### Exercise Training for Mild Cognitive Impairment Adults Older Than 60: A Systematic Review and Meta-Analysis

| Section and Topic | Item # | Checklist item                                                                 | Location where item is reported |
|-------------------|--------|--------------------------------------------------------------------------------|---------------------------------|
| **TITLE**         |        |                                                                                |                                 |
| Title             | 1      | Identify the report as a systematic review.                                   | 1                               |
| **ABSTRACT**      |        |                                                                                |                                 |
| Abstract          | 2      | See the PRISMA 2020 for Abstracts checklist.                                  | 2                               |
| **INTRODUCTION**  |        |                                                                                |                                 |
| Rationale         | 3      | Describe the rationale for the review in the context of existing knowledge.    | 3-4                             |
| Objectives        | 4      | Provide an explicit statement of the objective(s) or question(s) the review addresses. | 4                               |
| **METHODS**       |        |                                                                                |                                 |
| Eligibility criteria | 5  | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the synthesizes. | 5-6                             |
| Information sources | 6   | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | 4-5                             |
| Search strategy   | 7      | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | 5, Supplementary Material       |
| Selection process | 8      | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | 6                               |
| Data collection process | 9   | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | 6                               |
| Data items        | 10     | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | 6                               |
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | 7                               |
| Effect measures   | 12     | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | 8                               |
| Synthesis methods | 13     | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | 6-7                             |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | 7                               |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | 7                               |
| Section and Topic | Item # | Checklist item | Location where item is reported |
|------------------|--------|----------------|-------------------------------|
| **RESULTS**      |        |                |                               |
| Study selection  | 16a    | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram. | 31 |
|                  | 16b    | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | 8 |
| Study characteristics | 17  | Cite each included study and present its characteristics. | 24-28 |
| Risk of bias in studies | 18  | Present assessments of risk of bias for each included study. | 32 |
| Results of individual studies | 19  | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | 33, Supplementary Material |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | 9 |
|                  | 20b    | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g., confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | 33, Supplementary Material |
| Reporting biases | 21    | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | 9 |
| Certainty of evidence | 22  | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | 9-11 |
| **DISCUSSION**   |        |                |                               |
| Discussion       | 23a    | Provide a general interpretation of the results in the context of other evidence. | 12-13 |
|                  | 23b    | Discuss any limitations of the evidence included in the review. | 13 |
|                  | 23c    | Discuss any limitations of the review processes used. | 13 |
|                  | 23d    | Discuss implications of the results for practice, policy, and future research. | 15 |
| **OTHER INFORMATION** |        |                |                               |
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | 4 |
| Support          | 25    | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | 17 |
| Competing interests | 26  | Declare any competing interests of review authors. | 17 |
Search strategy on PubMed (www.ncbi.nlm.nih.gov) on November 2, 2021.
(1800 - 2021)

