WO-06 Dislocations and sprains: reduction techniques through the ages

HEALING after the FALL, research library, WO-06

Researched 10 October 2026 by Claude Opus agent for THRIVING after the FALL, Book Four. Library document, unverified.

How to read this

Almost every success rate below was measured in an emergency department, on a patient X-rayed before and after, often with a drug in a vein. A village has none of that, and where a figure depends on the setting the text says so. Two library documents sit under this one and are not repeated, the fracture report (THRIVING library, WO-05) and the anaesthesia report (THRIVING library, WO-11). Section 1 carries the evidence, section 11 the steps.

1. Findings by section

1.1 The size of the problem

The shoulder is about half of all major joint dislocations, 95 to 97% anterior, 2 to 4% posterior, at 23.9 per 100,000 person-years in the United States and 56.3 in Oslo (Alkaduhimi 2016). Ankle sprain runs at 2.15 per 1,000 person-years in emergency data against 19.0 to 26.6 in a general-population survey, so most sprains never reach a healer (StatPearls n.d.) [VERIFY, secondary summary]. True knee dislocation is under 0.02% of orthopaedic trauma admissions (Helito 2025), rare, and the one here that most often costs a leg.

1.2 Telling a dislocation from a fracture-dislocation by hand

The shoulder that is out. The deltoid contour is lost, giving a square shoulder, the socket feels empty, and the arm is held away from the body, turned out, and will not come across the chest (Kauta 2023). After reduction the test is the reverse: the palm reaches the opposite shoulder (Merck Manual 2025a). A posterior dislocation, the one caused by seizure and electric shock, is locked turned inwards and will not rotate outwards at all, and is missed in up to half of first presentations because the front-on film looks nearly normal [VERIFY, teaching estimates]. With no film one clinical rule stands alone: a shoulder that cannot be turned outwards at all is posterior until proved otherwise.

How often is there also a fracture? Kahn and Mehta found 37.5% of associated fractures visible only after reduction (cited in Kauta 2023), so a village will never know, and must accept that some of its reductions are of a fracture-dislocation.

The Quebec rule (Emond) calls a patient high risk at 40 or over with bruising over the upper arm or a first dislocation, or, under 40, with a substantial force such as a fall from greater than their own height, a sporting injury or a vehicle collision. An Australian validation under 40 found sensitivity 0.42 (95% CI 0.16 to 0.71) and the over-40 branch is unvalidated [VERIFY, search summaries]. Inverted, it becomes the stop rule in Protocol 1.

The Ottawa rules. Ankle: 27 studies and 15,581 patients, sensitivity 97.6% (95% CI 96.4 to 98.9), specificity about 31.5%, with sensitivity falling beyond 48 hours (Bachmann 2003). Knee: 6 studies, 4,249 adults, sensitivity 98.5%

(95% CI 93.2 to 100) (Bachmann 2004). The criteria are in Protocol 13. With no X-ray both are used backwards: negative means treat as a sprain, positive means treat as a fracture and accept that most will be sprains.

1.3 The nerve and vessel check, before and after

This is the part a village can do as well as a hospital, and the part that decides whether a reduction was care or assault. What to test is in Protocol 1, with motor testing more reliable than sensory (Merck Manual 2025a). De Laat found nerve injury on electromyography in 45% of 101 patients against clinical series of 13 to 36% (cited in Kauta 2023), most being stretch injuries that recover over months. What matters is the sequence: examine before, after every attempt, and write it down, or a deficit caused by the injury will be blamed on the healer and one caused by the healer will be blamed on the injury.

The pulse lies. Merck states plainly that distal pulses cannot rule out popliteal artery injury (Merck Manual n.d.b), and case reports describe major arterial injury behind an intact radial pulse [VERIFY, search summaries]. The usable signs are a limb white, cold and slow to refill, swelling growing under the hand, bruising spreading over hours, and a patient going grey and thirsty.

The knee is the special case. Popliteal artery injury complicates about 25% of knee dislocations (WikEM n.d.) and 29.1% in a South African series, a quarter of those ending in amputation [VERIFY, search summary]. About half of knee dislocations reduce themselves before anyone looks, which is why they are missed, and revascularisation is wanted within 6 to 8 hours (Helito 2025). The village can recognise, reduce, splint and tell the truth. It cannot revascularise.

1.4 The shoulder through the ages

Hippocrates, On Joints gives seven or eight approaches for the shoulder dislocated into the armpit, the only direction the author says he has seen, from self-reduction with the knuckles in the armpit to what he calls the strongest, a padded lever under the head with the arm bound to it and forced down over a cross-beam. Part 71 claims that with extension, counter-extension and levers "we need never fail in reducing any dislocation at a joint", the overconfidence this report argues against, while Part 78 says that where several methods work "the least troublesome should be selected", which the trials have confirmed.

Astley Cooper, 1822, in *A Treatise on Dislocations and on Fractures of the Joints* (London, Longman), made the mechanical case for fixing the scapula and using a pulley rather than assistants, and set the limit for an old shoulder dislocation at about three months [VERIFY, read only through later quotation]. **Theodor Kocher of Berne, 1870**, in *Berliner Klinische Wochenschrift* 7:101-5, worked on cadavers, described three movements with, critically, no traction, treated eleven subcoracoid dislocations over three years, and criticised Cooper's abduction-with-traction for squeezing the axillary vessels (Cunningham and Kretzenberger n.d.). The "Kocher" of modern trials includes abduction and traction that Kocher never described. **Stimson, 1900**: face down with the arm hanging off the table under about 5 kg for 10 to 30 minutes until spasm fatigues (Merck Manual n.d.a, Alkaduhimi 2016).

The modern family. Alkaduhimi screened 2,099 titles, included 60 studies and catalogued 23 techniques with 17 or 18 modifications (Alkaduhimi 2016). Five matter here: **scapular manipulation**, pushing the lower tip of the shoulder blade towards the spine under hanging traction, **slow external rotation** (Hennepin, Milch), reducing between 70 and 110 degrees and often silently (Merck Manual 2025a), **the chair, or Arlt**, with a padded backrest in the armpit under slow traction through the elbow (Guler 2015), **Boss-Holzach-Matter, or Davos**, the patient's own fingers laced around the flexed knee (Widmer 2023), and **FARES**, small oscillations under constant traction while abducting and rotating outwards (Sayegh 2012). **Cunningham**, seated, gentle traction while massaging trapezius, deltoid and biceps, was first described in five cases and has never been trialled (Cunningham 2003) [VERIFY, secondary summaries only].

