CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

Rehabilitation, Recovery and Community Participation Following Stroke

Part Two: Delivery of Stroke Rehabilitation to Optimize Functional Recovery Evidence Tables

7th edition, update 2025

Rehabilitation to Improve Communication

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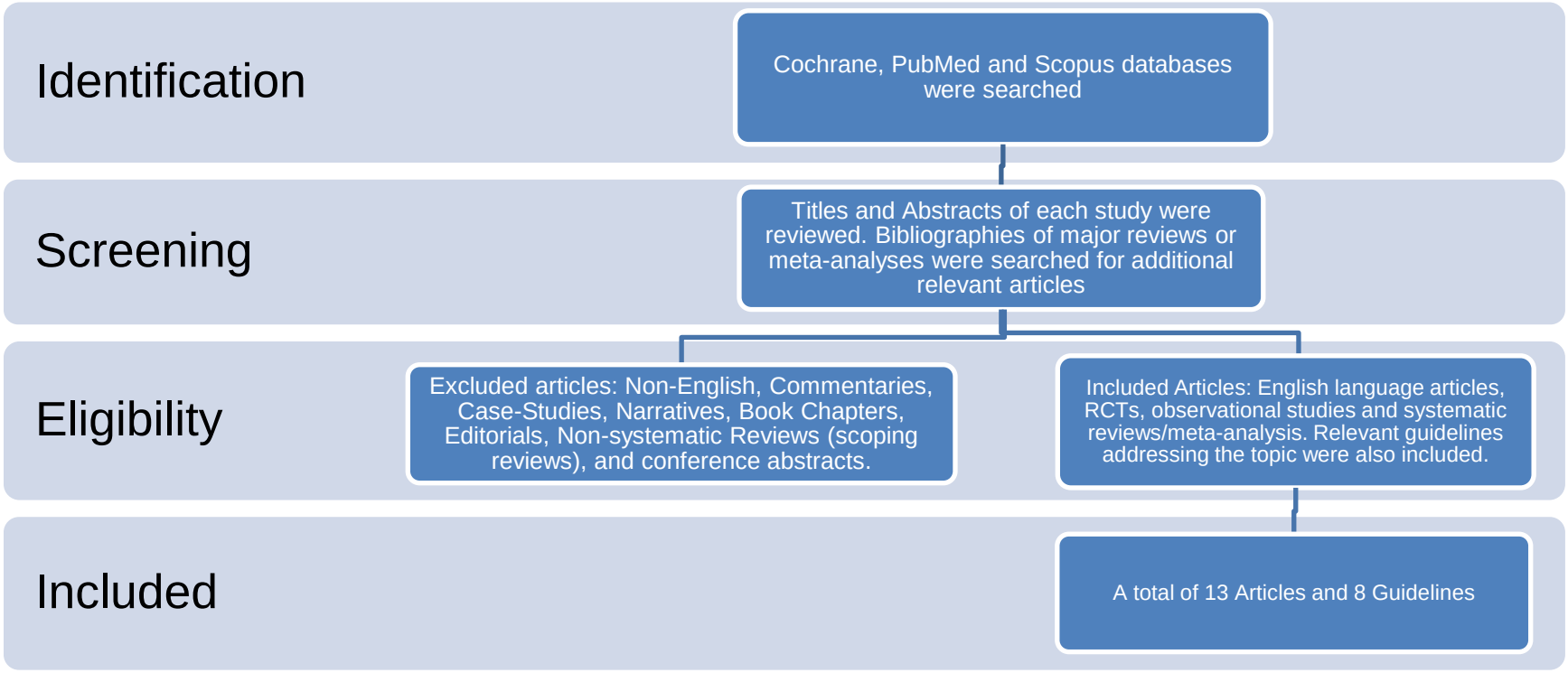
Search Strategy



Cochrane, PubMed Scopus databases were searched using search terms such as Stroke AND (communication OR aphasia OR speech OR language OR “speech-language” OR conversation OR discourse OR reading OR writing OR dysarthria). Titles and abstract of each article were reviewed for relevance. Bibliographies were reviewed to find additional relevant articles. Articles were excluded if they were: non-English, commentaries, case-studies, narrative, book chapters, editorials, non-systematic review, or conference abstracts. Additional searches for relevant best practice guidelines were completed and included in a separate section of the review. A total of 13 articles and 8 guidelines were included and were separated into categories designed to answer specific questions.

Published Guidelines

Guideline	Recommendations
Management of Stroke Rehabilitation Working Group. VA/DoD clinical practice guideline for the management of stroke rehabilitation. Washington (DC): Veterans Health Administration, Department of Defense; Version 5.0 – 2024. **Available at:** https://www.healthquality.va.gov/guidelines/Rehab/stroke/	There is insufficient evidence to recommend for or against the use of intensive language therapy for aphasia. (Neither for nor against)
National Clinical Guideline for Stroke for the UK and Ireland. London: Intercollegiate Stroke Working Party; 2023 May 4. **Available at:** www.strokeguideline.org**.** **(selected)**	People with communication difficulties after stroke should: – be assessed and offered access to a range of communication aids, prescribed according to the person's needs, goals, and preferences; – be assessed for their ability to use assistive technology and have programmes and equipment adjusted accordingly; – be trained and supported in the use of the appropriate technology. People with communication difficulties after stroke should be offered access to social and participatory activities such as conversation partners, peer support groups, and return to work programmes as appropriate. Intensive speech and language therapy such as comprehensive aphasia programmes may be considered from 3 months after stroke for those who can tolerate high-intensity therapy. The carers and family of a person with communication difficulties after stroke, and health and social care staff, should receive information and training from a speech and language therapist to improve their communication skills and enable them to optimise engagement in the person's rehabilitation, and promote autonomy and social participation.
National Institute for Health and Care Excellence **Stroke Rehabilitation in Adults Clinical guideline. 2023** **UK** https://www.nice.org.uk/guidance/ng236	**1.12 Communication** 1 updated recommendation from 2013. Consider a computer-based programme (or apps) tailored to individual goals and circumstances in relation to word finding, alongside face-to-face speech and language therapy. [2023] Screen people after stroke for communication difficulties within 72 hours of onset of stroke symptoms. Each stroke rehabilitation service should devise a standardized protocol for screening for communication difficulties in people after stroke. Refer people with suspected communication difficulties after stroke to a speech and language therapist for detailed analysis of speech and language impairments and assessment of their impact. Provide appropriate information, education and training to the multidisciplinary stroke team to enable them to support and