(((Exercise")Mesh") OR (((((((((Exercise)OR (Physical Activity>Title/Abstract)) OR (Activities, Physical>Title/Abstract)) OR (Activity, Physical>Title/Abstract)) OR (Physical Activities>Title/Abstract)) OR (Exercise, Physical>Title/Abstract)) OR (Exercises, Physical>Title/Abstract)) OR (Physical Exercise>Title/Abstract)) OR (Physical Exercises>Title/Abstract)) OR (Acute Exercise>Title/Abstract)) OR (Acute Exercises>Title/Abstract)) OR (Exercise, Acute>Title/Abstract)) OR (Exercises, Acute>Title/Abstract)) OR (Exercise, Isometric>Title/Abstract)) OR (Exercises, Isometric>Title/Abstract)) OR (Isometric Exercises>Title/Abstract)) OR (Isometric Exercise>Title/Abstract)) OR (Exercise, Aerobic>Title/Abstract)) OR (Aerobic Exercise>Title/Abstract)) OR (Exercises, Aerobic>Title/Abstract)) OR (Exercise Training>Title/Abstract)) OR (Exercise Trainings>Title/Abstract)) OR (Training, Exercise>Title/Abstract)) OR (Trainings, Exercise>Title/Abstract)) OR ("Exercise Therapy")Mesh)) OR (((((Remedial Exercise>Title/Abstract)) OR (Exercise, Remedial>Title/Abstract)) OR (Exercises, Remedial>Title/Abstract)) OR (Remedial Exercises>Title/Abstract)) OR (Exercise Therapies>Title/Abstract)) OR (Therapies, Exercise>Title/Abstract)) OR (Rehabilitation Exercise>Title/Abstract)) OR (Exercise, Rehabilitation>Title/Abstract)) OR (Exercises, Rehabilitation>Title/Abstract)) OR (Rehabilitation Exercises>Title/Abstract)) OR (Training, Exercise>Title/Abstract)) OR (Training, Circuit>Title/Abstract)) OR (Training, Remedial>Title/Abstract)) OR (Circuit Training>Title/Abstract)) OR (Training, Circuit>Title/Abstract)) OR (Circuit Based Exercise>Title/Abstract)) OR ("Circuit-Based Exercise")Mesh)) OR (Circuit-Based Exercises>Title/Abstract)) OR (Exercise, Circuit-Based>Title/Abstract)) OR (Exercises, Circuit-Based>Title/Abstract)) OR (Circuit Training>Title/Abstract)) OR (Training, Circuit>Title/Abstract)) OR ("Physical Fitness")Mesh)) OR (Fitness, Physical>Title/Abstract)) OR (Fitness>Title/Abstract)) OR (Fitness, Cardiorespiratory fitness [Title/Abstract])) OR (Fitness, Cardiorespiratory [Title/Abstract])) OR ("Endurance Training")Mesh)) OR (Training, Endurance>Title/Abstract)) OR ("Muscle Stretching Exercises")Mesh)) OR ((((((((Exercise, Muscle Stretching>Title/Abstract)) OR (Muscle Stretching Exercise>Title/Abstract)) OR (Static Stretching>Title/Abstract)) OR (Stretching, Static>Title/Abstract)) OR (Active Stretching>Title/Abstract)) OR (Stretching, Active>Title/Abstract)) OR (Static-Active Stretching>Title/Abstract)) OR (Static-Active Stretching>Title/Abstract)) OR (Isometric Stretching>Title/Abstract)) OR (Static-Active Stretching>Title/Abstract)) OR (Ballistic Stretching>Title/Abstract)) OR (Ballistic TITLE/Abstract]) OR (Dynamic Stretching [Title/Abstract]) OR (Stretching, Dynamic>Title/Abstract]) OR (Proprioceptive Neuromuscular Facilitation (PNF) Stretching [Title/Abstract]) OR (PNF Stretching [Title/Abstract]) OR (PNF Stretchings [Title/Abstract]) OR (Stretching, PNF>Title/Abstract)) OR (PNF Stretching Exercise>Title/Abstract)) OR (Exercise, PNF Stretching>Title/Abstract)) OR (PNF Stretching Exercise>Title/Abstract)) OR (Stretching Exercise, PNF>Title/Abstract)) OR (Proprioceptive Neuromuscular Facilitation>Title/Abstract]) OR (Neuromuscular Facilitation, Proprioceptive>Title/Abstract)) OR (Proprioceptive Neuromuscular Facilitations>Title/Abstract]) OR (Passive Stretching>Title/Abstract]) OR (Stretching, Passive>Title/Abstract)) OR (Relaxed Stretching [Title/Abstract]) OR (Stretching, Relaxed>Title/Abstract]) OR (Static-Passive Stretching>Title/Abstract]) OR (Static-Passive Stretching>Title/Abstract]) OR (Stretching, Static-Passive>Title/Abstract])) OR ("Plyometric Exercise")Mesh)) OR ((((((Exercise, Plyometric>Title/Abstract)) OR (Exercises, Plyometric>Title/Abstract)) OR (Plyometric Exercises>Title/Abstract)) OR (Plyometric Drill>Title/Abstract]) OR (Drill, Plyometric>Title/Abstract]) OR (Drills, Plyometric>Title/Abstract]) OR (Plyometric Drills>Title/Abstract]) OR (Plyometric Training>Title/Abstract]) OR (Plyometric Trainings>Title/Abstract)) OR (Training, Plyometric>Title/Abstract]) OR (Trainings, Plyometric>Title/Abstract]) OR (Stretch-
Shortening Exercise[Title/Abstract]) OR (Exercise, Stretch-Shortening[Title/Abstract]) OR (Exercises, Stretch-Shortening[Title/Abstract]) OR (Stretch Shortening Exercise[Title/Abstract]) OR (Stretch-Shortening Exercises[Title/Abstract]) OR (Stretch-Shortening Cycle Exercise[Title/Abstract]) OR (Cycle Exercise, Stretch-Shortening[Title/Abstract]) OR (Cycle Exercises, Stretch-Shortening[Title/Abstract]) OR (Exercise, Stretch-Shortening Cycle[Title/Abstract]) OR (Exercises, Stretch-Shortening Cycle[Title/Abstract]) OR (Stretch Shortening Cycle Exercise[Title/Abstract]) OR (Stretch-Shortening Cycle Exercises[Title/Abstract]) OR (Stretches, Stretch-Shortening[Title/Abstract]) OR (Drills, Stretch-Shortening Drill[Title/Abstract]) OR (Drill, Stretch-Shortening Drill[Title/Abstract]) OR (Stretch-Shortening Drills[Title/Abstract]) AND ("Cognitive Dysfunction"[Mesh]) OR (((((((((((((((((((((((((((((((((Cognitive Dysfunctions[Title/Abstract]) OR (Dysfunction, Cognitive[Title/Abstract]) OR (Dysfunctions, Cognitive[Title/Abstract]) OR (Cognitive Impairments[Title/Abstract]) OR (Cognitive Impairment[Title/Abstract]) OR (Impairment, Cognitive[Title/Abstract]) OR (Impairments, Cognitive[Title/Abstract]) OR (Mild Cognitive Impairment[Title/Abstract]) OR (Mild Cognitive Impairments[Title/Abstract]) OR (Mild Neurocognitive Disorder[Title/Abstract]) OR (Disorder, Mild Neurocognitive[Title/Abstract]) OR (Disorders, Mild Neurocognitive[Title/Abstract]) OR (Mild Neurocognitive Disorders[Title/Abstract]) OR (Neurocognitive Disorder, Mild[Title/Abstract]) OR (Neurocognitive Disorders, Mild[Title/Abstract]) OR (Cognitive Decline[Title/Abstract]) OR (Cognitive Declines[Title/Abstract]) OR (Decline, Cognitive[Title/Abstract]) OR (Declines, Cognitive[Title/Abstract]) OR (Mental Deterioration[Title/Abstract]) OR (Deterioration, Mental[Title/Abstract]) OR (Deteriorations, Mental[Title/Abstract]) OR (Mental Deterioration[Title/Abstract])) AND ("Aged"[Mesh]) OR (((older adults[Title/Abstract]) OR (elder[Title/Abstract]) OR (senior[Title/Abstract]) OR (older[Title/Abstract]) OR (aging[Title/Abstract]) OR (elderly[Title/Abstract]))) OR (((((((("Aged, 80 and over"[Mesh]) OR (Nonagenarians[Title/Abstract]) OR (Nonagenarian[Title/Abstract]) OR (Oldest Old[Title/Abstract]) OR (Centenarians[Title/Abstract]) OR (Centenarian[Title/Abstract]) OR (Octogenarian[Title/Abstract]) OR (Octogenarians[Title/Abstract]) OR (very elderly[Title/Abstract]) OR (very old[Title/Abstract]))) AND (randomized controlled trial[Publication Type] OR randomized[Title/Abstract] OR placebo[Title/Abstract])))
## Search strategy on Embase on November 3, 2021