Study	Design	Findings
Sayegh 2009	RCT, 154, junior residents	FARES 88.7%, Hippocratic 72.5%, Kocher 68% (p = 0.033). Time 2.36, 5.55, 4.32 min. Pain VAS 1.57, 4.88, 5.44 (p < 0.001). No complications
Gonai 2023	Network meta-analysis, 14 RCTs, 1,189 patients	Kocher vs Hippocratic, the only well-populated direct pair: success OR 1.21 (0.53 to 2.75), pain SMD -0.33 (-0.69 to 0.02). FARES the only method significantly less painful than Kocher, MD -4.0 (95% CrI -7.6 to -0.40). Rankings favoured Davos and FARES. One complication in the network
Alkaduhimi 2017	13 studies, 9 RCTs	Scapular manipulation 97% at VAS 1.47, FARES 92% at 1.59, traction-countertraction 95% at 4.75 [VERIFY, abstract only]
Guler 2015	Retrospective, 153, no anaesthesia	Chair 97.8%, Kocher 97.5%, Spaso 94.8%, Matsen 92.5% (p = 0.65). Chair faster (3.0 vs 4.7 to 4.9 min) and less painful (VAS 4.0 vs 6.5 to 6.9). No fractures or nerve injuries
Widmer 2023	Prospective, 106, sedation-free first	82% sedation-free, Davos 61%, chair 71%. Better without a greater tuberosity fracture (86 vs 68%), in recurrence (93 vs 80%) and within 90 min (93 vs 73%), all p < 0.01. Six new sensory palsies, all after the chair
Self-reduction and field series	An RCT of 60 (Marcano-Fernandez 2018), a video-guided RCT (KSSTA 2020), a series of 35 (Wirbel 2014), ski patrol 96 cases (Mulvey 2021)	Davos beat Spaso on pain (3.57 vs 5.26) and success (77% vs 67%). Video-guided Davos 53% and self-Milch 55% beat self-Stimson 16%, but all 16 patients over 70 could not perform it. Trained patrollers reduced 89%, with no immediate complications [VERIFY, search summaries, no comparison groups]

What it adds up to. The differences between techniques are smaller than those between operators, patients and timing, and gentle methods succeed as often as forceful ones while hurting much less. A previous dislocation is the best predictor of an easy reduction, so the recurrent dislocator can be taught to do it alone (Widmer 2023).

1.5 The relaxation and analgesia a village can give

Nothing at all is a real option, and the Dutch shoulder guideline favours a biomechanical approach without analgesics, moving to sedation only on failure, on low-grade evidence and expert opinion [VERIFY, search summary, PDF unreadable].

Intra-articular lidocaine is the one salvaged drug worth spending here. Twelve RCTs and 630 adults against intravenous sedation: success RR 0.93 (95% CI 0.86 to 1.01), adverse events RR 0.16 (95% CI 0.07 to 0.33), number needed to treat 6 (Sithamparapillai 2022, via Long and Gottlieb 2023). An earlier Cochrane review of five trials found the same on low-quality evidence (Wakai 2011), and Pradhan recommended the local route for early presenters and the intravenous route beyond 5 hours (Pradhan 2006) [VERIFY, both secondary summaries]. Ten of the twelve trials used 20 ml of 1%, which is 200 mg, exactly the village ceiling of the lesser of 3 mg/kg and 200 mg (THRIVING library, WO-11). This report follows the library: **0.3 ml/kg of 1%, never more than 20 ml**, so 15 ml for a 50 kg woman.

Opium and ethanol. Morphine 5 to 15 mg under the skin or into muscle, or 10 to 20 mg by mouth, 30 to 60 minutes beforehand, with the overdose triad of pinpoint pupils, unrousable sedation and a breathing rate under 8, dulls pain but does not relax the muscle holding the joint out, and ethanol is a poor anaesthetic whose blood level for insensibility overlaps the level that kills (THRIVING library, WO-11). What relaxes muscle is time, warmth, a level surface, a voice and gravity, and Merck names rushing the rotation as the commonest cause of failure (Merck Manual 2025a).

1.6 The elbow

Hippocrates said that protruding bones of the elbow which are reduced are often fatal, which is the pre-antibiotic truth about the open elbow. The steps are in Protocol 7. Distal pulses do not exclude brachial artery injury because of collateral flow (Merck Manual n.d.c). Outcomes are modest, with only 4 of 21 adults (19.1%) in one series feeling fully recovered [VERIFY, search summary]. Immobilisation beyond 7 to 14 days buys stiffness.

The child's elbow that is not dislocated. A toddler pulled by the hand who then will not use the arm has a pulled elbow. Seven RCTs and 701 children: hyperpronation failed less often than supination-flexion, RR 0.34 (95% CI 0.23 to 0.49), absolute risk difference 26%, number needed to treat 4 (Bexkens 2016). Cochrane found first-attempt failure of 9.2% against 26.4%, RR 0.35, on low-quality evidence (Krul n.d.). This is the highest-yield, lowest-risk manoeuvre in the report.

1.7 The finger

Hippocrates, Part 80, says "the articulation of a finger is restored in fourteen days." Practice has not changed: traction with pressure on the base of the displaced segment, usually without anaesthesia and best at the time of injury. A stable joint is buddy-taped 3 to 6 weeks and moved from the first day, an unstable one splinted with the last 30 degrees of extension blocked [VERIFY, search summaries]. If it will not go, soft tissue is caught in the joint and pulling harder will not free it.

1.8 The jaw

Hippocrates, Parts 30 to 34 describes the manoeuvre still used, and gives the treatise's only mortality figure: an untreated bilateral dislocation may kill around the tenth day, from fever, stupor and diarrhoea.

