecting around and not within ligaments finds favour with Kerlan[18].

Contrasting advice is found with regard to the **site of injection**. High success rates are found by injecting directly into functionally diagnosed impaired tissue as compared with trigger point injection[19]. Other evidence recommends injecting at the site of pain by pressure[17].

These findings, together with the recommendations of James Cyriax[44] and expert clinical experience, have led to the guidance shown in the following algorithm of recommended procedures and their rationale.

[4] To inject fluid in several small droplets for larger flat areas or loculated (scarred) bursae or joint cavities.

Injection technique application flowchart



5 To inject fluid in a single flow to one area for joint cavities and bursae.
6 To inject fluid in several small droplets for tendons and ligaments.

8

Frequency

8.1 The term frequency refers to the number of injections administered and the interval between them for any one condition.

8.2 Repeated injections of corticosteroid substances can possibly increase the likelihood of known adverse reactions, especially in joints[6,16]. There is no absolute consensus about safe upper limits but guidelines in the literature are based upon the condition or nature of an injury, reaction to initial injection and the clinical effectiveness of the procedure.

8.3 A distinction is made between articular conditions and non-articular conditions. Systematic reviews report variation within clinical trials and literature and practice reviews reflect clinical trials and expert opinion. For intra-articular conditions frequently repeated injections are rarely justified[28] but the procedure is safe provided joints are not injected too frequently[25,27]. Timings for the same joint vary from intervals of at least one month[27], four–six weeks[16], no more frequently than every six weeks[6], at least six–twelve weeks apart[26], with up to a maximum of three times per year[11,25]. For soft tissue conditions such as athletic injuries and overuse syndromes less caution is reported. If symptoms persisted or recurred, second or third injections were administered within a six week period[7,8,9,10,17,20,24,26,30]. A maximum of three for timescales of varying length is regularly recommended[1,9,25,28].

Table 8: Recommendations for the frequency of injections

General		**Evidence rating**
All structures	Up to three injections if improving	**
	Do not repeat injections if no benefit or change in condition	**
Specific		**Evidence rating**
Hip and knee joint	Approximately three months between injections	**
	X-ray recommended after three injections	*
Tendons	Maximum of two injections per episode	*
Bursae	Usually one injection but repeat if symptoms persist	*

9 Aftercare

9.1 The literature advocates rest [27] or more specifically *relative* rest depending on the site of injection and the causative factors to the lesion being treated. Relative rest includes:

- reduced use of weight bearing joints [1,15,25]
- restriction of activities that cause symptoms [7,13,17,24,28]
- not to carry out any activity that provokes pain [10].

9.2 The **time limit** given to the periods of rest varies from 24 hours [26], 24–28 hours [1,15,27], 2–3 days [26], 4–5 days [25], 10–14 days [17], to no time limit given.

9.3 The additional use of splinting is advocated in some studies [12,24,26].

9.4 Reference to other aspects of aftercare is scarce. Haslock [1] reported that a minority of his respondents offered specific advice on the management of adverse reactions.

9.5 Patients should be warned that pain can occur after an injection but that it is usually short-lived.

Table 9: Recommendations for aftercare

	Evidence rating
Observe patient for indications of any immediate post-injection adverse reactions for at least 30 minutes	*
Warn about possible post-injection pain and potential later adverse reactions	**
Advise about relative rest (paragraph 9.1) for about one week	**
Check in one week to monitor effectiveness of injection	*

10 Anaphylaxis and its management

10.1 Anaphylaxis is an acute reaction to a foreign substance to which an individual has been previously sensitized. Drugs, vaccines, plasma substitutes, blood, foods, food additives and insect stings can all cause anaphylactic reactions [43,45].

10.2 Following exposure to the foreign substance, immunoglobulin E (IgE) is synthesised in the body. If the patient is re-exposed to the foreign material an antigen – antibody reaction occurs resulting in the release of histamine. The release of large quantities of histamine into the circulation can lead to several physiological changes including vasodilation, smooth muscle contraction, increased glandular secretion and increased capillary permeability [47].

