Question 36 evidence tables

Question 36: Does exercise improve outcomes after stroke? How should it be delivered?

NB Any discrepancies between reviewers in evidence quality and comment were discussed at the corresponding evidence review meeting

BP = blood pressure, HRR = heart rate reserve, HOMA-IR = Homeostatic Model Assessment for Insulin Resistance, HDL = high density lipoprotein, LDL = low density lipoprotein, HIIT = high intensity interval training, HIT = high intensity training, 6MWT = 6 minute walk test, 10MWT = 10 minute walk test, PT = physiotherapist/ physiotherapy, MoCA = Montreal Cognitive Assessment, MMSE = Mini Mental State Exam, FIM = Functional Independence measure, BMI = body mass index, MCID = minimum clinically important difference, VO2 = maximal oxygen consumption, TUG = Timed Up and Go Test, RoB = risk of bias, LOS = length of stay, TCT = Trunk Control Test, TIS = Trunk Impairment Scale, FVC = forced vital capacity, FEV1 = forced expiratory volume, SR = systematic review, MA = meta-analysis, RCT = randomised controlled trial, IPDMA = individual patient data meta-analysis, MDT = multidisciplinary team, PICO = patient/population, intervention, comparison and outcomes, OR = odds ratio, CI = confidence interval, QoL = quality of life, ADL = activities of daily living, OR = odds ratio, RR = relative risk, aOR = adjusted odds ratio, cOR = crude odds ratio, CI = confidence interval, RoB = risk of bias, I2 = heterogeneity statistic.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
520	R. Brouwer et a (2021). Effect of aerobic training on vascular and metabolic risk factors for recurrent stroke: a meta-analysis. Disability and rehabilitation. 43: 15 2084-2091.	SR and meta-analysis of RCTs of the effect of on vascular and metabolic risk factors for recurrent stroke. Using PRISMA guidelines	Aerobic training, compared to non-aerobic usual care or non-aerobic exercise	Vascular and metabolic risk factors for recurrent stroke	11 outcomes in 9 articles included. Significant positive effect on systolic BP (-3.59 mmHg, 95%CI -6.14 to -1.05) and fasting glucose (-0.12 mmol/l, 95%CI -0.23 to -0.02). The effect on systolic BP improved further when only high-quality studies were included (-4.95mmHg, 95%CI -8.24 to -1.66).	++ Aerobic training significantly improves systolic BP and fasting glucose after stroke compared to non-aerobic usual care or non-aerobic exercise
520	R. Brouwer et a (2021). Effect of aerobic training on vascular and metabolic risk factors for recurrent stroke: a meta-analysis.	Systematic Review and meta-analysis of nine studies Methodological quality of the trials was assessed using PEDro scale	Only RCTs with stroke patients over 18 were included. Intervention had to consist of aerobic training (maximum heart rate exceeds	Evaluating the effect of aerobic training (compared to non-aerobic interventions) on vascular or metabolic risk factors for stroke.	11 studies involving 527 participants. Time from stroke or TIA varied from less than one week to over one year. Duration of the intervention ranged from six weeks to six months.	Conclusion from the study "Aerobic training results in a significant risk reducing effect on SBP and fasting glucose after stroke when compared to (non-aerobic) usual care or other non-aerobic exercise"

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	Disability and rehabilitation. 43: 15 2084-2091.		50% of heart rate reserve for prolonged period).		7/11 studies involved training three times per week. One study two times/week and one study five times week. Nine of the eleven studies were able to have data from results pooled. Systolic BP Treatment group=190, Control=187 MD=-3.6 (95%CI=-6.1 to -1.0) Diastolic BP Treatment group=190, Control=187 MD=-1.1 (95%CI=-2.8 to 0.5) Resting Heart Rate Treatment group=213, Control=209 MD=-0.8 (95%CI=-2.5 to 0.9) 2 Hour blood glucose Treatment group=44, Control=44 MD=-1.1 (95%CI=-2.7 to 0.5) Fasting insulin Treatment group=70 Control=64 MD=-1.5 (95%CI=-3.1 to 0.2) Fasting glucose Treatment group=95, Control=89 MD=-0.1 (95%CI=-0.2 to -0.02)	Unclear if change in SBP of 4 is clinically meaningful. May be a significant difference but it is not a significant risk reducing effect.

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					HOMA-IR Treatment group=70, Control=64 MD=-0.4 (95%CI=-0.9 to 0.1) HDL Cholesterol Treatment group=69, Control=69 MD=-0.02 (95%CI=-0.05 to 0.08) LDL Cholesterol Treatment group=69, Control=69 MD=-0.06 (95%CI=-0.15 to 0.28) Triglycerides Treatment group=69, Control=69 MD=-0.03 (95%CI=-0.33 to 0.27) Peripheral pulse pressure Treatment group=50, Control=47 MD=-3.4 (95%CI=-9.2 to 2.3) When completed meta-analysis on only high quality studies – Systolic BP showed the only significant difference. Similarly, when meta-analysis on studies where intervention was less than 12 weeks only	

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					systolic BP was found to have significant difference.	
525	N. J. Gaskins et al (2021). Factors influencing implementation of aerobic exercise after stroke: a systematic review. Disability and rehabilitation 43: 17 2382-2396.	SR and MA. Studies focusing on the factors affecting implementation of aerobic exercise after stroke from staff perspectives. 20 studies included (4 on aerobic exercise, 16 on general exercise). The subjects were the staff responsible for delivering exercise interventions – number of staff not recorded)	Exercise (including aerobic, community, fitness programmes, HIIT)	Staff views	The main factors perceived by staff as influencing the implementation of aerobic exercise post-stroke were staff self-efficacy, their beliefs about the intervention and their patients' needs, and system-level issues relating to staffing, resources, knowledge and training.	++
525	N. J. Gaskins et al (2021). Factors influencing implementation of aerobic exercise after stroke: a systematic review. Disability and rehabilitation 43: 17 2382-2396.	Systematic review, n=20 studies focusing on staff perspectives of the factors affecting implementation of aerobic exercise after stroke with no restriction on the types of study design.	Studies used a mixture of methods to glean qualitative data from physiotherapists and exercise professionals; questionnaires/survey s/semi-structured interviews/focus groups A broad definition of aerobic exercise was used. Four studies reported on implementation of aerobic exercise, 16 on general exercise interventions, all post-stroke.	Barriers and facilitators discussed.	Factors identified as influencing implementation of aerobic exercise after stroke included professionals' self-efficacy and knowledge about stroke, patients' needs, communication and collaboration within and between organisations and resources such as equipment, staff and training.	++ Well conducted SR Limited number of studies and only 4 which specifically report on aerobic exercise (all North American) – authors highlight this limitation.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
527	B. J. Kendall et al (2016). Effect of Aerobic Exercise Interventions on Mobility among Stroke Patients: A Systematic Review. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists. 95: 3 214-224	SR search 1995-2014 investigating aerobic exercise interventions and mobility in stroke survivors after the subacute phase. 9 RCTs, mean age 56.95Y68 years) were identified.	Aerobic interventions lasted 2-6 months and primarily walking. aerobic intervention groups comprised walking (indoors / outdoors, track/ treadmill). 7/9 DOSE 3xweek 30-45 mins. Varied target HRR or increasing walking distance and speed.	6MWT, 10m walk, and up-n-go	Small to moderate effect sizes favoring the aerobic exercise group: 6MWT (g = 0.366, P G 0.001) and 10m walk (g = 0.411, P = 0.002), while the up-n-go test was not significant (g = 0.150, P = 0.330). Adds to evidence that aerobic exercise may improve mobility.	- Low quality Limited search terms (full list not detailed), mostly 1 person search/ review/ extract (just a selection joint, unclear how many). No consideration of PEDRO scores.
527	B. J. Kendall et al (2016). Effect of Aerobic Exercise Interventions on Mobility among Stroke Patients: A Systematic Review. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists. 95: 3 214-224	Systematic Review of 9 RCTs with a total of 580 participants .All type of stroke and severity included. Participants > 6months post stoke with mean age of 61 to 68 (7 studies) & 2 studies with mean age 57. 2 independent reviewers. Physiotherapy Evidence Base used to determine bias.	Intervention: Aerobic exercise: walking (indoors or outdoors) on track or treadmill; lower limb aerobic exercise program . Delivered from 25mins -50mins sessions x 3 / week in 7 studies. One study delivered 5 times a week. Duration of intervention ranged from 4 weeks to 6 months. Control group: Conventional rehab, stretching, sham exercise programs	Outcomes: 6 min walk test (6MWT); 10 metre walk test (10MWT); and/ or up and go test. Measured at baseline and follow up time points.	Eight studies utilised 6MWT. Effect size was significant with g=0.366(SE=0.081; 95% CI,0.207-0.525;P<0.001) 10 MWT effect size was significant g=0.411 (SE=0.130;95% ci ,0.156-0.666;P=0.558) The Up -n-Go test effect size was not significant.	- Small number of studies. Whilst of severity of all stroke included , not described in results. Little detail of control group with no description /dose /duration of conventional rehab.
534	M. MacKay-Lyons et al (2020).	This is an updated guidance document: AEROBICS 2019.	Current guidelines recommend cardiovascular training	The aim of the document is to make it easier for clinicians to screen for and	20 recommendations created together with LOE and brief rationale (rewording of some	Authors state that the quality of evidence from which guidelines were derived ranges

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	Aerobic Exercise Recommendations to Optimize Best Practices in Care After Stroke: AEROBICS 2019 Update. Physical therapy. 100: 1 149-156	A knowledge synthesis of research from 2012 to 2018 was conducted. Original panel members drafted revisions to the 2013 document. Iterative process used to gain agreement amongst all panel members. They recommend that screening for participation can take place once person is medically stable – typically within the early subacute phase.	be incorporated into routine stroke rehab, but clinicians lack confidence in specific screening and exercise prescription protocols	prescribe aerobic exercises in stroke rehabilitation.	of the original recommendations, 2 new recommendations added). These are divided into; i)Pre-participation screening for aerobic training after stroke or TIA ii)Prescription of aerobic exercise interventions after stroke or TIA	from low to high. They provide levels of evidence (A, B or C) based on the strength of the evidence. This Guidance provides more structure on screening and exercise prescription (e.g. minimum of 8 weeks, 3 days / week, minimum of 20 minutes). Some guidance on intensity is provided but caveated with must be determined on an individual basis.
536	K. Moncion et al (2020). Barriers and Facilitators to Aerobic Exercise Implementation in Stroke Rehabilitation: A Scoping Review. Journal of neurologic physical therapy : JNPT. 44: 3 179-187.	Scoping review to describe the nature and extent of professionals' barriers and facilitators to aerobic exercise after stroke. Theoretical Domains Framework used to map the barriers or facilitators, analyze and interpret the results		N/A	Four studies included. All surveys of PTs. <u>Barriers =</u> · Environment and resources (eg, lack of equipment, time, staff) · Insufficient knowledge and skills (eg, safe aerobic exercise prescription and implementation · Beliefs about capabilities (eg lack of confidence about exercise intensity and screening tools) · Professional identity (eg, aerobic exercise not a priority) <u>Facilitators =</u> Access to and continued education in structured aerobic	+ Reasonable scoping review but very small numbers, no Ax of quality. As ever, some barriers could be overcome with training and others need organisational changes reform and stroke leadership.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
536	K. Moncion et al (2020). Barriers and Facilitators to Aerobic Exercise Implementation in Stroke Rehabilitation: A Scoping Review. Journal of neurologic physical therapy : JNPT. 44: 3 179-187.	Systematic Scoping Review. 4 quantitative and cross sectional studies . 3 conducted in Canada ; 1 USA. All physiotherapists n=772 primarily working with stroke . Various settings : Rehab centre, stroke unit; general hospital , community , outpatient Validity and risk of bias measured by Quality Assessment Tool for Obeservational Cohort & Cross Sectional Studies . Two independent reviewers	Cross sectional web based survey (3 studies n= 756) Written in person survey (1 study n=16) Theoretical Domains Framework used to identify & classify facilitators and barriers	Barriers and facilitators to Aerobic Exercise (AE): 7 barriers : Knowledge & skills Professional Role & Identity Beliefs about Capabilities Beliefs about consequences Goals Environmental Context and Resources 4 Facilitators: Knowledge & Skills Professional Role Beliefs about Capabilities Environmental Context & Resources	Environmental context most frequently identified barrier in all 4 studies Lack of access to exercise equipment & safety monitoring equipment . (3 studies) Knowledge & skills : Insufficient knowledge or skill to prescribe & assess aerobic capacity. 85%(n=391/462) unfamiliar with guidelines. Facilitators : PTs screened used objective measures to monitor & prescribe AE Professional Role : Barrier : Not part of routine practice (n=10/155;15%) & interferes with other therapy schedules : (n=30/130 19% to n=8/33; 24%) Facilitator : 94% (n=15/16) physiotherapists see it as part of their role. 70% (n=84/120)report should be used in practice. Belief about capabilities :Barrier: Uncertainty about prescribing sufficient exercise intensity : Light intensity (RPE ≤11)prescribed in acute care (n=22/49 ; 45%) & outpatient (n=77/177;49%) Moderate intensity (RPE 11-13) more commonly	+ Canadian / USA study Unclear applicability to UK therapists/ settings resources / skills.

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					prescribed in home settings (n=34/55 ; 62%) and inpatient settings (n=23/46; 50%) . RPE≥14 rarely prescribed (≤2%) Facilitators: 1 study : 100% PTs (n=16/16) willing to learn/improve skills Belief about consequences: Barriers: 1 study, 59% (n=92/155) reported concerns regarding patients cardiac status . In acute & non-acute settings : limited pt ability (≤82%) ; cognitive/ perceptual impairments (≤68%) citied as barrier to ability to exercise . In acute settings balance impairments (n=56/81; 69%) commonly reported.	
542	Y. Shu et al (2020). Cognitive Gains of Aerobic Exercise in Patients With Ischemic Cerebrovascular Disorder: A Systematic Review and Meta-Analysis. Frontiers in Cell and Developmental Biology. 8	SR/MA 11 studies (n=1038)	Aerobic exercise	cognition	No significant effect on cognition overall Those with cognitive impairment might benefit from moderate AE – but not powered to test this	++
542	Y. Shu et al (2020). Cognitive Gains of Aerobic Exercise in	SR & MA (N=11, n=1038). RCTs with stroke participants. There	All studies compared a control group with a group receiving a	Various neuropsychological tests used;	Findings were aerobic exercise might	++ Well conducted review

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Patients With Ischemic Cerebrovascular Disorder: A Systematic Review and Meta-Analysis. Frontiers in Cell and Developmental Biology. 8	was no limit on baseline cognitive status.	programme of monitored and structured aerobic exercise for at least 4 weeks. Studies included had at least one valid neuropsychological test of cognitive function before and after intervention.	ACE, MoCA, MMSE, FIM cognitive sub-test, processing speed tests.	exert positive effects on cognition in ischemic cerebrovascular disorder survivors, especially for those already with cognitive impairment. Moderate intensity training tends to be the applicable selection. Duration of the training program and the initiation time of exercise of stroke survivors were not the predictors for cognitive gains. The study did not find favourable effects of aerobic exercise on executive function and processing speed.	Well set parameters. Significant number of different outcome measures used throughout studies, focusing on different aspects of cognition, therefore difficult to draw certain conclusions.
`546	C. Wang et al (2019). Aerobic exercise interventions reduce blood pressure in patients after stroke or transient ischaemic attack: a systematic review and meta-analysis. British journal of sports medicine. 53: 24 1515-1525	SR of exercise interventions on vascular risk factors and recurrent ischaemic events after stroke or TIA. 20 RCTs evaluating aerobic or resistance exercise, n=1031 patients	Exercise therapy included cardiorespiratory (aimed at improving fitness), resistance (aimed at improving muscle strength or endurance) or mixed components. Interventions termed ‘aerobic’ involved a clear aim to enhance physical fitness by stimulating heart rate and respiratory rate, for example, running, walking, circuits, cycling.	BP/ cholesterol/ fasting glucose, BMI or secondary cerebrovascular events and cardiovascular death.	Significant reductions in systolic blood pressure (SBP) −4.30 mm Hg (95% CI −6.77 to −1.83) and diastolic blood pressure −2.58 mm Hg (95% CI −4.7 to −0.46) compared with control. Reduction in SBP was most pronounced among studies initiating exercise within 6 months of stroke or TIA and in those incorporating an educational component (−7.81 mm Hg, 95% CI −14.34 to −1.28 vs −2.78 mm Hg, 95% CI −4.33 to −1.23). One trial reported reductions in secondary vascular events with exercise, but was insufficiently powered.	++ No concerns noted. Diverse types of interventions/ dose.