**Embase <1974 to 2021 November 3>**

| #   | Query                                                                 | Results from 3 November 2021 |
|-----|----------------------------------------------------------------------|-------------------------------|
| 1   | 'exercise'/exp                                                      | 388,292                       |
| 2   | 'exercises':ab,ti OR 'physical activity':ab,ti OR 'activities, physical':ab,ti OR 'activity, physical':ab,ti OR 'physical activities':ab,ti OR 'exercise, physical':ab,ti OR 'exercises, physical':ab,ti OR 'physical exercise':ab,ti OR 'physical exercises':ab,ti OR 'acute exercise':ab,ti OR 'acute exercises':ab,ti OR 'exercise, acute':ab,ti OR 'exercises, acute':ab,ti OR 'exercises, isometric':ab,ti OR 'exercise, isometric':ab,ti OR 'isometric exercises':ab,ti OR 'isometric exercise':ab,ti OR 'exercise, aerobic':ab,ti OR 'aerobic exercise':ab,ti OR 'aerobic exercises':ab,ti OR 'exercises, aerobic':ab,ti OR 'exercise trainings':ab,ti OR 'training, exercise':ab,ti OR 'training, exercise':ab,ti OR 'exercise training':ab,ti OR 'fitness training':ab,ti OR 'fitness workout':ab,ti OR 'physical effort':ab,ti OR 'physical exertion':ab,ti OR 'physical workout':ab,ti OR 'physical workout':ab,ti OR 'training, physical':ab,ti | 302,600                       |
| 3   | #1 OR #2                                                           | 557,826                       |
| 4   | 'circuit training'/exp                                             | 293                           |
| 5   | 'circuit based exercise':ab,ti OR 'circuit-based training':ab,ti OR 'circuit-based exercises':ab,ti OR 'exercise, circuit-based':ab,ti OR 'exercises, circuit-based':ab,ti OR 'circuit-based exercise':ab,ti OR 'circuit-based exercises':ab,ti OR 'training, circuit':ab,ti OR 'circuit-type training':ab,ti OR 'circuit-type exercise':ab,ti | 52                            |
| 6   | #4 OR #5                                                           | 333                           |
| 7   | 'kinesiotherapy'/exp                                              | 90,605                        |
| 8   | 'exercise therapy':ab,ti OR 'remedial exercise':ab,ti OR 'exercise, remedial':ab,ti OR 'exercises, remedial':ab,ti OR 'remedial exercises':ab,ti OR 'therapy, exercise':ab,ti OR 'exercise therapies':ab,ti OR 'therapies, exercise':ab,ti OR 'rehabilitation exercise':ab,ti OR 'exercise, rehabilitation':ab,ti OR 'exercises, rehabilitation':ab,ti OR 'rehabilitation exercises':ab,ti OR 'treatment, exercise':ab,ti OR 'therapeutic exercise':ab,ti OR 'exercise treatment':ab,ti | 11,400                        |
| 9   | #7 OR #8                                                           | 95,410                        |
| 10  | 'resistance training'/exp                                          | 22,072                        |
| 11  | 'resistance exercise':ab,ti OR 'resistance exercise training':ab,ti OR 'resistance-type exercise':ab,ti OR 'resistance-type training':ab,ti OR 'strength exercise':ab,ti OR 'strength-type exercise':ab,ti OR 'strength training':ab,ti OR 'strength-type training':ab,ti OR 'training, resistance':ab,ti OR 'training, strength':ab,ti OR 'strength exercise':ab,ti | 14,504                        |
| 12  | #10 OR #11                                                         | 27,830                        |
| 13  | 'tai chi'/exp                                                      | 3,382                         |
| 14  | 'tai chi chuan':ab,ti OR 'chi, tai':ab,ti OR 'tai ji quan':ab,ti OR 'ji quan, tai':ab,ti OR 'quan, tai ji':ab,ti OR 'taiji':ab,ti OR 'taijiquan':ab,ti OR 'tai ji':ab,ti OR 'tai chi':ab,ti | 2,899                         |
| 15  | #13 OR #14                                                         | 3,888                         |
| 16  | 'sport'/exp OR 'sports':ab,ti                                      | 230,258                       |
| 17  | 'fitness'/exp                                                     | 40,988                        |
| 18  | 'fitness, physical':ab,ti OR 'physical fitness':ab,ti OR 'cardiorespiratory fitness':ab,ti OR 'fitness, cardiorespiratory':ab,ti | 19,993                        |
| 19  | #17 OR #18                                                         | 49,244                        |
| 20  | 'endurance training'/exp                                           | 7,651                         |
| 21  | 'endurance exercise':ab,ti OR 'endurance exercise training':ab,ti OR 'training, endurance':ab,ti | 5,648                         |
|   |   |
|---|---|
| **22** | #20 OR #21 |
| **23** | 'jogging'/exp OR 'walking'/exp OR 'swimming'/exp OR 'running'/exp OR 'bicycling'/exp OR 'yoga'/exp |
| **24** | 'stretching exercise'/exp |
| **25** | 'muscle stretching exercises':ab,ti OR 'stretching exercises':ab,ti OR 'exercise, muscle stretching':ab,ti OR 'muscle stretching exercise':ab,ti OR 'static stretching':ab,ti OR 'stretching, static':ab,ti OR 'active stretching':ab,ti OR 'static-active stretching':ab,ti OR 'static active stretching':ab,ti OR 'stretching, static-active':ab,ti OR 'isometric stretching':ab,ti OR 'stretching, isometric':ab,ti OR 'ballistic stretching':ab,ti OR 'stretching, ballistic':ab,ti OR 'dynamic stretching':ab,ti OR 'stretching, dynamic':ab,ti OR 'proprioceptive neuromuscular facilitation (pnf) stretching':ab,ti OR 'pnf stretching':ab,ti OR 'pnf stretchings':ab,ti OR 'stretching, pnf':ab,ti OR 'proprioceptive neuromuscular facilitation':ab,ti OR 'neuromuscular facilitation, proprioceptive':ab,ti OR 'proprioceptive neuromuscular facilitations':ab,ti OR 'passive stretching':ab,ti OR 'stretching, passive':ab,ti OR 'relaxed stretching':ab,ti OR 'stretching, relaxed':ab,ti OR 'static-passive stretching':ab,ti OR 'static passive stretching':ab,ti |
| **26** | #24 OR #25 |
| **27** | 'aged'/exp |
| **28** | 'senium':ab,ti OR 'older adults':ab,ti OR 'elder':ab,ti OR 'senior':ab,ti OR 'older':ab,ti OR 'aging':ab,ti OR 'elderly':ab,ti |
| **29** | #27 OR #28 |
| **30** | 'very elderly'/exp |
| **31** | 'aged, 80 and over':ab,ti OR 'very old':ab,ti OR 'octogenarians':ab,ti OR 'nonagenarians':ab,ti OR 'nonagenarian':ab,ti OR 'centenarians':ab,ti OR 'centenarian':ab,ti OR 'octogenarian':ab,ti OR 'oldest old':ab,ti |
| **32** | #30 OR #31 |
| **33** | 'mild cognitive impairment'/exp |
| **34** | 'cognitive dysfunction':ab,ti OR 'cognitive dysfunctions':ab,ti OR 'dysfunction, cognitive':ab,ti OR 'dysfunctions, cognitive':ab,ti OR 'cognitive impairments':ab,ti OR 'cognitive impairment':ab,ti OR 'impairment, cognitive':ab,ti OR 'impairments, cognitive':ab,ti OR 'cognitive impairment, mild':ab,ti OR 'cognitive impairments, mild':ab,ti OR 'impairment, mild cognitive':ab,ti OR 'impairments, mild cognitive':ab,ti OR 'mild cognitive impairments':ab,ti OR 'mild neurocognitive disorder':ab,ti OR 'disorder, mild neurocognitive':ab,ti OR 'disorders, mild neurocognitive':ab,ti OR 'mild neurocognitive disorders':ab,ti OR 'neurocognitive disorder, mild':ab,ti OR 'neurocognitive disorders, mild':ab,ti OR 'cognitive decline':ab,ti OR 'cognitive declines':ab,ti OR 'decline, cognitive':ab,ti OR 'cognitive decline, cognitive':ab,ti OR 'mental deterioration':ab,ti OR 'deterioration, mental':ab,ti OR 'deteriorations, mental':ab,ti OR 'mental deteriorations':ab,ti |
| **35** | #33 OR #34 |
| **36** | 'randomized controlled trial':ab,ti OR 'randomized':ab,ti OR 'placebo':ab,ti |
| **37** | #3 OR #6 OR #9 OR #12 OR #15 OR #16 OR #19 OR #22 OR #23 OR #26 |
| **38** | #29 OR #32 |
| **39** | #35 AND #36 AND #37 AND #38 |
## Search strategy on Cochrane on November 5, 2021