Guideline	Recommendations
	communicate effectively with the person with communication difficulties and their family or carer. Speech and language therapy for people with stroke should be led and supervised by a specialist speech and language therapist working collaboratively with other appropriately trained people – for example, speech and language therapy assistants, carers and friends, and members of the voluntary sector. Provide opportunities for people with communication difficulties after stroke to have conversation and social enrichment with people who have the training, knowledge, skills and behaviours to support communication. This should be in addition to the opportunities provided by families, carers and friends. Speech and language therapists should assess people with limited functional communication after stroke for their potential to benefit from using a communication aid or other technologies (for example, home-based computer therapies or smartphone applications). Provide communication aids for those people after stroke who have the potential to benefit, and offer training in how to use them. Tell the person with communication difficulties after stroke about community-based communication and support groups (such as those provided by the voluntary sector) and encourage them to participate. Speech and language therapists should: • provide direct impairment-based therapy for communication impairments (for example, aphasia or dysarthria) • help the person with stroke to use and enhance their remaining language and communication abilities • teach other methods of communicating, such as gestures, writing and using communication props • coach people around the person with stroke (including family members, carers and health and social care staff) to develop supportive communication skills to maximise the person's communication potential • help the person with aphasia or dysarthria and their family or carer to adjust to a communication impairment • support the person with communication difficulties to rebuild their identity • support the person to access information that enables decision-making. When persisting communication difficulties are identified at the person's 6-month or annual stroke reviews, refer them back to a speech and language therapist for detailed assessment, and offer treatment if there is potential for functional improvement. Help and enable people with communication difficulties after stroke to communicate their everyday needs and wishes, and support them to understand and participate in both everyday and major life decisions. Ensure that environmental barriers to communication are minimised for people after stroke. For example, make sure signage is clear and background noise is minimised. Make sure that all written information (including that relating to medical conditions and treatment) is adapted for people with aphasia after stroke. This should include, for example, appointment letters, rehabilitation timetables and menus. Offer training in communication skills (such as slowing down, not interrupting, using communication props, gestures, drawing) to the conversation partners of people with aphasia after stroke.

Guideline	Recommendations
Clinical Guidelines for Stroke Management 2022. Melbourne (Australia): National Stroke Foundation. **(selected)**	Strong Recommendation For stroke survivors with aphasia, speech and language therapy should be provided to improve functional communication. Weak Recommendation For stroke survivors with aphasia, intensive aphasia therapy (at least 45 minutes of direct language therapy for five days a week) may be used in the first few months after stroke. Weak Recommendation AGAINST Brain stimulation (transcranial direct current stimulation or repetitive transcranial magnetic stimulation), with or without traditional aphasia therapy, should not be used in routine practice for improving speech and language function and only used as part of a research framework.
Zhang T, Zhao J, Li X, Bai Y, Wang B, Qu Y et al. **Chinese Stroke Association guidelines for clinical management of cerebrovascular disorders: executive summary and 2019 update of clinical management of stroke rehabilitation.** ***Stroke and Vascular Neurology* 2020: svn-2019-000321.** **(selected)**	1. Communication assessments should include interviews, dialogues, observations, standardised tests or non-standardised projects for assessment of speech, language, cognition, language use, reading and writing; identifying advantages and weaknesses of communication; and identifying useful compensatory strategies (Class I recommendation, Level B evidence). 2. Remote rehabilitation is reasonable to employ when the face-to-face assessment is impossible or impractical (Class IIa recommendation, Level A evidence). 3. It is reasonable to use individualised interventions for the treatment of cognitive-communication disorders (Class IIa recommendation, Level B evidence). 4. Aphasia rehabilitation for aphasia patients is recommended (Class I recommendation, Level A evidence). 5. Intensive treatment is likely to be necessary, but there is no consensus on the optimal quantity, strength, distribution or duration (Class IIa recommendation, Level B evidence). 6. Computer therapy is reasonable to be used as an addition to speech and language therapy (SLT) (Class IIa recommendation, Level B evidence). 7. Group therapy for aphasia is reasonable at each stage of treatment, including the application of community aphasia groups (Class IIa recommendation, Level B evidence). 8. Brain stimulation may be considered as an adjunct experimental therapy to behavioural SLT, thus regular use is not recommended (Class IIb recommendation, Level B evidence). 9. Acupuncture is reasonable for aphasia treatment (Class IIa recommendation, Level B evidence). 10. Use of music is reasonable for aphasia rehabilitation (Class IIa recommendation, Level B evidence).
Simmons-Mackie N, Worrall L, Murray LL, Enderby P, Rose ML, Paek EJ,	1. All patients with brain damage or progressive brain disease should be screened for communication deficits (Level C). 2. People with suspected communication deficits should be assessed by a qualified professional (determined by country);

