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| Version       | 1.0.0                                                                                                      |
| Published     | 5 October 2026                                                                                             |
| Publisher     | Scrolling Is Evil LLC                                                                                      |
| Reference app | <u>Low Back Pain Coach</u> 1.6.0 and later (iOS and Android). Version 1.6.0 was checked on 5 October 2026. |
| License       | Text <u>CC BY 4.0</u>                                                                                      |

**This is not medical advice.** PBEP is a set of training rules. It does not diagnose or treat any condition and has not been tested in a clinical trial. Read section 9 (Safety) first, and ask a clinician if you are unsure whether exercise is right for you.

## 1. Scope

PBEP describes how to progress back-extension training on a 45-degree back-extension bench for adults with persistent (chronic) low back pain who have been cleared to exercise. It specifies:

- one floor entry stage and four bench stages, with starting doses;
- a daily pain log compared with a personal baseline;
- the next-day rule that sets each session from that log: repeat, ease off, or step up;
- stop rules for leg symptoms, flare-ups and warning signs;
- stage gates, return-from-break easing and a maintenance mode.

PBEP does not cover acute injury, post-surgical rehabilitation, or the vertical (90-degree) Roman chair. The rules are written for the 45-degree bench only.

The reference implementation is the session engine of the app Low Back Pain Coach (iOS and Android), published by Scrolling Is Evil LLC. Section 11 describes how the app was checked against these rules.

## 2. Evidence context

Three guidelines and one Cochrane review address exercise for low back pain, at different strengths, as summarized below. None tested PBEP, this bench progression, or the reference app.

- World Health Organization (2023). *WHO guideline for non-surgical management of chronic primary low back pain in adults in primary and community care settings*. A structured exercise therapy or programme may be offered as part of care for adults, including older people, with chronic primary low back pain (conditional recommendation in favour, low-certainty evidence). No particular exercise is named. WHO describes that programme as prescribed or delivered by a health worker, distinct from self-directed exercise, and says to offer it within a broader set of treatments.  
<https://www.who.int/publications/i/item/9789240081789>

- National Institute for Health and Care Excellence (2016, updated). *Low back pain and sciatica in over 16s: assessment and management* (NICE guideline NG59). Recommendation 1.2.2 (2016, unchanged in later updates): consider a group exercise programme (biomechanical, aerobic, mind-body, or a combination) within the NHS for a specific episode or flare-up of low back pain with or without sciatica. This is not a recommendation of an individual, ongoing bench progression.  
<https://www.nice.org.uk/guidance/ng59>
- Qaseem A, Wilt TJ, McLean RM, Forciea MA; Clinical Guidelines Committee of the American College of Physicians (2017). Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Annals of Internal Medicine* 166(7):514–530. doi:10.7326/M16–2367. For chronic low back pain, recommends initially choosing non-drug treatment, with exercise among several options.
- Hayden JA, Ellis J, Ogilvie R, Malmivaara A, van Tulder MW (2021). Exercise therapy for chronic low back pain. *Cochrane Database of Systematic Reviews* 9:CD009790. doi:10.1002/14651858.CD009790.pub2. Found moderate-certainty evidence that exercise probably reduces pain compared with no treatment, usual care or placebo. Against other conservative treatments, effects on pain (low-certainty evidence) and on function (moderate-certainty evidence) were small and not clinically important.  
<https://pubmed.ncbi.nlm.nih.gov/34580864/>

PBEP's own design choices (the stages, the 8–to–48–hour next-day window, the step sizes, the gates) are pacing rules written for the reference app. They are not derived from a trial, and they are not a diagnostic test.

### 3. Definitions

- **Pain reading.** A number from 0 (no pain) to 10 (worst imaginable), logged with a timestamp. A reading may record where the pain is: the low back, or into the legs. Location is optional.
- **Baseline.** The person's usual low back pain on an ordinary day, 0 to 10, set before the first session and changed only by the person. Every rule compares readings with it.
- **Session.** A saved workout: a timestamp, a stage, and the ordered sets performed. A floor round counts as one set; its tracked value is the prone hold.
- **Partial session.** A session saved before the prescribed work was finished. Partial sessions never count toward a stage target and never supply the base for the next dose. Section 6.2 gives the two ways they block a dose increase.
- **Working set.** A set at the stage being judged, with a positive value for that stage's measure (hold seconds; reps and range; reps; reps and added weight). A set belongs to its own stage when one is recorded, and otherwise to its session's stage. Floor sets saved inside a bench session are accessory work and never feed bench doses or bench targets.
- **Qualifying session.** A non-partial session with at least one working set at the stage being judged, whatever stage the session itself was saved under.