| #   | Search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | MeSH descriptor: [Exercise] explode all trees                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2   | (Exercises):ti,ab,kw OR (Physical Activity):ti,ab,kw OR (Activities, Physical):ti,ab,kw OR (Activity, Physical):ti,ab,kw OR (Physical Activities):ti,ab,kw OR (Exercise, Physical):ti,ab,kw OR (Exercises, Physical):ti,ab,kw OR (Physical Exercise):ti,ab,kw OR (Physical Exercises):ti,ab,kw OR (Acute Exercise):ti,ab,kw OR (Acute Exercises):ti,ab,kw OR (Exercise, Acute):ti,ab,kw OR (Exercises, Acute):ti,ab,kw OR (Exercise, Isometric):ti,ab,kw OR (Exercises, Isometric):ti,ab,kw OR (Isometric Exercises):ti,ab,kw OR (Isometric Exercise):ti,ab,kw OR (Exercise, Aerobic):ti,ab,kw OR (Aerobic Exercise):ti,ab,kw OR (Aerobic Exercises):ti,ab,kw OR (Exercises, Aerobic):ti,ab,kw OR (Exercise Training):ti,ab,kw OR (Exercise Trainings):ti,ab,kw OR (Training, Exercise):ti,ab,kw OR (Trainings, Exercise):ti,ab,kw OR (exercise training):ti,ab,kw OR (fitness training):ti,ab,kw OR (physical effort):ti,ab,kw OR (physical exertion):ti,ab,kw OR (physical workout):ti,ab,kw OR (training, physical):ti,ab,kw |
| Line | Description |
|------|-------------|
| 24  | #22 OR #23 |
| 25  | MeSH descriptor: [Walking] explode all trees |
| 26  | MeSH descriptor: [Jogging] explode all trees |
| 27  | MeSH descriptor: [Running] explode all trees |
| 28  | MeSH descriptor: [Bicycling] explode all trees |
| 29  | MeSH descriptor: [Swimming] explode all trees |
| 30  | MeSH descriptor: [Yoga] explode all trees |
| 31  | #25 OR #26 OR #27 OR #28 OR #29 OR #30 |
| 32  | MeSH descriptor: [Muscle Stretching Exercises] explode all trees |
| 33  | (stretching exercise):ti,ab,kw OR (muscle stretching exercises):ti,ab,kw OR (Exercise, Muscle Stretching):ti,ab,kw OR (stretching exercises):ti,ab,kw OR (Muscle Stretching Exercise):ti,ab,kw OR (Static Stretching):ti,ab,kw OR (Stretching, Static):ti,ab,kw OR (Active Stretching):ti,ab,kw OR (Stretching, Active):ti,ab,kw OR (Static-Active Stretching):ti,ab,kw OR (Static Active Stretching):ti,ab,kw OR (Stretching, Static-Active):ti,ab,kw OR (Isometric Stretching):ti,ab,kw OR (Stretching, Isometric):ti,ab,kw OR (Ballistic Stretching):ti,ab,kw OR (Stretching, Ballistic):ti,ab,kw OR (Dynamic Stretching):ti,ab,kw OR (Stretching, Dynamic):ti,ab,kw OR (Proprioceptive Neuromuscular Facilitation (PNF) Stretching):ti,ab,kw OR (PNF Stretching):ti,ab,kw OR (PNF Stretchings):ti,ab,kw OR (Passive Stretching):ti,ab,kw OR (Relaxed Stretching):ti,ab,kw OR (Stretching, Relaxed):ti,ab,kw OR (Static-Passive Stretching):ti,ab,kw OR (Static Passive Stretching):ti,ab,kw OR (Stretching, Static-Passive):ti,ab,kw |
| 34  | #32 OR #33 |
| 35  | MeSH descriptor: [Plyometric Exercise] explode all trees |
| 36  | (Exercise, Plyometric):ti,ab,kw OR (Exercises, Plyometric):ti,ab,kw OR (Plyometric Exercises):ti,ab,kw OR (Plyometric Drill):ti,ab,kw OR (Drill, Plyometric):ti,ab,kw OR (Drills, Plyometric):ti,ab,kw OR (Plyometric Drills):ti,ab,kw OR (Plyometric Training):ti,ab,kw OR (Plyometric Trainings):ti,ab,kw OR (Training, Plyometric):ti,ab,kw OR (Trainings, Plyometric):ti,ab,kw OR (Stretch-Shortening Exercise):ti,ab,kw OR (Exercise, Stretch-Shortening):ti,ab,kw OR (Exercises, Stretch-Shortening):ti,ab,kw OR (Stretch Shortening Exercise):ti,ab,kw OR (Stretch-Shortening Exercises):ti,ab,kw OR (Stretch-Shortening Cycle Exercise):ti,ab,kw OR (Cycle Exercise, Stretch-Shortening):ti,ab,kw OR (Cycle Exercises, Stretch-Shortening):ti,ab,kw OR (Exercise, Stretch-Shortening Cycle):ti,ab,kw OR (Exercises, Stretch-Shortening Cycle):ti,ab,kw OR (Stretch Shortening Cycle Exercises):ti,ab,kw OR (Stretch-Shortening Drill):ti,ab,kw OR (Drill, Stretch-Shortening):ti,ab,kw OR (Drills, Stretch-Shortening):ti,ab,kw OR (Stretch Shortening Drill):ti,ab,kw OR (Stretch-Shortening Drills):ti,ab,kw |
| 37  | #35 OR #36 |
| 38  | MeSH descriptor: [Aged] explode all trees |
| 39  | (senium):ti,ab,kw OR (older adults):ti,ab,kw OR (elder):ti,ab,kw OR (senior):ti,ab,kw OR (older):ti,ab,kw OR (aging):ti,ab,kw OR (elderly):ti,ab,kw |
| 40  | #38 OR #39 |
| 41  | MeSH descriptor: [Aged, 80 and over] explode all trees |
| 42  | (Nonagenarians):ti,ab,kw OR (Nonagenarian):ti,ab,kw OR (Oldest Old):ti,ab,kw OR (Centenarians):ti,ab,kw OR (Centenarian):ti,ab,kw OR (Octogenarian):ti,ab,kw OR (Octogenarians):ti,ab,kw OR (very elderly):ti,ab,kw OR (very old):ti,ab,kw |
| 43  | #41 OR #42 |
| 44  | #40 OR #43 |
|   |   |
|---|---|
| 45 | MeSH descriptor: [Cognitive Dysfunction] explode all trees |
| 46 | (mild cognitive impairment):ti,ab,kw OR (Cognitive Dysfunctions):ti,ab,kw OR (Dysfunction, Cognitive):ti,ab,kw OR (Dysfunctions, Cognitive):ti,ab,kw OR (Cognitive Impairments):ti,ab,kw OR (Cognitive Impairment):ti,ab,kw OR (Impairment, Cognitive):ti,ab,kw OR (Impairments, Cognitive):ti,ab,kw OR (Cognitive Impairment, Mild):ti,ab,kw OR (Cognitive Impairments, Mild):ti,ab,kw OR (Impairment, Mild Cognitive):ti,ab,kw OR (Impairments, Mild Cognitive):ti,ab,kw OR (Mild Neurocognitive Disorder):ti,ab,kw OR (Disorder, Mild Neurocognitive):ti,ab,kw OR (Disorders, Mild Neurocognitive):ti,ab,kw OR (Mild Neurocognitive Disorders):ti,ab,kw OR (Neurocognitive Disorder, Mild):ti,ab,kw OR (Neurocognitive Disorders, Mild):ti,ab,kw OR (Cognitive Decline):ti,ab,kw OR (Cognitive Declines):ti,ab,kw OR (Decline, Cognitive):ti,ab,kw OR (Declines, Cognitive):ti,ab,kw OR (Mental Deterioration):ti,ab,kw OR (Deterioration, Mental):ti,ab,kw OR (Deteriorations, Mental):ti,ab,kw OR (Mental Deteriorations):ti,ab,kw |
| 47 | #45 OR #46 |
| 48 | #3 OR #6 OR #9 OR #12 OR #15 OR #18 OR #21 OR #24 OR #31 OR #34 OR #37 |
| 49 | #48 AND #44 AND #47 |
**Sub-classification of exercise training**

