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Pilates

Pilates is a method of controlled full-body exercises, and the research on it is remarkably consistent: the majority of the controlled human studies concern lower back pain. The most interesting finding is the form of the evidence — the most cited works in the field are network meta-analyses and reviews, not individual studies.

656

STUDIES IN
TOTAL

494

IN HUMANS

305

OF WHICH
CONTROLLED

0

IN ANIMALS

1

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-15

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Pilates at a Glance

ORIGIN:

Pilates is a method of controlled full-body exercises in fixed sequences, practised on the mat or on large equipment, with emphasis on core stability, breath guidance and precise execution. Clinically, the programme is adapted to the individual's complaints and usually conducted over several weeks as group or individual training. The study literature refers to it as "modified Pilates", "Clinical Pilates", "Pilates-based exercise" and "Mat Pilates".

EVIDENCE BASE:

656 evaluated studies · 305 controlled human studies · 189 observational studies · 32 review articles · 0 animal experiments · 1 cell culture studies

STRONGEST EVIDENCE:

- Musculoskeletal system: network meta-analysis comparing Pilates with strength, core and mind-body training for chronic low back pain, 9,710 participants ({1}).
- Musculoskeletal system: review with meta-analysis on pain, functional impairment and quality of life in chronic low back pain, 1,108 participants ({2}).
- Older adults: meta-analysis on physical function, mood and quality of life, 897 participants ({7}); meta-analysis on strength, endurance and muscle performance, 1,190 participants ({8}).
- Fatigue: review with meta-analysis on fatigue in chronic conditions, 812 participants ({18}); breast cancer: review with meta-analysis on health during treatment, 531 participants ({15}).
- Multiple sclerosis: systematic review on therapeutic effects of the method, 999 participants ({4}); a systematic review with meta-analysis is also available for Parkinson's.

LIMITATIONS:

- Under the label "Pilates" run programmes that differ in composition, equipment, group sizes and instruction; what is compared side by side are variants of one method, not one method with another.
- Control groups receive minimal intervention, general exercise advice, a waiting list or another form of training; where Pilates is tested against a waiting list, the study measures attention and group appointments as well.
- For neurological conditions other than Parkinson's, individual controlled studies exist; for women after breast-cancer treatment the findings stand side by side, and how robust they are when taken together remains open.

CLASSIFICATION:

Pilates is an exercise method with an unusually closed body of research for a training programme on chronic low back pain and open questions on programme definition and long-term course.

1. What Pilates Is and How It Is Performed

Pilates is a training method in which slow, controlled full-body exercises are performed in fixed sequences. Practice takes place on the mat or on large equipment; emphasis is placed on core stability, breath guidance and precise movement execution. The study literature uses different designations for this: the titles contain "modified Pilates", "Clinical Pilates", "Pilates-based exercise" and "Mat Pilates". In clinical application the programme is adapted to the individual's complaints and is usually delivered as group or individual training over several weeks.

For understanding all studies it is crucial that Pilates is not a substance with a fixed dose but a bundle of behaviours. Exercise selection, equipment, group size, instruction and frequency differ between the studies, and the control groups differ likewise: they receive minimal intervention, general exercise advice, a waiting list or another form of training. Some studies test Pilates as an add-on to existing treatment, others directly against a comparator exercise. The target variables are predominantly self-report scales for pain, daily function, movement fear and quality of life; such **questionnaire scores** cannot be completely separated from reported **satisfaction** with the exercise form.

2. How Robust the Research Is

The **musculoskeletal system** accounts for the large majority of controlled studies, and within this field the literature focuses almost exclusively on **chronic low back pain**. Randomised individual studies, systematic reviews and network meta-analyses are available that compare Pilates with other forms of training and with minimal interventions. These are followed at a clear distance by fatigue — here mainly in women after breast-cancer treatment and in the post-menopause — as well as cognition with a focus on Parkinson's. Further areas such as oncology, metabolism, bone and cardiovascular system are represented by individual controlled studies. Safety aspects are captured in a separate group of studies.

For an exercise method the starting position is unusually favourable: several meta-analyses and network meta-analyses of randomised studies exist for low back pain. **Proven:** the comparative picture between Pilates and other exercise forms therefore derives not from single centres but from pooled evaluations. At the same time Pilates cannot be blinded — whoever trains knows that they are training. **Hypothesis:** part of the reported improvements cannot be reliably separated from attention, group experience and regular appointments, irrespective of which exercises were performed.