- **Training day.** A local calendar day with at least one qualifying session at the stage. Several saves on one day count once.
- **Day windows and hour windows.** Day windows ("the last 7 days", "7 or more days", "14 days") count local calendar days. Hour windows (8 to 48 hours, the 48-hour recovery note) count real elapsed hours, so a daylight-saving change is counted correctly.
- **Future records.** Readings and sessions dated after the current time are ignored, except in three places that the reference app reads without that filter: the maintenance offer (section 7.4), the return-easing check (section 8.3) and the flare circuit lookup (section 8.1).

## 4. Order of rules

Each time a session is requested, the rules run in this order. Steps 1, 3 and 4 end the process when they apply; every other step feeds the next.

1. **Warning sign recorded** (section 9.1): no session. Stop here.
2. **Flare-up exit check** (section 8.2): if the exit condition is met, flare-up mode ends now, return easing begins, and the process continues.
3. **Leg rule** (section 7.2): if the newest reading that records a location is in the legs, no extension work today. Stop here.
4. **Flare-up mode on** (section 8.1): bench work paused; an optional short floor circuit is offered. Stop here.
5. **Next-day decision** (section 6): step up, repeat or ease off.
6. **Maintenance** (section 7.4): if maintenance is on and the decision is ease off, maintenance switches off. If maintenance is on and the decision is not ease off, the working decision becomes repeat.
7. **Return easing** (section 8.3): while it is pending, the working decision becomes ease off. It takes priority over maintenance.
8. **Stage gate** (section 7.1): checked only when return easing is not pending and maintenance is not holding the dose.
9. **Break** (section 7.3): if 7 or more days have passed since the last session in the stage family, the working decision becomes ease off and no stage move up happens. This overrides maintenance's repeat.
10. **Dose** (section 5): if the stage gate opened, today starts the next stage at its entry dose. Otherwise build today's sets from the working decision.

## 5. Stages and doses

### 5.1 Starting point

Before the first session the person answers two questions: whether they have access to a 45-degree back-extension bench, and where they are starting from ("most movement worries me right now"; "daily life is OK, but I avoid loading my back"; "I'm active, and my back is the one limiter").

- No bench: start at Floor Foundations.
- Bench: start at Stage 1. The first session is 3 holds of 10 seconds, or 15 seconds for the "active" answer, with 60 seconds rest. This entry hold applies only while no session has been saved.

### 5.2 Stage table

| STAGE              | EXERCISE                                                                 | ENTRY DOSE                   | REST  | STAGE TARGET (PER TRAINING DAY)                                                      |
|--------------------|--------------------------------------------------------------------------|------------------------------|-------|--------------------------------------------------------------------------------------|
| Floor Foundations  | Rounds of: prone hold, 6 bird-dogs (both sides counted), 8 glute bridges | 3 rounds, 10 s prone hold    | 60 s  | One prone hold of at least 30 s, or at least 90 s of prone holding across the rounds |
| 1. Isometric holds | Still hold at the top of the 45-degree bench                             | 3 holds x 15 s               | 60 s  | One hold of at least 60 s, or at least 180 s total in the session                    |
| 2. Partial reps    | Reps through part of the range                                           | 3 sets x 3 reps at 50% range | 60 s  | One set of at least 5 reps at 80% range or more                                      |
| 3. Full reps       | Full-range bodyweight reps                                               | 3 sets x 5 reps              | 90 s  | At least 20 reps in total in the session                                             |
| 4. Weighted reps   | Full reps holding a plate at the chest                                   | 3 sets x 8 reps with 10 lb   | 120 s | Every working set at 12 reps or more (used for the load step, section 5.5)           |

Floor Foundations is the entry path while the person does not have a bench. It is not an equipment-free version of the protocol. Having a bench does not by itself move a person up; the floor stage gate in section 7.1 decides.