Symptoms of anaphylaxis

10.3 Symptoms can vary greatly from a mild erythematous blush to full circulatory collapse (anaphylactic shock)[48]. They may include:

- Skin rashes, urticaria, pallor, cyanosis
- Tachycardia, hypotension, shock
- Rhinitis, bronchospasm, laryngeal obstruction
- Nausea, vomiting, abdominal cramps, diarrhoea.

Many other atypical features may manifest. These may include feelings of apprehension, coughing, choking sensations, arthralgia, convulsions, and clotting disorders.

10.4 Secondary features include oedema due to capillary permeability, particularly in the face and neck. This can result in pressure being placed upon the larynx and pharynx and may lead to airway obstruction [47].

Management of anaphylaxis

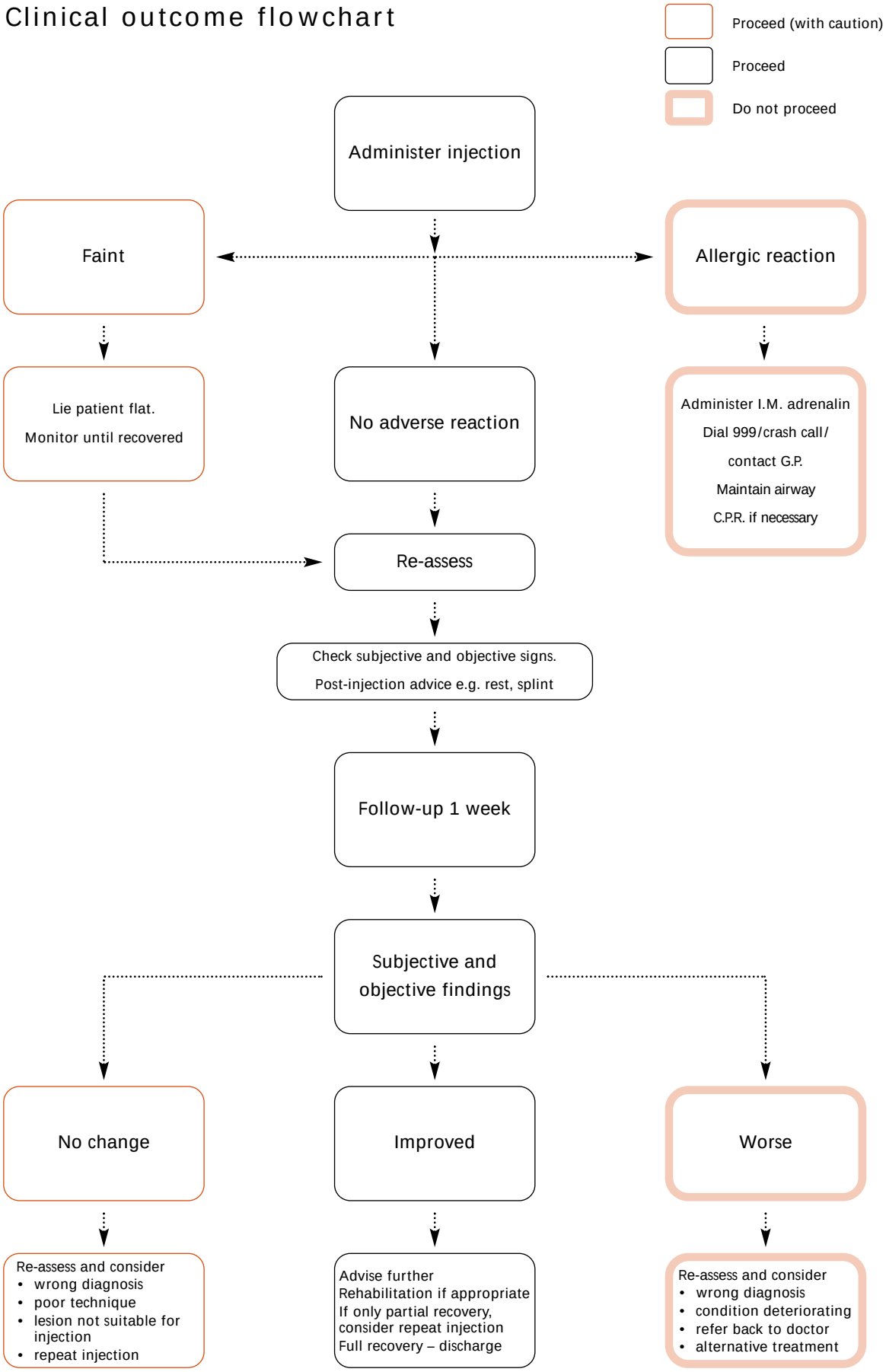
10.5 This will vary depending on the severity. First line management will include:

- Stop administration of the drug
- Administer adrenaline
- Summon medical help immediately
- Open airway if patient collapsed – intubation may be necessary
- Ventilate if necessary – provide oxygen via face mask/bag-valve mask/pocket mask
- Support circulation with cardiopulmonary resuscitation if necessary.

Follow-up

10.6 The drug or agent should be identified and the manufacturer informed. The patient must be informed of the potential risks of a further injection of the same drug and referred to their medical practitioner.

Clinical outcome flowchart



11

Injection therapy as part of a rehabilitation programme

11.1 The literature suggests that injection therapy is primarily used for pain relief but is best utilised as an adjunct to other forms of rehabilitative treatment. Literature referring to the role of corticosteroid therapy in sports medicine [15,18] and overuse injuries [17] stresses its use should be considered as part of the required rehabilitation. (Corticosteroid for local injections are permitted with physician written notification to the International Olympic Committee Medical Code, 31st January 1998). It does not substitute for flexibility and strengthening exercises, strapping or other modalities, but is likely to allow patients to participate and respond more readily, therefore facilitating recovery [17,18].

11.2 Research as presented in the two systematic reviews [6,9] compares corticosteroid injection therapy with other modalities alone e.g. with pain relieving medication, TENS, physiotherapy techniques and placebo. Therefore single therapies have largely been used to investigate clinical effectiveness so far rather than injection in addition to, or as an adjunct to, some of the other techniques employed in the research. However Dacre et al [36] found no difference between injection, injection plus physiotherapy or physiotherapy alone in the management of shoulder problems. This study is of questionable quality and the injections were not administered by physiotherapists.

Table 10: Recommendation for injection therapy as part of a rehabilitation programme

	Evidence rating
Physiotherapists are in an ideal position to be able to assess and monitor patient progress and, where indicated, initiate or continue rehabilitation. This may include stretching, active exercise, postural correction, fitness training, electrotherapy, ergonomic advice or other appropriate intervention to manage the symptoms and prevent recurring problems.	**

12 Cost effectiveness of injection therapy

12.1 There is little evidence evaluating cost effectiveness but where stated it offers positive support. The systematic review by Assendelft et al [9] concluded that the treatment is relatively inexpensive and outcomes in some trials show injection therapy to be equally as effective as physiotherapy [36] or more effective than Cyriax physiotherapy [10]. On those grounds they state that injection therapy is the most cost effective and consequently the preferred treatment. Other literature acknowledges the relatively low cost [7,24,28] and that injection therapy can possibly avoid more radical procedures such as surgical intervention [18,24] or manipulation under anaesthetic [7]. Cost implications are important.

12.2 Currently practitioners using injection therapy treat commonly occurring musculo-tendinous lesions for a much reduced number of sessions; eg tennis elbow requiring 2 or 3 treatments using injection therapy, compared to an average of 10–12 treatments for selected physiotherapy techniques.

12.3 It is unusual for corticosteroid injection to be used in isolation. It is normally used as an adjunct to other modalities. The cost of physiotherapy is not negated therefore, but the number of treatment sessions may be substantially reduced.

Record keeping

The following details should be recorded in the notes every time an infiltration is given.