Guideline	Recommendations
Klippi A. **The top ten: best practice recommendations for aphasia.** ***Aphasiology.*** **2017 Feb 1;31(2):131-51.**	Assessment should extend beyond the use of screening measures to determine the nature, severity and personal consequences of the suspected communication deficit (Levels B, C). 3. People with aphasia should receive information regarding aphasia, etiologies of aphasia (e.g., stroke) and options for treatment (Levels A–C). This applies throughout all stages of healthcare from acute to chronic stages. 4. No one with aphasia should be discharged from services without some means of communicating his or her needs and wishes (e.g., using AAC, supports, trained partners) or a documented plan for how and when this will be achieved (Level: Good Practice Point). 5. People with aphasia should be offered intensive and individualized aphasia therapy designed to have a meaningful impact on communication and life (Level A-Good Practice Point depending on approach, intensity, timing). This intervention should be designed and delivered under the supervision of a qualified professional. a. Intervention might consist of impairment-oriented therapy, compensatory training, conversation therapy, functional/participation oriented therapy, environmental intervention and/or training in communication supports or augmentative and alternative communication (AAC) b. Modes of delivery might include individual therapy, group therapy, telerehabilitation and/or computer assisted treatment c. Individuals with aphasia due to stable (e.g., stroke) as well as progressive forms of brain damage should be offered intervention d. Individuals with aphasia due to stroke and other static forms of brain damage can benefit from intervention in both acute and chronic recovery phases 6 Communication partner training should be provided to improve communication of people with aphasia (Levels A, B). 7. Families or caregivers of people with aphasia should be included in the rehabilitation process (Levels A–C) a. Families and caregivers should receive education and support regarding the causes and consequences of aphasia (Level A) b. Families and caregivers should learn to communicate with the person with aphasia (Level B). 8. Services for people with aphasia should be culturally appropriate and personally relevant (citation 1,2,5,8: Level: Good Practice Point). 9. All health and social care providers working with people with aphasia across the continuum of care (i.e., acute care to end-of-life) should be educated about aphasia and trained to support communication in aphasia (Level C). 10. Information intended for use by people with aphasia should be available in aphasia-friendly /communicatively accessible formats (Level C).
Winstein CJ, Stein J, Arena R, Bates B, Cherney LR, Cramer SCet al; on behalf of the American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and	Communication assessment should consist of interview, conversation, observation, standardized tests, or nonstandardized items; assess speech, language, cognitive, communication, pragmatics, reading, and writing; identify communicative strengths and weaknesses; and identify helpful compensatory strategies. Class I; LOE B Telerehabilitation is reasonable when face-to-face assessment is impossible or impractical. Class IIa; LOE A Communication assessment may consider the individual's unique priorities using the ICF framework, including quality of life. Class IIb; LOE C

Guideline	Recommendations
Outcomes Research. **Guidelines for adult stroke rehabilitation and recovery: a guideline for healthcare professionals from the American Heart Association/American Stroke Association.** ***Stroke* 2016;47:e98–e169**	
The National Health and Medical Research Council funded Centre for Clinical Research Excellence in Aphasia Rehabilitation **Aphasia Rehabilitation Best Practice Statements 2014** **Australia** www.aphasiapathway.com.au	**Best Practice Statement: 5. Providing Intervention** 5.1 People with aphasia should be offered therapy to gain benefits in receptive and expressive language, and communication in everyday environment. (Level 1 Evidence) 5.2 People with chronic aphasia should be offered therapy to gain benefits in receptive and expressive language, and communication in everyday environments. (Level 1 Evidence0 5.3 People with aphasia post one month should have access to intensive aphasia rehabilitation if they can tolerate it (Level 1 Evidence) 5.4 People with aphasia earlier than one month post onset could have access to intensive aphasia rehabilitation if they can tolerate. (Level II Evidence) 5.5 Aphasia rehabilitation should: a) Be tailored to the needs of the person with aphasia and the nature of their communication difficulty (Level Evidence: Qual) b) Address the impact of aphasia on functional everyday activities, participation and quality of life including the impact upon relationships, vocation and leisure as appropriate from post-onset and over time for those chronemically affected. (Level 1 Evidence) c) Address the needs of family/carers (Level of Evidence: Qual) d) Include information tailored to meet the needs of people with aphasia and their family/carers (Level of Evidence: Qual) e) Include communication partner training (Level 1 Evidence) 5.6 Aphasia rehabilitation can include: a) Treatment of aspects of language models derived from cognitive neuropsychology (Level 1 Evidence) i. Word retrieval deficits (Level IV Evidence) ii. Reading deficits (Level 1 Evidence iii. Writing deficits (Level 1 Evidence) b) Treatment of sentences comprehension and production impairments (Level III-3 Evidence) c) Discourse treatment (Level IV Evidence) d) Augmentative and alternative communication (Level IV Evidence)

Guideline	Recommendations
	e) Constraint-induced language therapy (Level 1 Evidence) f) Gesture-based therapy (Level III-2 Evidence) 5.7 In addition to individual therapy delivered by speech pathologists aphasia rehabilitation my include: a) Group therapy and conservation groups (Level 1 Evidence) b) Computer-based treatments (Level II Evidence) c) Telerehabilitation (Level IV Evidence) d) Trained volunteers (Level I)

Evidence Tables

Speech and Language Therapy (SLT)

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Brady et al. 2016 **UK** **Cochrane Review**	Overall, the risk of bias was highest for incomplete reporting of outcome data (35% of trials). Risk of bias was high for blinding (15% of trials), concealed allocation (15% of trials) and selective reporting (15% of trials)	57 RCTs, including 3,002 participants with post-stroke aphasia. Mean ages ranged widely, but were generally between 50 and 70 years. Time since stroke ranged from several days to >20 years.	Trials compared SLT to no SLT(n=27); SLT to social support and stimulation (n=9); and 2 different types of SLT (n=38). Among the trials comparing SLT vs. no SLT, the interventions are described as: conventional SLT (n=12), constraint-induced aphasia therapy (n=1), melodic intonation therapy (n=1), intensive SLT (n=5), group SLT (n=1), volunteer-facilitated SLT (n=2), computer-mediated SLT (n=6), and functionally based SLT involving a communicative partner (n=1). Acupuncture was a co-intervention is 3 trials.	**Primary outcome:** Measures of functional communication (e.g. Communicative Abilities of Daily Living, Communicative Effectiveness Index) **Secondary outcomes:** Surrogate outcome measures of communication impairment (or ability), including formal measures of receptive language (oral, written and gestural), expressive language (oral, written, and gestural) or overall level of severity of aphasia (e.g. Western Aphasia Battery, Porch Index of Communicative Abilities); Psychological impact (e.g. impact on psychological or social well-being including mood, depression, anxiety and distress); Satisfaction with intervention; Number of drop-outs; adherence to allocated intervention, economic outcomes; caregiver and family quality of life	*SLT vs no SLT* Immediately after treatment, SLT was associated with significant improvement in functional communication (SMD=0.28, 95% CI 0.06 to 0.49, 10 trials; n=376; GRADE: moderate certainty), reading comprehension (SMD=0.29, 95% CI 0.03 to 0.55, 8 trials, n=253; GRADE: moderate certainty), expressive language: general (SMD=1.28, 95% CI 0.38 to 2.19, 7 trials, n=248. GRADE: low certainty) and expressive language: written (SMD=0.41, 95% CI 0.14 to 0.67, 8 trials, n=253; GRADE: moderate certainty). At 6-month follow-up, SLT was not associated with significant improvement in functional communication, receptive language (auditory comprehension) or expressive language (naming), based on results from 2-3 trials. *STL vs. social support and stimulation:* There was no evidence of a benefit in expressive language (naming), but more participants withdrew from social support intervention than SLT. *STL vs. another form of SLT:* Functional communication was significantly better in people who received therapy at high intensity vs. low intensity (MD=11.75, 95% CI 4.09 to 19.40, 2 trials, n=84. GRADE: low certainty) and long vs. short duration (SMD= 0.81, 95% CI 0.23 to 1.40, 2 trials, n=50: GRADE: very low certainty). Forms of therapy that did not differ between