Modern. A systematic review of 29 studies covering 13 alternatives reported about 86% for the conventional method, 96.7% for the wrist pivot and 55.2 to 66.7% for extraoral methods, with no comparative trials in trained hands [VERIFY, search summaries]. The extraoral method earns its place for diagnosis: the coronoid process is palpable through the cheek only when the jaw is out. Wrapping the thumbs is not optional, because the jaw snaps shut the instant the condyle goes home, and pain persisting after reduction suggests a fractured jaw (Merck Manual n.d.d).

1.9 The hip

Hippocrates distinguishes four directions and warns that an unreduced childhood case leaves a limb "entirely useless and atrophied". **The modern methods** are traction-countertraction with gentle rotation, the hip and knee flexed to right angles while an assistant presses the pelvis down. **Allis** pulls upward on the shin and **Captain Morgan** uses the operator's own knee as a fulcrum and pulls the ankle down (Merck Manual 2025b), both in Protocol 11. **Bigelow** is named in the brief and I could not find a usable description in any source I read. It is a circumduction method of the older texts and I will not reconstruct it [VERIFY, unconfirmed].

Success and the clock. Hendey and Avila documented technique in 25 of 77 hip dislocations, and 12 of 13 Captain Morgan attempts succeeded, with no comparison group, so Merck's claim that it beats Allis is more confident than the data (Hendey and Avila 2011) [VERIFY, search summary]. Avascular necrosis is what turns a reduced hip into a ruined hip years later: five retrospective cohorts and 236 dislocations gave an odds ratio of 5.00 (95% CI 1.30 to 19.29) for late against early reduction (Ahmed 2017), with textbook figures of 5 to 40% overall and under 10% within six hours [VERIFY, both secondary]. Some meta-analyses find no difference.

The honest village position. A femoral neck fracture, an absolute contraindication, cannot be excluded without an X-ray. Reduce it anyway, early, gently, twice at most, then stop, because a hip permanently out is worse than a hip reduced imperfectly, and afterwards repeat the sciatic examination, since in one 35-patient series sciatic injury did not recover completely when reduction was delayed beyond twelve hours [VERIFY, search summary].

1.10 The patella

Flex the hip a little to slacken the quadriceps, extend the knee slowly, and push the kneecap inwards, lifting its outer edge if needed to clear the bony ridge. Many reduce spontaneously on extension. Recurrent instability runs 35 to 71% and is higher in children [VERIFY, search summaries]. For the village: reduce, splint in extension two to three weeks, strengthen the thigh for months, and expect a third to two thirds to do it again.

1.11 The ankle, the talus and the knee

The ankle fracture-dislocation is an emergency for the skin, not the bone, because displacement causes pressure necrosis, and there are effectively no contraindications to attempting closed reduction [VERIFY, search summaries]. The fracture report says it bluntly: reduce a dislocated talus at once by pulling on the heel, before the stretched skin dies (THRIVING library, WO-05). **Quigley traction**, a stockinette drawn up the leg and hung from a frame over the opposite shoulder, lets the deforming forces relax until reduction occurs, and a village forge and a bedsheet can build it [VERIFY, search summaries].

The knee dislocation. Immediate closed reduction, splint in about 15 degrees of flexion, repeat the nerve and vessel check, then watch obsessively for three days (Merck Manual n.d.b). With no Doppler the village does what Helito recommends for low-income settings: compare the distal pulses, check refill, temperature and colour, and test peroneal and tibial nerve function (Helito 2025).

1.12 Recurrence and immobilisation

How often. Hovelius found 49% recurrence at ten years, and at twenty-five years 72% among those under 22 at first dislocation against 27% of those over 30 [VERIFY, search summary]. A review of ten studies pooled recurrent instability at 39%, and in adolescents 72 to 100% (Kauta 2023). This is natural history, not a failure of treatment.

Duration and position. Paterson pooled nine Level I and II studies and found no difference between one week or less and more than three weeks of immobilisation ($p = 0.52$, about 41% against 37%), with age under thirty the strongest predictor (Paterson 2010) [VERIFY, secondary summaries]. Itoi randomised 188 patients to three weeks in internal or external rotation and reported about 42% against 26% (Itoi 2007) [VERIFY, secondary summaries], but

two later trials did not replicate it and Paterson's pooled comparison was p = 0.07, so external rotation is not worth the discomfort (Kauta 2023). The village gives a sling for about a week, then movement, then months of rotator cuff and scapular strengthening, and teaches the recurrent dislocator the Davos self-reduction.

1.13 Sprains

RICE has no good evidence behind it. Gabe Mirkin coined the acronym in 1978 and withdrew his support in 2015, writing that ice may delay healing (RICE n.d.). **PEACE and LOVE**, proposed by Dubois and Esculier in 2019, is a replacement acronym and not a replacement evidence base (Dubois and Esculier 2019).

Early movement beats immobilisation for most sprains. Kerkhoffs pooled 21 trials and 2,184 participants and found functional treatment favourable, with return to work 12.89 days sooner (95% CI 7.10 to 18.67), while warning that most differences lost significance when low-quality trials were excluded. The review has since been withdrawn from the Cochrane Library (Kerkhoffs 2002) [VERIFY, search summaries].

A severe sprain is different. Lamb's CAST trial randomised 584 adults from eight United Kingdom emergency departments between April 2003 and July 2005, all unable to bear weight with no fracture, to a tubular bandage, a below-knee cast, an Aircast brace or a Bledsoe boot, applied two to three days after presentation. At twelve weeks the cast beat the tubular bandage on pain, activities, sport and quality of life, but by nine months the differences were gone. The authors advised a ten-day below-knee cast (Lamb 2009).

The resolution for the village is in Protocol 13. About 44.2% have at least one recurrence and chronic instability runs 20 to 40% [VERIFY, StatPearls summaries]. The treatment is balance and strengthening work, which costs nothing.

