NU-04 Rehabilitation: walking again after fracture, stroke, amputation and long illness

HEALING after the FALL, research library, NU-04

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What this report covers and what it leaves to others. It starts where other reports stop. Stroke up to 72 hours is in CH-02, which hands rehabilitation on to this report. Setting and splinting a fracture are in WO-05, and the stump and its first year are in WO-09. Massage and manipulation are judged on their own terms in TR-12, and this report attaches only the rehabilitation evidence to them. The physiology of bed rest, contracture and the strain on carers is in NU-01 and is not repeated here. NU-05 and NU-09 are not yet written, and nothing here is meant to take their ground. The four questions in the brief run through the whole report: why the ATTEND trial failed, what dose and timing of getting people up the evidence supports, how many amputees walk again with care of the ICRC kind, and what can be done for the deconditioned old.

1. Findings by section

1.1 Rest against movement: the tradition, the record and the inference

The tradition on its own terms. "Rest heals" is the oldest rule in the sickroom and it is not foolish. A broken bone moved too much does not knit. An inflamed joint hurts when used. A weak person who stands may fall, and a person with a failing heart breathes better lying still. Hugh Owen Thomas of Liverpool, whose splint saved thousands of femurs in the First World War, built his practice on "enforced, uninterrupted prolonged rest". He mocked those who moved an inflamed joint, comparing them to a doctor who cured fever by kicking the patient out of bed (Buckwalter 1995). In many households after the Fall, the sick person's family will show love by doing everything for them and keeping them in bed. Grandmothers, priests and bone-setters will say the same thing in different words.

The counter-tradition. In Paris, Just Lucas-Championnière gave up immobilising many fractures from about 1879 and treated them with very light stroking massage and early, limited movement (Lucas-Championnière 1900). In London, James Paget told surgeons in 1867 that bone-setters cured the cases that surgeons had made stiff by too much rest (THRIVING library, TR-12). In 1947 Richard Asher listed "the dangers of going to bed": clots, bed sores, pneumonia, wasting, softened bones, kidney stones and lost spirit (Asher 1947, read only through secondary accounts).

The record. A Lancet review of 39 trials with 5,777 patients found that bed rest prescribed as treatment did not help in any of 15 conditions and harmed in many (Allen 1999, summarised in THRIVING library, NU-01). Ten days of bed rest costs a healthy older adult about 1 kg of leg muscle and 13 per cent of knee strength (THRIVING library, NU-01). Buckwalter's review of the tissue science sides with Lucas-Championnière: controlled early movement speeds repair of bone, tendon, ligament and cartilage, but heavy early loading can stop it (Buckwalter 1995).

The inference. Both traditions are right about something. The bone and the fresh wound need protection. The rest

of the body does not. The rule that survives the evidence is "protect the injured part, move everything else, and load the injured part in steps as it heals". The timings for each fracture are in WO-05. This report deals with everything after that.

1.2 Stroke after 72 hours: who walks again, and when

The Copenhagen curve. The best natural history comes from 804 people admitted with stroke in Copenhagen (Jørgensen 1995). At onset 51 per cent could not walk, 12 per cent walked with help and 37 per cent walked alone. By the end of rehabilitation 21 per cent had died, 18 per cent still could not walk, 11 per cent walked with help and 50 per cent walked alone. So of survivors, about two in three walked independently. Of those who were not walking at the start, a third walked alone at the end. Recovery was fast and then stopped. Ninety-five per cent of walking recovery came within 11 weeks. People with mild or moderate leg weakness stopped gaining at about 9 weeks, and those with severe weakness at about 11 weeks. A household can therefore be told at 3 weeks (mild) or 6 weeks (severe) roughly where the person will end.

A bedside prediction. The EPOS study tested 154 people who could not walk at all after stroke (Veerbeek 2011). If on day 2 the person could sit unsupported for 30 seconds on the edge of the bed and could move the weak leg against gravity, the chance of walking alone at 6 months was 98 per cent. If they could do neither, it was 27 per cent, and if they still could do neither on day 9 it fell to 10 per cent. A later validation found the test worked well from day 3 onwards (Veerbeek 2022). No equipment is needed. This is the most useful single test in this report.

The arm. Of 102 people with a completely floppy arm, 38 per cent regained some hand use at 6 months and 11.6 per cent regained it fully. The outcome was largely settled by 4 weeks (Kwakkel 2003). Families should be told early that the leg usually does better than the arm.

Without a rehabilitation service. A small study in Soweto followed 54 people with minimal rehabilitation. At 12 to 14 weeks, 66 per cent of those over 50 and all of those under 50 walked (Hale and Eales 1998). Selection was strict, so this is a ceiling rather than a typical result. Bamford's community figures, which say about 65 per cent of survivors are independent at a year, are in CH-02 (THRIVING library, CH-02).

1.3 Stroke: how much, how often, how soon

AVERT and the danger of too much too soon. AVERT randomised 2,104 people in 56 stroke units in 5 countries (AVERT Trial Collaboration 2015). Very early mobilisation got 92 per cent out of bed within 24 hours, against 59 per cent with usual care, and the protocol gave more frequent and longer sessions. Fewer people had a good outcome at 3 months: 46 per cent against 50 per cent, adjusted OR 0.73 (0.59 to 0.90). Deaths were 8 against 7 per cent, not significantly different. The extra activity did not reduce the complications of immobility it was meant to prevent. NU-01 already summarises the headline (THRIVING library, NU-01).