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					groups for functional communication were: group vs. individual, computer-mediated vs. professional SLT and constraint-induced aphasia vs. other SLT High intensity therapy was also associated with a significant reduction in severity of impairment compared with low intensity therapy (SMD=0.38, 95% CI 0.07 to 0.69, 5 trials, n=187; GRADE: moderate). High dose vs. low dose, short duration vs. long duration, group vs. one on one and constraint-induced aphasia therapy were not associated with significantly different reduction in impairment severity.

Intensity of Speech and Language Therapy (SLT)

Study/Type	Quality Rating	Sample Description	Method	Outcome	Key Findings and Recommendations
Brady et al. 2022a, b **UK** **Systematic review & meta-analysis**	5 trials were at high risk of selection bias (random sequence generation, n=2 and lack of CA n=4). For detection and attrition bias, risk was low or unclear.	25 RCTs including 959 participants with aphasia post stroke. Median age was 63 years (range 45 to 79 years, 58% were men. Median time since stroke was 61 days (IQR:7–487).	The associations between speech-language therapy (SLT) and i) total dosage (hours) categorized as ≤5, >5-14, >14-20, ≥20-<50 and ≥50, ii) intensity (hours/week), categorized as <2, 2-<3, 3-<4, 4-9, and >9; iii) frequency days/week, categorized as ≤2, 3,3,5 and 5+, total duration of therapy (weeks), categorized as <3, 3, 4-10, 11-20, and >20, iv) impairment target (mixed expressive-receptive targeted	**Primary Outcomes:** *Overall language* scores were assessed using the Western Aphasia Battery–Aphasia Quotient (WAB-AQ), *auditory comprehension* was assessed by the Aachen Aphasia Test–Token Test (AAT-TT), *naming* by the Boston Naming Test (BNT), and *functional communication* by the Aachen Aphasia Test–Spontaneous Speech Communication (AAT-SSC)	***SLT dosage (hours)*** Mean gains from baseline for overall language ability, and auditory comprehension were greatest for >20 to < 50 hours of therapy (18.37, 95% CI 10.58 to 16.16 and 5.23, 95% CI 1.51 to 8.95, respectively. Mean gains from baseline for functional communication were greatest for >14 to 20 hours of therapy (0.94, 95% CI 0.34 to 1.55). No functional communication gains were observed for ≤5 hours SLT or comprehension gains for ≤20 hours SLT. ***SLT intensity (hours/week)*** Mean gains from baseline for overall language

Study/Type	Quality Rating	Sample Description	Method	Outcome	Key Findings and Recommendations
			approaches, spoken language, word-finding approaches and auditory comprehension), v) theoretical approach (semantic/phonological, phonological, constraint-induced aphasia therapy [CIAT], functional/pragmatic and Melodic Intonation Therapy [MIT]) and vi) home practice (yes/no), were examined. In the sister publication (Brady et al. 2022b), the association between outcomes of interest and subgroups, including age (⩽/>65years), aphasia severity (mild–moderate/ moderate–severe), chronicity (⩽/>3months), and sex, were examined.		ability were greatest for ≤2 hours/week (15.85, 95% CI 8.06–23.64), although gains in mean scores were very similar across all intensity categories. The pattern was similar for functional communication with the greatest gains for ≤2 hours/week (0.77, 95% CI 0.36–1.19) with equivalent gains for 2 to 3 hours/week (0.76, 95% CI 0.34–1.18) and 3-4 hours/week (0.70, 95% CI 0.35–1.06). Auditory comprehension gains were greatest at ≥9 hours/week (7.3, 95% CI 4.09–10.52) with similar gains for >3 to 4 hours/week (6.01, 95% CI 1.04–10.98) and up to 2 hours/week (6.5, 95% CI 1.72–11.27). No gains were observed when SLT was provided 2 to 3 hours/week or 4 to 9 hours weekly. ***SLT frequency (days weekly)*** The greatest gain in overall language ability was associated with 5 days/ week (14.95, 95% CI 8.67–21.23), although similar gains were achieved at all other frequency categories ranging from 10.24 to 14.14). The greatest gain for functional communication was associated with 5 days/week (0.78, 95% CI 0.48–1.09), although mean gains were achieved with all other categories (0.5 to 0.7) except for ≥5. Auditory comprehension gains were only observed at 4 and 5 days/week (5.86, 95% CI 1.64–10.08 and 4.63, 95% CI 1.48-7.77, respectively). ***SLT duration (total weeks)*** The greatest gain in overall language ability was associated with therapy duration of 11-20 weeks (17.27, 95% CI 9.71-24.82), followed closely by >20 weeks (16.93, 95% CI 8.57-25.29). Therapy duration of <3 weeks was not associated with significant improvement.