Form, in brief: hips on the pad with its top edge just below the hip crease, feet anchored, arms crossed. Stage 1 is a still hold at the top: rise until the body is in one straight line, hips on the pad, and hold still, with no bouncing. In Stages 2 to 4 the back rounds on the way down and straightens on the way up, stopping at a straight body line with no arching past it. Pain in the legs, or pain spreading that way during a movement, means stop (section 7.2).

Schedule: 2 to 3 sessions a week with a day between is the written guidance. The rules do not lock days; a bench session within the previous 48 hours shows a soft recovery note and never blocks a session.

### 5.3 Repeat

The next session repeats the actual ordered working sets of the most recent qualifying session at the current stage (ignoring sessions dated after the current time), up to the first 5 working sets, each limited to the caps: hold 120 s, 30 reps, range 100%, added weight 500 lb. With no previous session at the stage, the entry dose is used.

## 5.4 Ease off

When there is no qualifying session at the current stage dated at or before the current time, the stage's entry dose is prescribed unchanged, including during pain easing, return easing and break easing. Otherwise each set of the repeat base (section 5.3) is lowered toward the stage minimum. The number of sets stays the same, and no value rises.

- Holds (floor and Stage 1): the hold times 0.7, computed in IEEE 754 double precision and rounded half up (15 s gives 11 s; 45 s gives 31 s, because  $45 \times 0.7$  is stored as 31.4999...), minimum 5 s.
- Stage 2: one rep fewer (minimum 2) and range 10 points lower (minimum 40%).
- Stage 3: the reps times 0.7, computed the same way, minimum 3.
- Stage 4: above 5 lb, 5 lb less (minimum 5 lb) with the same reps; at or below 5 lb, two reps fewer (minimum 6).

A value already at or below its minimum stays where it is. When every set is already at or below the stage minimum (holds 5 s; Stage 2 at 2 reps and 40%; Stage 3 at 3 reps; Stage 4 at 5 lb and 6 reps), the next session instead steps back one stage, at that stage's entry dose. Stage 1 never steps back to the floor, and the floor stage has no stage below it.

## 5.5 Step up

One small change per session:

- Floor: add 5 s to the shortest hold, cap 40 s.
- Stage 1: add 5 s to the shortest hold, cap 90 s.
- Stage 2: add one rep to the set with the fewest reps, cap 5. When every set has 5 reps or more, raise the range of every set by 10 points instead, cap 100%.
- Stage 3: add one rep to the set with the fewest reps, cap 12.
- Stage 4: add one rep to the set with the fewest reps, cap 12. Add 5 lb to every set (to at most 500 lb) and reset every set to 8 reps only when all of these hold: (a) on each of the latest two training days at Stage 4, a qualifying session had every working set at 12 reps or more, and the last session saved that day, of any stage, was not partial; (b) both of those days have a no-increase next-day check-in; (c) the dose increase rule (section 6.2) holds; (d) every set carried into today has 12 reps or more and less than 500 lb. Otherwise the one-rep step applies.

Every single-set increase above picks the first set in order when several are tied for shortest hold or fewest reps. A capped value repeats. A cap never turns a step up into a reduction.

## 6. The next-day rule

### 6.1 The next-day check-in

A reading is the check-in for a session when all of these hold:

- it is on the next local calendar day after the session;
- it is at least 8 hours and at most 48 hours after the session;
- it is logged before any later session;
- it is not in the future.

If several readings qualify, the highest level counts, and any reading in the legs makes the check-in a legs check-in. The check-in for a training day is read against the last session saved that day; if that session was partial, the day has no usable check-in.

A check-in is **no increase** when its level is at or below baseline and no higher than the newest reading logged earlier on the session's own day, before the session (if there is one). Otherwise it is an **increase**.