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			Most exercise interventions involved 3x1 hr sessions / week (mean weekly minutes=175), but minutes of weekly programmed exercise activity ranged from 60 to 350 min.			
546	C. Wang et al (2019). Aerobic exercise interventions reduce blood pressure in patients after stroke or transient ischaemic attack: a systematic review and meta-analysis. British journal of sports medicine. 53: 24 1515-1525	Systematic review and meta-analyiss of aerobic exercise to reduce blood pressure. Quality measured using Cochrane risk of bias and GRADE.	Only RCTs that involved people with stroke or TIAs and who were over 18 were included. Exercise therapy included cardiorespiratory, resistance, or mixed components. Interventions termed 'aerobic' involved a clear aim to enhance physical fitness by stimulating heart rate and respiratory rate, for example, running, walking, circuits, cycling	Only studies reporting on systolic blood pressure (SBP), diastolic blood pressure (DBP), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDLC), fasting glucose (FG), BMI or secondary cerebrovascular events and cardiovascular death were included	20 RCTs involving 1031 participants were included. Sixteen included only stroke patients, two included stroke and TIA and two included only TIA. Only five recruited patients with severe strokes who were not ambulant. Programme duration ranged from 6 weeks to 6 months with frequency from once a week to 5 times a week. Each session ranged from 30 minutes to 90 minutes. BLOOD PRESSURE Systolic Treatment=305 Control=301 MD=-4.3 (95%CI=-6.8TO-1.8) Diastolic Treatment=305	++ Good review with risk of bias. Slightly short search strategy and no protocol published.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					Control=301 MD=-3.1 (95%CI=-4.9TO-1.3) Sub-group (with education) Greater effect Treatment=100 Control=100 MD=7.8 (95%CI=-14.3to-1.3) Sub-group (more disabling stroke) Less effect Treatment=88 Control=90 MD=-2.6 (95%CI=-4.5to-.7) LIPID PROFILES Overall cholesterol Treatment=185 Control=185 MD=-0.27 (95%CI=0.54to0.0) LDL-C Treatment=151 Control=152 Indicated no effect. No significant effect on LDL-C, HDL-C, fasting blood glucose, BMI,	

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519	J. M. Anjos et al (2022). The impact Of high-intensity interval training On functioning And health-related quality Of life In post-stroke patients: A systematic review With meta-analysis. Clinical rehabilitation.	9 randomised controlled trials included (n=375) Age range 55.8 – 72.1 years Included participants within 2 weeks of stroke (2 studies), 5 studies included participants more than 6 months post stroke. No information provided on severity of stroke of included participants, likely mild strokes. Setting not clear either.	High-intensity interval training defined as application of maximum exercise intensity (> 60% HRR, > 70% peak HR or > 14 Borg RPE) alternating with low activity or rest. Interventions ranged from 2 x/week to 5x/week, 25 min – 60 min session length, duration from 4 weeks to 18 weeks. Control groups varied – usual care, continuous aerobic training, conventional gait training, PNF	Cardiorespiratory fitness (4 studies, HIIT=47 vs 44 continuous aerobic training (CAT)) using peak VO2 Balance (BBS) (2 studies, HIIT=33 vs CAT=31). Gait speed – 10mWT (4 studies, HIIT = 54, CAT=46) QOL – SF36 (HIIT=18 vs CAT=20) Cardiorespiratory fitness – (3 studies all used different measures HIIT=122 and Usual care=117) – standardized mean difference was used for comparison	Change in peak VO2 – they found a significant difference in peak VO2 for participants in HIIT vs continuous aerobic training (MD 3.8, CI 95%, 2.62-5.01) BUT MCID in peak VO2 for stroke patients is not known. Balance – significant improvement in balance for HIIT compared to CAT. BBS 5.7point change – they suggested may be a clinically significant improvement but this was inferred from MS data. Walking speed – improvement found in HIIT group compared to CAT Quality of evidence for balance and gait speed was low QOL – no difference found in physical or mental component score Cardiorespiratory fitness – an improvement in CR fitness was found in the HIIT grp compared to usual care	**-/+**
519	J. M. Anjos et al (2022). The impact Of high-intensity interval training On functioning And health-related quality Of life In post-stroke patients: A	SR & MA N=9 (n=375). Included studies that were randomised post-stroke that included at least one group of high intensity interval training. Included participants at all stages of stroke (acute/sub-acute/chronic)	High-intensity interval training was defined as the application of maximum exercise intensity (> 60% heart, rate reserve [HRR] /VO2peak, > 70%	Various outcomes; Cardiorespiratory fitness outcomes (peak VO2) (4 studies) Berg Balance scale (2 studies) Gait speed (4 studies) QOL (2 studies)	High-intensity interval training resulted in improvement in cardiorespiratory fitness (peak oxygen uptake) MD (3.8 mL/kg/min, 95% CI: 2.62, 5.01, n = 91), balance MD 5.7 (95% CI: 3.50, 7.91; N=64),	**++** Well conducted Small pool of studies – recommendations regards cardiorespiratory fitness based on 4 studies only (n=144)

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	systematic review With meta-analysis. Clinical rehabilitation.		peak HR, or > 14 Borg RPE [6–20 scale]), by short bursts of concentrated effort alternating with low activity or rest		and gait speed SMD (0.2 m/s; 95% CI: 0.05, 0.27; N=100) compared with continuous aerobic training. The health-related quality of life did not differ between the groups. Compared to usual care, high-intensity interval training improved the cardiorespiratory fitness SMD (0.5 95% CI: 0.14, 0.81, n = 239). No serious adverse events were observed.	
532	L. Luo et al (2020). Effect of high-intensity exercise on cardiorespiratory fitness in stroke survivors: A systematic review and meta-analysis. Annals of Physical and Rehabilitation Medicine. 63: 1 59-68	SR and MA of the effect of high-intensity exercise on cardiorespiratory fitness using GRADE and PEDRO to assess quality, subgroup analysis to test the consistency of results and as sensitivity analysis to assess the robustness of the results. Only included mod/high quality trials	High intensity exercise or interval training. High intensity defined as target intensity of high-intensity exercise is >60% HRR/VO2peak, >70% peak HR, or >14 Borg RPE Articles had to include a detailed description of the exercise including intensity, duration, and frequency with the target intensity. Controls = exercise (treadmill walking, stretching exercise, conventional PT) at <50% HRR/VO2 peak.	Cardiorespiratory fitness = Peak oxygen consumption (VO2peak), 6-min walk test (6MWT), fastest 10-m walk test (10MWT), and adverse events	17 studies (16 RCTs, n=707) included. 11 = treadmill walking and 6 = cycle ergometer. Intensity = 60-80% HRR/VO2 peak. Sessions were 25- 50 mins (mode = 30- 40 min (n = 14), 2- 5x/week (mode = 3x/week) (n=8) for 4-24 weeks (mode 8-12 weeks). Positive effect on peak O2 (SMD= 0.56 P<0.01 WMD= 2.53mL/kg/ min; high quality evidence) and 6MWT (SMD= 0.26, P<0.01 WMD= 17.08m; mod quality evidence) but not fastest 10MWT (SMD= 0.33 P= 0.27 WMD= 0.05 m/s; low quality evidence). No diff in adverse events. Subgroup analysis suggested TT training may be > effective than cycling and when training >70%HRR /VO2peask and	**++** Excellent review Conclusions: High-intensity exercise is safe and improves cardiorespiratory fitness in stroke survivors regardless of time since stroke. It appears treadmill training at >70% HRR/VO2 for at least 12 weeks (30-40 mins) is needed for best effect.

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					>12/52). No differences with chronicity.	
532	L. Luo et al (2020). Effect of high-intensity exercise on cardiorespiratory fitness in stroke survivors: A systematic review and meta-analysis. Annals of Physical and Rehabilitation Medicine. 63: 1 59-68	Systematic Review & Meta analysis. 17 studies (16 RCT & 1 controlled trial) , n= 707. Participants ≥18 in acute , sub-acute , chronic stage of recovery. 66.1% male. Mean age range 45-69 years of age. Mean time from stroke 17.8 days to 5.2 years. 14 studies undertaken in inpatient or outpatient settings Risk of bias tools: Quality assessed by PEDRO scale ,(12 studies rated as high and 5 moderate quality) GRADE system, Independently assessed by 2 reviewers. 3rd reviewer consulted if required.	Intervention: 3 studies adopted High Intensity Interval training (HIIT); 14 studies adopted High intensity training (HIT); 11 studies used treadmill walking. 6 studies used a cycle ergometer. Intensity in experimental group ranged from 60% to 85% heart rate reserve (HRR)/ VO_2 peak Sessions ranged from 25 to 50 mins. Frequency 2 to 5 times a week. Program length: 4 to 24 weeks. Control group: Intensity 28 to 45 min of aerobic exercise (treadmill walking, stretching, conventional physiotherapy) at intensities of < 50% (HRR)/ VO_2 peak	Primary outcome measure : change in Peak Oxygen Consumption measured by VO_2 peak , 6-min walk test (6MWT). Fastest 10m walk test (10MWT) Adverse events	HIT showed significant effect on peak oxygen uptake: n=646 (VO_2 peak: SMD=0.56 ;95%CI 0.40 -0.72) P<0.01 I^2=8%;) ; n=602 WMD=2.53Ml/kg/min 6MWT: moderate evidence of effect (n=581, SMD=0.26,95%CI 0.09-0.42, P<0.01) (n=512 WMD=17.08) Subgroup analysis showed effect was significant with HIT (11 studies , SMD=0.31,p<0.01; 9 studies WMD=21.36m) rather than HIIT (3 studies SMD=0.13 p=0.42;2 studies WMD=6.96m) . Higher intensity of HIT ≥ 70%HRR /VO_2 peak had significant effect Subgroup analysis showed significant change in 6MWT with high intensity treadmill training (8 studies : SMD=0.44 p<0.01 WMD=21.66M) for longer duration ≥ 12 weeks Fastest 10MWT : 7 Studies : no significant difference between groups.	**++** High quality study. Severity of stroke not detailed, Only 5 studies reported adverse events.

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					Adverse events : 5 RCTS detailed adverse events including non-injurious falls , pain in joints , back muscle or chest; and skin injuries	
533	L. Luo et al (2019). High Intensity Exercise for Walking Competency in Individuals with Stroke: A Systematic Review and Meta-Analysis. Journal of Stroke and Cerebrovascular Diseases. 28: 12	SR/MA 22 studies (n=952)	High intensity exercise for walking in stroke Rehabilitation - generally defined as 60%-84% HRR/ VO2peak, 70%-89% HR max, or 14-16 Borg RPE (6-20 scale)	walking distance, comfortable gait speed, gait analysis (cadence, stride length, and the gait symmetry), cost of walking, Berg Balance Scale , Time Up&Go (TUG) Test and adverse events	Significant differences on walking distance (SMD= .32, 95% CI, .17-.46, P < .01, I2 = 39%; WMD= 21.76 m), comfortable gait speed (SMD = .28, 95% CI, .06-.49, P = .01, I2 = 47%; WMD= .04 m/s), stride length (SMD = .51, 95% CI, .13-.88, P < .01, I2 = 0%; WMD= .12 m) and TUG (SMD=.36, 95% CI, .72 to .01, P = .05, I2=9%; WMD=1.89 s) in favour of high intensity exercise versus control group. No significant differences were found between the high intensity exercise and control group in adverse events, including falls (OR = 1.40, 95% CI, .69-2.85, P = .35, I2 = 11%), pain (OR = 3.34, 95% CI, .82-13.51, P = .09, I2 = 0%), and skin injuries (OR = 1.08, 95% CI, .30-3.90, P = .90, I2 = 0%).	++
533	L. Luo et al (2019). High Intensity Exercise for Walking Competency in Individuals with	Systematic review and meta-analysis Investigating high intensity exercise with aim of improving walking.	Interventions were defined clearly - Exercise therapy was defined as a plan of physical activities	Outcome measures included: Walking distance - 6MWT, comfortable gait speed,	21 RCTs and 1 controlled trial included with total of 952 participants.	++ Very well written and presented.

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	Stroke: A Systematic Review and Meta-Analysis. Journal of Stroke and Cerebrovascular Diseases. 28: 12	Methodological quality of the trials was assessed using the Cochrane risk of bias tool and GRADE system.	intended to strengthen muscles and the cardiovascular system. High intensity exercise in stroke defined as 60%-84% HRR/ VO2peak, 70%-89% HR max, or 14-16 Borg RPE (6-20 scale)	Gait analysis - stride length, cadence, gait symmetry and Cost of walking, Balance capacity - BBS, TUG, adverse events	Mean time from stroke varied from 4.9 days to 5.2 years. Weekly frequency was 2-5 times per week and duration of intervention ranged from 4 to 24 weeks. Walking distance Treatment=394 Control=383 SMD=0.32 (95%CI=0.17to0.46) WMD = 21.8m Comfortable Gait speed Treatment=182 Control=163 SMD=0.28 (95%CI=0.06to0.49) WMD=0.4m/s Stride length Treatment=64 Control53 SMD=0.5 (95%CI=0.1to0.9) WMD=0.12m TUG Treatment=59 Control=61 SMD=-0.36 (95%CI=-0.72to0.0) WMD=-1.9 No significant effect on cost of walking, cadence, gait symmetry or Berg Balance.	