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					Gains in functional communication were similar, and greatest for 4-10, 11-20 and >20 weeks (mean of 0.76-0.80). Gains for auditory comprehension were variable with durations of <3 weeks, 11-20 and >20 weeks yielding similar results (mean improvements of 6.06 to 6.79). ***SLT Rehabilitation Target and Theoretical Approach:*** The greatest overall language and functional communication gains occurred alongside mixed expressive-receptive targeted approaches, while auditory comprehension and naming gains were the greatest for word-finding approaches. Therapy targeting semantic-phonological recovery was associated with greater overall language ability and auditory comprehension gains from baseline, while functional/pragmatic approaches were associated with the greatest functional communication gains. ***Home practice (yes/no)*** Home practice was associated with significantly greater improvements in overall language ability and auditory comprehension, compared with no home practice, while functional communication and naming gains were similar between home practice/no practice groups. *Brady et al. 2022b (subgroup analysis)* ***Age*** ≤65 years: The greatest gains in overall language ability were associated with the provision of SLT for 5 days/week 9 hours/week (total of 20-50 hours). For functional communication, the greatest gains were associated with SLT provided for ≥5x/week, 3-4x/week for a total of 14-20 hours.

Study/Type	Quality Rating	Sample Description	Method	Outcome	Key Findings and Recommendations
					<65 years: The greatest gains in overall language ability were associated with provision of SLT >5x/week, for <2 hours /week for a total of 20-50 hours. For functional communication, the greatest gains were associated with SLT provided for 4x/week, for <2 hours/week for a total of 20-50 hours. ***Chronicity*** SLT ⩽ 3 months: The greatest gains in overall language ability were associated with provision of SLT 5x/week, for < 3-4 hours /week for a total of ≥50 hours. For functional communication, the greatest gains were associated with SLT provided for 4 days/week, <3 hours/week for a total of 20-50 hours. >3months: The greatest gains in overall language ability were associated with provision of SLT 5x/week, for <2hours /week for a total of 20-50 hours. For functional communication, no frequency, duration or total dose were associated with improvements. ***Aphasia severity*** Moderate–severe: The greatest gains in overall language ability were associated with provision of SLT 4x/week, for 3-4 hours /week for a total of 20 to 50 hours. For functional communication, the greatest gains were associated with SLT provided for 4 days/week, <2 to 3 hours/week for a total of ≥50 hours. Mild-moderate: The greatest gains in overall language ability were associated with provision of SLT >5x/week, for >9 hours /week for a total of 20 to 50 hours. For functional communication, the greatest gains were associated with SLT provided for >5 days/week, >9 hours/week for a total of 14-20 hours.

Study/Type	Quality Rating	Sample Description	Method	Outcome	Key Findings and Recommendations
					Sex Women: The greatest gains in overall language ability were associated with provision of SLT 5x/week, for <2 hours /week for a total of 20 to 50 hours. For functional communication, the greatest gains were associated with SLT provided for 4 days/week, <2 hours/week for a total of 14-20 hours. Men: The greatest gains in overall language ability were associated with provision of SLT ≥5x/week, for >9 hours /week for a total of 20 to 50 hours. For functional communication, the greatest gains were associated with SLT provided for >5 days/week, 3-4 hours/week for a total of ≥50 hours. ***Overall*** Men, aged ≤65 years in the chronic stage of stroke with mild–moderate aphasia severity, experienced the greatest language gains with high-frequency/intensity SLT. In contrast, women, aged >65 years with moderate–severely impairment who were within 3 months of aphasia onset experienced the greatest gains with lower-intensity SLT.
Acute Stroke					
Godecke et al. 2020 **Australia** **RCT** ***Very Early Rehabilitation for SpEech (VERSE) study***	CA: ☑ Blinding: Patient ☑ Assessor ☑ ITT: ☒	246 patients with post-stroke aphasia, recruited from 17 acute care hospitals. Mean age was 75 years, 50% were men. 71% had moderate to severe aphasia (WAB-RAQ ≤ 62.5).	Patients were randomized to a usual care (UC) group, and received standard care at each site, or to the UC-Plus group, who received an additional 20 sessions (45-60 minutes each, 4–5 hours per week x 4 weeks) of aphasia therapy, or to the VERSE group who received an impairment-based therapy that prioritized error-free, verbal communication,	**Primary Outcomes:** WAB-R AQ and treatment effectiveness (% maximal potential recovery achieved [MPR]) at 12 weeks **Secondary Outcomes:** Boston Naming Test, Stroke and Aphasia Quality of Life scale-39, Aphasia Depression Rating Scale and adverse events. Outcomes were assessed at 12 and 26 weeks.	At 12 weeks, the mean WAB-R AQ scores were 70 (UC), 69.4 (VERSE) and 65.1 (UC-Plus). The difference between groups was not significant. When the scores from the 2 intensive groups were combined, the mean score was 67.2, which was not significantly different from UC. At 26 weeks, there were no significant differences in mean scores between groups. At 12 weeks, the mean % MPR was 52.9 (UC), 53.1 (VERSE) and 48 (UC-Plus). The difference between groups was not significant. When the scores from the 2 intensive groups were combined, the mean score was 50.5, which was not significantly different from UC. At 26 weeks, there