The follow-up analysis is more useful than the headline (Bernhardt 2016). Each extra out-of-bed session a day raised the odds of a good outcome by 13 per cent (OR 1.13, 1.09 to 1.18). More total minutes of mobilisation a day lowered them (OR 0.94, 0.91 to 0.97, per unit of daily minutes). [VERIFY] The abstract does not say whether the unit is one minute or a block of minutes. The authors' own conclusion was short and frequent sessions, not long ones. This is observational analysis within a trial, so it is a guide, not a proof. The successor trial, AVERT DOSE, recruited 1,000 people at 50 hospitals before funding ran out, and its results were due to be presented in 2026 (Bernhardt 2026). I could not find them. [VERIFY]

A Cochrane review of 9 trials and 2,958 people found no benefit from very early mobilisation and a slight, uncertain rise in deaths (Langhorne 2018). Its network analysis suggested the first sit-out at about 24 hours did best. Median time to first mobilisation was 18.5 hours in the early arms and 33 hours in usual care. The safe reading: first sit-out about a day after the stroke if the person is awake and stable, then short sessions several times a day, not a single long push.

After the first week: more practice helps, up to a point. The 2014 Cochrane review of physical rehabilitation pooled 96 studies and 10,401 people, half the studies from China (Pollock 2014). Rehabilitation against none improved independence in daily activities by a moderate to large amount (SMD 0.78, 0.58 to 0.97, 27 studies, 3,423 people), and the gain persisted (SMD 0.58). The effective dose was 30 to 60 minutes a day, 5 to 7 days a week. Earlier was better. No named method beat any other. The 2025 update, with 267 studies and 21,838 people, confirmed benefit for daily activities and motor function, found functional task training better than other approaches for daily activities (SMD 0.58), and found the older "neurophysiological" methods possibly worse (SMD -0.34) (Todhunter-Brown 2025).

But adding more time to the same programme did little. A Cochrane review of 21 trials found more minutes gave little or no gain in daily activities (SMD 0.13, -0.02 to 0.28), with a small gain for the arm (Clark 2021). The authors thought a threshold may exist and that trials needed a difference of at least 1,000 extra minutes to show it.

What this means for a household. Some practice every day matters a great deal. Practising the real task (standing up, walking to the door, dressing) matters more than any named method. Beyond about an hour a day, extra time is hard to justify, and in the first days extra time may harm. Short sessions many times a day fit a household better than a clinic schedule anyway.

1.4 Stroke: the arm, the shoulder and falls

Forcing the weak arm to work. In constraint-induced movement therapy, the good hand is put in a mitt for most waking hours and the weak arm is drilled in tasks. In the EXCITE trial, 222 people 3 to 9 months after stroke who had some wrist and finger movement had 2 weeks of this (Wolf 2006). Time on a timed arm test fell by 52 against 26 per cent, everyday arm use rose more, and the effect lasted a year. A Cochrane review of 42 studies found better arm movement but no convincing reduction in overall disability (Corbetta 2015). It suits the person with some wrist and finger movement, not the flaccid arm. [VERIFY] EXCITE's exact movement threshold for entry was not in the abstract read. It needs a mitt and a stubborn helper.

Mirror therapy. The person places the weak arm behind a mirror and watches the good arm move in the mirror, so the brain sees the weak arm moving. A Cochrane review of 62 studies and 1,982 people found moderate improvement in movement (SMD 0.47) and daily activities (SMD 0.48), with less pain, on low certainty evidence, and no harms (Thieme 2018). The usual dose was 30 minutes, 5 days a week, for 4 weeks. A mirror and a box are within any village's means.

The shoulder. A paralysed arm hangs from the shoulder joint, and its weight can pull the joint partly out of its socket (subluxation). In a Swedish population study, 22 per cent of people developed shoulder pain within 4 months, and 79 per cent of those who could rate it had moderate to severe pain (Lindgren 2007). Pain peaks at about 3 months. Subluxation drives early pain, and a stiff, frozen capsule follows from about a month (Cotellessa 2026). The evidence for prevention is thin. A Cochrane review of 4 small trials found strapping delayed pain by about 14 days without preventing it, and a hemisling used in one trial was associated with more pain (Peto OR 8.7) (Ada 2005). A lap tray with a triangular sling did no better than a hemisling (Ada 2017). A 2025 review of 29 studies found no device, tape or exercise beat standard care, on very low certainty evidence (Denizli 2025). What the evidence does not contradict is careful handling: never pull the person up by the weak arm, support the arm on a pillow or table when sitting, and move the shoulder gently within a pain-free range. [VERIFY] These handling rules are standard nursing practice and I found no trial of them.

Falls. Falls after stroke are common: estimates range from 7 per cent in the first week to 73 per cent in the first year, and a Dublin cohort of 128 found 44 per cent fell within a year (Denissen 2019, background figures via secondary summary). [VERIFY] Exercise may reduce the rate of falls (rate ratio 0.72, low quality, 8 studies) but not the number of people who fall (Denissen 2019). A 2026 review of 3 trials with 677 people found no significant reduction in falls rate (IRR 0.84, 0.62 to 1.15) (Scrivener 2026). For the general older population the evidence is much stronger (section

1.9). The household must assume the person will fall, and make the floor, the light and the path to the latrine safe.

1.5 Family-delivered rehabilitation, and why ATTEND failed

This is the question the village most needs answered, because after the Fall the family will be the therapist.

What ATTEND was. ATTEND randomised 1,250 people with stroke at 14 hospitals across India between 2014 and 2016 (ATTEND Collaborative Group 2017). The intervention was family-led rehabilitation: information, joint goal setting with the family, training a family carer in hospital, and task-specific practice continued at home for up to 2 months. It was delivered by physiotherapists who acted as stroke coordinators and made home visits (Liu 2016). The control group got usual care.