Distribution of **controlled human studies** by application area — the numbers are not additive because one study can be assigned to several areas:

APPLICATION AREA	CONTROLLED STUDIES
Musculoskeletal system	180

APPLICATION AREA	CONTROLLED STUDIES
Fatigue and stress	60
Cognition and psyche	44
Safety and tolerability	44
Oncology	20
Metabolism	17
Bone and joints	16
Heart and circulation	13

What the studies call “Pilates” is not always the same

Under the label Pilates run very different programmes. The study titles mention “modified Pilates”, “Clinical Pilates”, “Pilates-based exercise” and “Mat Pilates”; behind these stand differently composed exercise sequences, different equipment, group and individual settings as well as differently trained instructors. When the studies are placed side by side, therefore, one is not comparing one method with another but several variants of one method with different control conditions. A judgement on “Pilates” overall presupposes that these variants can be reduced to a common denominator.

The second difficulty lies in the comparison group. Where Pilates is tested against a minimal intervention or against a waiting list, the study also measures the value of attention, guidance and group sessions. More meaningful are direct comparisons against another form of exercise, as presented by individual studies. Even there, it remains open which component contributes: core stabilisation, breathing guidance, movement precision or the regular guided movement. As long as this is not clarified, the reviews describe the direction of a difference, not its mechanism.

3. What Is Frequently Claimed — and What the Data Provide

CLAIM	STUDY SITUATION
Pilates is a proven means against chronic back pain.	Several meta-analyses and network meta-analyses of randomised studies are available on this topic. They compare Pilates with other forms of exercise and with control groups.
Pilates improves balance and everyday function in older people.	There is a meta-analysis on physical functional performance and a systematic review with meta-analysis on postural balance in older adults. Individual controlled studies contribute to the evidence.
Pilates is a rehabilitation procedure for neurological diseases.	A systematic review with meta-analysis is available for Parkinson's. For other neurological conditions, individual controlled studies contribute, for example on cognitive function.
Pilates helps female cancer patients against fatigue and depressive symptoms.	Individual randomised studies are available on this, including in women after breast cancer treatment, on functional capacity, mobility, fatigue, depression and quality of life.

4. The Most Robust Studies

Ordered by strength of evidence, not by prominence: reviews and studies with many participants first. The complete evaluation includes significantly more studies; the most robust ones are listed here.

Controlled Studies in Humans

- ¹ Best Exercise Options for Reducing Pain and Disability in Adults With Chronic Low Back Pain: Pilates, Strength, Core-Based, and Mind-Body. A Network ... (2022) — Übersichtsarbeit, 9.710 Teilnehmer
- ² Efficacy of Pilates on Pain, Functional Disorders and Quality of Life in Patients with Chronic Low Back Pain: A Systematic Review and Meta-Analysis (2023) — Übersichtsarbeit, 1.108 Teilnehmer
- ³ Effectiveness of Pilates and Yoga to improve bone density in adult women: A systematic review and meta-analysis (2021) — Übersichtsarbeit, 591 Teilnehmer
- ⁴ Therapeutic Effects of the Pilates Method in Patients with Multiple Sclerosis: A Systematic Review (2022) — Übersichtsarbeit, 999 Teilnehmer
- ⁵ Effect of Pilates on Glucose and Lipids: A Systematic Review and Meta-Analysis of Randomized Controlled Trials (2021) — Übersichtsarbeit, 587 Teilnehmer
- ⁶ The optimal exercise intervention for sleep quality in adults: A systematic review and network meta-analysis (2024) — Übersichtsarbeit, 2.142 Teilnehmer
- ⁷ Effects of pilates on physical-functional performance, quality of life and mood in older adults: Systematic review and meta-analysis of randomized ... (2021) — Übersichtsarbeit, 897 Teilnehmer
- ⁸ Effects of pilates exercises on strength, endurance and muscle power in older adults: Systematic review and meta-analysis (2024) — Übersichtsarbeit, 1.190 Teilnehmer
- ⁹ Effects of Pilates in children and adolescents - A systematic review and meta-analysis (2023) — Übersichtsarbeit, 1.235 Teilnehmer
- ¹⁰ How to tackle non-specific low back pain among adult patients? A systematic review with a meta-analysis to compare four interventions (2024) — Übersichtsarbeit, 1.253 Teilnehmer
- ¹¹ Effects of Pilates exercises on cardiorespiratory fitness: A systematic review and meta-analysis (2023) — Übersichtsarbeit, 569 Teilnehmer
- ¹² Optimizing labor duration with pilates: evidence from a systematic review and meta-analysis of randomized controlled trials (2024) — Übersichtsarbeit, 1.239 Teilnehmer
- ¹³ Pilates Dosage in Rehabilitation of Patients With Musculoskeletal Conditions: A Scoping Review (2025) — Übersichtsarbeit, 19.642 Teilnehmer
- ¹⁴ Mind-body exercise for improving balance, aerobic capacity, walking ability, muscle strength, and mental health in patients with type 2 diabetes: a ... (2026) — Übersichtsarbeit, 500 Teilnehmer
- ¹⁵ The Impact of Pilates Exercise on the Overall Health of Patients With Breast Cancer: A Systematic Review and Meta-Analysis (2026) — Übersichtsarbeit, 531 Teilnehmer
- ¹⁶ Pilates and AR/VR-based and other technology-assisted exercise for balance and postural control in older-adult and aging-related rehabilitation ... (2026) — Systematic review, 606 participants
- ¹⁷ Comparative effectiveness of rehabilitation therapies for diastasis recti abdominis: A systematic review and Bayesian network meta-analysis (2026) — Systematic review, 783 participants
- ¹⁸ Effectiveness of pilates on fatigue in persons with chronic conditions: a systematic review and meta-analysis (2026) — Systematic review, 812 participants
- ¹⁹ Comparative effects of pilates-based interventions on functional mobility, balance, fatigue, and quality of life in people with multiple sclerosis: a ... (2026) — Systematic review, 901 participants
- ²⁰ Pilates Method as a Biopsychosocial Intervention in the Modern Workplace: A Systematic Review of Physical, Mental, and Occupational Benefits (2026) — Systematic review, 1.179 participants
- ²¹ Comparative efficacy of mind-body exercises for treating chronic obstructive pulmonary disease: a systematic review and network meta-analysis (2026) — Systematic review, 3.179 participants
- ²² Comparative effectiveness of exercise interventions for axial spondyloarthritis: a systematic review and network meta-analysis (2026) — Systematic review, 3.404 participants
- ²³ Effects of different types of core training on pain and functional status in patients with chronic nonspecific low back pain: a systematic review and ... (2025) — Systematic review, 7.705 participants
- ²⁴ Effect of Pilates on Sleep Quality: A Systematic Review and Meta-Analysis of Randomized Controlled Trials (2020) — Systematic review, 477 participants