## 6.2 Dose increase rule

The dose may step up only when all of these hold:

1. There is at least one training day at the current stage.
2. No leg rule applies: the newest located reading is not in the legs, and no reading in the last 7 days (today and the 6 days before) was in the legs.
3. A baseline is set.
4. The newest reading is not above baseline.
5. No partial session was saved at or after the latest qualifying session at this stage, where the partial session was either saved under this stage or contains working sets at this stage. (Separately, if the last session saved on a training day was partial, of any stage, that day has no usable check-in; see section 6.1.)
6. The latest training day's check-in is no increase, and either
  - its level is below baseline, or
  - its level equals baseline and the training day before it also has a no-increase check-in.

Pre-session readings, readings the same day as the session, stale readings and medians never authorize an increase. One reading cannot serve as the check-in for two training days, because it must come before the next session.

## 6.3 Decision

1. If the newest located reading is in the legs: the leg rule in section 7.2 applies and no session is prescribed (the decision value is ease off, so no increase can happen).
2. If no baseline is set or no readings exist: repeat.
3. If the newest reading is above baseline: ease off.

4. Otherwise take the newest reading logged after the latest session; if there is none, take the median of the three newest readings (the mean of the middle two, rounded half up, when there are two). If that level is above baseline: ease off.
5. If the dose increase rule holds: step up.
6. Otherwise: repeat.

Easing is deliberately broad; stepping up is deliberately narrow.

## **7. Gates, stops and breaks**

### **7.1 Stage gate**

The stage moves up when all of these hold:

- a next stage exists (Stage 4 is the last);
- the stage target (section 5.2) was met by a non-partial session on each of the latest 3 training days at the stage;
- pain was logged on at least 3 of the last 7 days, with no reading in that window above baseline and none in the legs;
- the decision in section 6.3 is step up;
- for Floor Foundations only: the person has a 45-degree bench.

The first session at the new stage uses its entry dose. A floor user who meets every gate but has no bench keeps doing the floor work.

### **7.2 Leg rule (stop extending)**

If the newest reading that records a location is in the legs, extension work stops: no session is prescribed, and no load is added. Readings without a location never lift this; a later reading located in the low back does. After it lifts, any leg reading in the last 7 days still blocks a dose increase; the other rules (easing above baseline, flare, break) apply as usual.

When this rule fires, check the warning signs in section 9.1 first. If none apply, the protocol advises turning on flare-up mode (section 8). The leg stop and flare-up mode are separate: the leg stop lifts on a later low-back reading, while flare-up mode, once the person turns it on, keeps bench work paused until its own exit condition (section 8.2) is met or the person ends it.

### **7.3 Breaks**

If 7 or more calendar days have passed since the last non-partial session in the person's stage family, the next session eases off (section 5.4) and no stage move up happens that day. For a person at Floor Foundations, the family is non-partial sessions saved under Floor Foundations with floor working sets. For a person at a bench stage, it is non-partial sessions saved under a bench stage with working sets at any bench stage; a session holding only floor accessory sets does not count. Easing can still step back

a stage when every set is at its minimum. For a floor user the family is floor sessions; for a bench user it is bench sessions, so floor accessory work does not reset a bench user's clock.

## **7.4 Maintenance**

At Stage 4 the reference app offers maintenance when the person has at least 6 saved sessions under Stage 4 (partial ones included) and pain logged on at least 5 different days from 13 days before today onward, with none of those readings above baseline and none in the legs. This offer check does not filter out records dated after the current time. The offer returns no sooner than 14 days after it is declined. In maintenance the session repeats at the current volume. The reference app suggests about two sessions a week; the rules do not enforce a weekly count. A decision to ease off switches maintenance off, and the session eases.

## **8. Flare-ups**

### **8.1 Flare-up mode**

The person turns flare-up mode on. While it is on, bench work pauses and pain logging continues. An optional floor circuit is offered: 2 rounds with 10 s prone holds, 60 s rest. For a person at Floor Foundations it is never more rounds or longer holds than their latest non-partial session with floor working sets. Any movement that sharpens the pain stops.

### **8.2 Exit**

Flare-up mode ends on its own when there are two consecutive days, both after the day the flare started and ending today or yesterday, each with at least one reading, where every reading from the first of those days onward is at or below baseline and none is in the legs, and the newest reading is at or below baseline. The person can also end it by hand.

### **8.3 Return easing**

After a flare ends, sessions ease off (section 5.4) until a non-partial session saved under the current stage, with working sets at that stage, is saved after the flare ended. Return easing takes priority over maintenance. Floor accessory work and partial sessions do not clear it for a bench user.