| Classification         | Definition                                                                 | Illustration                                                                 |
|------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Aerobic exercise       | Periodic, dynamic activities involved by the major muscle groups of the whole body | Walking, jogging, running, bicycling, swimming, treadmill, square dancing, aerobics, etc. |
| Resistance exercise    | Any form of exercise that causes the muscles to contract against external resistance with the expectation of increasing muscular strength, mass, and bone density [1] | Exercise by body weight, dumbbell, barbell, elastic band, elastic tube, or other exercise equipment, etc. |
| Mind body exercise     | A sequence of movements and postures with musculoskeletal stretching and relaxation, breath control, and mental focus, have gradually gained global popularity [2] | Yoga, qigong, and tai chi, etc. |

[1] Hashida R, Kawaguchi T, Bekki M, Omoto M, Matsuse H, Nago T, Takano Y, Ueno T, Koga H, George J, Shiba N and Torimura T (2017) Aerobic vs. resistance exercise in non-alcoholic fatty liver disease: A systematic review. *J Hepatol* 66, 142-152.

[2] Takemura N, Cheung D S T, Smith R, Deng W, Ho K Y, Lin J, Kwok J Y Y, Lam T C and Lin C C (2020) Effectiveness of aerobic exercise and mind-body exercise in cancer patients with poor sleep quality: A systematic review and meta-analysis of randomized controlled trials. *Sleep Med Rev* 53, 101334.
Supplemental Outcomes

### Outcome 1.1 Impact of aerobic exercise training on immediate memory
CI, confidence interval; IV, inverse variance; SD, standard deviation; Std, standardized.

| Study or Subgroup | Aerobic | Control | Std. Mean Difference |
|-------------------|---------|---------|----------------------|
|                   | Mean    | SD      | Total                |
|                   | Mean    | SD      | Total                |
|                   | Weight  | IV, Random | 95% CI               |
|                   | Mean    | SD      | Total                |
|                   | Mean    | SD      | Total                |
|                   | Weight  | IV, Random | 95% CI               |
| 1.1.1 The Verbal Learning and Memory Test, direct recall | | | |
| Schwarzer EU 2005 | 41      | 15.14   | 15                   | 33.33     | 16.15   | 15                   | 22.6%     | 0.48 [0.25, 1.20] |
| Subtotal (95% CI) | 15      | 15      | 22.6%                | 0.48 [0.25, 1.20] | |
| Heterogeneity: Not applicable | | | |
| Test for overall effect: Z = 1.39 (P = 0.18) | | | |

| Outcome 1.2 Impact of aerobic exercise training on working memory |
|---------------------------------------------------------------|
| CI, confidence interval; IV, inverse variance; SD, standard deviation; Std, standardized. |

| Study or Subgroup | Aerobic | Control | Std. Mean Difference |
|-------------------|---------|---------|----------------------|
|                   | Mean    | SD      | Total                |
|                   | Mean    | SD      | Total                |
|                   | Weight  | IV, Random | 95% CI               |
|                   | Mean    | SD      | Total                |
|                   | Mean    | SD      | Total                |
|                   | Weight  | IV, Random | 95% CI               |
| 1.2.2 Digit span backward | | | |
| Cummins & Donelan 2019 | 4.72    | 1.19    | 10                   | 3.79      | 0.97    | 14                   | 24.2%     | 0.93 [0.10, 1.56] |
| Subtotal (95% CI) | 10      | 14      | 24.2%                | 0.93 [0.10, 1.56] | |
| Heterogeneity: Not applicable | | | |
| Test for overall effect: Z = 2.22 (P = 0.03) | | | |

| Study or Subgroup | Aerobic | Control | Std. Mean Difference |
|-------------------|---------|---------|----------------------|
|                   | Mean    | SD      | Total                |
|                   | Mean    | SD      | Total                |
|                   | Weight  | IV, Random | 95% CI               |
|                   | Mean    | SD      | Total                |
|                   | Mean    | SD      | Total                |
|                   | Weight  | IV, Random | 95% CI               |
| 1.2.3 Digit span component of the Wechsler memory test | | | |
| Schneider EU 2005 | 10.8    | 3.1     | 15                   | 10.82     | 2.59    | 15                   | 24.9%     | 0.04 [0.06, 0.07] |
| Tset EU 2018      | 19.32   | 1.77    | 19                   | 18.78     | 2.20    | 18                   | 27.6%     | 0.28 [0.40, 0.91] |
| Yogev-Seligmann 2021 | 13.97   | 4.07    | 13                   | 15.85     | 5.37    | 14                   | 22.2%     | 0.39 [1.15, 0.37] |
| Subtotal (95% CI) | 47      | 47      | 27.6%                | 0.28 [0.40, 0.91] | |
| Heterogeneity: Tau^2 = 0.00; Ch^2 = 4.74; df = 2 (P = 0.04); P = 8% | | | |
| Test for overall effect: Z = 0.10 (P = 0.92) | | | |
**Outcome 1.3** Impact of aerobic exercise training on processing speed. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

**Outcome 1.4** Impact of aerobic exercise training on delayed memory. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.
### Outcome 1.5 Impact of aerobic exercise training on attention

CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

| Study or Subgroup | Aerobic | Control |
|-------------------|---------|---------|
|                   | Mean    | SD      | Total | Mean    | SD      | Total | Weight | IV, Random, 95% CI | Std, Mean Difference |
|                   |         |         |       |         |         |       |        |        |                     |                      |
| 1.5.1 Trail making test B | -21.36 (92.16) | 16 | -226.43 (80.24) | 14 | 27.1% | 0.13 (0.59, 0.85) |
| Yogov-Belgmann 0 2021 | -155.4 (73.98) | 13 | -127.8 (39.25) | 14 | 25.2% | -0.48 (1.23, 0.31) |
| Subtotal (95% CI) | 29 | 28 | 52.4% | -0.15 (-0.72, 0.43) |
| Heterogeneity: Tau² = 0.03; Ch² = 12.1; df = 1 (P = 0.27); P = 17% |
| Test for overall effect: Z = 0.59 (P = 0.61) |