1.14 The plants, and what they are worth

Comfrey, *Symphytum officinale* L., root, topical. A placebo-controlled trial in 142 ankle sprains found significantly greater pain regression, and an observer-blind trial in 164 outpatients found the ointment non-inferior to diclofenac gel [VERIFY, read through an industry submission to the European Medicines Agency (EMA n.d.), not the originals]. Most trials come from one group testing one branded product and I found no independent systematic review. Safety governs: comfrey contains pyrrolizidine alkaloids causing hepatic veno-occlusive disease, the trial product was specified at under 0.35 ppm, and a village cannot measure that. Never by mouth. Before flowering, foxglove, *Digitalis purpurea* L., resembles it closely enough that "comfrey tea" made of foxglove caused poisoning in Taiwan with at least one death (THRIVING library, WO-05).

1.15 What the bonesetters got right

The fracture report gives the scale: about 85% of Nigerian fracture patients go first to a bonesetter, and complication ranges across studies run to malunion 16.1 to 64.3%, gangrene 2.8 to 29.6% and amputation 2.8 to 60% (THRIVING library, WO-05). Those are fracture figures, dominated by one error, the tight binding of a swollen limb. For dislocation the record is thinner and entirely descriptive. Huber and Anderson's 1996 study of the Nahua of Hueyapan found bonesetters explaining injuries naturalistically while curers used supernatural terms (Huber and Anderson 1996) [VERIFY, abstract only], and a 2022 study reports South Indian bonesetters approaching dislocations much as modern practitioners do [VERIFY, search summary]. **I found no outcome study of traditional dislocation reduction anywhere.** What is worth keeping is hands that know what a joint feels like, presence on the day of injury and payment in kind. What kills, in the fracture literature, belongs to the aftercare.

2. Evidence grades

Practice	Grade	Basis
Closed reduction of acute anterior shoulder dislocation, any mainstream technique	A	14 RCTs, 1,189 patients, 80 to 97% (Gonai 2023, Alkaduhimi 2017, Sayegh 2009)
Gentle cooperative techniques rather than forceful ones	A	Network meta-analysis for pain, trials and series for equal success (Gonai 2023, Guler 2015, Widmer 2023)
Reducing a shoulder within 90 minutes without any drug	B	One prospective series of 106, 93% against 73% (Widmer 2023)
Teaching the recurrent dislocator to self-reduce	B	Two small RCTs and a series of 35 (Marcano-Fernandez 2018, Widmer 2023, Wirbel 2014)
Intra-articular lidocaine instead of sedation	A	12 RCTs, 630 patients, RR 0.16 for adverse events (Sithamparapillai 2022, Wakai 2011)
Ottawa ankle rules	A	27 studies, 15,581 patients, sensitivity 97.6% (Bachmann 2003)
Ottawa knee rule	A	6 studies, 4,249 adults, sensitivity 98.5% (Bachmann 2004)
Hyperpronation for a child's pulled elbow	A	7 RCTs, 701 children, NNT 4 (Bexkens 2016, Krul n.d.)
Reducing a posterior hip within 6 hours	B	5 retrospective cohorts, OR 5.00 (1.30 to 19.29), some analyses null (Ahmed 2017)
Below-knee cast for 10 days for a severe ankle sprain	A	CAST trial, 584 patients, 8 centres (Lamb 2009)
Early functional treatment for mild and moderate sprain	B	21 trials, 2,184 participants, benefit shrinking when poor trials are excluded (Kerkhoffs 2002)
Ice to speed healing of a sprain	X	A 2008 meta-analysis found insufficient evidence and the originator withdrew it (RICE n.d.)
Tight binding of a swollen limb	X	The dominant cause of gangrene and amputation in the bonesetter record (THRIVING library, WO-05)
Immobilisation beyond one week after shoulder dislocation	X	No benefit across 9 Level I and II studies (Paterson 2010)

3. Means ledger

Hands and knowledge alone. Diagnosis of the dislocated shoulder, elbow, finger, jaw, kneecap and hip by look and feel. The Ottawa examinations and the full nerve and vessel check. Scapular manipulation, slow external rotation, the chair against any solid chair back or fence rail, Cunningham's massage, Stimson over a table edge, the Davos self-reduction, hyperpronation of a child's elbow, the finger, the jaw, the kneecap. Elevation. Ten slow minutes of talking a frightened patient through a rotation. **This rung does most of the work in this report, which is the most**

important finding in it. Outcome: most acute shoulders, fingers, jaws, kneecaps and children's elbows go back.

At the hearth (fire, clean water, salt, honey, vinegar, fat, cloth, needle and knife). Adds a sling and swathe, buddy-taping, a cold wet cloth, figure-of-eight compression, a padded splint, warmth and a flat surface. Outcome: the aftercare exists, so reduced joints stay reduced. The reduction itself does not change.

Garden and still (medicinal plants, ethanol, beeswax, soap, a scale, a pressure cooker, a forge). Adds plaster of Paris from local gypsum if an oven holds 120 to 150 °C (THRIVING library, WO-05), giving the ten-day cast the CAST trial supports, a frame and stockinette for Quigley traction, a Stimson weight of known mass, and opium if poppies are grown. Outcome: severe sprains and displaced ankles are treated properly rather than improvised.

Village dispensary (300 people, a trained lay healer, salvaged stock, instruments, a microscope). Adds salvaged lidocaine, syringes and needles, so joint blocks become possible, a written record of every reduction, and a trained second pair of hands. Outcome: pain falls sharply and the patient who could not relax can now be reduced.

District infirmary (3,000 people, a nurse or doctor, a sterile room, ten beds). Adds three or four strong trained assistants for a hip, overnight observation for the swollen elbow and the threatened knee, a traction frame, and the capacity to decide a limb is dead. Outcome: the hip has a real chance and the irreducible joint has somewhere to go.

A hospital before the Fall. Imaging before and after, angiography, sedation with a dedicated airway person, general anaesthesia with muscle relaxation, vascular surgery within six to eight hours, open reduction, physiotherapy. Outcome: the knee keeps its leg and the fracture-dislocation is recognised before anybody pulls on it.