## **9. Safety**

### **9.1 Warning signs**

Go to emergency care now for any of these if they are new:

1. Numbness, tingling or change in feeling in the saddle area: around the groin, inner thighs, genitals or anus, or when you wipe.
2. Trouble getting or keeping an erection, not being able to orgasm, or a change in feeling during sex.
3. Bladder or bowel changes: trouble starting or stopping urine, a weak stream, not feeling when you need to go, or leaking urine or stool.

4. Pain, tingling, numbness or weakness in both legs.
5. Leg or foot weakness that is getting worse (tripping, a foot that slaps down).
6. Back pain that started after a recent serious accident, such as a car crash or a bad fall.

See a clinician today (urgent care if no appointment is available) for:

1. Other new weakness or numbness in one leg or foot.
2. Fever or chills alongside the back pain.
3. New pain after a recent smaller fall or knock.
4. Unexplained weight loss, or a history of cancer.
5. Pain that is rapidly getting worse.
6. Pain that is constant at rest and worse at night, not tied to movement.

Do not train while a warning sign applies. Get care first, and do not resume until a clinician has checked it.

In the reference app, recording that a warning sign applies pauses every session until the person records that none apply. The recorded answer lapses after 14 days so that an old answer cannot lock the app indefinitely. The lapse is a software timeout, not a medical clearance; the instruction above still holds.

## **9.2 Who PBEP is not for, and when to ask first**

- Anyone with a warning sign above, new or getting worse.
- Anyone with a recent injury, fall, accident or surgery who has not finished the recovery plan their doctor set, or with an injury no clinician has checked.
- Anyone a clinician has told not to do loaded back extension.
- Back pain of recent onset (PBEP is written for pain lasting months or years).

The reference app's checklist is the list in section 9.1. These further situations are not in that checklist, and each needs a clinician's advice before using PBEP:

- Sudden severe tearing pain in the back, chest or abdomen, or back pain with collapse, sweating or feeling faint: emergency care now.
- Back pain while you feel very unwell, if you inject drugs, if your immune system is weakened (long-term steroids, chemotherapy, HIV, or a transplant), or after a recent spinal injection, spinal surgery or serious infection.
- Sudden back pain after a cough, a lift or a minor bump when you have osteoporosis or take steroids regularly.

- Morning stiffness lasting more than about 30 minutes that eases when you move, especially with alternating buttock pain, psoriasis, inflammatory bowel disease, uveitis, or a parent, brother or sister with these.

### 9.3 Limits

- PBEP has not been evaluated in a clinical trial. No outcome is claimed for any person.
- The next-day rule is a pacing rule. It does not detect injury, and a low reading does not mean an exercise is safe for a given person.
- The author of the rules has no medical or physical-therapy credentials.

## 10. Versioning

PBEP uses semantic versioning. A patch version fixes wording without changing any decision. A minor version adds a rule that never changes an existing decision for the same record. A major version changes at least one decision. Each version keeps its own canonical file and date; earlier versions stay published.

## 11. Reference implementation and conformance

- Reference app: Low Back Pain Coach, iOS and Android, by Scrolling Is Evil LLC, version 1.6.0 and later. The build checked on 5 October 2026 was 1.6.0. <https://lowbackpaincoach.com/app/>
- Conformance: on 5 October 2026, 12,000 synthetic records were run through the reference app's own engine (`ProgressionService.getTodaysPrescription`) and through an independent implementation of section 4, and every answer matched: stage, every set value, rest, and the flags for stage moves, flare, leg stop, warning sign, maintenance, break easing and the recovery note.
- Times: the hour windows (8 to 48 hours, the 48-hour recovery note) count real elapsed hours, so a daylight-saving change is counted correctly. Day windows count local calendar days.

Units: the reference app stores added weight in pounds; it displays kilograms when the person chooses, and the 5 lb step is about 2.3 kg.

## 12. How to cite

Scrolling Is Evil LLC. (2026). *Progressive Back-Extension Protocol (PBEP)* (Version 1.0.0). <https://lowbackpaincoach.com/protocol/>

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