Table 11: Recommendations for record keeping

	Evidence rating
Subjective and objective examination	*
Diagnosis	*
Patient consent	*
Drugs – name, strength, batch number and expiry date of each injection	*
Aseptic technique used	*
Pain, range of movement and function pre and post injection	*
Recommended aftercare and appropriate rehabilitation	*
Final outcome of treatment	*

Reference list

1 Haslock, I., MacFarlane, D. and Speed, C. (1995). Intra-articular and soft tissue injections: a survey of current practice. *British Journal of Rheumatology*, Vol 34, No 5, pp 449–452.

2 NHS Executive (1996). *Clinical guidelines: Using clinical guidelines to improve patient care within the NHS*. London: NHS Executive.

3 Saunders, S. and Cameron, G. (1997). *Injection techniques in orthopaedic and sports medicine.* WB Saunders Co. Ltd.

4 Greenhalgh, T. (1997). *How to read a paper. The basics of evidence based medicine.* London: BMJ Publishing Group.

5 Lawrence, D.R., Bennett, P.N. and Brown, A. (1997). *Clinical pharmacology*, 8th ed. Churchill Livingstone.

6 Van Der Heijden, G., Van Der Windt, D., Kleijnen, J., Koes, B. and Bouter, L. (1996). Steroid injections for shoulder disorders: a systematic review of randomized clinical trials. *British Journal of General Practice*, Vol 46, pp 309–316.

7 Jacobs, L.G.H., Barton, M.A.J., Wallace, W.A., Ferrousis, J., Dunn, N.A. and Bossingham, D.H. (1991). Intra-articular distension and steroids in the management of capsulitis of the shoulder. *British Medical Journal*, Vol 302, pp 1498–1501.

8 Winter, J.C., Sobel, J.S., Groenier, K.H., Arendzen, and Meyboom-de-Jong, M. (1997). Comparison of physiotherapy, manipulation and corticosteroid injection for treating shoulder complaints in general practice: randomized, single blind study. *British Medical Journal*, Vol 314, No 5, pp 1320–1325.

9 Assendelft, W.J.J., Hay, E.M., Adshead, R. and Boulter, L.M. (1996) Corticosteroid injections for lateral epicondylitis: a systematic review. *British Journal of General Practice*, Vol 465, pp 209–216.

10 Verhaar, J.A.N., Walenkamp, G.H.I.M., van Mameren, H., Kester, A.D.M. and van der Linden, A.J. (1996). Local corticosteroid injection versus Cyriax-type physiotherapy for tennis elbow. *The Journal of Bone and Joint Surgery*, Vol 78-B, No 1, pp 128–132.

11 Labelle, H., Guilbert, R., Joncas, J., Newman, N., Fallaha, M. and Rivard, C.H. (1992). Lack of scientific evidence for the treatment of lateral epicondylitis of the elbow. *The Journal of Bone and Joint Surgery*, Vol 74B, pp 646–651.

12 Otto, N., and Wahbe, M.A. (1986). Steroid injections for tenosynovitis in the hand. *Orthopaedic Review*, Vol XV, No 5, pp 45–48.

13 Anderson, B. and Kaye, S. (1991). Treatment of flexor tenosynovitis of the hand ('Trigger Finger') with corticosteroids. *Archives of International Medicine*, Vol 151, No 1, pp 153–156.

14 Dieppe, P.A., Sathapatayavongs, B., Jones, H.E., Bacon, P.A., and Ring, E.F.J. (1980). Intra-articular steroids in osteoarthritis. *Rheumatology and Rehabilitation*, Vol 19, pp 212–217.

15 Grillet, B. and Dequeker, J. (1990). Intra-articular steroid injections. *Drug Safety*, Vol 5, No 3, pp 205–211.

16 Stefanich, R.J. (1986). Intra-articular corticosteroids in treatment of osteoarthritis. *Orthopaedic Review*, No 2, pp 27–33.