4. Harm test

Pulling on a fracture-dislocation. Maims by displacing or completing the fracture. The error is treating a first dislocation over 40, bruising over the upper arm or a fall from height as simple. Signs: grating rather than springy resistance, pain rising instead of easing, shape unchanged. Then stop, splint in the position of comfort, do not retry. The only complication in the 1,189-patient network was a fracture with Kocher in an 85-year-old woman when traction was added (Gonai 2023), and a Korean report describes two women over 70 with fractures caused during closed reduction [VERIFY, search summary].

Tearing an artery. Kills by bleeding into the armpit or thigh with no wound and often a normal pulse. The error is force, speed and leverage against a fulcrum in the armpit. Never in the elderly, the anticoagulated, or a joint out more than three weeks. Signs: swelling growing under your hand, bruising spreading over hours, pallor, thirst, a limb turning white and cold, new weakness after a normal start. Then stop, lie flat, do not bandage tightly over a growing swelling, keep warm, fluids by mouth while alert, and accept the village cannot repair it. Regauer, Polzer and Mutschler describe a 69-year-old farmer on coumarin whose brachial vein was injured during Hippocratic reduction, leaving incomplete recovery at three months (Regauer 2014).

Stretching a nerve. Maims as a dead arm or a dropped foot for months, and the error is prolonged heavy traction, hard fulcrums and repeated attempts. All six new sensory palsies in Widmer's 106 followed the Arlt chair, five in the axillary field, attributed to backrest pressure (Widmer 2023), which is why padding the backrest is not optional (Guler 2015).

Leaving a hip out. The head dies. No dose, only a clock: pooled odds ratio 5.00 (95% CI 1.30 to 19.29) for late against early reduction (Ahmed 2017), with necrosis appearing up to three years later.

Leaving a knee dislocation unwatched. The artery occludes hours later and the leg dies. The error is being reassured by a normal pulse or by a knee that reduced itself. Signs: pain out of proportion, a tense calf, a cold white numb foot. A quarter of those with arterial injury in the South African series were amputated.

Binding a swollen joint tightly. Gangrene, amputation, Volkmann's contracture, the signature harm of the bone-setter record (THRIVING library, WO-05). Signs: pain under the bandage out of proportion, numbness, white,

blue or cold digits. Take it off completely, at any hour, and start again loose.

Intra-articular lidocaine. Kills by systemic toxicity, beginning with numb lips, ringing ears and confusion, then fits, then the heart. The ceiling is the lesser of 3 mg/kg and 200 mg, and 20 ml of 1% is exactly 200 mg. Never at full dose in the frail, the very old, liver or kidney disease, late pregnancy or small children. Stop, lie them flat, protect the airway, and accept there is no lipid emulsion (THRIVING library, WO-11).

The jaw and the sedated patient. The operator's thumbs are bitten through when the jaw snaps shut, and a human bite without antibiotics is a serious infection, so wrap the thumbs every time. The other drug hazard is the sedated patient left face down under a Stimson weight who vomits and inhales it. Never leave a sedated patient prone and alone (THRIVING library, WO-11).

5. Red flags

1. **A cold, white, pulseless limb, especially after a knee dislocation.** Reduce immediately if still out, because reduction sometimes restores flow. Splint in slight flexion, keep the limb at heart level and the patient warm, give water. If the limb dies the question becomes amputation, and the family should be told on the first day.
2. **A swelling growing under your hand after a reduction, with spreading bruising and a patient going pale and thirsty.** Internal bleeding. Lie flat, legs raised, no tight bandage over it, fluids while alert.
3. **A hip that will not go back after two gentle attempts.** The head will die. Splint where it lies, padded so it cannot roll, give what pain relief exists, try once more the next day with more hands, then accept it and teach the household to prevent pressure sores.
4. **Grinding instead of springy resistance, in someone over 40 with a first dislocation or bruising over the upper arm.** A fracture-dislocation. Stop, splint, treat as a fracture (THRIVING library, WO-05), accept a stiff shoulder.
5. **Pain under a bandage out of proportion, with numbness or cold digits.** Remove everything at once. If tension and pain persist with the bandage off, this is compartment syndrome and the village has no answer short of the surgery in WO-05.
6. **A child who will not use an arm after a fall.** An apparent shoulder dislocation in a child is usually a growth-plate fracture (Merck Manual 2025a). Splint, do not pull.

Honest comfort. In every one of these the village can still give what was given for most of human history: presence, warm covers, water, a story and the truth. Do not promise an arm will be normal or a dead leg will come back. Say what you will do each day. A healer who attends daily, examines the limb and says what has changed is worth more to the household than a technique nobody has.

6. The case against

Against reducing anything in a village at all. Every success rate here was measured where a fracture had been excluded by X-ray first. Strip that away and the village is pulling on joints that may be broken, in an older population than the trials, and lay musculoskeletal care at scale produces the complication ranges in the bonesetter literature (THRIVING library, WO-05). The reply is that those are fracture figures dominated by tight binding, and that every pre-hospital dislocation study reported zero immediate complications. But those patrollers were trained and supervised, and their patients were young skiers.

Against the Hippocratic method. Regauer, Polzer and Mutschler are the named critics, and the case is strong: a heel or fist in the armpit is leverage over the neurovascular bundle, and in the old and anticoagulated it tears things (Regauer 2014). Since scapular manipulation and Milch do at least as well in every comparison, this report drops the heel-in-armpit method, 2,400 years of tradition notwithstanding.

Against believing any technique is better than another. Gonai found no significant difference between Kocher and Hippocratic in the only well-populated direct pair, and none for success across the network, while a separate

meta-analysis of nine studies and 987 patients found no difference between biomechanical, leverage and traction-countertraction groups [VERIFY, search summary]. The rankings that put FARES and Davos on top rest on indirect comparisons through Kocher, and Sayegh's own trial was unblinded, single-centre and underpowered, with every clinic failure later reduced in theatre by the same method [VERIFY, critical appraisal read as a summary]. Alkaduhimi's guide says plainly it is not possible to conclude which technique is most successful (Alkaduhimi 2016). If that is right, the book should teach two or three techniques well and choose them for gentleness and for needing no equipment.