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					No significant difference in pain or falls found.	
521	C. S. Chae et al (2020). Effectiveness of Hydrotherapy on Balance and Paretic Knee Strength in Patients With Stroke: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. 99: 5 409-419	SR comparing hydrotherapy v land-based conventional therapy on postural balance & knee strength in stroke patients. 11 RCTS, n=325 (n = 164 hydro, 161 controls), 1 month to 3.5 years post stroke. ½ of the included RCTs had a PEDro of 5, suggesting limited methodological quality.	Hydro 2-5 x 30–60 mins/ week duration 2-8 weeks. Hydrotherapy was additionally to land based CT (2 studies), whereas in the remaining studies, hydrotherapy was substituted with the time and intensity equal to the land-based CT.	Berg Balance Scale was pooled as the primary outcome Forward Reach Test, TUG, and paretic knee flexor and knee extensor torque as secondary outcomes	hydrotherapy was more beneficial in stroke patients on Berg (mean difference = 1.60, 95% CI = 1.00 -2.19), FRT(mean difference = 1.78, 95% CII 0.73-2.83), TUG (mean difference = −1.41, 95% CI: −2.44-0.42), . subgroup analysis: chronic stroke patients effectiveness on Berg (mean difference = 1.61, 95% CI 1.00–.21); no significant effect in subacute stroke	– Low quality Some concerns - Different comparators (hydro as adjunct or hydro v land) - Search terms- limited c/w Cochrane - Not clear that 2 people did searches/ extraction Not clear low quality considered
521	C. S. Chae et al (2020). Effectiveness of Hydrotherapy on Balance and Paretic Knee Strength in Patients With Stroke: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. 99: 5 409-419	A systematic review and met-analysis of 11 RCTS. with 325 participants. 7 studies related to chronic stroke phase and 4 related to subacute phase . Both ischaemic and haemorrhagic patients included. Sample size ranged from 13 to 65 participants with mean age 56.9-68.6 years. Stroke onset duration ranged from 1 month to 3.5 years. Physiotherapy Evidence Base used to determine bias	Intervention : Hydrotherapy ranging from 2 to 5 sessions of 30-60 mins per week for a period of 2-8 weeks. 3 studies used Hallwick technique . 1 trial used aquatic therapy combined with Hallwick and Ai Chi methods . 2 studies used treadmill training underwater. 2 trials used Proprioceptive Neuromuscular	Primary Outcome : Berg Balance Scale.(BBS) Secondary outcome : Functional Reach Test, (FRT) Timed Up and Go; Paretic knee extensor and knee flexor torque measured as knee strength	BBS utilised in 10 studies (n=264; 134 experimental group & 130 as controls) BBS showed greater improvement in hydro group compared to control group. (P<0.0001, MD=1.59,95% CI=1.00 to 2.19, I^2=0%) . In subgroup analysis , BBS score improved significantly in chronic phase (P<0.0001, MD 1.61, 95%CI =1.00 TO 2.21 ,I^2=29%) Secondary outcomes : Hydrotherapy showed significant improvement of functional reach (P=0.0009.	**++** High quality systematic review and meta-analysis. Primary outcome of BBS has ceiling effect , underestimating therapeutic effect . Studies had small sample sizes and half the studies included were of limited methodological quality

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			facilitation.(PNF) 3 studies use exercise programs including balance exercises and stretching exercises . Control group : Land based therapy . Matched experimental group in no. of mins, sessions and weeks .Consisted of general physical activity, gym exercise , PNF , NDT and standard physio .		MD=1.78, 95% CI =0.73 to 2.83) And Timed Up & Go (p=0.005, MD =-1.41, 95% CI =-2.44 to 0.42,I^2=53%) 3 studies showed improvement in knee strength in affected limb (P=0.008, MD =4.34, 95% CI 1.13 TO 7.55 I^2 =91%)	
752	Ghayour Najafabadi, M., Shariat, A., Dommerholt, J., Hakakzadeh, A., Nakhostin-Ansari, A., Selk-Ghaffari, M., et al. (2022). Aquatic Therapy for improving Lower Limbs Function in Post-stroke Survivors: A Systematic Review with Meta-Analysis. Top Stroke Rehabil, 29(7), 473-489.	17 RCTs included (n=629) Age range of participants: 20-75 years Time since stroke: 29.2 (19.9 days) to 18.1 (4.8 months) Acute to chronic stroke survivors included.	Aquatic therapy Sessions lasted 30 to 60 min Frequency ranged from 2 – 6 times per week Duration of intervention: 2-12 weeks Control: Land based exercise therapies (11 studies), other conventional therapies eg OT (6 studies)	All outcomes measured at baseline and end of intervention only. Motor Function: 10mWT Functional Gait Assessment (FGA) 2mWT TT MAS Balance: BBS Good Balance System (GBS) Five times sit to stand test (FTSST) Functional Reach Test (FRT) Force plates – measuring ML and AP sway Biodex	665 participants initially enrolled but review only reports on 629 that completed the trial they were involved in. This conflicts with risk of bias tool which reports that all participants completed their exercises except for 1 drop out in all studies?? Balance: 11 trials (n=349), SMD, 0.72; 95% CI, 0.5-0,94, I^2 =67%) Walking Speed: 5 trials (n=160), SMD -0.45; 95% CI (-0.71, -0.19) I^2 = 57% Mobility: 8 trials (n=233), TUG (SMD -0.43; 95% CI, -0.7, -0.17, I^2 = 71%	- Risk of bias table reveals lots of unknowns and 'unclears'. Presented in a confusing way which makes it difficult to get a clear view of a risk of bias result for each study.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
				Community balance and mobility test (CBM)		
752	Ghayour Najafabadi, M., Shariat, A., Dommerholt, J., Hakakzadeh, A., Nakhostin-Ansari, A., Selk-Ghaffari, M., et al. (2022). Aquatic Therapy for improving Lower Limbs Function in Post-stroke Survivors: A Systematic Review with Meta-Analysis. Top Stroke Rehabil, 29(7), 473-489.	SR & MA N=17 (n=629). Only RCTs included with participants after stroke with lower limb disability	Aquatic therapy (defined as therapy delivered by a suitably Qualified physiotherapist using the properties of water i.e. in heated pool) compared with land-based therapy, control, or conventional therapy.	Reported functional lower limb impairment, including balance, mobility, walking speed, gait, or disability. Motor function was assessed by the 10-min walk test (10MWT), a functional gait assessment (FGA), a digital power meter, the 2-min walk test (2MWT), the Tinetti test (TT), and the Modified Ashworth scale (MAS). Static balance was assessed by the Berg Balance Scale (BBS), Good Balance System (GBS), Five Times Sit to Stand Test (FTSST), Functional Reach Test (FRT), force plate (velocities of mediolateral (ML), anteroposterior and sway area), Biodex, Community Balance, and Mobility test (CBM).	Aquatic therapy leads to significant improvements in mobility compared to land-based exercises as measured by the Timed Up & Go test (SMD, −0.43; 95% CI {-0.7-(-0.17)}; I2 = 71%). 8 studies (n=233). Aquatic therapy improved walking speed to a greater extent than land-based exercises (SMD, −0.45; 95% CI {-0.71 – (−0.19)}; I2 = 57%). 5 studies (n=160). Balance in patients undertaking aquatic therapy was significantly improved compared to land-based exercises (SMD, 0.72; 95% CI, 0.50–0.94; I2 = 67%). 11 studies (n=349).	**++** Some studies included did not determine the type of the conventional therapy in the control group.
529	D. Li; P. Chen (2021). Effects of aquatic exercise and land-based exercise on cardiorespiratory	SR and MA of RCTs. Cochrane RoB used.	Aquatic therapy vs land-based exercises (control)	Cardiorespiratory fitness (Peak O2 uptake), motor function/ impairment (Fugl-Meyer) , balance	11 RCTs (5 low and 6 moderate risk). Sample size = 369 (187= aquatic and 182 land-based exercise).	**++** Good review

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	fitness, motor function, balance and functional independence in stroke patients-a meta-analysis of randomized controlled trials. Brain Sciences. 11: 8 1097.			(Berg balance scale), and functional independence.	Aquatic exercise improved balance (BBS MD= 5.19 95%CI 2.66- 7.71 p<0.0001), fitness (peak O2 uptake MD= 3.49, 95%CI 0.17- 6.8, p=0.04), Motor impairment (FMA MD= 3.84 95%CI 1.64- 6.04 p= 0.0006) and (FIM MD= 6.1 95%CI 4.05- 8.15 p= 0.00). But not mobility (TUG and FAC)	Conclusion: Aquatic exercise appears to improve balance, motor function, cardiorespiratory fitness, and functional independence more than land-based exercise
529	D. Li; P. Chen (2021). Effects of aquatic exercise and land-based exercise on cardiorespiratory fitness, motor function, balance and functional independence in stroke patients-a meta-analysis of randomized controlled trials. Brain Sciences. 11: 8 1097.	Systematic review and meta-analysis. Methodological quality of the trials was assessed using the Cochrane risk of bias tool	Intervention – these were only reported in the results. Exercise programmes on land and water are described in detail for each of the included studies. Water based exercises included "Halliwick training" and Ai Chi training. Some of the studies used land based strength training compared to aerobic training in the water.	Outcomes were also not described before the results section. One of the selection criteria was "(2) the outcome does not meet the requirements" but no description of what outcomes would or would not meet the requirements was described.	Eleven studies included involving 369 participants. 187 AE and 182 LE Interventions lasted 2-12 weeks, 2-6x/week Berg balance scale AE=131 LE=133 MD=5.2 95%CI=2.7 to 7.7 Fugl-Meyer AE=71, LE=63 MD=3.8 95%CI= 1.6 to 6.0 TUAG AE=39, LE=41 MD=-2.5 95%CI=-5.9 to 0.9) FAC AE=68, LE=64 MD=0.3 (95%CI=-0.2 to 0.8) VO2 peak AE=26 LE=23 MD=3.5 (95%CI=0.2 to 6.8) FIM AE=23, LE=23 MD=6.1 (95%CI= 4.1 to 8.2)	Very poor study. Poorly written. Small search strategy used. Very difficult to establish if this study was investigating the results of RCTs specifically assessing the difference between aquatic exercise versus land-based exercises. No evidence of a protocol.
528	J. Lee; A. J. Stone (2020). Combined Aerobic and Resistance Training for Cardiorespiratory Fitness, Muscle Strength, and Walking Capacity after Stroke:	SR/MA 18 studies (n=602) Combined Aerobic and Resistance Training for Cardiorespiratory Fitness, Muscle Strength, and Walking	Combined Aerobic and Resistance Training = 'Exercise Training'	Cardiorespiratory Fitness, Muscle Strength, and Walking Capacity after Stroke	Exercise training significantly improved all 3 outcomes Moderate-intensity (AT: 40%-60% of HRR, RT: 50%-70% of 1RM) and 3 days per week for 20 weeks should be considered	**++**

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	A Systematic Review and Meta-Analysis. Journal of Stroke and Cerebrovascular Diseases. 29: 1	Capacity after Stroke			as a priority in ET program for greater effect on all 3 outcomes Longer training = better cardiorespiratory fitness Moderate frequency and lower volume better for muscle strength Moderate frequency/longer duration better for walking capacity	
528	J. Lee; A. J. Stone (2020). Combined Aerobic and Resistance Training for Cardiorespiratory Fitness, Muscle Strength, and Walking Capacity after Stroke: A Systematic Review and Meta-Analysis. Journal of Stroke and Cerebrovascular Diseases. 29: 1	Systematic Review and Meta analysis . 18 RCT . N=602 (Range 9 to 120) Participants : Ambulatory stroke survivors with or without assistive device, Average age : 62.1 +/- 10.2 years ; Average post stroke period 2.4 +/- 3.3 years Quality assessed using PRISMA recommendations	Aerobic training (AT) combined with resistance training(RT) . All interventions except 3 supervised by qualified trainer. Mean training period : 15 weeks (4-24 weeks) Mean training frequency : 3days/week (2-5 days) Intensity ranges : low to high 1RM Control group : Only Participant characteristics detailed.	Cardiorespiratory fitness (CRF)measured by VO_2 peak by graded exercise test in 9 studies. 1 study used estimated VO_2 peak Muscle strength : measured by one repetition maximum (1-RM) or dynamometry : 6 studies measured max weight moved; 5 measured max vol of isometric contraction Walking capacity : 11 studies measured 6metre walk test (6MWT), 1 measured 12 MWT & 3 used gait speed .	10 trials showed absolute increase in CRF of 12% (mean 0.41, 95%CI=0.25 to .56 P<0.001) In subgroup analysis, younger subgroups aged <65 resulted in greater improvement in CFR than>=65 11 trials showed increase in muscle strength (mean ES=0.59 ; CI 32-0.86 P<.001) Absolute increase of 33% Walking capacity :Exercise therapy increased walking capacity in 15 trials (E.S.45, 95%CI, 0.25 TP 0.65 p<0.001). Absolute increase 14%. Adverse events : 2 participants experienced complications during exercise testing	- Risk of bias. No details of how many people selected studies, only one author searched studies and not clear if reviewer was the same individual. Analysis & Subgroup analysis numbers not reported.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
				Adverse events : Recorded in 7 studies.	3 participants diagnosis of 2nd stroke.	
540	M. B. Saquetto et al (2019). Water-Based Exercise on Functioning and Quality of Life in Poststroke Persons: A Systematic Review and Meta-Analysis. Journal of Stroke and Cerebrovascular Diseases. 28: 11	SR To investigate the effects of water-based exercise on functioning and quality of life in poststroke persons. 24 RCTs, n=12 to 120. 15 included in MA. ?time since stroke	Water-based exercise Control intervention = land exercise. Duration 2- 12 weeks 30-60min,2-6 per week	muscle strength, balance, gait speed, mobility, aerobic capacity, reach function, quality of life, and joint position sense.	significant improvement in balance (berg) at 1.55 (95% CI: .5-2.6; N = 80) Water-based exercise may improve muscle strength, balance, mobility, aerobic capacity, functional reach, joint position sense, and quality of life in poststroke persons and could be considered for inclusion in rehabilitation programs.	+ Acceptable Not sure what is meant by qual synthesis and why not all RCTs in MA- not clear.
540	M. B. Saquetto et al (2019). Water-Based Exercise on Functioning and Quality of Life in Poststroke Persons: A Systematic Review and Meta-Analysis. Journal of Stroke and Cerebrovascular Diseases. 28: 11	Systematic review and meta-analysis of 24 studies – water-based exercise Used PEDro and GRADE to assess quality.	Intervention was water-based exercise using water resistance. The control intervention was land exercise.	Muscle strength, Balance, Gait speed, mobility, Aerobic capacity, Reach function, Quality of life, Joint position sense	4 studies included though does not state the number of participants pooled in total. Studies lasted from 2 to 12 weeks and frequency of sessions varied from 2 to 6 times a week. Water versus land Strength Treatment=35 Control=34 SMD=0.6 (95%CI=0.2to1.1) Balance (BBS) Treatment=41 Control=39 MD=1.55 (95%CI=0.5to2.6) TUAG Treatment=24	Some worrying issues – written results do not tally with the forest plots. Apparent bias in the way results are reported.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					Control=24 MD=-1.2 (95%CI=-2.0to-0.4) VO2 Peak Treatment=17 Control=16 MD=3.6 (95%CI=0.7to6.6) No significant difference in gait speed, functional reach or quality of life. Water and Land Versus Land Only Balance Treatment=63 Control=66 MD=2.3 (95%CI=1.3to3.4) Gait Treatment=93 Control=92 MD=0.6 (95%CI=0.3to0.9) Functional Reach Treatment=24 Control=26 MD=2.1 (95%CI=1.1to3.0) TUAG Treatment=24 Control=24 MD=-1.2 (95%CI=-2.0to-0.4) For Land only No significant difference between groups in quality of life and strength.	