What it found. Death or dependency at 6 months was identical: 285 of 607 (47 per cent) against 287 of 605 (47 per cent), OR 0.98 (0.78 to 1.23). Deaths were 12 against 14 per cent, not significantly different. Readmission was 14 against 13 per cent. The investigators had expected a clear benefit, and wrote that the results did not support investment in shifting rehabilitation to family carers unless new evidence emerged (ATTEND Collaborative Group 2017, University of Nottingham 2017).

Why it failed: the investigators' own account. The process evaluation found that the intervention was delivered faithfully, but that early supported discharge was not implemented and that both arms widely accessed some form of rehabilitation (Liu 2019). The two likeliest reasons for the null result were therefore, first, that the control group also got rehabilitation, so the contrast was smaller than planned, and second, that families lost motivation once the visits stopped, under emotional and financial strain. A later analysis of the same cohort found that two in three improved by 3 months and a third improved further between 3 and 6 months, and that people whose main carer was a daughter or daughter-in-law did worse than those cared for by a spouse (adjusted OR 1.44) (Mishra 2026). One in five families also used traditional medicine, more so after severe strokes (Mishra 2025).

It was not alone. In England, TRACS trained carers in 36 stroke units and found nothing: daily activity scores 27.4 against 27.6 and carer burden 45.5 against 45.0 (Forster 2013). In the Netherlands, CARE4STROKE added 150 minutes a week of carer-led exercise for 66 couples and found no gain in mobility, though patients were less anxious and carers less depressed (Vloothuis 2019). A Cochrane review of 9 small trials found low quality evidence for better standing balance and little else (Vloothuis 2016).

But training carers did something. Kalra's earlier London trial of 300 people found that a short training of carers did not change the patient's disability, death or move into a care home, but cut carer burden, anxiety and depression and lowered costs over a year by about a quarter (Kalra 2004). Carer strain itself carries a large excess risk of death (THRIVING library, NU-01).

Where community programmes have worked. The Campbell review of community-based rehabilitation found 15 studies, 4 of them in stroke (Iemmi 2016). In Shanghai, general practitioners trained families to exercise with the patient for 45 minutes at least 3 times a week for 5 months, with 10 doctor visits, and neurological deficit improved (SMD -0.42). In Thailand, occupational therapists trained carers one day a week for 3 weeks and village volunteers then visited weekly for 2 months, and physical quality of life improved substantially. In Turkey, home visits by a clinician and physiotherapist for 2 hours a week did better than inpatient rehabilitation. The authors warned that the studies were few, mostly at risk of bias and not pooled. An older review of 14 trials of therapy at home after stroke found 7 in 100 people spared a poor outcome (Outpatient Service Trialists 2003).

The answer to the brief's question. ATTEND did not show that families cannot rehabilitate. It showed that adding a 2-month family programme to a setting where people already got some rehabilitation did not change the 6-month outcome. The successful programmes ran longer (2 to 5 months), kept a trained person visiting, and had a weaker comparator. After the Fall, the comparator will be nothing, and Pollock's review says rehabilitation against nothing helps a great deal. The inference for the village is that a family programme is worth running, but only if

someone keeps visiting and the family is not left alone after the first weeks. [VERIFY] This is my reading of the trials, not a trial result. The pitfall to avoid is advocacy that cites the successful community studies and ignores ATTEND, or the reverse.

1.6 Hip fracture without a surgeon

Hip fracture is not covered elsewhere in the library. It is the fracture of the frail old and, after the Fall, mostly a non-operative condition.

Before surgery was routine. Until the 1950s, hip fractures were treated with traction and bed rest (Handoll and Parker 2008). A Cochrane review of 5 trials with 428 people compared that with surgery. For fractures through the bone below the joint capsule (extracapsular, usually intertrochanteric), traction gave similar death rates but slower rehabilitation and more deformity. The reviewers judged conservative treatment acceptable where surgery is not available. In one trial of 106 people, traction against a screw-and-plate fixation gave no difference in complications or 6-month deaths, but more people lost their independence at 6 months after traction (Hornby 1989). Fractures inside the capsule (intracapsular, through the femoral neck) heal poorly because the blood supply is cut, and displaced ones often do not unite at all.

Lying still kills the old. In 532 New York patients, those with the longest spell of immobility after hip fracture had higher 6-month mortality than those with the shortest, a difference of 5.4 percentage points, and 17 points among those who had needed help to walk before the fracture (Siu 2006). This is observational and sicker people lie longer, so it overstates the effect, but it points the same way as Asher. Recent pooled data on non-operative treatment show nearly three times the mortality of surgery, but the comparison is confounded by who was judged too ill for an operation (Ismail 2026). A Malaysian series of 55 elderly femoral neck fractures treated without operation had 58 per cent survival (Selayang series, read via a summary only) [VERIFY]. A Belgian series of 16 unfit patients with displaced neck fractures, managed without operation and with intensive medical support, found deaths no higher than after surgery (Faraj 2008, read via a summary) [VERIFY].

What recovery looks like. Even with modern surgery, only 40 to 60 per cent regain their previous mobility within a year, most of the recovery comes in the first 6 months, and about a quarter end with new total dependence in walking (Dyer 2016). Among people over 80, 56 per cent cannot walk independently a year later, against 15 per cent of people the same age without a fracture (Dyer 2016). One in eleven break the other hip within 3 years (Abd Wahab 2026, citing earlier work) [VERIFY].

What rehabilitation adds. A Cochrane review of 40 trials with 4,059 people, mean age 80, found that exercise after hip fracture improved mobility, both in hospital (SMD 0.53) and after discharge (SMD 0.32, high certainty) (Fairhall 2022). Training in walking, balance and functional tasks did best. It did not change deaths.