5. Summary

PROVEN The vast majority of controlled human studies concern the musculoskeletal system, and within this area the field focuses almost exclusively on chronic low back pain. The target outcomes are predominantly pain and daily function, assessed by questionnaire; such questionnaire values cannot be completely separated from reported satisfaction with the form of exercise. In clear second place follow exhaustion and fatigue as well as cognition, each with summary papers.

PLAUSIBLE That regular, guided exercise over several weeks favourably influences pain and daily function fits the pattern of the findings. **Hypothesis:** Part of the reported improvements cannot be reliably separated from attention, group experience and regular appointments, regardless of which exercises were performed; the method cannot be blinded, whoever trains knows that they are training. From this it could follow that direct comparisons against another training are more meaningful than comparisons against a waiting list or minimal intervention. What remains open is which component contributes: core stabilisation, breathing guidance, movement precision or the regular guided movement.

What would need to be clarified first is the intervention definition: which exercise selection, which equipment and which instruction make a study a Pilates study, and from when no longer? The comparison condition follows from this: which control group separates the method from attention, instruction and group experience? For this a uniform description of programme and control would be needed, as the overviews currently provide only in part. Third is the long-term course: how long does a training result last after the end of a programme, and which measurement time point would be binding for this? A study that combines defined programmes, an active comparison group and fixed follow-up time points could clarify these questions in one go.

6. What Remains Open

- **Intervention definition:** Which exercise selection, which equipment and which instruction make a study a Pilates study, and from when no longer?
- **Comparison condition:** Which control group separates the method from attention, instruction and group experience?
- **Long-term course:** How long does a training result last after the end of a programme, and which measurement time point would be binding for this?

Frequently Asked Questions

For which application area is the study situation most robust?

It is most robust for chronic lower back pain. There are randomised studies, systematic reviews and network meta-analyses that compare Pilates with other forms of exercise and with minimal interventions. All other areas — fatigue, cognition, oncology, metabolism, bone, cardiovascular — are represented by individual controlled studies or a single review.

How do I recognise whether a Pilates study is useful for my question?

Three points decide. First, the comparison group: was it tested against another form of exercise or against a waiting list or minimal intervention? Second, the description of the intervention: mat or apparatus, group or individual, which exercise selection, how long. Third, the target variable: is it a self-assessment by questionnaire or an objectively measured value? Without the first two details, the result can hardly be classified.

Can Pilates be blinded at all?

No. Anyone participating in an exercise programme knows it, and the instructors also know what they are teaching. Therefore the informative value of a Pilates study depends almost entirely on the control group: if it also receives guided movement at a comparable frequency, the comparison is informative. If it receives nothing or only brief advice, the study additionally measures attention.

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International Health Research

Research, put in context. Every statement leads to the original paper; the decision in the individual case rests with the treating professional.
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