Against RICE, from its own author, and against its replacement. Mirkin withdrew RICE in 2015, but a 2023 animal-model review argues the optimal window for ice is the immediate acute stage and that icing should stay standard until the evidence is unanimous [VERIFY, search summary], and PEACE and LOVE has no outcome trials either. The first 48 hours of sprain care are weakly evidenced in every direction, and compression, elevation and early weight-bearing are better supported than ice.

Against both romances. There is no outcome study of traditional dislocation reduction anywhere, so nothing here is evidence that it works, only that nothing shows it does not. And against the hospital: a shoulder can be put back by a stranger on a chair in three minutes with no drug, and it hurts less than the hospital's own traditional method. The hospital's main contribution to shoulder reduction is the X-ray that says it is safe to try.

7. Ten-line summary

1. The shoulder is half of all major joint dislocations, 95 to 97% anterior, and the joint a lay healer can most often fix.
2. Across 14 randomised trials and 1,189 patients no technique is clearly better than another, and almost all reach 80 to 90%.
3. The gentle techniques, scapular manipulation, slow external rotation, the padded chair and the patient's own Davos manoeuvre, succeed as often as forceful ones and hurt much less.
4. Timing beats technique: 93% of shoulders go back with no drug within 90 minutes of injury, against 73% after that.
5. The person who has dislocated before reduces most easily, 93% against 80%, and can be taught to do it themselves.
6. Intra-articular lidocaine matches intravenous sedation for success and cuts adverse events sixfold, at 0.3 ml/kg of 1% to a ceiling of 20 ml.
7. A first dislocation over 40, bruising over the upper arm or a fall from height means a fracture-dislocation until proved otherwise, and pulling on it is the error that maims.
8. The nerve and vessel check before and after every attempt is the part a village does as well as a hospital, and a normal pulse does not exclude a torn artery.
9. A hip must be reduced within about six hours or the head may die, and a knee dislocation threatens the artery in about a quarter of cases.
10. For sprains: compression, elevation and early movement for the mild and moderate, ten days of rigid support for the severe, never a tight bandage on a swollen limb.

8. Open questions

- No study anywhere reports outcomes of traditional dislocation reduction.
- No adequately sized head-to-head comparison of the main techniques in an unsedated population exists.
- The Quebec rule's over-40 branch is unvalidated and its under-40 branch failed validation.
- Whether the six-hour hip rule reflects causation or injury severity is unresolved, as is whether ice helps or harms early.
- The Bigelow hip manoeuvre could not be reconstructed from any source I read.

- The elbow has no comparative trial at all, and its Cochrane review has been a protocol for over a decade.

9. Sources to read in full

1. **Hippocrates, *On Joints*** (Adams translation). Parts 1 to 11 on the shoulder, 30 to 34 on the jaw, 51 to 80 on the hip and fingers.
2. **Gonai and colleagues (2023), *Annals of Emergency Medicine*.** The definitive modern comparison, and the source for the finding that technique differences are smaller than the literature claims.
3. **Alkaduhimi and colleagues (2016), *Turkish Journal of Emergency Medicine*.** Free full text, 23 techniques step by step, the catalogue a dispensary would copy out.
4. **Widmer and colleagues (2023), *Shoulder and Elbow*.** The closest thing to a post-Fall study: sedation-free, two attempts, 106 patients.
5. **Sithamparapillai and colleagues (2022), summarised by Long and Gottlieb (2023).** The case for the one salvaged drug worth spending here.
6. **Lamb and colleagues (2009), *The Lancet*.** The CAST trial, and the reason a village should make plaster.
7. **Bachmann and colleagues (2003 and 2004).** The Ottawa ankle and knee rules, which let a village decide by hand who has a fracture.
8. **Mattick and Wyatt (2000), "From Hippocrates to the Eskimo".** The standard historical survey, which I could not obtain.

10. At the bedside after the Fall

A household

Minimum viable version. Know the shape of a shoulder that is out. Get the person sitting, calm and warm within the first hour, sling the arm, and send for the healer, letting them try the Davos manoeuvre meanwhile. For a toddler who will not use an arm after being pulled by the hand, hyperpronate. For a sprained ankle, bandage firmly in a figure of eight, raise the leg, and walk on it as soon as it takes weight.

The first failure to expect. The household will bandage too tight, because tight feels like treatment. Teach, before anything else, that a bandage comes off the moment the toes go cold or the pain changes character, at any hour.

A village of 300

Minimum viable version. One trained healer who can examine a joint and a nerve, knows scapular manipulation, slow external rotation and the padded chair, plus the small ones everyone should know, the finger, the jaw, the kneecap and the child's elbow, plus the rule about when to stop, keeps a written record, and is sent for immediately.

What it needs to start. Skills: the Ottawa examinations, the full nerve check, the three shoulder techniques, hyperpronation, the jaw with wrapped thumbs, and the discipline of two attempts. Materials: slings, bandages, padded splints, a solid padded chair, a bed approachable from both sides, a weight of known mass. Plants: nothing essential, comfrey topically if grown and kept away from anyone who might make tea of it. Salvage: lidocaine 1%, syringes and needles. Records: one line per case with date, joint, mechanism, age, nerve findings before, technique, attempts, result, nerve findings after, and the limb at one week, one month and one year. Within a generation that book is the village's own evidence base.

The first failure to expect. The village will reduce a fracture-dislocation in an older person with a first dislocation, because everyone will want it fixed and the healer will not want to refuse. The arm will be worse and the healer will lose trust exactly when the village most needs one. Write the over-40 rule on the wall and let the family read it.

A district of 3,000

Minimum viable version. All of the above, plus a bed and ten days of observation, three or four trained assistants who can hold a pelvis, plaster for a below-knee cast, and the one person in the district allowed to attempt a hip or a knee.

The first failure to expect. The district will attempt a hip, fail twice, keep going, and injure the sciatic nerve or fracture the femoral neck. Stopping is hardest where the resources are greatest, so set the limit in writing before the first case arrives.