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
551	N. Zughbor et al (2021). The Effect of Water-Based Therapy Compared to Land-Based Therapy on Balance and Gait Parameters of Patients with Stroke: A Systematic Review. European Neurology. 84: 6 409-417	16 RCTS, including pilot RCTS included (n=412) Lacking information even in supplementary material on characteristics of the individual participants – no info on chronicity, setting, type and size of stroke, level of impairment. Age range available in supp material for each study.	Water-based therapy: Duration of intervention 4- 8 weeks, number of sessions per week 2-5 x per week, length of session 20 min to 1 hour	Berg Balance Scale – primary outcome. Good Balance System and Biodex Balance System (measures anteroposterior and mediolateral sway) other balance measures considered Gait – range of measures used for distance, time and speed – 2mWT, 6mWT, 10mWT, figure of 8 walk test, 8m walkway, biodex gait trainer and others	Pooled results for BBS (water-based = 101 and land-based therapy =92) Favours land-based therapy MD, 2.93 (1.11, 4.74), 95% CI, Heterogeneity 57% GBS and BioBS – (water-based=82, land-based=81) – pooled data favours water-based therapy to improve APS component of balance for stroke. SMD: 95% CI -0.61 (-1.08, -0.14) No indication of whether this is clinically significant difference. They also state water-based therapy vs land-based favours improvement in MLS Gait: pooled data favoured land-based therapy to improve gait.	- Low quality systematic review Noted that one of the included studies (Chu et al, 2004) described their intervention as an arm function program yet reported with effect on balance analysis. Hard to follow review with critical information missing. Some fairly sweeping statements that are not referenced e.g. 'It has been stated that water-based therapy enhances balance and gait of patients with stroke in various ways'
551	N. Zughbor et al (2021). The Effect of Water-Based Therapy Compared to Land-Based Therapy on Balance and Gait Parameters of Patients with Stroke: A Systematic Review. European Neurology.	Systematic Review 16 studies n=412, PEDro scale used to assess quality . No reference to number of reviewers	Water based therapy Length of intervention : 4 weeks to 12 weeks No of sessions 12 -36 from 2-5/week Duration of sessions 20mins to 60mins Land based therapy Length of intervention	Berg Balance Scale (BBS) Good Balance System Biodex Balance System 2 min walk test 6 min Walk test Figure of Eight walk test 10 metre walk test, 8m walkway Biodex Gait Trainer	-Pooled data favoured land based therapy to improve balance (MD 2.93 (95% CI 1.11 -4.74 p=0.02) Pooled data favoured land based therapy to improve gait SMD=0.48,95% CI 0.11-0.85 p=0.01	- High Risk of bias: No details of reviewers/ extraction of data .Small number of participants in each study. Limited participants details reported such as time from stroke . Large variability in age of participants .

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	84: 6 409-417		4 weeks to 12 weeks No of sessions 12-24 weeks Duration of sessions :20 -60 mins			Significant heterogeneity between studies.
544	T. Thayabaranathan et al (2017). Determining the potential benefits of yoga in chronic stroke care: A systematic review and meta-analysis. Topics in Stroke Rehabilitation. 24: 4 279-287	SR and MA of RCTs of yoga for chronic stroke. Grey literature was searched. modified Cochrane RoB assessed bias and GRADE assessed quality. .	Stroke >6/12 previously. Yoga= postures (asanas); breathing (pranayama), meditation, or a combination. Excl multimodal mindfulness, Tai Chi, or chanting. Controls = wait-list, usual care, or other 'active therapy'.	Not specified	5 papers from 4 small RCTs (n = 17–47 total= 108)). Quality= low- mod. Yoga reduced anxiety and depression (MD anxiety 6.05, 95%CI −0.02 to 12.12; p =0.05. SMD depression: 0.50, 95%CI−0.01 to 1.02 p = 0.05).	**++** Good review but very small numbers and borderline results Conclusions: Yoga may improve mood after stroke.
544	T. Thayabaranathan et al (2017). Determining the potential benefits of yoga in chronic stroke care: A systematic review and meta-analysis. Topics in Stroke Rehabilitation. 24: 4 279-287	RCT & MA (N=4, n=118) of RCTs – **all pilot RCTs** with small participant numbers. Participants were adults with a stroke diagnosis of any etiology or severity occurred at least within the 6 months prior to being recruited to the study, **including transient ischemic attack**, regardless of sex, ethnicity, language spoken, or number of events. Trials with mixed populations, e.g., acquired brain injury were included, where stroke-only data could be extracted	Trial interventions could include either yoga postures (asanas); breathing (pranayama); or mindfulness meditation, or a combination of two or all three components of yoga.	Outcomes were assessed across three broad categories: physical function (Motor Assessment Scale, walking speed/distance, Berg Balance Scale); mood (depression and anxiety scales); and quality of life (stroke Impact Scale QOL scale). Adverse events, including falls or death, were also summarized.	Yoga is beneficial in reducing state anxiety symptoms and depression in the intervention group compared to the control group (mean differences for state anxiety 6.05, 95% CI:−0.02 to 12.12; *p* = 0.05 and standardized mean differences for depression: 0.50, 95% CI:−0.01 to 1.02; *p* = 0.05). Consistent but nonsignificant improvements were demonstrated for balance, trait anxiety, and overall quality of life.	**+** Only one author responsible for much of screening/selection of articles, with second author responsible for final selection of eligible trials and resolving uncertainty over eligibility. All 4 RCTs were pilot studies with low numbers. Also note participants with TIA and multiple stroke events were also included.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
549	X. Zheng et al (2021). The Influences of Tai Chi on Balance Function and Exercise Capacity among Stroke Patients: A Meta-Analysis. Evidence-based Complementary and Alternative Medicine. 2021.	MA Explore the influences of Tai Chi on the balance function and exercise capacity among stroke patients. 19 studies (n=1238)	Tai chi	Berg Balance Test (n=231) Standing and Walking Test (n=113) 6m walk (n=128) Swing of Gravity centre (n=109) Fugl-Meyer (n=335)	'Stroke patients are able to improve their balance functions and exercise capacities prominently when they do Tai Chi exercise once or twice a week and ≥5 times/week and >30 ≤ 60 min/time.'	++
549	X. Zheng et al (2021). The Influences of Tai Chi on Balance Function and Exercise Capacity among Stroke Patients: A Meta-Analysis. Evidence-based Complementary and Alternative Medicine. 2021.	Systematic review and meta-analysis assessing Tai Chi on balance and exercise capacity post stroke.	Search categories included - Tai Ji or Tai-ji or Tai Chi or Tai Ji Quan or Taiji or Taijiquan or Tai Chi Chuan) Tai Chi is a low-intensity aerobic exercise.	Outcome measures included Berg balance scale, Fugl-Meyer, 6MWT.	19 studies were included – intervention period lasted for up to 12 weeks with a frequency of between 2-6 times/week. Sessions lasted from less than half and hour to over one hour though 14 were between 30-60 minutes in length. BERG BALANCE SCALE Treatment=231 Control=181 MD=7.7 (95%CI=3.4to11.9) STAND AND WALK TEST Treatment=113 Control=109 MD=-3.4 (95%CI=-4.2to-2.6) Swing area of gravity centre Treatment=109 Control=109 MD=-0.79 (95%CI=-1.48to-0.10)	++ Protocol published. Well described meta-analysis.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					FMA Treatment=335 Control=321 MD=4.15 (95%CI=1.7to6.6) No significant differences between groups on swing length of gravity centre, 6 minute walk test, or SPPB	
535	Marzolini et al (2021). Associations Between Time After Stroke and Exercise Training Outcomes: A Meta-Regression Analysis. Journal of the American Heart Association. 24.	SR: time after stroke and 6MWD, 10m time, cardiorespiratory fitness and balance (BBS) in exercise training interventions. Time after stroke as continuous or dichotomized (≤3m, >3 ≤6m, >6 m) 148 studies, n=5987. 86 in meta regression analyses	aerobic training was defined as planned, structured, and repetitive exercise [excluding incidental exercise that occurs during physical therapy] that is progressed in duration or intensity or both.	Walking distance/ speed/ CRF and balance only 47% (70/148) of the studies included in this meta-regression analysis reported on adverse events,	Earlier exercise = larger pre-post differences in mobility; studies initiated ≤3 m v >3 m= larger differences (WMD [95% CI] 6MWD (36.3 m; 14.2–58.5), 10m walk (0.13 m/s; 0.06–0.19) and fast 10m walk (0.16 m/s; 0.03–0.3), Not associated with CRF but was associated with a higher but not clinically important BBS difference (2.9 points; 0.41–5.5). In exercise training v control studies, ≤3 m = greater difference in only postintervention 6MWD (baseline-adjusted 27.3 m; 6.1–48.5. Similar association was seen for ≤6 m v >6m after stroke (fully adjusted, 26.6m; 2.6–50.6).	++ No concerns noted

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
535	Marzolini et al (2021). Associations Between Time After Stroke and Exercise Training Outcomes: A Meta-Regression Analysis. Journal of the American Heart Association. 24.	SR & MA (Meta-regression analysis). N=148 (n=5987). Studies were included that were (1) original research articles studying patients following stroke, (2) consisting of at least 1 study group receiving an exercise intervention with an aerobic component but without external stimuli or robotic assistance (3) reporting time since stroke or defining an interval of time since stroke in their subject inclusion; and (4) measuring the outcomes of interest.	Aerobic training was defined as planned, structured, and repetitive exercise [excluding incidental exercise that occurs during physical therapy] that is progressed in duration or intensity or both. Examples of aerobic training include walking, stationary cycling [arm or leg], stepping machine, and treadmill exercise	6-minute walk distance, 10-meter walk time, cardiorespiratory fitness and balance (Berg Balance Scale score	Earlier exercise training initiation was associated with larger pre-post differences in mobility; studies initiated ≤3 months versus >3 months after stroke were associated with larger differences (weighted mean differences [95% confidence interval]) in 6-minute walk distance (36.3 meters; 95% CI, 14.2–58.5), comfortable 10-meter walk time (0.13 m/s; 95% CI, 0.06–0.19) and fast 10-meter walk time (0.16 m/s; 95% CI, 0.03–0.3), in fully adjusted models. Initiation ≤3 months versus >3 months was not associated with cardiorespiratory fitness but was associated with a higher but not clinically important Berg Balance Scale score difference (2.9 points; 95% CI, 0.41–5.5). In exercise training versus control studies, initiation ≤3 months was associated with a greater difference in only postintervention 6-minute walk distance (baseline-adjusted 27.3 meters; 95% CI, 6.1–48.5; fully	++ Very well conducted review with large trial/participant numbers. Well defined parameters, focusing on specific outcomes.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
522	C. English et al (2017) Circuit class therapy for improving mobility after stroke. Cochrane Database of Systematic Reviews. 2017: 6.	Update of 2010 review 17 trials included in this review (12 published between 2010 and 2015). Inclusion criteria: Adults, diagnosed with stroke of any severity/stage/setting, receiving CCT as defined, outcomes evaluated in domains as defined, RCT. 4 trials were conducted in inpatient settings, 13 trials in community settings n=1297 (sample size varied from 12 to 250) Time since stroke – within 1 month (3 trials), 3 months (3), 6 months (1), one year (1), more than one year post stroke (8 trials). Only 2 trials reported stroke severity. Severity inferred as mild to moderate based on inclusion criteria	CCT – workstation-based, task specific practise in a grp with a ratio of staff to client of 1:3 or higher with aim of improving mobility in people post stroke. Only studies that focused on repetitive (within session) practice of functional tasks. The length of sessions, frequency and duration of intervention period varied between studies. Included studies that provided a minimum of once weekly CCT for a minimum of 4 weeks. 12 studies had a comparison grp. Control interventions included – usual care (5), CCT involving UL only (4), non-specific exercises (2), no therapy (3), lower intensity CCT (2)	Primary outcome: 6mWT Secondary measures: Measures of walking and standing ability – walking speed, TUG, RMI, BBS, Functional reach test, step test Measures of impairment- LL strength, ROM, Measures of activity limitation – IADL, personal care Measures of participation restriction – HRQOL Other measures: LOS, AE, self-reported satisfaction, locus of control, economic indicators	10 studies (n=835) demonstrated CCT to be superior to comparison intervention on 6mWT (Mean difference, F-E, 60.86m, 95% CI 44.55 to 77.17, GRADE: moderate). 8 studies (n=744) measured gait speed and found in favour of CCT (MD -3.62Sec, 95% CI -6.09 to -1.16, GRADE: moderate). Both of these effects are clinically meaningful. Some but not all pooled measures were able to demonstrate the superior effects of CCT for aspects of walking and balance (TUG, 5 studies (n=488) – MD-3.62 sec, 95% CI -6.09 to -1.16. Pooled BBS and Step Test failed to demonstrate superior effects. Independent mobility measured by SIS, Functional ambulation classification and RMI improved more in CCT interventions compared with others. 8 trials measured AE (n=815). There was a non-significant effect of greater risk of falls in the CCT groups (RD 0.03, 95% CI -0.02 to 0.08, GRADE: very low) Time after stroke did not make a difference to positive outcomes	++ ++ High quality Cochrane Review

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
522	C. English et al (2017) Circuit class therapy for improving mobility after stroke. Cochrane Database of Systematic Reviews. 2017: 6.	Systematic review and meta-analysis, 17 studies with n=wee297 participants. Stroke survivors of all types, severity and stages of stroke aged 18 years and older. Setting: Hospital or community. Most participants could walk 10m Comprehensive literature research with 2 reviewers to retrieve / review papers. 3rd reviewer for consensus. Cochrane Handbook for Systematic Reviews criteria used to review risk of bias.	Mobility related Circuit Class therapy (CCT) Staff to client ratio of no greater than 1:3 (staff to clients) Studies provided a minimum of one weekly CCT for min 4 weeks. Control : Usual care or sham rehabilitation or other therapy modality	Outcomes measured at post-intervention and follow up (e.g. 3 to 6 months post intervention) Primary outcomes: Walking capacity measured using Six Minute Walk Test(6Mwt) Secondary Outcomes: Walking speed Functional mobility measures such as Timed Up & Go (TUG) Measures of standing balance including Step Test, Berg Balance Scale or Functional Reach Lower limb strength Range of motion Instrumental activities of daily living Personal care Health related quality of life Length of hospital stay Adverse events Self reported satisfaction Locus of Control Economic indicators	10 studies n=835 measured 6Mwt and shown CCT was superior to comparison (MD 60.86,95% CI 44.55 to 77.17;I^2=27%) Secondary Outcomes: 8 studies n=744 measured gait speed with significant difference in favour of CCT(MD 0.15,95%CI 0.10-0.19 i^2=14%) 2 studies n=50 measured cadence in steps per minute with significant effect in favour of CCT (MD 13.57, 95% CI 7,52 -19.62 I^2=0% 5 studies n=488 showed significant in favour of CCT as measured by TUG (MD -3.62, 95% CI -6.09 TO -1.16. I^2=0 2 studies n=296 measured Rivermead Mobility Index showing significant effect with CCT(MD 0.56,95% CI 0.18 -0.95 I^2=7%) 3 studies measured Functional Ambulation Classification n=469 and found significant effect with CCT . (OR,1,91 95%CI 1.01 -3.62; I^2=34% 2 pooled balance measures did not show superior effects	++ High quality, well conducted study . Large number of outcomes across trials Greater falls rate in CCT although not statistically significant,