Study/Type	Quality Rating	Sample Description	Method	Outcome	Key Findings and Recommendations
			encouraging conversation and was provided for the same frequency and duration as the UC-Plus protocol.		were no significant differences in mean scores between groups. At 12 and 26 weeks, there were no significant differences in mean scores for any of the secondary outcomes. There were no significant differences between groups in adverse events. There were 41 patients with 1 serious adverse event and 14 deaths. There were 11 losses to follow-up or dropouts in the UC and VERSE groups, and 7 in the UC-Plus group.
Nouwens et al. 2017 **Netherlands** **RCT** ***Rotterdam Aphasia Therapy Study-3 (RATS-3)***	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	152 stroke patients with first-ever aphasia following acute stroke (<14 days), recruited from 14 centers. Mean age was 66 years, 56% were men.	Patients were randomised to receive either 4 weeks of early intensive cognitive-linguistic treatment for one hour per day for 4 weeks or no language treatment. Afterwards, further therapy was at the discretion of the local therapist, for patients in both groups.	**Primary Outcomes:** Everyday verbal communication (Amsterdam-Nijmegen Everyday Language Test [ANELT A-score]) at 4 weeks **Secondary Outcomes:** Primary outcome at 3 and 6 months, scores on linguistic tests, EQ-5D-3L, and modified Rankin Scale	29% of patients completed 28 hours of therapy in the intervention group. At 4 weeks, the mean score on the primary outcome was 33.2 in the intervention-group and 36.2 in the control-group (MD= -3.01, 95% CI 7.15 to 1.14). The adjusted MD was 0.39, 95% CI (2.70 to 3.47). At 3 months the adjusted MD was 0.54 (95% CI 3.04 to 4.12) and at 6 months was 0.41 (95% CI 3.70 to 2.89). There were no significant differences between groups for any of the other secondary outcomes at 3 or 6 months.
Chronic Stroke					
Breitenstein et al. 2017 **Germany** **RCT** ***From Controlled Experimental Trial 2 Everyday Communication***	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	158 patients recruited from 19 inpatient or outpatient rehabilitation centres with post-stroke aphasia of duration ≥ 6 months. Mean age was 53 years, 35% were men. Mean time since stroke onset was >2 years.	Participants were randomized into intensive SLT or waitlist groups. Intensive SLT was provided over 3 weeks (≥10 hours/week) in individual and group therapy sessions and ≥5 hours/week of self-managed (mostly	**Primary Outcome:** Amsterdam-Nijmegen Everyday Language Test (ANELT-A Scale) at 3 weeks **Secondary Outcomes:** Change in primary outcomes from 3 weeks to 6 months, Acoustic intelligibility (ANELT B-	*3 weeks* There was significantly greater improvement from baseline for the primary outcome in the intensive group (28.8 to 31.4 vs. 29.6 to 29.6; p=0.0004). There was little change in ANELT B-scores within each group with no significant difference between groups. There was significantly greater improvement in total SAPS scores, and total SAQoL-39 (patient

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(FCET2EC)			computer-based) training targeting individual linguistic deficits.	score), linguistic performance (SAPS); QoL (patient's view; SAQoL-39); Non-verbal cognitive function; mRS, Trail Making Test (TMT), and Nonverbal Learning Test	view) in the intervention group. There was significant improvement in mean Nonverbal Learning Test scores, total SAPS scores and mean TMT-Part A scores within, but not between groups. Mean mRS scores did not change significantly in either group. *6 months* There was significant, but modest improvement from baseline in mean ANELT-A Scale scores in both groups with no significant differences between them. There was significant improvement in mean ANELT B-scores, total SAPS scores, SAQoL-39, Nonverbal Learning Test scores, and TMT Part A and B within each group, but with no significant difference between groups. One patient in each group was lost to follow-up.

Constraint-Induced Language Therapy (CIAT)

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Rose et al. 2022 **Australia** **RCT** ***Constraint-Induced or Multimodality Personalised Aphasia***	CA: ☑ Blinding: Patient: ☒ Assessor ☑ ITT: ☑	201 participants with chronic aphasia resulting from stroke of onset >6 months. Median age was 63.6 years, 68% were men. Median time since stroke was 2.55 years. Most participants (71%) had mild aphasia.	Groups of 3 participants were randomized 1:1:1 to receive 30 hours of CIAT-Plus or Multimodality Aphasia Therapy (M-MAT) or to usual care (UC), provided for 3 hours/day, 5 days/week, for 2 weeks. Both CIAT-Plus and M-MAT	**Primary Outcome:** Aphasia severity (WAB-R-AQ). **Secondary Outcomes:** Word retrieval (COMPARE naming battery), functional communication (CETI), multimodal communication (Scenario Test) and quality	There were no significant within or between group changes in mean WAB-R-AQ post intervention (CIAT-Plus 0.96; M-MAT 1.04; UC 2.06). At 3-month follow-up there was significantly greater improvement in the UC group vs. CIAT-Plus group (mean change=2.39 points, 95% CI 0.53 to 4.24), with no significant differences in the comparisons of M-MAT vs. UC or M-MAT vs. CIMT-Plus Post intervention there were significant

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Rehabilitation (COMPARE)			are intensive, high dose interventions delivered in a small group setting of 2–4 participants, aimed at improving verbal communication, using different therapeutic strategies: CIAT-plus preferences speech production and verbal therapist cueing; M-MAT includes multimodal tasks and cues (drawing, gesturing and writing).	of life (Stroke and Aphasia Quality of Life Scale-39g [SAQOL-39g]) Outcomes were measured at post intervention and 12 weeks follow-up.	improvements in: mean CETI scores for both CIAT-Plus vs. UC and M-MAT groups vs. UC, favouring the intervention groups; total SAQOL-39g scores for M-MAT vs. UC, favouring the M-MAT group and the COMPARE naming battery (80 treated items) for all comparisons (CIMT-Plus vs. UC, M-MAT vs. UC and CIAT-Plus vs. M-MAT). At follow-up, the only significant difference in mean change was for the outcome of the COMPARE naming battery (CIAT-Plus vs. UC and M-MAT vs. UC, favouring the intervention groups). There were 11 dropouts/losses to follow-up in the UC group, 5 in the CIAT-Plus group and 8 in the M-MAT group.
Zhang et al. 2017 **China** **Systematic review & meta-analysis**	The most frequent form of bias was due to the lack of blinding of therapists.	8 RCTs including persons with post-stroke aphasia. No demographic information is reported. Time since stroke was chronic in 5 trials, and acute in 3.	Trials compared CIAT vs. conventional therapy or no therapy(n=3); CIAT vs. intensive language action therapy (unconstrained therapy, n=4) and CIAT vs. social interaction in CIAT (n=1). Duration of therapy ranged from 10 days to 5 weeks.	**Primary outcome:** Severity of aphasia (e.g. Western Aphasia Battery – aphasia quotient, WAB-AQ); language performances (e.g. Aachen aphasia test, ATT) **Secondary outcomes:** Subjective experience of language performance, functional communication; any activity related to language functions	Pooled analyses were possible for 2 outcomes from 2 trials, both examining intensive language action therapy. CIAT was not associated with significantly higher AAT scores: naming (MD=3.97, 95% CI -7.86 to 15.79); repetition (MD=0.08, 95% CI -11.88 to 12.03), token test (MD= -0.67, 95% CI -5.62 to 4.28), written language (MD=-1.96, 95% CI -9.08 to 5.16) and comprehension (MD= -4.34, 95% CI -12.58 to 3.91) or Boston Naming Test scores (MD=-3.54, 95% CI -14.91 to 7.84).
Ciccone et al. 2015 **Australia** **RCT**	CA: ☑ Blinding: Patient: ☒ Assessor ☑ ITT: ☑	20 patients with mild to severe aphasia (defined as a score of <13/20 on the shortened Frenchay Aphasia Screening Test (FAST) and aphasia severity score of < 93.7 on the Aphasia Quotient (AQ), within 10 days of an acute stroke. Mean age was 70 years, 60%	Patients were randomized to receive CIAT (n = 12) or individual, impairment-based intervention group (n = 8) delivered at the same intensity (45–60 min, 5 days a week) for 20 sessions over 5 weeks (15–20 hours total). Therapy was initiated at the	**Primary outcome:** Aphasia Quotient (AQ) from the Western Aphasia Battery assessed post intervention **Secondary outcomes:** AQ, a Discourse Analysis (DA) score and the Stroke and Aphasia Quality of Life Scale (SAQoL), measured	There was significant improvement in mean scores over the study period for all outcomes with no significant differences between groups. Mean baseline AQ scores at baseline and at the end of treatment were 42.5 and 67.5, respectively for the CIAT group and 45.1 and 67.6, respectively for the individual therapy group. Mean baseline DA scores at baseline and at the end of treatment were 1.8 and 10.5, respectively for