17 Nelson, K.H., Briner, W. and Cummins, J. (1995). Corticosteroid injection therapy for overuse injuries. *American Family Physician*, Vol 52, No 6, pp 1811–1816.

18 Kerlan, R.K. and Glousmann, R.E. (1989). Injection techniques in athletic medicine. *Clinics in Sports Medicine*, Vol 8, No 3, pp 541–560.

19 Hollingworth, G.R., Ellis, R.M. and Hattersley, T.S. (1983). Comparison of injection techniques for shoulder pain: results of a double blind randomized study. *British Medical Journal*, Vol 287, pp 1339–1341.

20 Rizk, T.E., Pinals, R.S. and Talaiver, A.S. (1991). Corticosteroid injections in adhesive capsulitis: investigation of their value and site. *Archives of Physical Medicine and Rehabilitation*, Vol 72, No 1, pp 20–22.

21 Vecchio, P.C., Hazleman, B.L. and King, R.H. (1993). A double-blind trial comparing subacromial methylprednisolone and lignocaine in acute rotator cuff tendinitis. *British Journal of Rheumatology*, Vol 32, pp 743–745.

22 Mazanec, D.J. (1995). Pharmacology of corticosteroids in synovial joints. *Physical Medicine and Rehabiliation Clinics of North America*, Vol 6, No 4, pp 815–849.

23 Monthly Index of Medical Specialities (MIMS). March 1998.

24 Nuestadt, D.H. (1991). Local corticosteroid injection therapy in soft tissue rheumatic conditions of the hand and wrist. *Arthritis and Rheumatism*, Vol 34, No 7, pp 923–926.

25 Millard, R.S. and Dillingham, M.F. (1995). Peripheral joint injections. Lower extemity. *Physical Medicine and Rehabilitation Clinics of North America*, Vol 6, No 5, pp 841–849.

26 Swain, R.A. and Kaplan, B. (1995). Practices and pitfalls of corticosteroid injection. *The Physician and Sports Medicine*, Vol 23, No 3, pp 27–40.

27 Cooper, C. and Kirwan, J.R. (1990). The risks of corticosteroid therapy. *Balliere's Clinical Rheumatology*, Vol 4, No 2, pp 305–332.

28 *Drugs and Therapeutic Bulletin* (1995). Vol 33, No 9, pp 67–70. Articular and periarticular corticosteroid injections. The independent review for doctors and pharmacists from the Consumers' Association.

29 Shrier, I., Matheson, G.O. and Kohl, III. H.W. (1996). Achilles tendonitis: Are corticosteroid injections harmful? *Clinical Journal of Sports Medicine*, Vol 6, No 4, pp 245–250.

30 Pfenninger, J.L. (1991). Injections of joint and soft tissue: part II. Guidelines for specific joints. *American Family Physician*, Vol 44, No 5, pp 1690–1702.

31 Price, R., Sinclair, H., Heinrich, I. and Gibson, T. (1991). Local injection treatment of tennis elbow – hydrocortisone, triamcinolone and lignocaine compared. *British Journal of Rheumatology*, Vol 30, pp 39–44.

32 Kannus, P., Jarvinen, M. and Niittymaki, S. (1990). Long or short-acting anaesthetic with corticosteroid in local injections of overuse injuries? A prospective, randomized double-blind study. *International Journal of Sports Medicine*, Vol 11, pp 397–400.

33 British Medical Association and Royal Pharmaceutical Society (1997). *British National Formulary*. London: British Medical Association and Royal Pharmaceutical Society.

34 A.B.P.I. Data sheet compendium (1998), pp 106–107.

35 A.B.P.I. Data sheet compendium (1998), pp 1393.

36 Dacre, J.E., Beeney, N. and Scott, D.L. (1989). Injections and physiotherapy for the painful stiff shoulder. *Annals of the Rheumatic Diseases*, Vol 48, pp 322–325.

37 Sambrook, P.N., Champion, G.D., Browne, C.D., Cairns, D., Cohen, M.L., Day, R.O., Graham, S., Handel, M., Jaworski, R., Kempler, S. and Wacker, T. (1989). Corticosteroid injection for osteoarthritis of the knee: peripateller compared to intra-articular route. *Clinical and Experimental Rheumatology*, Vol 32, pp 743–745.