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					(Berg Balance Test and Step Test) . Eight trials n=85% measured adverse events(falls during therapy) .Non significant effect of greater risk in CCT group(RD 0.03,95%CI-0.02 yo 0.08,)	
518	Alhwoaimel et al (2019). Do trunk exercises improve trunk and upper extremity performance, post stroke? A systematic review and meta-analysis. NeuroRehabilitation. 43: 4 395-412.	SR and meta-analysis of the effect of trunk exercises on trunk performance post-stroke. Used PRISMA guidelines, quality assessed with Cochrane RoB and PEDRO. Sample sizes ranged 16- 80 participants. Mean age = 52 to 76 years. Includes acute, sub-acute and chronic phases.	Trunk exercise = any form of trunk excercise involving selective movements of the upper and lower trunk +/- the upper limbs in supine + /or sitting. Intervention durn = 1.5hrs-36 hrs and 1-12weeks. Dose = 15 – 120 mins/day, all 5 days/week.	Trunk performance using Trunk Control Test (TCT) or Trunk Impairment Scale (TIS).	17 studies with 599 participants included. Trunk exc improved trunk performance (SMD= 0.85; 95%CI = 0.58 - 1.12; P< 0.00001; I2= 59%). The effect was v. large for acute stroke (SMD= 0.85 95%CI = 0.58-1.12; P<0.00001) and medium for subacute (SMD= 0.67; 95%CI = 0.44- 0.90; P<0.00001) and chronic stroke (SMD= 0.74; 95%CI= 0.42-1.05; P< 0.00001)	++ Good quality review. Quality of constituent trials was mixed. Conclusions: Trunk exercises improve trunk performance for people with acute, subacute and chronic strokes.
518	Alhwoaimel et al (2019). Do trunk exercises improve trunk and upper extremity performance, post stroke? A systematic review and meta-analysis. NeuroRehabilitation. 43: 4 395-412.	Systematic review and meta-analysis of 17 studies. Methodological quality of the trials was assessed using the Cochrane risk of bias tool and the PEDro scale	Only RCTs involving stroke patients over 18 included. Intervention involved any form of balance exercise, trunk strength training and/or any form of trunk exercise. Interventions were not to include robotics or FES.	Trials had to include TCT or the Trunk impairment scale or a valid outcome measure for the arm. Sub-group assessments of time from stroke and treatment duration were assessed.	7 articles identified and included 590 stroke patients. Meta-analysis of TCT and total TIS scores were pooled to assess improvement in trunk performance. 320 in treatment group versus 317 in control group. SMD=0.85 (95%CI=0.58 to 1.12) Three studies were poled with only the TCT with 53 in the	Good quality review. Clear rationale and results. Suggests focus on trunk exercises should occur in acute stage and leads to significant improvement in trunk control.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			Intervention times for the included studies ranged from 1.5 hours to 36 hours with the duration of treatment ranging from 1 to 12 weeks. The amount of time varied from 15 minutes per day to 120 minutes per day. Interventions were also begun less than one month post stroke in some studies compared to over 6 months in others.		treatment group and 56 in control group. SMD=0.34 (95%CI=-0.04 to 0.72). Fourteen studies were pooled with the TIS score only with 227 in the treatment group and 222 in control group. (SMD = 0.98 (95% CI=0.65 to 1.32) Sub-Group Time of treatment Acute (<1/12) – SMD=1.57 (95%CI=0.76to2.47) Sub-acute (1-6 months) SMD=0.67 (95%CI=0.44to0.90) Chronic (>6 months) SMD=0.74 (95%CI=0.42to1.05 Both studies that included treatments for <16 hours, or > 16 hours showed large significant effects in favour of the treatment group.	
524	K. Gamble et al (2021). Core Stability Exercises in Addition to Usual Care Physiotherapy Improve Stability and Balance After Stroke: A Systematic Review and Meta-analysis. Archives of Physical Medicine and Rehabilitation.	SR/MA 11 studies (n=391) The effect of core stability exercises on stability and balance measures	Core stability exercises + usual care physiotherapy vs Usual care physiotherapy alone for rehabilitation post stroke Core stability exercises	Trunk control (n=130) Trunk Impairment Scale (n=80) TUG (n=43) Berg Balance & Brunel Balance assessment (n=77) Functional Ambulation Categories (n=44) Walking speed (n=26)	The addition of core stability exercises to usual care physiotherapy after stroke may lead to improved trunk control and dynamic balance.	++

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	102: 4 762-775.		performed while lying included transverse abdominis contractions, pelvic tilts, rolling, and variations of bridges, curl ups, and push-ups. Core stability exercises performed in seated included reaching, weight shift, trunk active movements through range, pelvic tilts, perturbation, and buttocks shuffling. 15-60 minutes per session, for 3-6 sessions per week, for a duration of 2-8 weeks in total The total reported time spent on usual care physiotherapy ranged from 600-1500 minutes in both groups			
524	K. Gamble et al (2021). Core Stability Exercises in Addition to Usual Care Physiotherapy	Systematic Review of 11 RCTS with a total of 391 participants aged 18 or older; acute, subacute or chronic stroke of any type	Intervention : core stability exercises with conventional physiotherapy .	Trunk control measured in 8 trials (n=257): 6 trials used Trunk Impairment Scale, 1 study used Trunk	Moderate evidence to suggest core stability exercises improves trunk control (SMD 0.94; 95% CI,0.44-1.44;)	**++** Good quality Systematic. Substantial heterogeneity

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Improve Stability and Balance After Stroke: A Systematic Review and Meta-analysis. Archives of Physical Medicine and Rehabilitation. 102: 4 762-775.	(ischaemic or haemorrhagic) .7 studies conducted in acute / subacute settings and 4 in chronic stroke . Average age range of participants 44.4-79.9 years. 2 independent reviewers with 3rd reviewer for resolution . PEDro to assess risk of bias.	. Dose of core stability exercise 15-60 mins per session, 3-6 sessions per week for duration 2-8 weeks. Control : usual /conventional physiotherapy care:included tone facilitation, passive and active range, stretching, neuromuscular training , trunk and pelvic movement, task directed training, functional training , reaching	Control Test and 1 utilised Spanish version of Trunk Impairment Scale. Dynamic Balance assessed in 7 trials (n=220) : 4 used timed Up & Go, 3 used Berg Balance and 1 trial used Brunel Balance assessment . Mobility was measured in 3 trials (n=85) using Functional Ambulation Category Walking Speed was assessed in 3 trials (n=58)using tempo-spatial measures. Global function was assessed in 2 trials (n=99) using Barthel Index & Functional Indep Measure	Functional dynamic balance showed improvement with additional core stability exercises as measured by Berg Balance Scale & Brunel Balance Assessment .(SMD 1.23 ;95% CI ,0.5-1.97) Walking speed showed significant improvement with additional core stability exercises albeit low quality evidence. (MD,0.27m/s;95% CI,0.01-0.52) No significant effect on functional ambulation, Timed Up and Go . In one trial , additional core stability exercises improved Barthel Index (P=.002)	Not always controlled by subgroup analysis.
543	F. T. D. Tabah et al (2020). Factors influencing stroke patient adherence to physical activity: A systematic review. Journal of Gerontology and Geriatrics. 68: 3 174-179.	review on factors influencing stroke patients' adherence to physical activity (PA) & identify intrapersonal, interpersonal and environmental factors that affect adherence 10 studies n= 815	2 studies: community-based PA 2 studies: home-based exercise 3 studies: clinical based exercise 4 studies: general PA	N/A	intrapersonal factors include physical impairment, balance, and mobility, fear of fall, aging, forgetful, reduce in self-efficacy and exercise benefits. Interpersonal factors were social support, lack of attendant and support from healthcare,	**-/0** Reject Limited search strategy. Included quant studies but extracting qual info?? Not clear who/ how many undertook identification/ extraction. Synthesis method unclear.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					physiotherapist or gym trainer. Economic factors, transportation, and exercise facility were the environmental factors that influence stroke patient adherence to PA.	
543	F. T. D. Tabah et al (2020). Factors influencing stroke patient adherence to physical activity: A systematic review. Journal of Gerontology and Geriatrics. 68: 3 174-179.	Systematic review of studies with participants after stroke which discussed factors to participate in PA. Quantitative studies (N=10, n=815) with no limited range of age of the stroke patient were included. 8 cross-sectional studies, 2 RCTs.	Two studies focus on community-based physical activity, two studies on home-based exercise , three studies on clinical based exercise and four studies focusing on general physical activity.	Unclear – inclusion criteria for studies was quantitative studies, however reported on factors influencing stroke patient adherence to physical activity	The intrapersonal factors include physical impairment, balance, and mobility, fear of fall, aging, forgetful, reduce in self-efficacy and exercise benefits. Interpersonal factors were social support, lack of attendant and support from healthcare, physiotherapist or gym trainer. Economic factors, transportation, and exercise facility were the environmental factors that influence stroke patient adherence to PA.	- Low quality Poorly defined parameters Unclear how many reviewers screened/reviewed articles.
541	C. Shen et al (2018). Effects of MOTOmed movement therapy on the mobility and activities of daily living of stroke patients with hemiplegia: a systematic review and meta-analysis. Clinical rehabilitation.	19 RCTs (n=1099) All 19 studies were performed in China. Age Ranges; 64.5 (7.85) to 83.4 (2.6). Time since stroke: 5.9 (11.5) to 62.48 (7.56) days Settings: inpatient rehab	Motomed movement therapy. Length of session 20min (11 studies), 30 min (6 studies), 40 min (1 study) Intervention period: 4-12 weeks	Fugl-Meyer Assessment Score Modified Ashworth Scale Berg Balance Scale Functional Ambulation Category Scale 10mWT BI Modified BI	FMA Score (n=939), MAS (n=270), BBS (n=348). High heterogeneity among studies therefore RE models used to calculate merged mean difference. FMA 95% CI: 5.51 (4.03, 6.98), MAS 95% CI: -1.13 (-1.37, -0.89), BBS 95% CI: 13.66 (10.47,16.85)	+ Most of the study population are Asian. Interventions not described in detail in this paper and authors comment that experimental designs were not described comprehensively.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	32: 12 1569-1580.	Severity of impairment following stroke not described.	Frequency: once or twice a day, 5-7 x/week Control: 'conventional rehabilitation'		Low heterogeneity for FAC scale, 10mWT and BI, mBI but smaller total numbers included FAC Scale: 95% CI: 0.85 (0.68, 1.03) 10mWT 95% CI: 10.15 (5.72, 14.58) n=510 BI 95% CI: 14.82 (12.95, 16.68) mBI 95% CI: 11.49 (8.96, 14.03) n=68	FMA Score – not clear which aspects are used? LE score only or balance and sensation included? MCID - ?? 6
541	C. Shen et al (2018). Effects of MOTOmed movement therapy on the mobility and activities of daily living of stroke patients with hemiplegia: a systematic review and meta-analysis. Clinical rehabilitation. 32: 12 1569-1580.	SR and MA of RCTs of MOTOmed® + usual therapy for mobility and activities of daily living in stroke. Cochrane RoB tool for quality. Mean time since stroke = 5.9 (11.5) to 62.48 (7.56) days ie acute/sub-acute. Control appears to be usual care alone	Motomed = passive or active assisted recumbent cycling with visual feedback. Enables people with limited balance, strength and mobility to exercise. Modal duration of exc = 20-30mins, 5-7x/week for 4-12 weeks.	Fugl-Meyer Assessment (limb movement), Modified Ashworth Scale (spasticity of the knee extensor), 10-meter walk test (walking speed), Berg Balance Scale (balance), + /or Functional Ambulation Category (walking ability), ADL (original or Modified Barthel Index).	19 trials (N=1099) all moderate quality and based in China. Sample sizes 20–120. MOTOmed à improved FMA (MD 5.51 95%CI 4.03- 6.98) Ashworth Scale, −1.13 95%CI −1.37, −0.89; Berg 13.66 95%CI 10.47–16.85); FAC 0.85 95%CI 0.68–1.03); 10MWT 10.15 (95% CI 5.72–14.58); BI 14.82 95% CI 12.96–16.68) mBI 11.49 95%CI 8.96–14.03).	**++/ +** Quality review but no details of what the conventional therapy consisted of (so don't know if relevant to UK), nor how the Motomed was used or level of severity. Was recruitment restricted to those who couldn't exercise actively? No info to support implementation
530	M. Lloyd et al (2018). Aerobic Physical fitness interventions for nonambulatory stroke survivors: A mixed-methods systematic review and meta-analysis. Brain a.nd Behavior. 8: 7	Mixed-methods SR and MA. Any quat, qaul or mixed method design. Any setting or time since stroke. A range of quality assessment tools for different designs	Fitness training for non-ambulatory stroke survivors = structured activities to improve health-related fitness. Interventions = assisted walking (n=25), cycle ergometry (n=5), and other training (n=3)	case fatality, effects, experiences, and feasibility of fitness training for non-ambulatory stroke survivors	33 studies w. 910 participants. 31 were quantitative (18 RCTs) Most were mod quality. No diff in case fatality btw Ix (1.75%) and controls (0.88%) (95%CI 0.13–3.78, p = 0.67). Assisted walking improved: fat mass, peak heart rate, peak O2 uptake and walking endurance and speed, and mobility at intervention end,	**++** Good review. Conclusions: Fitness training is safe and can be effective and feasible for non-ambulatory stroke survivors

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			mainly in acute settings. Control = placebo, no intervention, usual care, or ANO intervention Assisted walking = Functional overground walking (n=3) Freq 2x/day-2x/week. Durn= 30 min -1.74 ± 0.15hr for 4 -12 weeks. No of sessions 12- 50. BWSTT (n=8) 3-5x/week for 15-30 mins for 5-16 weeks. Robot-assisted Walking (n=11)1x/week-2x/day for 15-30 mins over 2-9weeks. No sessions =4- 45 (mode =20) Also jump training, brisk walking, stair climbing		and endurance, balance and mobility at follow-up. Cycle ergometry improved peak heart rate, work load, ventilation, CO2 production, HDL cholesterol, fasting insulin and glucose, and independence at Ix end. Participants' experiences were positive. Few adverse events.	
530	M. Lloyd et al (2018). Aerobic Physical fitness interventions for nonambulatory stroke survivors: A mixed-methods systematic review and meta-analysis. Brain and Behavior. 8: 7.	Mixed methods systematic revie and meta-analysis .including quantitative, qualitative , non-randomised 18 randomised, 3 randomised crossover, 4 cohort and 5 case studies . Total 33 studies n=910 participants : 29 dropped out , leaving 894. Non ambulatory with Functional Ambulation Category Score ≤2 .	Assisted walking using electromechanical and other devices ; overground functional/ task orientated assisted walking , brisk walking , modified jump training, body weight supported treadmill training (BWSTT) and	105 different outcome measures; Case fatality Cardiovascular & respiratory function Metabolic function Walking Endurance & strength Mobility Movement related functions	Case fatality : 29 studies n=739 reported case fatality. 10 deaths reported over entire study period. 7 in intervention group, 3 in control No deaths in cycling group . Difference in case fatality amongst groups not significant. (95%CI 0.13-3.78,P=0.67)	**++** High quality, detailed study however reporting ambulatory status was limited. Dose and intensity was limited in the studies. Many outcome measures.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
		stroke age ≥18 , all stroke types and any time since stroke . 80% (n=719) participants < 6months post stroke Interventions delivered in any land based setting . 2 reviewers independently screened and extracted studies with 3rd reviewer if required for consensus. Quantitative studies assessed using Effective Public Health Project for randomised & non-randomised studies . Mixed methods assessed using Mixed Methods Appraisal Tool. Qualitative studies assessed critical review form by McMaster University Evidence-Based Practice Research group .	robot assisted walking & stair climbing(25 studies n=730). Frequency ranged 2 per day to 2 per week Session duration ranged 30 min to 1.74+/-0.15hr. Program duration 4 weeks to 3 months. Cycle ergometer training (5 studies n=154) including lower limb cycling or upper/lower limb cycling. Session ranged 30 to 40 mins ; training periods from 6 to 10 weeks . No of sessions varied between 16 & 30 Other training :-dance, Pilates and health education (3 studies,n=9) All exercises were supervised. 17 studies indicated participants were given information to aid motivation. 22 studies included comparator groups	Body and Sensory functions Activities and Participation	Assisted walking improvement in fat mass, peak heart rate(MD 9.3, 95%CI-0.7 -19.3, p=0.07, I^2=32%) , peak oxygen uptake (MD 2.73ml/kg/min, 95%CI 0.64 to 4.89, p=0.001) : : Improvement in walking endurance compared to control groups (MD 7.22m/min 95%CI -1.42 -15.87, p=0.10, I^2=57%, Improvement in Independent walking as measured by FAC compared with control (MD 0.36, 95%ci-0.07 to0.78. p=0.1 I^2=51% 2 studies showed significant improvement in BBS in favour of walking training group. (M.D 6.09;95% CI-0.63 to 12.81 p=0.08	