The village dilemma. [OWNER] The record supports two paths, and the village must choose a rule. For a fit person with an extracapsular fracture who walked before, traction in bed for weeks gives union at the cost of the dangers of bed. For a frail person, or a displaced femoral neck fracture that will probably not unite, early sitting out and pain-guided standing with a frame may give a painful but usable hip and fewer deaths. [VERIFY] I found no trial comparing these two non-operative strategies. Either way, every part of the body that is not broken must move from day one.

The replaced hip. People who had a hip replacement before the Fall will still be in the village. Hip precautions (no bending past 90 degrees, no crossing the legs) are traditionally taught after the posterior approach. A review of 7 studies and 6,900 patients found dislocation in 2.2 per cent with precautions and 2.0 per cent without (Crompton 2020, read via summary). Dislocation is rare and precautions add little, but a dislocated artificial hip is an emergency (section 5).

1.7 Other fractures after the splint

WO-05 gives union times and the steps to full weight bearing. What comes after is simpler than therapists sometimes suggest. A Cochrane review of 26 trials of rehabilitation after wrist fracture found that physiotherapy plus a home programme was no better than written instructions for a home programme, and that passive stretching by a therapist, ice and whirlpool baths added nothing (Handoll and Elliott 2015). After ankle fracture, a removable support plus exercise after surgery reduced pain, at the cost of more minor wound problems, and after plaster no supervised method beat usual care (Lin 2012). The lesson is that the person's own repeated movement is the treatment, and the helper's job is to teach, check and encourage. The hand is the exception: WO-05 notes that an adult hand not moved within about 10 days may lose range for good (THRIVING library, WO-05).

Refracture is the danger of loading too early. WO-05 gives the steps and the warning about teenagers re-breaking the femur after union (THRIVING library, WO-05). This report adds no new evidence on that point.

1.8 Amputation: how many walk again

What the ICRC built. The ICRC's programme in Afghanistan began in Kabul in 1988 and grew to seven centres (ICRC c.2017). By the date of that factsheet it had registered about 147,000 people, adding about 9,000 a year, and made over 19,000 devices a year. The Kabul centre alone made about 1,100 artificial legs, 6,500 braces, 1,200 wheelchairs and 9,000 pairs of crutches a year and gave over 75,000 physiotherapy sessions. Almost all of its 800 staff were former patients, by deliberate policy. It runs a home care programme that trains families to look after people with spinal injuries, and lends small sums so disabled people can earn. Later figures I saw only in summary put registrations at about 210,000 [VERIFY]. Of 32 users followed for 10 to 19 months, 28 were satisfied with the ICRC's polypropylene leg and 23 preferred it to other legs they had used (Jensen and Heim 2000). In Tanzania, users of above-knee legs of this design wore them 98 per cent of the time and 92 per cent were satisfied, though a third of the legs had major failures (Jensen and Raab 2004).

What proportion walk. I could not find a follow-up figure from the ICRC for the share of amputees who walk again. The nearest figures come from users who were fitted and could be traced. Of 347 Cambodian limb users, 56 per cent reported no walking problems, 39 per cent slight problems, 4 per cent moderate, under 1 per cent severe, and none said they could not walk (Ramstrand 2025). Women, people who lost the leg to disease rather than injury, above-knee amputees and those in psychological distress did worse. Of 139 users in Sierra Leone, 86 per cent still used their device, but half needed repairs, a third had pain, two in three struggled on uneven ground, hills and stairs, and about half could not reach services (Magnusson 2014). Among landmine survivors worldwide, only about a quarter received appropriate care (Walsh and Walsh 2003).

The inference is that among amputees who receive a limb and follow-up, most walk, nearly all at home and many outdoors. The loss happens before that, among people who never reach a limb maker or whose limb breaks and is not repaired. [VERIFY] This is my reading, and it means that access and repair matter more than the design of the limb. WO-09 gives the stump care, the interim limb and the replacement intervals (THRIVING library, WO-09). After the Fall, the causes will shift as they did in Cambodia, from injury to disease and old age, with more above-knee and older amputees, who walk less well (Dickinson 2022).

Phantom pain. Pain felt in the missing limb is common. In a small trial at Walter Reed, 22 leg amputees were assigned to watch the intact leg move in a mirror, to do the same with the mirror covered, or to imagine movement, for 15 minutes a day for 4 weeks (Chan 2007, read via press coverage). All six in the mirror group who completed reported less pain, against one of six with the covered mirror and none with imagining. In Cambodia, 45 landmine amputees did 5 minutes of mirror or touch therapy morning and evening for 4 weeks, and phantom and stump pain fell by over half, still lower at 3 months (Ol 2018). The numbers are small. But a mirror costs nothing, and WO-09 warns that a painful neuroma must be excluded first (THRIVING library, WO-09).

The amputee shamed into a chair. The pitfall in the brief is real in any society that treats a missing limb as a disgrace.

The ICRC's answer was to employ former patients and pair each new amputee with an established one (THRIVING library, WO-09). That is a social intervention, not a medical one, and the village can copy it.

1.9 The deconditioned old and the long illness

Strength comes back at any age. In 1990, ten frail people aged about 90 trained their thigh muscles hard for 8 weeks, and their strength rose by 174 per cent (Fiatarone 1990). In the larger 1994 trial, 100 nursing-home residents aged 72 to 98, mean age 87, trained for 10 weeks (Fiatarone 1994). Ninety-four per cent finished. Strength rose by 113 per cent against 3 per cent in those who did not exercise, walking speed rose by 12 per cent while it fell by 1 per cent in controls, and stair-climbing power rose by 28 per cent. A nutritional supplement alone did nothing. The regimen, from a review's description, was high intensity at 80 per cent of the most the person could lift once, 3 sets of 8 lifts, 3 times a week, with 97 per cent attendance (Liu and Latham 2009, table of included studies) [VERIFY]. A Cochrane review of 121 trials and 6,700 older people confirmed a large strength gain (SMD 0.84), a modest gain in walking speed and better rising from a chair, with serious adverse events rare (Liu and Latham 2009).