11. Protocols

Protocol 1: the assessment before every reduction

1. Sit the patient somewhere warm and flat. Cut clothing off rather than pulling a limb through a sleeve.
2. Look at both sides together. Ask how old they are, whether this is the first time, and how it happened.
3. **Stop rule.** Stop if they are 40 or over with a first dislocation, there is bruising over the upper arm, the fall was from more than their own height, a vehicle or large animal was involved, or it is a child with an apparent shoulder dislocation.
4. Pulse at wrist or ankle, both sides compared, with colour, warmth, and how fast colour returns after pressing a nail bed for 3 seconds.
5. Sensation: outer upper arm, both sides of the palm, the web between thumb and index on the back of the hand. Leg: sole, top of foot, outer calf.
6. Movement: spread the fingers, bend them, straighten the wrist, thumb to index. Leg: lift the foot, push it down, wiggle the toes.
7. Write it down before touching the joint, or say it aloud to a witness.
8. Decide: reduce, or splint and stop.

Protocol 2: shoulder, scapular manipulation (first choice)

1. Give nothing, or lidocaine by Protocol 6 with 15 minutes' wait.
2. Patient face down with the injured arm hanging over the table edge, or sitting leaning forward over a chair back.
3. Hang 5 kg from the wrist, or have an assistant pull gently and steadily downwards.
4. Wait 5 to 10 minutes, saying nothing but reassurance. Do not pull harder.
5. Find the lower tip of the shoulder blade with both thumbs. Push that tip towards the spine while the heels of the hands push the upper part outwards. Hold 60 seconds.
6. Reduction is usually silent. Confirm: the palm reaches the opposite shoulder.
7. If not gone after two pushes of a minute each, move to Protocol 3.
8. Repeat the nerve and vessel check. Sling and swathe.

Protocol 3: shoulder, slow external rotation (second choice, or first with no table)

1. Patient sitting or on the back, upper arm against the chest, elbow at a right angle, forearm across the body, palm towards the belly.
2. One hand holds the upper arm to the chest, the other the wrist. Say what you will do and that they can stop you at any time.
3. Rotate the forearm slowly outwards, like opening a gate, over 5 to 10 minutes, slower than feels sensible.
4. Whenever the muscles tighten, hold still until it settles, then continue. Most reductions happen between 70 and 110 degrees, usually silently.

5. If the forearm reaches flat out to the side without reducing, hold there and pull slowly along the upper arm, but not if you suspect a nerve or vessel injury.
6. If still out, keep the outward rotation and raise the arm overhead while pressing the head of the bone up and out with the whole hand in the armpit, never the thumb tip.
7. Two attempts in total. Then stop.

Protocol 4: shoulder, the padded chair (third choice, or first if they cannot lie down)

1. Fold a blanket over the back of a solid chair until the top edge is thickly padded. **This padding is not optional.**
2. Sit the patient sideways so the backrest is in the armpit of the injured side and the arm hangs over it.
3. Kneel behind the chair, take the elbow and bend it gently. Tell them to let the arm go heavy, and wait a minute.
4. Slow steady downward pull through the elbow, increasing over 30 seconds. Do not jerk. If the head catches at the lower rim, add a small outward rotation.
5. Expect it in 1 to 3 minutes, confirmed by the palm-to-opposite-shoulder test.
6. Check the outer upper arm for new numbness afterwards. This method caused six sensory palsies in one series of 106.

Protocol 5: shoulder, self-reduction (Davos), for the recurrent dislocator

1. Patient sits with both legs out straight, then bends the knee on the injured side to a right angle.
2. Both hands clasp the front of that knee, fingers laced, wrists tied with a belt so the grip cannot fail. Somebody sits on the foot so it cannot slide.
3. The patient leans back slowly and lets the head tip back until body weight pulls the arms straight, shrugging both shoulders forwards.
4. Hold up to 2 minutes. Expect reduction within about 5 minutes.
5. Teach this to everyone who has dislocated once. Expect about 6 in 10 who cooperate, and nothing in the very old.

Protocol 6: intra-articular lidocaine for the shoulder

1. Only plain 1% lidocaine, clear, colourless and free of particles (THRIVING library, WO-11).
2. Dose 0.3 ml per kg, never more than 20 ml, so 15 ml at 50 kg and 20 ml at 67 kg or above. Less in the frail, the very old and in liver or kidney disease.
3. The point is 2 cm below the outer edge of the bony ridge on top of the shoulder, in the hollow the displaced head has left. Clean the skin and let the antiseptic dry a full minute.
4. Needle in perpendicular, then advance about 2 cm inwards and slightly downwards.
5. Pull back on the plunger. If blood comes, swap to an empty syringe, draw it off, reattach.
6. Inject slowly. Wait 15 to 20 minutes. Do not shorten this.
7. Watch for numb lips, ringing ears or confusion. If any appear, stop, lie them flat, inject no more.

Protocol 7: posterior elbow dislocation

1. Assess by Protocol 1. A normal pulse does not exclude an artery injury.
2. If available, 3 to 5 ml of 2% lidocaine into the hollow at the centre of the triangle of the outer bony knob, the point of the elbow and the head of the forearm bone, aimed at the inner knob, advanced 1 to 2 cm. Wait 15 to 20 minutes.
3. Patient face down, forearm hanging off a table at about your hip height, an assistant steadying the upper arm with both thumbs pressing the point of the elbow forwards.
4. Pull steadily downwards on the forearm with the elbow bent, up to 10 minutes. Success is the forearm lengthening and a clunk.

5. If it fails, the assistant lifts the upper arm while keeping thumb pressure, and you bend the elbow further. If that still fails, turn the patient face up and apply steady traction along the supinated forearm with slight flexion for up to 10 minutes.
6. Afterwards bend, straighten and turn the forearm both ways.
7. Back slab at a right angle, forearm neutral. **Never a circumferential cast on a fresh elbow.**
8. Watch 2 to 3 hours, or overnight if the elbow is very swollen or the hand at all doubtful. Splinted 7 to 14 days, then move it.

Protocol 8: the child's pulled elbow

1. A child under about six who will not use an arm after being pulled or swung by the hand, no swelling, no deformity, the arm limp with the palm backwards.
2. Child on a parent's lap. Support the elbow with one hand, your thumb over the outer side of the joint.
3. With the other hand turn the forearm firmly so the palm faces fully downwards, and keep turning. You often feel a small click under your thumb.
4. The child cries briefly and uses the arm within 5 to 30 minutes. That is the test of success.
5. If it has not worked, repeat once. Expect success at the first attempt in about 9 of 10 children.
6. No splint, no sling. Tell the parents never to lift the child by the hands.