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			and was dose matched in 18/22 studies.			
537	A. O. Obembe; J. J. Eng (2016). Rehabilitation interventions for improving social participation after stroke: A systematic review and meta-analysis. Neurorehabilitation and Neural Repair. 30: 4 384-392.	SR/MA 24 studies (n=2042)	Support services = telephone calls, home visits, educational courses, mailed educational information and group discussions. Support services had a frequency of at least one session per month for 8 weeks. Exercise = treadmill training, cycling, group exercise, and progressive resistance exercise. Studies utilizing exercise had a frequency of at least 2 sessions per week over 5 weeks – 6 months	18/24 studies used the social participation subscale of the Stroke Impact Scale	The included studies provide evidence that rehabilitation interventions may be effective in improving social participation after stroke, especially if exercise is one of the components. Small beneficial effect of interventions that used exercise on social participation (10 studies; SMD = 0.43; 95% CI = 0.09, 0.78; P = .01) immediately after the program ended. Exercise in combination with other interventions (13 studies; SMD = 0.34; 95% CI = 0.10, 0.58; P = .006) also resulted in beneficial effects. No significant effect was observed for interventions that involved support services over 9 studies (SMD = 0.09 [95% CI = −0.04, 0.21]; I2 = 0%; P = .16).	**++**
537	A. O. Obembe; J. J. Eng (2016). Rehabilitation interventions for improving social	SR & MA of RCTs (N=24, n=2042) Participants were community-dwelling adult stroke survivors.	Broad intervention; any nonpharmacological and nonsurgical community-	Outcome measures of social participation, such as SIS.	Some of the exercise studies which utilized attention controls had the largest effect sizes, suggesting that it is the	**+** Well conducted, however scope/parameters very broad.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	participation after stroke: A systematic review and meta-analysis. Neurorehabilitation and Neural Repair. 30: 4 384-392.		based intervention for community-dwelling adult stroke survivors, where social participation was an outcome. authors included trials which reported on a baseline data point and a postintervention data point or follow-up (ie, retention of effects) assessing social participation using a validated scale; (3) intervention and control group treatments clearly defined; and (4) intervention carried out for at least 4 weeks to have sufficient duration for benefits to accrue		exercise itself that is effective. Rehabilitation interventions may be effective in improving social participation in individuals with stroke, especially if exercise is one of the components.	
538	L. E. Oberlin et al (2017). Effects of physical activity on poststroke cognitive function a meta-analysis of randomized controlled trials. Stroke. 48: 11 3093-3100.	SR & MA to evaluate the effects of physical activity (PA) training on cognitive function poststroke 14 studies, n=736. Also identified intervention and sample characteristics that may moderate treatment effects. TSS ranged from 3m - 5 years, average of 2.62 years since stroke onset.	PA (aerobic exercise, resistance training, or physiotherapy), (3) duration of training >4 weeks	Validated neuropsychological test of cognition with data reported at baseline and postintervention. Moderate, positive improvements on measures of attention and processing speed, while the executive function and working	Positive overall effect of PA training on cognitive performance (Hedges' g [95% confidence interval]=0.304 [0.14–0.47]). Mixed-effects analyses demonstrated that combined aerobic and strength training programs generated the largest cognitive gains and that improvements in cognitive performance were	++ No concerns noted.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
				memory domains did not reach statistical significance	achieved even in the chronic stroke phase (mean=2.6 years poststroke). PA had favourable effects regardless of program length.	
538	L. E. Oberlin et al (2017). Effects of physical activity on poststroke cognitive function a meta-analysis of randomized controlled trials. Stroke. 48: 11 3093-3100	SR and MA of RCTs of Physical activity on cognition. 2 reviewers, followed PRISMA guidance, Cochrane RoB tool for quality. Post hoc subgroup analysis of overall effect of PA training on cognition in studies that screened for and included participants with motor impairments (eg, chronic hemiparesis, upper or lower limb paralysis, inability to walk without assistance) to assess whether stroke survivors with significant motor limitations could engage in PA training to the extent needed to generate cognitive gains.	Physical activity = intervention to increase Phys Activ (aerobic exercise, resistance training, or physiotherapy) for >4 weeks (sufficient time for benefits to accrue) and included a validated neuropsychological test of cognition with data reported at baseline and post-intervention.	Cognition overall, plus 3 specific domains: executive function, attention and processing speed, and working memory.	14 studies selected (n= 736). Positive overall effect of PA training on cognition (Hedges' g =0.304, 95%CI 0.14–0.47). Combined aerobic and strength training programs generated the largest cognitive gains, even in chronic stroke (mean=2.6 years poststroke). Moderate Rx effects for attention/ processing speed measures (Hedges' g =0.37 CI 0.10–0.63). Executive function and working memory was NS.	**++** Quality review Conclusions Most signif +ve effect from combined aerobic nad strength training even in chronic stroke.
539	D. Pogrebnoy; A. Dennett (2020). Exercise Programs Delivered According to Guidelines Improve Mobility in People With Stroke: A Systematic Review and Meta-analysis.	RCTs (n=499), 8 trials Time since stroke: range between 2.5 – 70.9 months post stroke (average 25.6 months) Average age range – 60's to mid-70's Stroke severity was reported in 4 studies; NIHSS (0-7) in 2 studies, Orpington prognostic score – moderated severity (1 study), AHA stroke functional	Combined exercise programme comprising aerobic and resistance training. Intervention must specify dose intensity, duration and frequency in accordance with ASA minimum physical	Habitual walking speed 6mWT 10mWT TUG Stair climb Sit to stand	Habitual walking speed (5 trials, n=248). High level evidence (MD, 0.07m/s; 95% CI 0.01 to 0.16) that combined training improves habitual walking speed. This can be interpreted as meaningful change. Walking endurance (6 trials, n=320) – (MD 39.2m: 95% CI	**++** This review demonstrated that combined aerobic and resistance training delivered as per guidelines can lead to clinically meaningful improvements in walking speed and endurance compared with usual care in

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Archives of Physical Medicine and Rehabilitation. 101: 1 154-165..	classification score (1 study) – 84% of participants scored having 2-3 impaired domains out of a possible 6 Setting: outpatient community setting, 1 trial was home based	activity guidelines post stroke: 40-70% VO2 reserve of HR reserve; 55-80%HR max, RPE 11-14 (6-20 scale). 20-60 min sessions, 3-5 x /week AND 1-3 sets of 10-15 reps for 8-10 exercises involving major muscle groups, 2-3 x / week, resistance gradually increased Intervention duration: 12 weeks to 6 months (most trials were 12 weeks, sessions averaged 54 min) Delivered by: trained exercise professionals including PT, OT HCA, kinesiologists, advanced exercise instructors. Comparator: No intervention or usual care		17.2-61.2) High level evidence showed a small significant effect in favour of combined training for improving walking endurance vs usual care. This is also above the 34.4m which is considered a MCID in people with stroke. TUG – moderate level evidence (SMD, 0.57; 95% CI 0.16-0.99) No differences detected for other mobility outcomes.	people with chronic stroke and mild to mod deficits.
539	D. Pogrebnoy; A. Dennett (2020). Exercise Programs Delivered According to Guidelines Improve	Systematic Review & Meta Analysis: 8 trials, no. of participants =499, (ranging from 29-92) 75% experienced ischaemic stroke. 63%	Intervention consisting of combined aerobic & resistance exercise delivered in an outpatient community	Outcomes: Habitual walking speed, walking endurance,	Results: Walking speed : 5 trials . n=248 showed combined AT & RT at required exercise recommendations improves	+ One paper (Moore et al) did not meet inclusion criteria regarding intervention.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Mobility in People With Stroke: A Systematic Review and Meta-analysis. Archives of Physical Medicine and Rehabilitation.. 101: 1 154-165	participants male with mean age 69.s +/- 16.7 Average duration post stroke 25.6 months with range 2.5 months to 70.9 months 2 independent reviewers . Risk of bias assessed using PEDro scale. (Mean score of all trails 7.4)	setting (7 trials) and 1 trial home based. Aerobic training (AT) included walking, exercise bike and treadmill training & steps Resistance training (RT) consisted functional strength training, resistance bands or lower limb strengthening machines. Intervention ranged 12 weeks to 6 months. Session duration averaged 54 mins . Intervention delivered by trained exercise professionals, PTs, OTs, allied health assistants , kinesiologists and exercise instructors. Control group: Stretching, education, walking , cycling, unsystematic physical activity , sham AT & RT And seated upper extremity program.	Timed Up and Go , Stairir climb , sit to stand and physical activity Adverse events reported	habitual walking speed compared with usual care. (MD 0.07 m/s;95% CI -0.01 TO 0.16) Walking endurance: Meta analysis of 6 studies n=320 showed small significant effect in AT & RT in improving walking endurance. (MD 39.2m CI 17.2-61.2) Analysis of 4 trials n=219 Showed significant improvement in walking endurance (MD 51.1M. 95% CI, 19.96-82.24). Timed Up and Go. 2 trials (n=92); moderate evidence of effect (SMD 0.57; 95%CI 0.16-0.99) when compared with usual care. No difference in sit to stand, stair climbing or physical activity level. One trial reported 3 participants had a recurrent stroke. Two trials reported low impact falls in both intervention & control group.	Only 8 trials with small numbers . Difficult to generalise recommendations to all stages stroke recovery

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
531	J. Luker et al (2015). Stroke Survivors' Experiences of Physical Rehabilitation: A Systematic Review of Qualitative Studies. Archives of Physical Medicine and Rehabilitation 96: 9 1698-1708.	Systemic review and meta-synthesis of qualitative studies of stroke survivors' perspectives, experiences, and preferences for inpatient physical Rehabilitation. Followed ENTREQ and COREQ guidelines. Selected qualitative studies where data had been collected via interviews, focus groups, or questionnaires that allowed free text. Rejected low quality studies	stroke survivors who underwent inpatient physical rehabilitation in acute or post-acute settings. No age, sex, comorbidity, or discharge restrictions		2 studies included. Themes (relevant to exercise) = (1) physical activity is highly valued (n=26) as more is better for recovery, especially walking and mobility. Wanted more training and intensity in PT sessions and practice outside formal therapy sessions – with help from visitors or other patients if necessary. Accepted ideas to increase therapy (eg circuit classes or 7-day services). But had preferences re: timing and format of therapies, and some needed a break. So flexibility is important. [2] Bored and alone; Pts are frequently bored + /or lonely during rehab so PT is something to do. (6) exercise/ activity fosters autonomy - something they can do to help themselves; (8) motivation needs nurturing – Pts did not mind being pushed to work harder during rehabilitation; (9) fatigue can overwhelm – so need to individualise	++ Good quality SR. Conclusions – activity/exercise is highly valued as it contributes to recovery and is motivating and overcomes boredom and fosters autonomy. Patients want more; to extend beyond therapy sessions; using 'innovative' delivery if necessary. But fatigue can overwhelm. Format and content needs to be individualised to accommodate needs, goals and preferences
531	J. Luker et al (2015). Stroke Survivors' Experiences of Physical Rehabilitation: A Systematic Review of Qualitative Studies.	Systematic review of Qualitative studies reporting stroke survivors' experiences of inpatient stroke rehabilitation (N=31).	Qualitative studies were included, where data had been collected via interviews, focus	Extracted texts were inductively coded and analyzed in 3 phases using thematic synthesis. Nine interrelated analytical themes,	Negative experiences were reported in all studies and include disempowerment, boredom, and frustration. Rehabilitation could be improved by increasing activity	++ Well conducted review of qualitative studies of patient

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Archives of Physical Medicine and Rehabilitation 96: 9 1698-1708.	Studies were included if data were obtained directly from adults (aged _18y) with stroke who underwent physical rehabilitation in acute or postacute inpatient settings. There were no other age, sex, comorbidity, or discharge destination restrictions.	groups, or questionnaires that allowed free text. Included studies gave some consideration to physical rehabilitation or physical activity either on its own or included within a rehabilitation package of care.	with descriptive subthemes, were identified that related to issues of importance to stroke survivors: (1) physical activity is valued; (2) bored and alone; (3) patient-centered therapy; (4) recreation is also rehabilitation; (5) dependency and lack of control; (6) fostering autonomy; (7) power of communication and information; (8) motivation needs nurturing; and (9) fatigue can overwhelm.	within formal therapy and in free time, fostering patients' autonomy through genuinely patient-centered care, and more effective communication and information.	perceptions. Underlines importance of activity.
541	R. E. Young et al (2021). Experiences of venue based exercise interventions for people with stroke in the UK: a systematic review and thematic synthesis of qualitative research. Physiotherapy (United Kingdom). 110.	SR/ Thematic analysis	The aim of this review of qualitative data is to provide a systematic search and synthesis of evidence about the experiences and reported impact of participation in venue based exercise following stroke in the UK. Venue based = programme based outside the individuals place of residency, delivered	Qualitative	People with stroke gain confidence and renewed identity through exercise participation. Perceived improvements in physical function were reported and participants enjoyed stroke specific exercise programmes in demedicalised venues.	++

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			by a physiotherapist, exercise instructor or exercise professional.			
541	R. E. Young et al (2021). Experiences of venue based exercise interventions for people with stroke in the UK: a systematic review and thematic synthesis of qualitative research. Physiotherapy (United Kingdom). 110.	SR and meta-synthesis of qualitative studies and service evaluations of stroke survivors' experiences and reported impact of participation in venue based exercise following stroke in the UK. COREC guidance used.	Venue based = programme outside the home delivered by a PT, exercise instructor or exercise professional. 7 studies included. Methodological quality was variable.	Qualitative	People with stroke gain confidence and renewed identity through exercise. Improvements in physical function reported. Stroke specific exercise programmes in demedicalised venues appreciated/enjoyed.	++
523	Fabero-Garrido et al (2022). Respiratory muscle training improves exercise tolerance and respiratory muscle function/structure post-stroke at short term: A systematic review and meta-analysis. Annals of Physical and Rehabilitation Medicine. 65: 5.	SR & MA to determine the effects of RMT (inspiratory or expiratory muscle training, or mixed) on exercise tolerance, respiratory muscle function and pulmonary function and also the effects depending on the type of training performed at short- and medium term in post-stroke. 9 studies (n=463). 418 in MA, (mean age 63.26 years, 43% female)	3 studies the addition of RMT to usual care 7 studies used a sham intervention or no intervention. 4 studies assessed IMT alone 4 combined training [IMT + expiratory muscle training (EMT)] 1 study [34] had more than one intervention group IMT v EMT v sham alone. The training was implemented 1/2 day,	exercise tolerance, respiratory muscle function and pulmonary function, assessed in the short- and/or medium-term (3 months after stroke)	Significant increase in: -ex tolerance [4 studies; n = 111; SMD = 0.65 (95% CI 0.27 –1.04)]; inspiratory muscle strength [9 studies; n = 344; SMD = 0.65 (0.17–1.13)]; inspiratory muscle endurance [3 studies; n = 81; SMD = 1.19 (0.71–1.66)]; diaphragm thickness [3 studies; n = 79; SMD = 0.9 (0.43 –1.37)]; and peak expiratory flow [3 studies; n = 84; SMD = 0.55 (0.03–1.08)] in the short-term. No benefits on expiratory muscle strength and	++ No concerns noted PEDRO quality score mean 7 (range 6–9) Excluded low quality