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
		were men. Mean time to assessment was 5 days post stroke. At baseline, 35% had mild aphasia, 25% had moderate and 40% had severe aphasia.	acute hospital and continued during the patient's stay at a rehabilitation hospital.	post intervention, and at 12- and 26-weeks post stroke.	the CIAT group and 5.0 and 75, respectively for the individual therapy group. Mean baseline SAQoL scores at baseline and at the end of treatment were 2.2 and 3.6, respectively for the CIAT group and 2.2 and 3.9, respectively for the individual therapy group. At 26 weeks, follow-up assessments were conducted on 4-5 patients in each group.

Computer Therapy

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Cherney et al. 2021 **USA** **RCT**	CA: ☒ Blinding: Patient: ☒ Assessor ☑ ITT: ☒	32 participants with chronic aphasia secondary to a left hemispheric stroke. Mean age was 55 years, 59% were men. Mean time since stroke was >36 months.	Participants were randomized to an Oral Reading for Language in Aphasia (ORLA®, n=22) or control group (computer game, n=13). ORLA® uses a virtual assistant for repeated practice of reading sentences aloud, whereby 3–5-word (level 1) or 8–10-word (level 2) sentences are presented, depending upon the severity of the aphasia. Therapy was provided for 90 minutes/day, 6 days/week for 6 weeks, in both groups.	**Primary outcome:** WAB-R Language Quotient (LQ), assessed post intervention and at 6-weeks follow-up	At 6 weeks, there was a significant improvement in WAB-R LQ from baseline in the ORLA group (baseline score of 58.9, with a gain of 2.96 points, p=0.008). At 6-week follow-up, the gain from baseline was 4.53. The difference in mean WAB-R LQ gain scores from baseline was not significantly greater between groups (0.99, p=0.49), but was at follow-up, favouring the ORLA® group (2.70, p=0.013). The mean gains in WAB-R LQ were not reported for the control group. There were 3 dropouts in the ORLA group and 2 in the control group.
Palmer et al. 2019 **UK**	CA: ☑ Blinding: Patient: ☒	270 participants with long-standing post-stroke aphasia (>4 months) and word-finding difficulties	Participants were randomized to receive 1) usual care (UC); 2) daily self-management	**Primary Outcomes:** Word finding, measured by a picture naming test of 100 personally relevant words,	At 6 months, the mean % change in word finding from baseline was 1.1% (UC), 16.4% (CSLT) and 2.4% (attention control). Compared with both UC and attention control, the % change was

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
RCT ***Big CACTUS***	Assessor ☑ ITT: ☑	recruited from 21 NHS speech and language therapy departments. Mean age was 65.4 years, 61% were men. Mean time since stroke was 3 years.	computerized word-finding therapy (CSLT) plus usual care; or 3) activity/attention control (e.g., Sudoku) plus usual care for 6 months. Practice with the computer was targeted for 20-30 min, 3 days/week at home, during the study period.	functional communication (Therapy Outcome Measures [TOMs]) **Secondary Outcomes:** Participant-rated perception of communication and quality of life (COAST) Outcomes were measured after 6 and 12 months of randomization.	significantly greater with CSLT. At 6 months, the mean change (improvement) in TOMs scores from baseline were 0.05 (UC), 0.04 (CSLT) and 0.10 (attention control). There were no significant differences between groups in pair-wise comparisons. At 6 months, the mean change in COAST scores from baseline were 2.7 (UC), 3.3 (CSLT) and -0.30 (attention control). There were no significant differences between groups in pair-wise comparisons. At 12 months from baseline, the mean % change in word finding from baseline was 5.1% (UC), 17.0% (CSLT) and 8.5% (attention control). Compared with both UC and attention control, the % change was significantly greater compared with CSLT. At 12 months, the mean change (improvement) in TOMs scores from baseline were 0.15 (UC), 0.12 (CSLT) and 0.11 (attention control). There were no significant differences between groups in pair-wise comparisons. At 6 months, the mean change in COAST scores from baseline were 7.2 (UC), -1.0 (CSLT) an 3.4 (attention control). There were no significant differences between groups in pair-wise comparisons.
Palmer et al. 2012 **UK** **RCT** ***CACTUS***	CA: ☑ Blinding: Patient: ☒ Assessor ☑ ITT: ☑	33 participants with post-stroke aphasia with word-finding difficulties, who had completed any formal SLT and who could repeat back spoken words. Those with severe visual or cognitive difficulties were excluded.	Participants were randomized to a computer-based therapy or a usual care (control group). Persons in the intervention group used a computer therapy program (StepbyStep), containing a library of language	**Primary outcome:** Measures related to feasibility (recruitment rate, completion rates) **Secondary outcomes:** Change in word retrieval ability, cost-effectiveness	The intervention was found to be feasible. 10 of the 15 participants (66.7%) randomized to the computer therapy arm were able to complete the therapy with the recommended frequency. At 5 months, outcome data were available for 13/17 persons in the usual care group and 15/17 persons in the computer training group.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
		Mean age was 67 years, 65% were men. Mean time since stroke was 6.5 years.	exercises, each of which was designed to help the persons progress from listening to target words, producing words with visual, semantic, phonemic, or written letter/word cues through to saying the words in sentences. Participants practiced 48 words from the Object and Action Naming Battery in addition to 48 words that were the individual participant considered relevant. Participants were asked to practice for at least 20 minutes 3 days a week for 5 months. Volunteers were used to support the intervention.		At 5 months, the percentage change in words named correctly from baseline was significantly higher in the intervention group (67.2 vs. 47.4, MD=19.8%, 95% CI 4.4 –35.2), but not at 8 months (67.9 [intervention] vs. 56.6, MD=11.3%, 95% CI -7.4 to 29.9). Over 75% of participants were offered the therapy using a trained volunteer for support; however, volunteer support was unavailable for the remaining treatment group participants. Of those who received volunteer support, 66.7% completed the study intervention with the recommended frequency, while 25% of individuals with no volunteer support were able to do so. The intervention was found to be cost effective ($4900/QALY)