Falls in the old. Exercise cuts the rate of falls in older people living at home by 23 per cent, balance and functional exercise by 24 per cent, mixed programmes by 34 per cent and Tai Chi by 19 per cent, and effects were larger when a trained person delivered it (Sherrington 2020).

After intensive care and long fever. Survivors of severe lung failure in Toronto had lost 18 per cent of their body weight. At 3 months they walked 281 m in 6 minutes and at a year 422 m, still below normal, and weakness was their main complaint (Herridge 2003). In ventilated patients, physiotherapy started while still on the ventilator raised the share who were independent at discharge from 35 to 59 per cent and halved the days of delirium, with one serious event in 498 sessions (Schweickert 2009). After the Fall, long typhoid, dysentery and the like will leave survivors in the same state, and the same principle applies: start moving in bed while still ill.

Other long illnesses. - Post-polio: a Cochrane review of 13 studies found too little evidence to say what works, though muscle strengthening appeared safe, and climate therapy did nothing (Koopman 2015). Polio survivors tire easily and need gentle loading. [VERIFY] - Post-tuberculosis lung damage: a 2026 review of 17 studies found pulmonary rehabilitation increased 6-minute walking distance by 36 to 189 m and improved symptom scores (Kumar 2026). - Heart failure: a Cochrane review of 60 trials and 8,728 people found exercise rehabilitation did not change deaths but cut hospital admissions (RR 0.69, one admission prevented for every 13 people trained), and home programmes worked too (Molloy 2023). CH-02 gives the daily weight rule (THRIVING library, CH-02).

The answer to the brief's question. For the deconditioned old, the evidence is unusually strong and the means are cheap: progressive leg strengthening against a heavy load two or three times a week, balance practice, and walking. The loads can be sandbags or bags of grain tied to the ankle, and the measure of "heavy" is a weight lifted 8 times with effort. [VERIFY] This translation into village means is my inference.

1.10 Traditions on their own terms

Acupuncture and Chinese rehabilitation. Acupuncture for stroke has been used in China for centuries, and much of the stroke rehabilitation evidence in the Cochrane reviews comes from Chinese trials. A Cochrane review of 31 trials and 2,257 people found that acupuncture added to standard care improved daily-activity scores, but the evidence was low or very low in quality, and in the two trials with a sham control there was no difference (Yang 2016). The fair reading is that its benefit may come from the attention and the movement that go with it rather than the needles.

Tai Chi. As a slow, weight-shifting exercise, Tai Chi reduces falls in older people (Sherrington 2020). A 2026 review of 20 trials found it improved balance after stroke when added to conventional care, on trials mostly from China (Qin 2026).

Massage and manipulation. TR-12 judges massage on its own terms. For rehabilitation, Lucas-Championnière's light massage served as a way to make early movement bearable, and the bone-setters' successes were stiff joints left by too much rest (THRIVING library, TR-12). Massage that keeps a person moving is useful. Massage that replaces moving is not.

Traditional medicine in ATTEND. One in five Indian stroke families used traditional remedies, at an estimated cost of about 67 million US dollars a year nationally (Mishra 2025). The village should expect the same and judge remedies by whether they keep the person practising.

2. Evidence grades

Grades: A, strong (several good trials or a firm meta-analysis). B, moderate. C, weak or observational. D, tradition or expert opinion only. X, evidence of no effect or of harm.

Practice	Tradition or claim	Record	Grade
Bed rest as treatment	Rest heals	39 trials, no benefit, frequent harm	X
Protect the injured part, move the rest	Lucas-Championnière, modern rehabilitation	Tissue science and trial evidence agree	B
Rehabilitation against none after stroke	Practice heals	SMD 0.78 for daily activities, 27 trials	A
30 to 60 minutes a day, 5 to 7 days a week	Pollock dose	Subgroup analysis, mostly Chinese trials	B
Adding more minutes to the same programme	More is better	SMD 0.13, little or no gain	X
Very early, long mobilisation in first 24 hours	Get them up early	AVERT, worse outcome, OR 0.73	X
Short frequent sessions from about 24 hours	AVERT dose-response	Within-trial analysis	C
Task-specific practice over named methods	Practise the real task	Cochrane 2025, SMD 0.58	B
Family-led rehabilitation for 2 months, India	Task shifting to family	ATTEND, OR 0.98, null	X for that design
Carer training for carer outcomes	Help the carer	Kalra, less burden and cost	B
Long community programme with visits	CBR	Few trials, positive, high risk of bias	C
EPOS bedside prediction at day 2 to 9	Predicts walking	98 and 10 per cent, validated	B
Constraint-induced movement therapy	Force the weak arm	EXCITE positive, disability unchanged	B for arm, C for disability
Mirror therapy after stroke	Fool the brain	SMD 0.47, low certainty	C
Slings and strapping for the shoulder	Hold the joint	No benefit, hemisling more pain	X for hemisling, D for careful handling
Exercise to prevent falls after stroke	Train balance	Rate ratio 0.72, low quality	C