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			20 - 40 min per day, 5 - 7 times per week Most of the programs were > 6 weeks Most of the studies used 5 sets of 5 to 10 repetitions with 1m rest		pulmonary function variables (FEV in 1 s) in short-term.	
523	Fabero-Garrido et al (2022). Respiratory muscle training improves exercise tolerance and respiratory muscle function/structure post-stroke at short term: A systematic review and meta-analysis. Annals of Physical and Rehabilitation Medicine. 65: 5.	Systematic Review & Meta Analysis 9 studies (n=418) included. RCTs in any language. Stroke survivors at all stages post stroke Mean age 63.26; 43% female 2 independent reviewers . 3rd reviewer for resolution . Quality and risk of bias using PEDro scale & Cochrane Risk of Bias tool.	3 studies examined Respiratory Muscle Training (RMT) in addition to usual care; 7 studies used sham intervention or no intervention. 4 studies assessed Inspiratory muscle training (IMT) alone versus control ; 4 studies combined IMT & Expiratory muscle training (EMT); 1 study compared IMT versus EMT versus sham alone. Training implemented once or twice a day between 20 & 40 minutes. Most studies used 5 sets of 5 to 10 reps. Most programs>6 weeks	Exercise Tolerance measured by max, workload during cardiopulmonary exercise tests (CPET) or 6MWT Respiratory muscle function Pulmonary Function	Exercise Tolerance : RMT significant increase in exercise tolerance in short term (4 studies n=111) SMD =0.65(95%CI 0.27-1.04)Q value=2.03.p=0.57;I²=0%) IMT alone produced significant in exercise tolerance in short term (3 studies n=73) SMD=0.84(CI 0.36-1.33);Q value=0.31;p=0.85; I²=0% RMT produced statistically significant moderate increase in maximal inspiratory pressure(MIP) in short term but not medium term . (9 studies ;n=344;SMD 0.65(0.17-1.13) IMT & EMT produced significant increase in MIP in short term . (4 studies n=168 SMD=0.87 (CI 0.34-1.40) p=0.07) Also produced significant increase in maximal expiratory pressure(MEP)in short term (4	++ Good quality SR & MA Low number of participants suggesting possible bias. Unclear applicability to which patient group not clear

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			All studies assessed intervention at end training program (short term) & 3 studies conducted medium term follow up.		studies n=168;SMD 0.90;95% CI 0.47-1.33) RMT produced increase in inspiratory endurance in short term (3 studies n=81 SMD=1.19 95%CI 0.71-1.66 Diagram thickness increased in paretic and nonparetic sides with RMT (3 studies n=79;SMD=0.9(0.43-1.37) RMT produced statistically significant increase i Peak Expiratory Flow (PEF) in short term (3 studies;n=84;SMD=0.55 (0.03-1.08)	
548	W. Zhang et al (2022). Respiratory Muscle Training Reduces Respiratory Complications and Improves Swallowing Function After Stroke: A Systematic Review and Meta-Analysis. Archives of Physical Medicine and Rehabilitation.	11 RCTs (n=523) Mean age ranged from 34 to 86 years. Mean time since stroke 8.8 days to 24 months. 87% of trials participants were within 3 months of stroke onset	Respiratory muscle training aimed at increasing strength of the inspiratory or expiratory muscles delivered by threshold resistance trainer or flow-oriented resistance trainer. Participants undertook training for 30-40min (or 25 – 50 reps), 4 to 14 times per week for 3 to 13 weeks. Control: sham respiratory intervention delivered via threshold trainer	Primary outcome: occurrence of respiratory complications Secondary outcomes: swallowing and cough function, PAS (penetration aspiration, swallowing) score, FOIS score, PECF-VC and PECF-RC (peak expiratory cough flow or reflex cough)	Respiratory complications were measured in 7 trials. 6 trials (n=394) were included in meta-analysis (all within 3 months of stroke). The likelihood of respiratory complications was significantly lower after respiratory muscle training (RR, 0.51; 95% CI, 0.28-0.93, $I^2 = 0\%$; P=.03. Absolute risk difference was 0.068 and NNTT 14.71 Swallowing function was measured in 3 trials using PAS (n=71). Respiratory muscle training decreased PAS scores by 0.81 (95% CI, -1.19 to -0.43,	**++** Appears to be a high quality review. This meta-analysis indicated that 20 to 30 min of respiratory muscle training 5 times per week for 4 to 5 weeks could improve swallow function and reduce the risk of respiratory complications after stroke. They found respiratory muscle training reduced the RR of respiratory complication immediately or 3-12 months after initiation of treatment for

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			with no resistance valve or small resistance.		I^2 = 39%, P<.0001) compared with no or sham respiratory intervention FOIS in 2 trials (n=48), no significant association between respiratory muscle training and the FOIS scores. Cough function was measured in 4 trials (n=226) using PECF-VC – no significant association found. PECF-RC (n=161), no significant association between respiratory muscle training compared with no or sham intervention	participants who were in the early-stage post stroke. However, no effects on improving cough function were observed. It is not clear from this review how easy these exercises are to do and what percentage of patients with large strokes would be able to do them.
548	W. Zhang et al (2022). Respiratory Muscle Training Reduces Respiratory Complications and Improves Swallowing Function After Stroke: A Systematic Review and Meta-Analysis. Archives of Physical Medicine and Rehabilitation.	SR & MA of RCTs (N=11, n=523). Participants were adults diagnosed with stroke. Studies were excluded if they included participants who had swallowing dysfunction before stroke; and if, except for stroke, participants had other diseases that might affect outcomes, such as heart disease, chronic obstructive pulmonary disease, or spinal deformity.	Intervention was respiratory muscle training aimed at increasing strength of the inspiratory or expiratory muscles by using threshold resistance trainer or flow oriented resistance trainer compared with control group sham intervention without effective respiratory muscle training or no intervention	Occurrence of respiratory complications was measured in 7 trials; it was reported as number of participants with pneumonia in 5 trials and as number of participants with lung infections in 1 trial after the commencement of training. Swallowing function was measured in 5 trials using the PAS and FOIS. Cough function was measured in 4 trials using PECF-VC or PECF-RC.	Respiratory muscle training reduced the risk of respiratory complications (relative risk, 0.51; 95% confidence interval [CI], 0.28-0.93; I2=0%; P=.03; absolute risk difference, 0.068; number need to treat, 14.71) compared with no or sham respiratory intervention. It also decreased the liquid-type Penetration-Aspiration Scale scores by 0.81 (95% CI, −1.19 to −0.43; I2=39%; P<.0001). There was no significant association between respiratory muscle training and Functional Oral Intake Scale (FOIS) scores,	**++** Well conducted It is of note that in total, only 242/523 stroke participants had dysphagia confirmed by videofluoroscopic swallowing study or bedside swallowing assessment. Therefore, it is assumed the majority of participants within the studies overall were within the 'general stroke population' with no formally identified swallowing difficulties.

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					cough function: increased FOIS scores by 0.47 (95% CI, −0.45 to 1.39; I2=55%; P=.32), decreased peak expiratory cough flow of voluntary cough by 18.70 L per minute (95% CI, −59.74 to 22.33; I2=19%; P=.37) and increased peak expiratory cough flow of reflex cough by 0.05 L per minute (95% CI, −40.78 to 40.87; I2=0%; P>.99).	
550	Y. Zheng et al (2020). Can inspiratory muscle training benefit patients after stroke? A systematic review and meta-analysis of randomized controlled trials. Clinical rehabilitation. 34: 7 866-876	SR and MA of RCTs of inspiratory muscle training followed PRISMA guidelines Subgroup analysis compared training programs Cochrane RoB assessed bias.		pulmonary function (absolute or predictive FVC, FEV1or max inspiratory pressure) cardiopulmonary endurance (from standardized tests eg 6MWT), pulmonary infection incidence, and quality of life (validated disease specific instrument.	13 trials (373 participants) were identified. MA conducted on 8/13. Inspiratory muscle training improved FVC (MD 0.47 95%CI 0.28–0.66), FEV1 (MD 0.26, 95%CI 0.18 –0.35), 6MWT (MD 52.6m 95%CI 25.22–80.01) max insp press (MD 18.18 95%CI 5.58 –30.78), insp muscle endurance (MD 19.99 95%CI 13.58 –26.40), and incidence of chest infection (RR 0.11 95%CI 0.03–0.40). The most effective protocol = 3x/week >20 mins/ day for 3 weeks	++ Good quality review but fairly small numbers Conclusion: Inspiratory muscle training can improve pulmonary function and cardiopulmonary endurance, and reduce the chest infections
545	J. Veldema; P. Jansen (2020). Resistance training in stroke rehabilitation:	SR/MA 30 studies (n=1051) Resistance training in stroke	Compared: (i) resistance training with no intervention,	Outcomes in: (1) gait, (2) muscular force and motor function, (3) mobility, balance and postural control, (4)	In general (i) resistance training is beneficial for the majority of parameters observed,	++

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	systematic review and meta-analysis. Clinical rehabilitation. 34: 9 1173-1197	rehabilitation	(ii) resistance training with other interventions, (iii) different resistance training protocols in stroke rehabilitation.	health related quality of life, independence and reintegration, (5) spasticity and hypertonia, (6) cardiorespiratory fitness, (7) cognitive abilities and emotional state and (8) other health-relevant physiological indicators.	(ii) resistance training is superior to other therapies on muscular force and motor function of lower and upper limbs, health related quality of life, independence and reintegration and other health-relevant physiological indicators, not significantly different from other therapies on walking ability, mobility balance and postural control and spasticity and hypertonia, and inferior to ergometer training on cardiorespiratory fitness and (iii) the type of resistance training protocol significantly impacts its effect; leg press is more efficient than knee extension and high intensity training is superior than low intensity training. Specifically, benefits were seen for: Muscular force/motor function of lower limbs (n=97) Mobility, balance and postural control (n=73)	
545	J. Veldema; P. Jansen (2020).	SR & MA (N=30, n=1051) Trials matching the following criteria were included:	Only studies applying pure resistance training	(1) gait, (2) muscular force and motor function, (3) mobility, balance and	The data indicates that: (i) resistance training is beneficial for the majority of	+

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	Resistance training in stroke rehabilitation: systematic review and meta-analysis. Clinical rehabilitation. 34: 9 1173-1197	(1) human-studies, (2) prospective studies, (3) written in English, (4) diagnosis of stroke, (5) resistance training as intervention, (6) pre- and post-intervention assessment, (7) two experimental groups at least and (8) five randomized patients at least.	were enrolled. This type of training uses the resistance of free weights, machine weights, body weight or resistance band, which have to be overcome by voluntary muscular effort Mixed interventions (resistance training with an additional intervention) were excluded. 11 studies (N=403) investigated the effects of resistance training in comparison with no intervention. 15 trials (N=581) compared the effectiveness of resistance training with other interventions in stroke rehabilitation.	postural control, (4) health related quality of life, independence and reintegration, (5) spasticity and hypertonia, (6) cardiorespiratory fitness, (7) cognitive abilities and emotional state and (8) other health-relevant physiological indicators	parameters observed, (ii) resistance training is superior to other therapies on muscular force and motor function of lower and upper limbs, health related quality of life, independence and reintegration and other health-relevant physiological indicators, not significantly different from other therapies on walking ability, mobility balance and postural control and spasticity and hypertonia, and inferior to ergometer training on cardiorespiratory fitness and (iii) the type of resistance training protocol significantly impacts its effect; leg press is more efficient than knee extension and high intensity training is superior than low intensity training.	Two authors screened, however only one extracted data. Authors identify high inconsistency of the effects detected, possibly caused by the large variability of interventions and populations, as well as inhomogeneity of parameters assessed.
552	Saunders et al (2020). Physical fitness training for stroke patients. Cochrane Database of Systematic Reviews. 2020: 3.	Cochrane SR and MA of RCTs to determine if fitness training after stroke reduces Controls = usual care, no Rx, or a non-exercise intervention in stroke survivors	Exercise = a planned, structured, repetitive, and deliberately performed to train (improve) one or more components of physical fitness, performance, or	Outcomes = death, death or dependence/ disability. Secondary objectives = adverse events, risk factors, physical fitness, mobility, physical function, health status	75 studies (n= 3017 mostly ambulatory participants). 32 trials of CR training (n= 1631, mod-high evidence), Mod-low evidence for 20 trials of resistance (n= 779) and 23 of mixed training (n=1207).	++ Exercise is safe but cannot tell if it reduces mortality or dependence. CR training and, to a lesser extent mixed training, reduce disability during or after usual stroke

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			health. Here it is classified as CR fitness training (usually walking or cycling); resistance training (muscle contractions resisted by weights, body mass, or elastic devices) or mixed.	and quality of life, mood, and cognitive function	Death not influenced by any intervention; Disability improved at end of RX by CR training (SMD 0.52, 95%CI 0.19 – 0.84; 8 studies n=462 P= 0.002; moderate evidence) and mixed training (SMD 0.23, 95%CI 0.03 -0.42; 9 studies n= 604; P = 0.02; low-certainty evidence). Resistance training improved strength but not other outcomes (SMD 0.23 95%CI 0.03, 0.42. Also low-mod evidence of improvements in physical fitness (VO2 peak MD 3.40 mL/kg/ min 95%CI 2.98 -3.83; 9 studies, n= 438. Moderate level evidence), walking speed and balance. No serious adverse events. Insufficient data for Ax of mood, quality of life, and cognition. Long-term benefits were unclear but some mobility benefits persist.	care. There is sufficient evidence to incorporate CR and mixed training, involving walking in stroke rehabilitation programmes to improve fitness, balance and walking speed and capacity. Risk of hospitalisation reduced by ˜7%. No conclusions re: cognition, mood and QoL Resistance training improved strength, may be balance and walking endurance but not other outcomes. Need further work to establish the optimal exercise prescription for different types of patients, the range of benefits and any long-term benefits.
753	T. Rackoll et al. (2022). Physical Fitness Training in Patients with Subacute Stroke (PHYS-STROKE): Safety analyses of a randomized clinical trial. *International Journal of Stroke* 17:1 93-100	Pre-specified safety analysis of a multicenter, RCT (PHYS-STROKE) to compare the incidence of severe adverse events and investigate factors which may influence the incidence. 200 patients with moderate to severe subacute stroke (5–45 days post stroke) 190 (95%)	Aerobic, bodyweight supported, treadmill-based training for 25 min, 5x/week for four weeks, plus standard rehabilitation (n=105). Target heart rate (THR) was 50–60% of max heart rate (180 – age), reduced by 10 beats/ min if beta-	Serious adverse events (SAE) = cerebro- or cardiovascular events, readmission to hospital or death, assessed during six months of follow-up. Incident rate ratios (IRR) calculated, and Poisson regression	50 SAE occurred in 39 patients: 15 recurrent strokes, 30 readmissions and 5 deaths (training =1 vs control= 4, all after the intervention). 9 patients (training =6 vs relaxation =3) had > one SAE. 18 SAE (36%) occurred during the intervention period but	A higher rate of SAE was seen in people with moderate-severe stroke undertaking aerobic training early post-stroke. However these were not, or unlikely to be related to the intervention. Risk was greater in people with diabetes

