Joint and Soft tissue Injections

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This is a standing friendly presentation.

Please feel free to take a standing break or stretch your legs at the back of the room at any time.
Objectives

What is the evidence behind injection therapy?
Why inject?
   Indications for joint injection
   When not to inject
When to refer?
Develop a pragmatic approach to joint injections

Dr Philip Hench

28 years old woman with severe RA

On September 21, 1948, IM injection of Compound E (100mg Cortisone).

By the third day few symptoms remained.

Dr Phillip S. Hench
First Rheumatologist at Mayo Clinic, 1921

**The Nobel Prize in Physiology or Medicine 1950**

Kendall isolated compound E (later called Cortisone) from the adrenal cortex.

One day in 1949:

*First Joint injection with Hydrocortisone in the shoulder for Severe Calcific tendinitis.*

Within 14 hours after the ‘compound F’ was put into the area of the calcium, the patient was moving his shoulder freely.

Morrey BF. *Orthopedic Surgery at the Mayo Clinic* Rochester, MN: Mayo Clinic; 1999:242
Hollander popularised the use of Cortisone injections for Joint and Soft tissue conditions

3,757 injections in 547 patients

“No other form of treatment has given such consistent local symptomatic relief in so many for so long with so few harmful effects”


**Mechanism of action**

- Inhibit arachidonic acid production from phospholipids
- Reduced inflammatory mediators in joint
- Reduced joint inflammation
Mechanism of action

Genomic
Downregulation of proinflammatory protein synthesis

Membrane Glucocorticoid Receptor mGCR

Non-specific Non-genomic

Cytoplasmic effects

Chondroprotective effect

Reduced C-fibres pain transmission

Cytosolic Glucocorticoid Receptor cGCR

Effects

Suppress inflammation e.g. RA
Vasoconstictive
Suppress inflammatory flares in degenerative joint disease
Interrupt the cycle of:
Chondroprotective
Promotion of articular surfactant
Immunosuppresive
Anti-proliferative
Direct effect on reducing pain e.g. substance P, chondroitin, glutamate esp in Tendinopathy
Effects

The Volume effect

Physical stretching of tissues can disrupt adhesions e.g bursae


Not advised when injecting tendon sheaths

Inhibition of myofibroblast activity:

Frozen Shoulder (adhesive capsulitis)

Increased Myofibroblast staining in Adhesive Capsulitis

IA steroid injection – decreased the amount of fibromatosis, vascular hyperplasia, fibrosis, and the presence of fibroblasts staining for α-smooth muscle actin.

Indications

Treatment
An aid to physical rehab.
Pain relief
Diagnosis
Improving mobility

Treatment

Trochanteric bursitis
Trochanteric injection is safe, effective, diagnostic and therapeutic.

A retrospective cohort study comparing treatments for trochanteric bursitis showed a 2.7-fold increase in the number of patients who were pain free five years after a single corticosteroid injection compared with those who did not receive an injection.


Cochrane review is awaited

Case series evidence

Treatment

De Quervaine’s Tenosynovitis
Limited evidence. Only one controlled trial. No RCT. Corticosteroid injection is superior to thumb spica splint.

Inconsistent or limited-quality patient-oriented evidence

Generally safe and effective in the short term
Avoid injection in First Trimester.
Advise mothers there may be a temporary reduction in breast milk output

An aid during physical rehabilitation

Tennis elbow
Reduces short-term (<6 weeks) symptoms, but physical therapy is superior to steroid injection after six weeks.

Consistent, good-quality patient-oriented evidence


An aid during physical rehabilitation

Rotator cuff syndrome
Short-term pain relief that is greater than placebo and at least equal to NSAIDs.

Limited quality evidence

Pain relief and allow rehab

Osteoarthritis

Intra-articular steroid injections reduce pain and swelling in osteoarthritis of the knee.  
*Good quality evidence*  


**Numbers needed to Treat:**
NNT – 1 in 7 (for pain improvement) NNT – 1 in 10 (for physical function)

**Numbers needed to Harm:**
NNH – 1 in 1000

Short Term Treatment

Rheumatoid arthritis

Improvement up to 22 weeks; No evidence of harm

5 RCTs; n=346

Treatment
Carpal Tunnel Syndrome

Steroid injection is superior to placebo in the short-term (1 month)

Over short term (3 months) steroid inj. is better than surgery; Over long term (1 year) steroid inj. is as good as surgery.

Carpal Tunnel Syndrome: Natural History

20 hands with CTS (in 12 patients) followed up for 4 – 9 years. Patients had refused all forms of treatment

8 hands (7 patients) showed improved clinical symptoms and conduction studies.

**Treatment**

**Trigger Finger**


Effective & Safe compared to placebo

*Effect lasts for upto 12 months*

**Systematic Review**


*Silver level evidence*

**Diagnosis**

If pain goes after injecting Local Anaesthetic (and steroid); then it can confirm a diagnosis or rule it out.

**Example:**

45 year old man with lateral elbow pain: Has previously had trauma to the elbow many years ago. Has some restriction of Prono-supination. Tender over common extensor origin.

Is this Tennis elbow or Osteoarthritis of the Radio-capitellar joint?

*Injection into the Radio-capitellar joint improved pain.*

Radial head excision improved pain.
**Diagnosis**

Can be used to differentiate pain from a peripheral joint and referred pain due to radiculopathy.


**Improve Mobility**

Example: 82 year old lady with history of RA. Seen at home by GP. Has taken to bed for last three days.