Practice	Tradition or claim	Record	Grade
Exercise to prevent falls in the old	Train balance	23 per cent fewer falls, 59 trials	A
Traction for extracapsular hip fracture	Pre-1950s practice	Similar mortality, slower, more deformity	B where no surgery
Prolonged immobility after hip fracture	Rest the hip	Higher mortality, observational	C for harm
Exercise after hip fracture	Rehabilitate	SMD 0.32 after discharge, high certainty	A
Hip precautions after replacement	Prevent dislocation	2.2 against 2.0 per cent	X as routine
Supervised physiotherapy after wrist fracture	Therapy needed	No better than home instructions	X over home programme
ICRC limb and follow-up	Walking again	Most users walk, access is the gap	C
Mirror therapy for phantom pain	Fool the brain	Two small trials, large effects	C
Progressive resistance training in the old	Weak old cannot train	113 per cent strength at age 87	A
Mobilising in intensive care	Wait until recovered	59 against 35 per cent independent	B
Exercise in heart failure	Rest the heart	Fewer admissions, NNT 13	A
Acupuncture after stroke	Restores function	Low quality, sham trials null	C at best
Tai Chi for balance	Traditional exercise	Falls cut 19 per cent in the old	B

3. Means ledger

Rung	What rehabilitation looks like	What the rung changes
Hands	Turning, sitting out, standing practice, walking with a helper's arm. The EPOS test. Careful handling of the weak shoulder. Teaching the family to stand a person up. Daily task practice.	Most of the benefit in Pollock's review comes from practice, which needs only hands and time. Prevents contracture, sores and the harms of bed.
Hearth	A firm chair with arms, a bed raised to knee height, a stick, a rope ladder tied to the bed foot, a cushion, a mirror in a box, a mitt from cloth, sandbags or grain bags for weights, cleared floors and a light at night.	Mirror therapy, constraint therapy and resistance training all become possible. Falls fall when the house is made safe. [VERIFY]

Rung	What rehabilitation looks like	What the rung changes
Garden and still	Willow or ash for crutches and walking frames, bamboo parallel bars, oil for massage, pain relief from willow bark or opium (see TR and PH reports).	Walking aids allow early weight bearing within WO-05's limits. Pain relief lets the hip fracture patient sit out.
Village dispensary	A trained rehabilitation worker who visits each household weekly. A carpenter for frames and crutches. Simple paracetamol or aspirin if stocks exist. A record book of who is improving.	The visits are what ATTEND lacked after 2 months and what the successful community programmes had.
District infirmary	Traction frames and weights for hip and femur fractures, plaster, a limb workshop with polypropylene or wood and leather, a person trained to fit limbs and repair them.	Traction makes extracapsular hip union possible. Limb making and repair decide whether amputees walk.
Hospital before the Fall	Stroke units, fixation or replacement of the broken hip, modern prostheses, inpatient rehabilitation, intensive care physiotherapy.	Surgery for hip fracture let people stand on a fixed hip. Even so, only 40 to 60 per cent regained their old mobility.

4. Harm test

Who could be hurt by following this report? - The person with a fresh stroke made to do long sessions in the first 24 hours. AVERT showed harm from that. Keep sessions short. - The frail person with a hip fracture who is stood up before the pain allows, or the fit person with a stable traction plan who is loaded too early. Early loading can displace a healing fracture. [OWNER] The village must choose its hip rule. - The heart failure patient pushed to exhaustion. Exercise helps, but overexertion can tip a weak heart into failure. - The person with a weak shoulder pulled up by the arm. That can tear the joint capsule. - Any person who falls during practice. Rehabilitation increases time upright and therefore exposure to falls.

Who could be hurt by ignoring it? - Everyone kept in bed by tradition. Ten days in bed costs an older adult about 1 kg of leg muscle and 13 per cent of knee strength (THRIVING library, NU-01). - The carer worn out by doing everything for the patient. - The amputee left in a chair because of shame or a broken limb nobody repairs.

Net judgement. The harms of moving carefully are smaller and rarer than the harms of not moving. The exception is the first day after a stroke and the first weeks after a fracture, where timing matters.

5. Red flags

Stop the session and get help if: - **Stroke worsening:** new weakness, new speech loss, a sudden severe headache or falling consciousness. This may be a new stroke or bleeding (THRIVING library, CH-02). - **The shoulder:** a gap below the bony tip of the shoulder, a hand that swells and turns red and hot, or pain on gentle movement that grows week by week. Support the arm and stop pulling. [VERIFY] - **Hip dislocation after replacement:** sudden severe hip pain, a leg that is suddenly shorter and turned inward, inability to bear weight, often after bending or twisting. Needs reduction by a skilled person. [VERIFY] - **Hip fracture moving:** new pain, new shortening or new outward rotation of the leg during traction or after early standing. [VERIFY] - **A fall:** check for new pain, new deformity, head injury or confusion before getting the person up. Any fall in a person with a recent hip fracture means checking

for a second fracture. - **Clot in the leg or lung:** one calf swollen, hot and tender, or sudden breathlessness or chest pain. Common after immobility (THRIVING library, NU-01). - **Heart failure overexertion:** breathlessness so severe the person cannot speak, chest pain, dizziness, a weight gain of 2 kg in 3 days, new ankle swelling (THRIVING library, CH-02). Stop and rest. [VERIFY] - **Bed sores:** a reddened area over the sacrum or heel that does not fade within half an hour of relieving pressure (THRIVING library, NU-01). [VERIFY] - **Stump:** an infected, broken-down or swelling stump, or a painful lump (neuroma) (THRIVING library, WO-09). - **Despair:** a person who stops eating, refuses practice and talks of being a burden. Depression after stroke and amputation is common and stops recovery.

6. The case against

The trialists themselves. Richard Lindley and the ATTEND Collaborative Group concluded that their results did not support investment in family-led rehabilitation (ATTEND Collaborative Group 2017). Anne Forster's TRACS found the same in England (Forster 2013). Any claim that families can replace therapists must answer those two trials.