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		included in 6 months follow up analysis. Patients randomised to the training group were more severely affected than controls (acute NIHSS: 9 (5–12) vs. 7 (5–11)).	blockers were taken, Control = relaxation sessions (n= 95).	analyses conducted to identify risk factors for SAE and to test the association with aerobic training. Models were controlled for age, sex, and stroke severity and cardiovascular risk factors (arterial hypertension, atrial fibrillation, diabetes, previous stroke or cardiac disease, number of comorbidities, and related medication (antiplatelets, oral anticoagulants, b-blocker, and statins).	none during an intervention session. 8 patients (5= training 3= control) discontinued the intervention due to SAE. Recurrent strokes were ischemic. Hospital readmissions were mainly due to cardiac complications (27%). There was a higher incidence of SAE in the training group vs control (6.31 vs. 3.22; IRR 1.70, 95%CI 0.96 - 3.12). However, no deaths were related to the intervention. Other SAEs were ‘‘unlikely’’ to be related to the intervention The risk was higher in people with diabetes (IRR 7.10 95%CI 1.56 - 51.24) or atrial fibrillation (IRR 4.37 95%CI 0.97 - 31.81).	or AF but not modified by age or stroke severity.
757	Moreno-Segura et al (2022). Effects of core training on trunk function, balance, and gait in stroke patients: A systematic review and meta-analysis of randomised controlled trials. *Clinical rehabilitation* : 2.6921552211e+15	Systematic review and meta-analysis of RCTs. Data source: Cochrane Library, Medline, Web of Science, Scopus, and Science Direct to Jan 2022. Used PRISMA guidelines and Cochrane risk of bias tool. Two independent reviewers.	Core muscle training alone or with conventional therapy. Core training was heterogeneous. Many trials used strength, resistance and coordination exercises in different positions, most commonly	trunk function, balance and gait/ mobility	29 trials included (n=1030, range 16 -180). 21 measured trunk function; 20 measured balance and 17 measured gait. Overall significant risk of bias in several areas were noted. , Significant improvements were seen with core training plus conventional therapy for trunk function ((Cohen's d=0.93, 95%CI 0.70- 1.17,p <0.0001))	Low evidence (but good quality review) that (very heterogeneous) ‘core muscle training’ can improve trunk function and balance in, primarily chronic stroke. Although relatively large, this review doesn't really add much because a) the quality is low

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		Mean age of participants = 58.5 ± 10 years and mean time since stroke was 308 ± 176 days. Only one study included patients with acute stroke	bridging (bi- and unilateral), trunk flexion and rotation, curl-ups, forward and lateral reaches. Other interventions = unstable surfaces, pelvic proprioceptive neuromuscular facilitation (PNF), trunk Bobath exercises, Halliwick therapy, or devices. Most common dose was 300 min/week for four weeks (range 3 - 12 weeks)		and balance (Cohen's d=0.67, 95%CI 0.43- 0.91) p <0.0001) but not gait ((Cohen's d=−0.46 95%CI −0.93, 0.02, P=0.06).	and the intervention is undefined and very heterogeneous. The most commonly used exercises could also be classified as hip and trunk exercises; strengthening, balance or co-ordination training.
755	Lin et al (2022). Effect of Physical Activity on Cognitive Impairment in Patients With Cerebrovascular Diseases: A Systematic Review and Meta-Analysis. *Frontiers in neurology* 13: 854158	SR and MA of 1) the effect of physical activity (PA) on cognition in patients with cerebrovascular disease, and 2) which PA characteristics had most benefit. PRISMA guidelines were followed and Cochrane risk of Bias tool applied Databases: Pubmed, Web of Science, Embase, and Cochrane Library searched to May 31st 2021. Standardized mean difference (SMD) and 95% confidence intervals were calculated to generate forest	10 trials delivered aerobic exercise, 2 of which adopted traditional (Chinese) exercises. 4 trials involved non-aerobic exercise. The mean duration of intervention = 15 weeks (range 4- 72 weeks), 3-4 x/week. In 10 trials , the control group = usual care, daily routines, or	15 studies used a global cognitive function assessment scale. 12 of which adopted objective measures and 3 administered subjective cognitive assessments. 7 studies conducted multiple neuropsychological tests in different cognitive domains	22 trials were included (n=1,601. 792 = control and 809 = intervention groups, range 14 to 358). Overall methodological quality was good. PA had a positive effect on global cognition (SMD: 0.20 95%CI 0.12–0.27), executive function (SMD: 0.09 95%CI 0.00–0.17) and working memory (SMD: 0.25 95%CI 0.10– 0.40). Patients cognitive impairment at baseline	Physical activity/ exercise can significantly improve overall cognition, executive function and working memory in people with chronic cerebrovascular disease, particularly if there was a cognitive impairment at the start of the intervention. Moderate-intensity aerobic training was the most effective form of delivery.

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		plots with subgroup, moderation and regression analyses to explore heterogeneity and possible adjustment factors. These included the measures used; time since stroke, baseline cognition, type of control and intervention, intensity and duration of training. Average age = 63 years, 40% women. Patients in the 14 trials had cognitive impairment before the intervention	wait-list control, without any PA, 9 trials had an non-aerobic exercise (muscle relaxation, stretching, balance, and physiotherapy) control the rest (n=3) were rhythm-and-music-based therapy, cognitive training, and social communication		received the greater benefit (SMD: 0.24 95%CI 0.14–0.34]) than those without. Benefits were seen in chronic stroke (>3 months) (SMD: 0.25 95%CI 0.16–0.35) but not acute. Moderate intensity PA showed the greatest larger pooled effect size (SMD: 0.23 95%CI 0.11–0.36) but further analyses re; types, duration, and frequency were inconclusive. The beneficial effects of PA on cognition are negatively correlated with age ($p < 0.05$)	
754	Clark, B., et al. (2021). "The effect of time spent in rehabilitation on activity limitation and impairment after stroke." Cochrane Database of Systematic Reviews(10).	Cochrane SR and MA of the effect of time spent in rehabilitation on activity, dichotomised to more/less time. Secondary objectives were to a) compare trials with a larger difference between groups in time spent in rehabilitation to those with a smaller difference and b) describe rehabilitation schedule in terms of duration and frequency of sessions and total duration of rehabilitation. Cochrane Stroke Group trials register, CENTRAL, MEDLINE, Embase, 8 other databases, and 5	Comparing different amounts of time spent in the same type of rehabilitation by adults with stroke. 14 trials provided inpatient rehabilitation. 5 provided intervention in the community/ out-patients. The remainder did not describe the setting. Time in rehabilitation varied from 90 to 1288 mins/week, 3-7	Primary outcome = activities of daily living (ADLs). Secondary outcomes = activity and impairment measures of upper and lower limbs, and serious adverse events (SAE)/death. 13 trials provided upper limb rehabilitation, 5 general rehabilitation, 2 mobilisation training, and one lower limb training.	21 RCTs were analysed (n= 1412. Quality was mixed; Most had some concerns or were high risk. Immediately after treatment, there was no difference in ADL, upper limb or lower limb activities between groups that spent more or less time in rehabilitation (very low certainty evidence). There was very/low certainty evidence that patients who recieved more rehabilitation showed greater improvement	There was very/low certainty evidence that spending more time n rehabilitation does not lead to better outcomes in terms of ADL, upper or lower limb activity, but may lead to improvement in upper and lower limb impairments than spending ‘less time’. There is currently insufficient evidence to recommend a minimum beneficial daily amount of rehabilitation.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
		trials registers were searched to June 2021 for RCTs using established Cochrane methods	days/week for 2 weeks to 6 months. 16 trials included acute/sub-acute stroke (<6 months) and the remaining 5 included chronic strokes.		in upper limb impairment (SMD 0.32 95%CI 0.06to 0.58 p=0.01; 9 studies, 287 participants) and lower limb impairments (SMD 0.71 95%CI 0.15 to 1.28; P =0.01; 1 study, 51 participants). More time in rehabilitation did not affect the risk of SAEs/death (RR 1.20, 95% CI 0.51 to 2.85 p= 0.68; 2 studies, 379 participants; low-certainty evidence), but few studies measured these outcomes. The larger the difference in time spent in rehabilitation, the greater the improvements with more rehabilitation. This was significant for ADL (P = 0.02) and upper limb activity (P = 0.04), but not lower limb activity (P = 0.41) or upper limb impairment (P = 0.06).	
756	Machado et al. (2022). Maintenance of Cardiorespiratory Fitness in People With Stroke: A Systematic Review and Meta-analysis. *Archives of Physical Medicine and Rehabilitation* 103:7 1410-1421.e6	SR and MA to determine if cardiorespiratory fitness is maintained after a cardiorespiratory fitness intervention. Databases: MEDLINE,CINAHL, Embase, (CENTRAL) Cochrane, Web of Science, Sports	People with stroke who had completed a cardiorespiratory fitness intervention. The intervention was varied. Participants completed training 2-5 days/ week over 4-13 weeks at moderate to	A direct measure of cardiorespiratory fitness measured at short- (0 to <3 months), medium- (3-6 months), or long-term (>6 months) follow-up. A lower limit of 1.0 $mL/kg^{-1}/min^{-1}$ determined maintenance (ie, no	14 studies (n =324, average sample size = 22) were included. PEDro scores ranged from 5-8 (moderate to excellent quality). Most people with stroke maintained cardiorespiratory fitness in the short- (0.19 $mL/kg^{-1}/min^{-1}$ 95%CI 1.66 to	A good quality review of moderate/good quality (albeit small) studies shows that gains in cardiorespiratory fitness appear to be maintained in the short, medium and long-term after training in people (predominantly) with mild stroke.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
		Discus, and PEDRO for randomized controlled trials and cohort studies. Data Extraction: Two independent reviewers using PRISMA guidelines and PEDRO to assess quality.	high intensity (40%-70% heart rate reserve [HRR]; n=4 studies), high intensity (60% to <90% HRR; n=7 studies), and intervals of high intensity (85%-95% peak heart rate or maximal heart rate; n=3 studies). 6 studies included only cardiorespiratory fitness training and 8 studies combined this with stretching/ flexibility, balance or strength training, stepping practice, stairs, or task-specific training, education or cognitive interventions Most participants had had a mild stroke. Mean age = 68.7 years and time since stroke ranged 14 days to 7.2 years. 5 studies recruited in the subacute phase (7 days to 6 months), and the remainder in the chronic phase (>6 months).	change) of cardiorespiratory fitness. In 7 studies short-term (≤3 months) follow-up was completed; 4 studies long-term (>6 months) follow-up and 3 studies had follow-up assessments (1 study at 3 and 6 months post intervention, 1 at 1 and 6 months, and 1 at 3 and 9 months post intervention).	1.28), medium (0.61 $mL/kg^{-1}/min^{-1}$ 95%CI 3.95 to 2.74), and long term (0.00 $mL/kg^{-1}/min^{-1}$ 95% CI 2.23 to 2.23) after completion of cardiorespiratory fitness interventions.	However, caution required as numbers were small and CI wide. Despite this, the results have important implications for recovery ad secondary prevention.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
946	Dorsch S, et al. 2022. Bobath therapy is inferior to task-specific training and not superior to other interventions in improving arm activity and arm strength outcomes after stroke: a systematic review. J Physiother. 2022 Dec 16:S1836-9553(22)00115-1.	SR-MA 13 trials, n=636 subjects Variability in time post-stroke 14 days - 4.5 yrs Average age 49- 73.	'Bobath approach' vs something else [task-specific training (five trials), arm movements (five trials), robotics (two trials) and mental practice (one trial)].	Synergies/impairment: FM UL motor score. Activity: ARAT, WMFT, Frenchay, B&B, timed reaching task Strength, shoulder flexion, elbow extension, grip	Thirteen trials included comparing Bobath with another intervention Pooled data from five trials indicated that Bobath therapy was less effective than task-specific training for improving arm activities (SMD –1.07, 95% CI –1.59 to –0.55). Pooled data from five trials indicated that Bobath therapy was similar to or less effective than arm movements for improving arm activities (SMD –0.18, 95% CI –0.44 to 0.09). One trial indicated that Bobath therapy was less effective than robotics for improving arm activities. One trial indicated similar effects of Bobath therapy and mental practice on arm activities. For strength outcomes, pooled data from two trials indicated a large benefit of task-specific training over Bobath therapy (SMD –1.08); however, this estimate had substantial	++

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					uncertainty (95% CI –3.17 to 1.01). The pooled data of three trials indicated that Bobath therapy was less effective than task-specific training for improving Fugl-Meyer scores (MD –7.84, 95% CI –12.99 to –2.69). The effects of Bobath therapy relative to other interventions on strength outcomes remained uncertain.	
946	Dorsch S, et al. 2022. Bobath therapy is inferior to task-specific training and not superior to other interventions in improving arm activity and arm strength outcomes after stroke: a systematic review. J Physiother. 2022 Dec 16:S1836-9553(22)00115-1.	SR and meta-analysis of 13 trials, n=636 participants; Participants 14 days - 4.5 yrs after stroke, (5 trials acute/sub-acute <6 mths, 8 trials late after stroke >6 mths); average age 49-73.	All compared Bobath with another intervention PEDro scores ranged from 5-8. Bobath criteria: the authors explicitly stated was Bobath or neurodevelopmental training; or referenced a Bobath textbook or publication or was based on Bobath therapy (ie, aimed to normalise movement, normalise tone, facilitate normal movement or inhibit reflex activity). Comparator: 5 task-specific training, 5 arm	-Arm activity: ARAT, WMFT, Frenchay, B&B, timed reaching task - Strength: grip strength, shoulder flexion strength, elbow extension strength, Motricity Index and the FM UL motor score.	N=5 Bobath less effective than TST for improving arm activities (SMD –1.07, 95% CI –1.59 to –0.55). n=5 Bobath similar to or less effective than arm movements for improving arm activities (SMD –0.18, 95% CI –0.44 to 0.09). 1 trial Bobath was less effective than robotics for improving arm activities and 1 trial indicated similar effects of Bobath and mental practice on arm activities. For strength outcomes, 2 trials indicated a large benefit of TST over Bobath (SMD –1.08); however, this estimate had substantial uncertainty (95% CI –3.17 to 1.01). 3 trials	**++** No concerns noted. Some old studies, and definition of what counts as Bobath is challenging (better to describe interventions not approach).

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			movements, 2 robotics, 1 mental practice.		indicated Bobath was less effective than task-specific training for improving Fugl-Meyer scores (MD –7.84, 95% CI –12.99 to –2.69). The effects of Bobath therapy relative to other interventions on strength outcomes remained uncertain.	