38 Jones, A., Regan, M., Ledingham, J., Pattrick, Manhire, A. and Doherty, M. (1993). Importance of placement of intra-articular steroid injections. *British Medical Journal*, Vol 307, pp 1329.

39 Gibson, T. (1991). Is there a place for corticosteroid injection in the management of Achilles' tendon lesions? *British Journal of Rheumatology*, Vol 30, No 6, pp 436.

40 Haker, E. and Lundberg, T. (1993). Elbow-band, splintage and steroids in lateral epicondylagia (tennis elbow). *The Pain Clinic*, Vol 6, No 2, pp 103–112.

41 Ronborg, S.M., Olsen, O.T., Heinig, J.H. and Malling, H.J. (1996). Adrenaline for self treatment of anaphylactic reactions. Indications, available preparations and prescription rules. *Ugeskr Laeger*, Vol 158, No 32, pp 4539–43.

42 Van der Klauw, M.M., Wilson, J.H. and Stricker, B.H. (1996). Drug-associated anaphylaxis: 20 years of reporting in the Netherlands (1974–1994) and review of the literature. *Clinical and Experimental Allergy*, Vol 26, No 12, pp 1355–63.

43 Wyatt, R. (1996). Anaphylaxis. How to recognise, treat and prevent potentially fatal attacks. *Postgraduate Medicine*, Vol 100, No 2, pp 87–90, 96–99.

44 Cyriax, J.H. and Cyriax, P.J. (1993). *Illustrated manual of orthopaedic medicine, 2nd ed*. Butterworth Heinemann.

45 Cawley, P.J. and Morris, I.M. (1992). A study to compare the efficacy of two methods of skin preparation prior to joint injection. *British Journal of Rheumatology*, Vol 31, pp 847–848.

46 Withrington, R.H., Girgi, F.L. and Seifert, M.H. (1985). A placebo-controlled trial of steroid injections in the treatment of supraspinatus tendonitis. *Scandinavian Journal of Rheumatology*, Vol 14, pp 76–78.

47 Brown, A.F. (1995). Anaphylactic shock: mechanisms and treatment. *Journal of Accident & Emergency Medicine*, Vol 12, No 2, pp 89–100.

48 Apter, A.J. and La Vallee, H.A. (1994). How is anaphylaxis recognised? *Archives of Family Medicine*, Vol 3, No 8, pp 717–722.

Appendix

Statement from the Medical Defence Union

Medico-legal aspects of soft tissue & joint injections by physiotherapists

Standard of care:

The test of accepted practice is firmly entrenched in English law and therefore physiotherapists/ orthopaedic clinicians would be judged by the standard expected or accepted as proper by a responsible body of colleagues skilled in that particular area.

Delegation/referral:

A doctor delegating a task or referring a patient would be expected to take reasonable steps to ensure that the person to whom they are delegating or referring is competent. It would be seen as reasonable that the physiotherapist was registered with the appropriate registration body (Chartered Society of Physiotherapy). The physiotherapist would be legally liable for any claims arising out of their negligent acts or omissions.

Prescribing:

Because the injectable drugs are prescription only medicines, the physiotherapist will necessarily need to involve a registered medical practitioner. The doctor will be clinically responsible for the prescription and the physiotherapist will be administering the injections in accordance with the directions of the doctor. This will satisfy the requirements of the Medicines Act 1968.

Supervision of trainees:

The person supervising the trainee would normally be held liable for any harm that a patient suffers at the hands of the learner. Within an NHS Trust or Health Authority this would necessarily come under the terms of NHS indemnity.

March 1996

February 1999

THE CHARTERED SOCIETY OF PHYSIOTHERAPY
14 BEDFORD ROW, LONDON WC1R 4ED
TEL **0171 306 6633** FAX **0171 306 6611**
www.csp.org.uk