The dose sceptics. Julie Bernhardt's AVERT team showed that more early mobilisation harmed (AVERT Trial Collaboration 2015). Brigit Clark and colleagues found more minutes of the same therapy did little (Clark 2021). The village should not assume that if an hour is good, three hours is better.

The quality critics. The positive community-based rehabilitation studies are few and at high risk of bias, as Valentina Iemmi and colleagues stated (Iemmi 2016). Pollock's dose finding rests mostly on Chinese trials of variable quality (Pollock 2014).

The selection critics. Most rehabilitation trials exclude the very old, the demented and the severely affected. EXCITE took only people with some finger movement. Hip fracture trials mostly followed surgery. Fiatarone's subjects were in a nursing home with staff. The village's patients will be sicker and their helpers less skilled.

The traditionalists. Hugh Owen Thomas was right that a fracture moved too much will not heal (Buckwalter 1995). WO-05 gives the timings, and the case for rest is the case for those timings.

The surgeons. For hip fracture, pooled data show nearly three times the deaths without surgery, much of it because the sickest were the ones not operated on (Ismail 2026). A village without a surgeon is doing second-best, and must not pretend otherwise.

7. 10-line summary

1. Protect the injured part, move everything else, load the injured part in steps.
2. After stroke, first sit-out about 24 hours, short and frequent sessions, not long ones.
3. Thirty to 60 minutes of task practice a day, most days, helps a great deal compared with none.
4. The EPOS test at day 2 to 9 predicts who will walk: sitting balance plus leg movement gives 98 per cent.
5. Most walking recovery after stroke comes within 11 weeks.
6. ATTEND failed because control patients also got rehabilitation and families lost support after 2 months.
7. Hip fracture without surgery: traction works for extracapsular fractures but bed rest kills the old [OWNER].
8. Amputees who get a limb and repairs mostly walk. Access is the gap.
9. People aged 87 to 98 doubled their strength in 10 weeks of heavy training.
10. Make the house safe, keep a visitor coming, and look after the carer.

8. Open questions

- What did AVERT DOSE find about the best dose of early mobilisation in mild and moderate stroke?
- What proportion of amputees fitted by the ICRC walk at 1 and 5 years? No published figure was found.

- What is the best non-operative regime for a displaced femoral neck fracture in a frail person: traction, early pain-guided mobilisation or something between?
- How long and how often must a visitor come to keep a family programme going? None of the trials tested this directly.
- How well does family-led rehabilitation work when the alternative is nothing, as after the Fall?
- What is the safest loading progression for a femur after traction without radiographs?

9. Sources to read in full

1. ATTEND Collaborative Group 2017, the main trial report, and Liu 2019, the process evaluation, together.
2. Pollock 2014 and Todhunter-Brown 2025, Cochrane physical rehabilitation for stroke.
3. Bernhardt 2016, AVERT dose-response analysis.
4. Iemmi 2015, the full Campbell review of community-based rehabilitation.
5. Fairhall 2022, Cochrane mobility training after hip fracture.
6. Handoll and Parker 2008, Cochrane conservative against operative treatment of hip fracture.
7. Fiatarone 1994, to get the exercise protocol from the original.
8. WHO 2010, Community-Based Rehabilitation guidelines, health component.
9. ICRC physical rehabilitation programme reports for Afghanistan and elsewhere.
10. Asher 1947, "The dangers of going to bed".

10. At the bedside after the Fall

Household. Minimum viable version: the family learns to turn, sit out and stand the person safely, practises real tasks (standing up, walking to the latrine, dressing) in short sessions several times a day, keeps the weak arm supported and the house clear of hazards. What it needs to start: one person taught by someone who has done it, a chair with arms, a stick or frame, and a list of daily tasks. First failure to expect: the family does everything for the person out of love, and the person stops trying. Or the main carer, often a daughter-in-law, is exhausted by week four.

Village of 300. Expect roughly one to three new strokes a year, one hip fracture every year or two and a steady number of frail old people. [VERIFY] These are rough inferences from population rates, not sourced figures. Minimum viable version: one trained rehabilitation worker who visits each household weekly, teaches the family, checks progress against the expected curve and keeps a record. A carpenter makes frames, crutches and parallel bars. A strength and balance class for the old twice a week. What it needs to start: someone trained in the EPOS test and these protocols, time released from other work, and a rule about hip fractures [OWNER]. First failure to expect: the visits stop after a few weeks when other work presses, which is what ATTEND's process evaluation warned about.

District of 3,000. Minimum viable version: a district infirmary with traction frames, plaster, a limb workshop, a person able to fit and repair limbs, and two or three rehabilitation workers who train village workers. What it needs to start: a workshop and materials for limbs, a training programme, and a way to bring amputees in for fitting and repairs. First failure to expect: limbs break and are not repaired, so amputees who walked in the first year end up in chairs.

11. Protocols

Protocol 1: Stroke, from day 3 to week 12

Days 1 to 3 are in CH-02. From day 3:

EPOS test (day 2 to day 9). Sit the person on the edge of the bed, feet on the floor, unsupported, for 30 seconds. Then lying down, ask them to lift the weak leg off the bed. Record "both", "one" or "neither". Both: tell the family walking alone is very likely by 6 months. Neither by day 9: plan for a person who may not walk alone, and focus on transfers, sitting and the arm.

Week 1 (days 3 to 7). Sessions 5 to 10 minutes, 3 to 6 times a day. Sit out of bed in a chair, stand with support, step in place. Turn every 2 to 3 hours if bed-bound. [VERIFY] Support the weak arm on a pillow or table. Never pull on the weak arm.