Training Communication Partners/Significant Others

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Simmons-Mackie et al. 2016 **USA** **Systematic Review**	N/A	56 articles, across 2 systematic reviews, evaluating the effect of communication partner training on individuals with aphasia and their communication partners: Review 1: 31 studies with 352 communication partners and 319 people with aphasia; Review 2: 25 studies with 720	Intervention was defined broadly to include communication skills training as well as educational or counselling programs directed at communication partners with aphasia: Communication training focused on teaching communication partners to use strategies and	**Primary outcome:** Language impairment (standard aphasia tests) **Secondary outcomes:** Communication activity/participation (functional use of language, conversation rating scales), personal/psychosocial adjustment (self-esteem, confidence) and Quality of life	*Language impairment* Insufficient evidence of impact for either person with aphasia or the communication partner *Communication activity/participation* Effective in communication partner Probably effective in persons with chromic aphasia with interaction with trained communication partner. *Personal/psychosocial adjustment* Insufficient evidence of impact for either person

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
		communication partners and 308 people with aphasia. Studies that involved training partners to provide traditional language exercises were excluded.	resources to enhance communication; Educational program focused on increasing partner knowledge of aphasia and related issues and counselling program included those that concentrated on psychosocial consequences of aphasia		with aphasia or the communication partner *Quality of life* Insufficient evidence of impact for either person with aphasia or the communication partner Communication partner training should be conducted to improve partner skills in facilitating the communication of people with chronic aphasia.

Interventions for Dysarthria

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Mitchell et al. 2017 **UK** **Cochrane Review**	2 trials were at low risk of bias across all 5 domains assessed.	5 RCTs including 234 participants with stroke (4 RCTs) or stroke and brain injury (n=1). Mean age ranged from 49 to 70 years. The percentage of men ranged from 56% to 85%.	Trials compared a dysarthria intervention vs. any control (n=2). Interventions included enhanced best practice speech and language therapy delivered by SLPs, supported by assistants and repetitive transcranial magnetic stimulation; dysarthria interventions vs. usual dysarthria care (n=3). Interventions included oro-motor exercises, Lee Silverman Voice Treatment and acupuncture. Treatments were provided for 2 weeks, 4 weeks, 8 weeks, 9 weeks and 3 months.	**Primary outcome:** Everyday speech (activity level) **Secondary outcomes:** Impairment and participation level outcomes	*Dysarthria intervention vs. any control (3-9 months post intervention).* Dysarthria interventions were not associated with significantly greater improvement in activity level outcomes (SMD=0.18, 95% CI -0.18- 0.55, 3 trials, n=116). GRADE: low certainty Dysarthria interventions were not associated with significantly greater improvements in impairment or participation level outcomes (SMD=0.07, 95% CI -0.91 to 1.06, 2 trials, n=56 and SMD= -0.11, 95% CI -0.56 to 0.33, 2 trials, n=56) GRADE: low certainty for both outcomes. *Dysarthria intervention vs. another intervention, attention control, placebo or no intervention (immediate effects)* Impairment level: SMD=0.29, 95% CI -0.07 to 0.66, 3 trials, n=very low certainty Activity level: SMD=0.47, 95% CI 0.02 to 0.92, 4 trials, n=99. GRADE: very low certainty Participation level: SMD= -0.24, 95% CI -0.94 to

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
					0.45, 1 trial, n=32). GRADE: not assigned. *Dysarthria intervention A vs. dysarthria intervention B (persisting and immediate effects)* Activity level (persisting effect): SMD=0.38, 95% CI -0.15 to 0.91, 1 trial, n=56). GRADE: very low certainty Participation level (persisting effect): SMD= -0.22, 95% CI -0.92 to 0.47, 1 trial, n=32) GRADE: not assigned.

Abbreviations

CA: Concealed Allocation	CETI: Communication Effectiveness Index
CI: Confidence Interval	COMPARE: Constraint-Induced or Multi-Modality Personalised Aphasia Rehabilitation
IQR: Interquartile Range	ITT: Intention to treat
MD: Mean difference	N/A: Not Assessed
OR: Odds Ratio	QALY: Quality-adjusted life year
RCT: Randomized Controlled Trial	SLT: Speech Language Therapy
SMD: Standardized Mean Difference	WAB-R-AQ: Western Aphasia Battery-Revised Aphasia Quotient

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