Systems review and examination

Has flare up of OA in knee

Joint aspiration and cortisone injection:
  - Reduced pain rapidly
  - Improved mobility
  - Reduced sarcopenia from immobility
  - A potential fall and hip fracture was prevented
Comparing NNT and NNH

Steroid injection in Knee OA
NNT – 1 in 7
NNH – 1 in 1000

Statins over 5 years
NNT – 1 in 39 (preventing MI)
NNT – 1 in 125 (preventing stroke)
NNT – 1 in 83 (Life saved)

NNH – 1 in 10 (muscle damage)
NNH – 1 in 50 (contributed to development of Diabetes)

Comparing NNT and NNH

Steroids in Other situations
Acute exacerbation of COPD:
NNT – 1 in 10
(防止失败的治疗)
NNH – 1 in 7
(次要副作用，如暂时血糖升高)

Antibiotics for Acute Sinusitis
NNT – 1 in 18
(更快的症状解决)

NNH – 1 in 8 (side effects)
Adverse effects: Extra-articular steroid injections

Systematic review
(Brinks, et al. BMC Musculoskeletal Disorders 2010)
87 studies, heterogenous – overall incidence not established
Injection site pain (variable) – or Flare up of symptoms
Cellulitis (and Joint sepsis)
Bruising
Tendon rupture e.g. delayed FDP/FDS rupture after injection for CTS
Fat atrophy
Skin atrophy, hypopigmentation
Osteomyelitis, Necrotising fascitis (only 1 case reported)
Nerve injury e.g. Superficial radial nerve paraesthesia in De Quervaine’s (2%)
Pain at injection site (16% after CTS inj. in one study)

Infection

Exact incidence not known. But is very low:
Rates between 1:3000 and 1:50,000

Patients on Anticoagulation

Stopping anticoagulation is not required

INR in therapeutic range – it is safe to inject
640 injections – only one episode of bleeding (Ahmed etal³)
(Level IV evidence INR < 4.5)
NOACs can be continued ⁴,⁵.
Avoid injection during peak drug levels e.g. 2-4 hours after last
dose of Rivaroxaban⁴

4. Manufacturers recommendations for NOACs.

Which steroid to use?

Hydrocortisone acetate (short acting)
Methylprednisolone (intermediate acting)
Triamcinolone acetonide (intermediate acting)
Betamethasone (long acting)
Dexamethasone (long acting)

Systemic effects

Disturbance in menstruation at 6 weeks (50.6%),
Prospective study of 77 women

Flushes (28.6%)

Temporary rise in blood sugar in Diabetics
Usually for a week, but can last upto 6 weeks.

Serious complications

Plantar fascia rupture

765 patients with Plantar Fascitis
51 had plantar fascia rupture
44 – attributed to steroid injection
Original heel pain went after rupture
Other long term problems emerged:
longitudinal arch strain, midfoot strain, lateral plantar nerve dysfunction, stress fracture, hammertoe deformity.
26 feet experienced long term pain despite treatment
Rare

Reactivation of dormant Joint TB - ? Immunosuppressive effect


Risks are more than benefits

Injecting traumatic Olecranon Bursitis

47 patients
Septic bursitis (9%)
Skin atrophy (25%)
Chronic pain (28%)
When not to inject

Active rash or Broken skin at site of injection
Local or systemic infection
Hypersensitivity
Uncontrolled coagulopathy
Prosthetic joint
Tendon regions at risk of rupture e.g. Achilles Tendon
Imminent surgery is proposed at the site of the injection

Tips for Joint and Soft Tissue injections for the General Practitioner

- Before injecting be sure what the condition is: A good history and examination to confirm the diagnosis.
- Joint injections don’t work for everything
- Screen for Red Flags before injecting: Fever, weight loss, sweating – Sepsis / Malignancy. Symptoms and signs suggestive of Inflammatory Arthritis – refer to Rheumatology
- Be aware of increased risk of infection in Diabetes or other immunocompromised conditions
- Only inject if INR is within therapeutic range
- Shared decision making and Informed Consent
- Do you need a Chaperone?
- Are you allergic to anything?
Top tips about technique

**Think surface anatomy**: Mark the area to be injected with skin marker or indent skin
Clean with *skin antiseptic* and use *no touch technique*
**Feel the resistance** as the needle progresses
**Aspirate before injecting** (to avoid injecting in vessel)
Do not inject if patient encounters *nerve irritation symptoms* (to avoid injecting into nerve)
Do not inject if *resistance* is encountered (to avoid injecting in tendon)
**Do not inject under the skin** with steroid
Can use plain local anaesthetic to inject under skin
Cover injection site with small adhesive *dressing*
Give *after-care instructions* to patient
Ask the patient to *remain in the surgery for 20 minutes* after the injection.
Resus medication and equipment should be available.

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Joint and soft tissue injection

- Have stood the test of time
- A diagnostic and therapeutic tool
- Best used with other therapeutic modalities
MR ROB TURNER, Orthopaedic Consultant, Shresbury and Telford Hospital NHS Trust

DR SUKHMAN KALRA, GP with Special Interest MSK Medicine, Telford MSK Service (TEMS)

JOINT AND SOFT TISSUE INJECTION TECHNIQUE DEMONSTRATION
“Together we can harness the power of exceptional science to make everyday life better for all people with all kinds of arthritis.”

“Arthritis Research UK: Everyday freedom from the limits of arthritis.”