Musculoskeletal corticosteroid use: Types, Indications, Contraindications, Equivalent doses, Frequency of use and Adverse effects.

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Corticosteroid Use

• Reduce inflammation, alleviate pain and restore function.

• Management of degenerative diseases, inflammatory diseases and post-traumatic soft tissue injury.

• Administered safely into joint space, peri-articular soft tissues, bursa and tendon sheaths.
Disclosure

- Dr J ide Olubaniyi – No disclosure
- Dr Sean Crowther – No disclosure
- Dr Sukhvinder Dhillon – Speaker, Ankylosis Spondylitis workshop, AbbVie.
Mechanism of Action

Binds onto intracellular glucocorticoid receptor

→

Receptor-ligand complex translocates into cell nucleus and binds onto target genes

→

Upregulation of Annexin-1

→

Inhibition of prostaglandin and leukotrienes production

→

Reduction of synovial blood flow and leucocyte accumulation

→

Reduction of inflammation and pain
Classification

- **Soluble**
  - Dissolve freely in water
  - Non-particulate (clear)
  - Non-esters
  - Quick onset of action
  - Shorter duration of action
  - Dexmedetomidine
  - Betamethasone

- **Insoluble**
  - Require hydrolysis by cellular esterases
  - Particulate
  - Contain esters
  - Longer onset of action
  - Longer duration of action
  - Triamcinolone
  - Methylprednisolone
Methylprednisolone acetate (Depomedrol)  
Methylprednisolone sodium succinate (SoluMedrol)  
Triamcinolone acetonide (Kenalog)  
Triamcinolone hexacetonide (Aristospan)  
Triamcinolone diacetate (Aristocort Forte)  
Betamethasone sodium phosphate/acetate (Celestone Soluspan)  
Dexamethasone sodium phosphate (Hexadrol)
Potency

- Hydrocortisone
- Methylpred.
- Triamcinolone
- Betamethasone
- Dexamethasone

*Relative to hydrocortisone*
## Half-life

<table>
<thead>
<tr>
<th></th>
<th>Short</th>
<th>Intermediate</th>
<th>Long</th>
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<tbody>
<tr>
<td></td>
<td>(8-12 hours)</td>
<td>(12-36 hours)</td>
<td>(36-72 hours)</td>
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<tr>
<td>Hydrocortisone</td>
<td></td>
<td></td>
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<tr>
<td>Triamcinolone</td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td>Betamethasone</td>
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<tr>
<td>Dexamethasone</td>
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<td></td>
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<tr>
<td>Corticosteroid</td>
<td>Dose (mg) *</td>
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<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
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</tr>
<tr>
<td>Methylprednisolone acetate (Depo-medrol)</td>
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<tr>
<td>Triamcinolone acetonide (Kenalog)</td>
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<tr>
<td>Dexamethasone acetate</td>
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<tr>
<td>Betamethasone sodium phosphate/acetate</td>
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<tr>
<td>Hydrocortisone acetate</td>
<td>200</td>
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*Equivalent dose to 40mg methylprednisolone acetate or triamcinolone acetonide, the most commonly used intra-articular corticosteroids.*
<table>
<thead>
<tr>
<th>Drug</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
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</thead>
<tbody>
<tr>
<td>Methylprednisolone Acetate (mg)</td>
<td>4-10</td>
<td>10-40</td>
<td>20-80</td>
</tr>
<tr>
<td>Triamcinolone Acetonide (mg)</td>
<td>2.5-5.0</td>
<td>5-15</td>
<td>5-15</td>
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<tr>
<td>Betamethasone (ml)</td>
<td>0.25-0.5</td>
<td>0.5-1.0</td>
<td>1-2</td>
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<tr>
<td>Hydrocortisone Acetate (mg)</td>
<td>10-25</td>
<td>-</td>
<td>25-50</td>
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</table>

Dexamethasone Acetate 4-16mg (based on joint size)

*www.drug.com*
Indications

Inflammatory arthritides
- Rheumatoid arthritis
- Crystal-induced arthritis (gout, pseudogout)

Spondyloarthropathies

Non-inflammatory arthritides: Osteoarthritis

Peri-articular/soft-tissue inflammatory conditions
- Bursitis
- Synovitis/Tenosynovitis
- Adhesive capsulitis
- Epicondylitis
- Nerve entrapment syndromes

Others
- Ganglion cyst
- Trigger finger
- Neuroma
Contraindications

• Absolute
  Infection (systemic/local)
  Corticosteroid allergy
  Intra-articular fracture
  Unstable joint

• Relative
  Coagulopathy
  Indwelling prosthesis
  Uncontrolled diabetes mellitus
  Severe juxta-articular osteoporosis
  Recent intra-articular injection (< 6 weeks)
  Multiple intra-articular injections (max. of 3-4 injections per year*)

*Controversial due to concerns of soft tissue/chondrocyte injury.
Adverse effects

• **Septic arthritis (0.01-0.03%)**
  Most feared complication
  Usually due to *staphylococcus aureus*

• **Post-injection flare (2-25%)**
  Commonest adverse effect
  Develops within hours post-injection, Can last up to 3 days
  Presumed due to crystal-induced synovitis

• **Facial flushing (15%)**
  Develops 2-30 hours post-injection
  Can last up to 36 hours
  Usually self-limiting
Adverse effects

- Skin atrophy (8%)
  Develops 1-4 months post-injection
  Usually normalizes over 1-2 years

- Skin depigmentation (5%)
  Develops 2 months post-injection
  Usually normalizes in 12 months

- Hyperglycemia
  2-5 days post-injection
  Caution in diabetics
Adverse effects

• Tendon rupture (<1%) Due to intra-tendinous injection Reported cases of Achilles and patellar tendon rupture

• Systemic effects Avoid surgery, dehydration or severe stress within 2 weeks post-injection

• Brain/spinal cord infarction Reported following cervical transforaminal injections Paraplegia reported following lumbar transforaminal injections Particulate corticosteroid are implicated Non-particulate corticosteroid (e.g. dexamethasone) advised
Bibliography

• www.drugs.com
• http://www.aafp.org/afp/2008/1015/p971.html