Weeks 2 to 4. Total 30 to 60 minutes a day, in sessions of 10 to 20 minutes. Practise sit to stand (10 repetitions a session), standing balance, walking with a helper on the weak side, reaching for objects. If some finger movement: mirror therapy 30 minutes a day, 5 days a week. If wrist and finger extension present at 3 weeks or later: consider mitt on the good hand for most waking hours and practice tasks with the weak arm.

Weeks 5 to 12. Walking outdoors with a stick, steps, dressing and washing practice, household tasks. Assess at 3 weeks (mild) and 6 weeks (severe): if no walking gain by 9 to 11 weeks, little more will come.

After week 12. Maintenance: daily walking, task practice. Gains are slower but the arm may still improve. Keep the shoulder moving.

Tolerances: stop a session if breathless, chest pain, new weakness or new confusion. Shorten sessions rather than lengthen them in the first week.

Protocol 2: Hip fracture without surgery

Day 0. Splint the leg to the other leg with padding (THRIVING library, WO-05). Pain relief. Assess: was the person walking before? Is the leg short and rotated outward? Where is the tenderness?

Decide the path [OWNER].

Path A, traction (fit person, likely extracapsular fracture). Skin or skeletal traction as in WO-05. Weeks 1 to 8 or more in traction. Every day: breathing exercises, moving the good leg and both arms, ankle pumps on the broken side (20 every hour while awake), turning or lifting for pressure areas every 2 to 3 hours [VERIFY], sitting up as far as traction allows. When traction ends: sit out, stand with frame, touch the foot down, increase weight over weeks guided by pain, within WO-05's femur timings of 8 to 12 weeks for full weight. [VERIFY] The traction duration for hip fractures specifically was not stated in the sources read.

Path B, early mobilisation (frail person or femoral neck fracture). Pain relief. Sit out in a chair from day 1 to 3. Stand with a frame and two helpers from about day 3 to 7, putting as much weight on the leg as pain allows. Short walks with frame as pain eases. Expect pain for weeks to months. [VERIFY] This path is my inference from the evidence on immobility and the Faraj series. No trial supports a specific schedule.

Both paths, weeks 2 to 26. Walking with frame or sticks, sit to stand, balance, strength for the hip and knee. Most recovery comes by 6 months. Check for pressure sores daily while in bed. Make the house safe: one in eleven breaks the other hip within 3 years.

Protocol 3: Amputation, from wound healing to walking

Stump care and the first weeks are in WO-09. After the wound has healed:

Weeks 1 to 4 after closure. Bandage the stump firmly, as taught in WO-09, and teach the person to do it. Lie prone 20 to 30 minutes 3 times a day to stop the hip bending up permanently (for above-knee) [VERIFY]. Do not put a pillow under the stump. Strengthen the arms and the good leg. Practise standing on the good leg with a frame or parallel bars. Mirror therapy for phantom pain: 15 minutes a day, or 5 minutes morning and evening.

Interim limb. As soon as possible after sutures are out (THRIVING library, WO-09). Walk between parallel bars first, then with crutches, then sticks.

Months 2 to 12. Increase walking time each week. Practise uneven ground, slopes and steps, which are where users struggle. Check the stump daily for sores. Repair the limb as soon as it breaks.

Social. Pair with an established amputee from the first week. Plan work the person can do.

Protocol 4: The long illness and the frail old

In bed (during illness). From the day the fever breaks or earlier: breathing, ankle pumps, arm and leg movements in bed, sitting up, all short and frequent.

Weeks 1 to 2 of recovery. Sit out for meals. Stand with help. Walk to the door and back, 3 to 6 times a day. Sit to stand from a chair: 5 to 10 times, twice a day.

Weeks 3 to 10, strength. Three times a week, not on consecutive days. Leg straightening while seated, with a weight tied to the ankle: choose a weight the person can lift about 8 times with effort. Three sets of 8, rest a minute between. Add weight when 3 sets of 8 become easy. Also standing from a chair, step-ups on a low step, standing on one leg holding a table. [VERIFY] Village loads are my translation of the trial protocol.

Every day. Walking, building to 20 to 30 minutes. Balance practice.

Heart failure. Same programme, at lower intensity: the person should be able to talk while exercising. Weigh daily (THRIVING library, CH-02). Stop if red flags appear. [VERIFY]

Post-polio. Gentle strengthening, stop before fatigue. Rest between sessions. [VERIFY]

Protocol 5: Making the house safe

- Clear the floor of mats, tools and loose objects.
- A light at night on the path to the latrine.
- A chair with arms at knee height. Raise the bed to knee height.
- A rail or rope along the path the person walks most.
- Shoes that fit and grip, not loose slippers.
- Someone close by during the first walks.
- [VERIFY] These are standard falls prevention measures, and I found no trial of each one in this setting.

12. Numbers to carry

1. 98 per cent: chance of walking alone at 6 months if sitting balance plus leg lift on day 2 after stroke. Neither by day 9: 10 per cent.
2. 11 weeks: by then 95 per cent of walking recovery after stroke has happened.
3. 30 to 60 minutes a day, 5 to 7 days a week: effective stroke rehabilitation dose. Short sessions, many times a day, in the first week.
4. 47 against 47 per cent: ATTEND, death or dependency with and without family-led rehabilitation.
5. 22 per cent: shoulder pain within 4 months of stroke. Never pull the weak arm.
6. 40 to 60 per cent: regain previous mobility within a year of hip fracture, even with surgery.
7. 9 per cent: break the other hip within 3 years.
8. 113 per cent: strength gain in 10 weeks in nursing-home residents aged 87 on average.
9. 23 per cent: fewer falls with exercise in older people.
10. 3 sets of 8, 3 times a week: the heavy strength regimen that works in the old.

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