Protocol 9: the finger

1. Hold the base of the finger with one hand and the segment beyond the joint with the other.
2. Pull along the line of the finger while pushing the dislocated segment down with your thumb, the joint slightly bent.
3. For a joint stuck bent far back, first bend it further back to unhook it, then push down and along. Confirm it bends and straightens fully.
4. If stable, tape it to the neighbouring finger with a pad between them and move it from the first day, for 3 to 6 weeks.
5. If it slips out as you straighten it, splint so the last 30 degrees of straightening is blocked, relaxing that by about 10 degrees a week for 3 weeks.
6. If it will not go after two tries, stop. Something is caught in the joint.

Protocol 10: the jaw

1. Confirm by feeling through the cheek for the hard point of bone in front of the ear, palpable only when the jaw is out.
2. Patient upright with the back of the head against a wall or an assistant's chest. Stand in front, elbows at or above the jaw.
3. **Wrap both thumbs thickly in cloth.** This is not optional.
4. Both thumbs on the lower back teeth, fingers under the chin outside the mouth. Ask them to open as if yawning.
5. Press down firmly and steadily on the back teeth while lifting the chin, and ease the jaw backwards. It snaps shut the instant it goes in, so have your thumbs moving outwards as it does.
6. If it fails, put a short hard roll between the back teeth on one side and use it as a pivot while easing the chin back.
7. Figure-of-eight bandage round the head and under the jaw for 2 to 3 days. No wide opening for 6 weeks, a fist under the chin for every yawn, food cut small.
8. Pain carrying on after the jaw is back suggests a broken jaw.

Protocol 11: posterior hip dislocation (district or trained healer only)

1. Three or four people, two attempts at most, within 6 hours of injury if you possibly can.
2. Confirm: the leg is short, the knee turns inwards, the hip is bent. Check the sciatic nerve first, can they lift the foot and feel the sole.
3. Give whatever analgesia exists, early.
4. Patient on their back on a low firm surface, because you must be above them. An assistant presses firmly down on both front points of the pelvis, or straps it down.
5. Bend hip and knee to right angles and keep them there throughout.
6. Either put one foot up beside the patient's buttock, rest their bent knee over your own as a fulcrum just below the back of their knee, and pull their ankle downwards. Or take both hands round the top of the shin and pull upwards, standing on the bed if that helps.
7. Increase the pull slowly over 30 to 60 seconds, gently wagging the foot inwards and outwards. A clunk usually means success, and the leg lengthens and lies straight.
8. Stop after the second attempt.
9. Recheck the sciatic nerve. A rolled blanket between the knees. No weight on the leg for six weeks, then a stick.
10. Tell the family that even a good reduction can be followed years later by a hip that wears out.

Protocol 12: the ankle fracture-dislocation with threatened skin

1. Urgent. The skin is dying under the displaced bone. Wait for nothing.
2. One person holds the lower leg. You take the heel in one hand and the front of the foot in the other.
3. Pull steadily along the line of the leg to unhook the ankle bone from under the shin, and holding the pull, push the foot back into line under the leg.
4. Splint at once with a padded back slab from below the knee to the toes, foot at a right angle. **Do not wrap tightly.**
5. Raise the leg to heart level, not above. Check the toes for colour, warmth and movement hourly for six hours, then four-hourly.

Protocol 13: the sprained ankle

1. Ottawa examination. Press the back edge and tip of each ankle bone, the base of the fifth toe bone outside, and the bump inside the midfoot. Ask for four steps.
2. Bone tenderness at any of those four points, or four steps impossible, means treat as a fracture: padded splint, elevate, re-examine in two weeks (THRIVING library, WO-05).
3. Mild or moderate, meaning they can take weight: firm figure-of-eight bandage from the base of the toes to above the ankle, snug and never tight, loosened and reapplied twice a day. Elevate at rest. Walk on it from the first day as pain allows. A cold wet cloth for pain in the first day or two, never ice on bare skin and never more than 20 minutes at a time.
4. Severe, meaning no weight at all: 2 to 3 days in a loose bandage with the leg elevated, then a below-knee plaster cast for 10 days, then out of it and walking.
5. From day three in every case: draw the alphabet with the big toe twice a day, then stand on the injured leg alone for 30 seconds several times a day, holding something at first.
6. Expect mild better in 1 to 3 weeks, moderate in 3 to 8, severe longer. About 4 in 10 sprain it again, and step 5 is the only thing that changes this.

Protocol 14: when to stop

Stop and splint whenever any of these is true.

1. Two full attempts have failed.

2. You feel grinding instead of springy resistance.
3. They are over 40 with a first dislocation, or have bruising over the upper arm, or fell from a height.
4. New numbness or weakness has appeared, or a swelling is growing under your hand.
5. The limb beyond the joint is white, cold or without feeling.
6. The joint has been out more than three weeks, or it is a child's shoulder.
7. You are about to use force to finish what gentleness did not.

12. Numbers to carry

1. **90 minutes.** Reduce a shoulder inside this and 93% go back with no drug. After it, 73%.
2. **Two attempts.** The limit, at every joint, for every healer, forever.
3. **5 to 10 minutes.** The time the external rotation must take. Rushing is the commonest cause of failure.
4. **40 years old and a first dislocation.** The stop rule, with bruising over the upper arm and a fall from height.
5. **0.3 ml per kg of 1% lidocaine, never over 20 ml.** The joint dose, which is also the whole-body ceiling.
6. **6 hours.** The hip. Beyond it the odds of the head dying rise about fivefold.
7. **1 in 4.** Knee dislocations with a torn artery, and the share of those arteries that cost the leg.
8. **One week.** The sling after a shoulder reduction. Longer changes nothing, 41% against 37%.
9. **10 days.** The cast for the severe ankle sprain that cannot take weight.
10. **Four points and four steps.** The Ottawa ankle examination.

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