### Outcome 1.6 Impact of aerobic exercise training on executive function

CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

| Study or Subgroup | Aerobic | Control |
|-------------------|---------|---------|
|                   | Mean    | SD      | Total | Mean    | SD      | Total | Weight | IV, Random, 95% CI | Std, Mean Difference |
|                   |         |         |       |         |         |       |        |        |                     |                      |
| 1.6.2 Matrix Reasoning test | 46.7 (14.59) | 13 | 45.6 (15.9) | 14 | 33.2% | 0.07 (0.69, 0.83) |
| Yogov-Belgmann 0 2021 | 46.7 (14.59) | 13 | 45.6 (15.9) | 14 | 33.2% | 0.07 (0.69, 0.83) |
| Subtotal (95% CI) | 13 | 14 | 33.2% | 0.07 (0.69, 0.83) |
| Heterogeneity: Not applicable |
| Test for overall effect: Z = 0.16 (P = 0.88) |

### 1.6.3 Category naming

| Study or Subgroup | Aerobic | Control |
|-------------------|---------|---------|
|                   | Mean    | SD      | Total | Mean    | SD      | Total | Weight | IV, Random, 95% CI | Std, Mean Difference |
|                   |         |         |       |         |         |       |        |        |                     |                      |
| Schneider 2003 | 24.9 (11.37) | 16 | 20.27 (9.34) | 15 | 34.3% | 0.22 (0.38, 1.15) |
| Subtotal (95% CI) | 15 | 15 | 34.3% | 0.22 (0.38, 1.15) |
| Heterogeneity: Not applicable |
| Test for overall effect: Z = 1.14 (P = 0.26) |

### Total (95% CI)

| Study or Subgroup | Aerobic | Control |
|-------------------|---------|---------|
|                   | Mean    | SD      | Total | Mean    | SD      | Total | Weight | IV, Random, 95% CI | Std, Mean Difference |
|                   |         |         |       |         |         |       |        |        |                     |                      |
|                   | 46 | 43 | 100.0% | 0.59 (0.11, 1.30) |
| Heterogeneity: Tau² = 0.24; Ch² = 6.9; df = 2 (P = 0.04); P = 82% |
| Test for overall effect: Z = 1.34 (P = 0.17) |
| Test for subgroup differences: Ch² = 5.9; df = 0 (P = 0.49); P = 0.49% |
### Outcome 1.6.1

Impact of aerobic exercise training on executive function without Combourieu Donnez L et al. included. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

#### 1.6.1.1 Verbal fluency, semantic

| Study or Subgroup       | Aerobic Mean | SD    | Total | Control Mean | SD    | Total | Weight | Std. Mean Difference IV, Random, 95% CI |
|-------------------------|--------------|-------|-------|--------------|-------|-------|--------|----------------------------------------|
| Yogev-Seligmann 0 2021  | 65.7         | 14.56 | 13    | 48.5         | 15.9  | 14    | 47.9%  | 0.07 [0.069, 0.083]                     |
| **Subtotal (95% CI)**   | **13**       | **47.9%** | **14** | **47.9%**    | **0.07 [0.069, 0.083]** |

Heterogeneity: Not applicable
Test for overall effect: Z = 0.18 (P = 0.86)

#### 1.6.2 Matrix reasoning test

| Study or Subgroup       | Aerobic Mean | SD    | Total | Control Mean | SD    | Total | Weight | Std. Mean Difference IV, Random, 95% CI |
|-------------------------|--------------|-------|-------|--------------|-------|-------|--------|----------------------------------------|
| Combourieu Donnez L 2018 | 18.93        | 5.96  | 18    | 9.5          | 4.95  | 14    | 0.0%   | 1.30 [0.52, 2.09]                      |
| **Subtotal (95% CI)**   | **0**        | **0%** | **0** | **0%**       | **Not estimable** |

Heterogeneity: Not applicable
Test for overall effect: Not estimable

#### 1.6.3 Category naming

| Study or Subgroup       | Aerobic Mean | SD    | Total | Control Mean | SD    | Total | Weight | Std. Mean Difference IV, Random, 95% CI |
|-------------------------|--------------|-------|-------|--------------|-------|-------|--------|----------------------------------------|
| Schneider EJ 2005       | 24.9         | 8.37  | 14    | 10.7         | 9.51  | 15    | 52.1%  | 0.42 [0.30, 0.55]                      |
| **Subtotal (95% CI)**   | **15**       | **52.1%** | **15** | **52.1%**    | **0.42 [0.30, 0.55]** |

Heterogeneity: Not applicable
Test for overall effect: Z = 1.14 (P = 0.26)

Total (95% CI): 28 29 100.0% 0.25 [0.27, 0.78]

Heterogeneity: Tau² = 0.03, Chi² = 0.01, df = 1 (P = 0.99); P = 0%
Test for overall effect: Z = 0.06 (P = 0.95)
Test for subanalyses differences: Chi² = 0.45, df = 1 (P = 0.49); P = 0%

### Outcome 1.7

Impact of aerobic exercise training on recognition. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

#### 1.7.1 Facial expression recognition

| Study or Subgroup       | Aerobic Mean | SD    | Total | Control Mean | SD    | Total | Weight | Std. Mean Difference IV, Random, 95% CI |
|-------------------------|--------------|-------|-------|--------------|-------|-------|--------|----------------------------------------|
| Yogev-Seligmann G 2021  | 30.6         | 9.62  | 13    | 20.3         | 9.64  | 14    | 47.4%  | 0.13 [0.03, 0.09]                      |
| **Subtotal (95% CI)**   | **13**       | **47.4%** | **14** | **47.4%**    | **0.13 [0.03, 0.09]** |

Heterogeneity: Not applicable
Test for overall effect: Z = 0.34 (P = 0.74)

#### 1.7.2 The Visual Learning and Memory Test, recognition

| Study or Subgroup       | Aerobic Mean | SD    | Total | Control Mean | SD    | Total | Weight | Std. Mean Difference IV, Random, 95% CI |
|-------------------------|--------------|-------|-------|--------------|-------|-------|--------|----------------------------------------|
| Schneider EJ 2005       | 35.67        | 11.56 | 15    | 35.07        | 4.96  | 15    | 52.6%  | 0.18 [0.54, 0.88]                      |
| **Subtotal (95% CI)**   | **15**       | **52.6%** | **15** | **52.6%**    | **0.18 [0.54, 0.88]** |

Heterogeneity: Not applicable
Test for overall effect: Z = 0.41 (P = 0.67)

Total (95% CI): 28 29 100.0% 0.15 [0.37, 0.67]

Heterogeneity: Tau² = 0.00, Chi² = 0.01, df = 1 (P = 0.93); P = 0%
Test for overall effect: Z = 0.58 (P = 0.56)
Test for subanalyses differences: Chi² = 0.41, df = 1 (P = 0.51); P = 0%
Outcome 1.8 Dropout rates between aerobic exercise groups and control groups. CI, confidence interval; M-H, Mantel-Haenszel.
### Outcome 2.1 Impact of resistance exercise training on immediate memory

| Study or Subgroup | Resistance | Control | Std. Mean Difference | 95% CI |
|-------------------|------------|---------|----------------------|-------|
|                    | Mean       | SD      | Total Mean           | SD    |
| 2.1.1 Rey Auditory Verbal Learning Test |            |         |                      |       |
| Narpumal L 2013   | 44.36      | 11.28   | 25                    | 43.81 |
| Subtotal (95% CI) | 25         | 43      | 25                    | 43.7% |
|                   | 0.13 [0.43 0.68] |       |                      |       |

Heterogeneity: Not applicable

Test for overall effect: Z = 0.45 (P = 0.65)

2.1.2 Rey 15 Item Memory Test

| Study or Subgroup | Resistance | Control | Std. Mean Difference | 95% CI |
|-------------------|------------|---------|----------------------|-------|
|                   | Mean       | SD      | Total Mean           | SD    |
| Hong SO 2013      | 0.9        | 4.01    | 10                    | 9.03  |
| Yoon DH 2018      | 1.31       | 2.70    | 20                    | 10.52 |
| Subtotal (95% CI) | 30         | 35      | 60                    | 56.3% |
|                   | -0.25 [-1.04, 0.59] |       |                      |       |

Heterogeneity: Tau² = 0.00; Ch² = 0.03; df = 1 (P = 0.88); I² = 0%

Test for overall effect: Z = 0.75 (P = 0.45)

Total (95% CI)

| Study or Subgroup | Resistance | Control | Std. Mean Difference | 95% CI |
|-------------------|------------|---------|----------------------|-------|
|                   | Mean       | SD      | Total Mean           | SD    |
|                   | 55         | 60      | 100.0%               |       |
|                   | -0.05 [-0.42 0.32] |       |                      |       |

Heterogeneity: Tau² = 0.00; Ch² = 0.73; df = 2 (P = 0.68); I² = 0%

Test for overall effect: Z = 0.27 (P = 0.79)

**Outcome 2.1 Impact of resistance exercise training on immediate memory. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.**

### Outcome 2.2 Impact of resistance exercise training on working memory

| Study or Subgroup | Resistance | Control | Std. Mean Difference | 95% CI |
|-------------------|------------|---------|----------------------|-------|
|                   | Mean       | SD      | Total Mean           | SD    |
|                    |            |         |                      |       |
| 2.2.1 Digit span backward |          |         |                      |       |
| Hong SO 2018      | 2.17       | 1.52    | 10                    | 1.08  |
| Liu J 2016        | 3.02       | 0.81    | 20                    | 4.13  |
| Subtotal (95% CI) | 32         | 35      | 60                    | 46.2% |
|                   | 0.29 [-0.72 1.29] |       |                      |       |

Heterogeneity: Tau² = 0.38; Ch² = 3.62; df = 1 (P = 0.06); I² = 72%

Test for overall effect: Z = 0.56 (P = 0.57)

2.2.2 Digit span component of the Wechsler memory test

| Study or Subgroup | Resistance | Control | Std. Mean Difference | 95% CI |
|-------------------|------------|---------|----------------------|-------|
|                   | Mean       | SD      | Total Mean           | SD    |
|                    |            |         |                      |       |
| Total CL 2015     | 10.18      | 2       | 18                    | 18.78 |
| Yoon DH 2018      | 10.71      | 1.34    | 20                    | 10.39 |
| Subtotal (95% CI) | 38         | 41      | 76                    | 53.8% |
|                   | 0.33 [-0.11 0.77] |       |                      |       |

Heterogeneity: Tau² = 0.00; Ch² = 0.60; df = 1 (P = 0.48); I² = 0%

Test for overall effect: Z = 1.46 (P = 0.14)

Total (95% CI)

| Study or Subgroup | Resistance | Control | Std. Mean Difference | 95% CI |
|-------------------|------------|---------|----------------------|-------|
|                   | Mean       | SD      | Total Mean           | SD    |
|                   | 76         | 76      | 100.0%               |       |
|                   | 0.07 [-0.13 0.68] |       |                      |       |

Heterogeneity: Tau² = 0.06; Ch² = 0.44; df = 3 (P = 0.22); I² = 32%

Test for overall effect: Z = 1.32 (P = 0.19)

**Outcome 2.2 Impact of resistance exercise training on working memory. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.**
### Outcome 2.3 Impact of resistance exercise training on processing speed

CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

### Outcome 2.4 Impact of resistance exercise training on delayed memory

CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.
Outcome 2.7 Impact of resistance exercise training on recognition. CI, confidence interval; IV, inverse variance; SD, standard deviation; Std, standardized.

Outcome 2.8 Dropout rates between resistance exercise groups and control groups. CI, confidence interval; M-H, Mantel-Haenszel.
Outcome 3.1 Impact of multimodal exercise training on delayed memory. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

Outcome 3.2 Impact of multimodal exercise training on executive function. CI, confidence interval; IV, inverse variance; SD standard deviation; Std, standardized.

Outcome 3.3 Dropout rates between multimodal exercise groups and control groups. CI, confidence interval; M-H, Mantel-Haenszel.