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European Stroke Organisation Guideline on Aphasia Rehabilitation

Professor Marian Brady on behalf of the Aphasia Rehabilitation Guideline Working Group

Disclosures

Intellectual Disclosures:

RELEASE Collaboration (MB, FB, LMTJ, IvdM, MM, KH); Cochrane review of SLT for Aphasia (MB, PC); RCTs Big CACTUS 2019 (MB), Telerehabilitation 2020 (FB, MB, HPØ), Menizer 2016 (MM), Efstratiadou 2019 (KH) and Marshall 2020 (KH)

Lead of Norwegian national stroke rehabilitation guidelines working group, Norwegian Directorate of Health (FB); Stroke and Aphasia Quality of Life (SAQOL-39) outcome measure developer (KH).

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Aphasia

- Impacts approximately 1/3 of people after stroke
- Compared to stroke survivors without aphasia and despite greater resource use [9]
    - poorer functional outcomes [1]
    - poorer psychosocial outcomes [2]
    - reduced wellbeing [3]
    - < pain medication [4,5], continence screening [6]
    - fewer return home or to work [1,7]

Effective aphasia rehabilitation is a clinical priority

1. Gialanella et al. Disability and Rehabilitation. 2011;33(2):122-9.
2. Hilari et al Aphasiology. 2017;31(6):674-87.
3. Zanella et al Top Stroke Rehabil 2023;30(5):448-58.
4. Kehayia et al. Stroke. 1997;28(10):1867-70.
5. 8. Ali et al. International Journal of Stroke 2022
6. McClurg et al. *International Continence Society,* 2011.
7. Gialanella et al. Topics in Stroke Rehabilitation. 2009;16(6):437-44.
8. Black-Schaffer Archives of Physical Medicine and Rehabilitation. 1990;71(5):285-90.
9. Bersano et al. IJS 2009;4(6):443-7.

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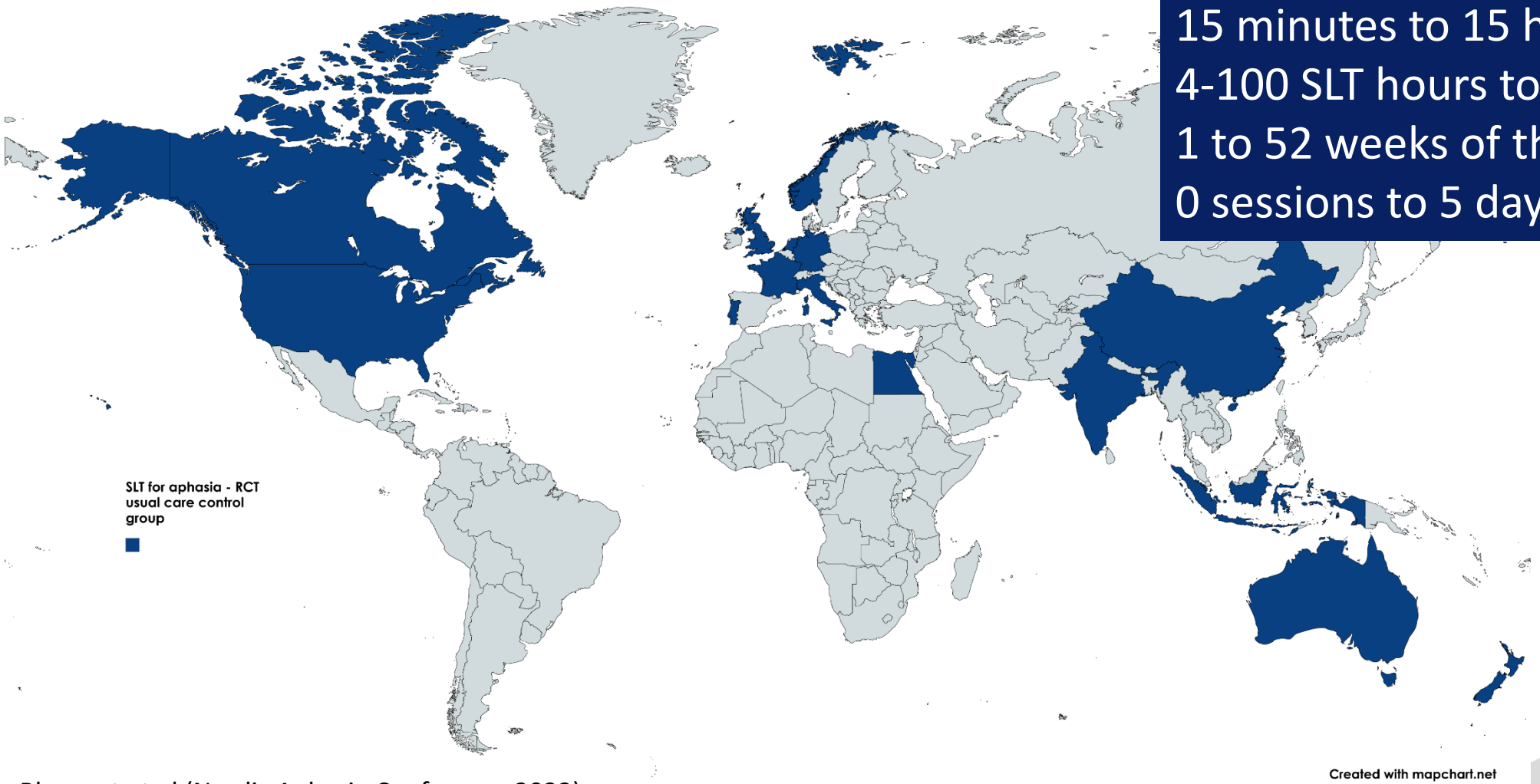
RCTs - usual care SLT for aphasia after stroke (since 2012)



Usual SLT reported

15 minutes to 15 hours per week

4-100 SLT hours total dosage

1 to 52 weeks of therapy

0 sessions to 5 days per week

Bhagwat et al (Nordic Aphasia Conference 2023)

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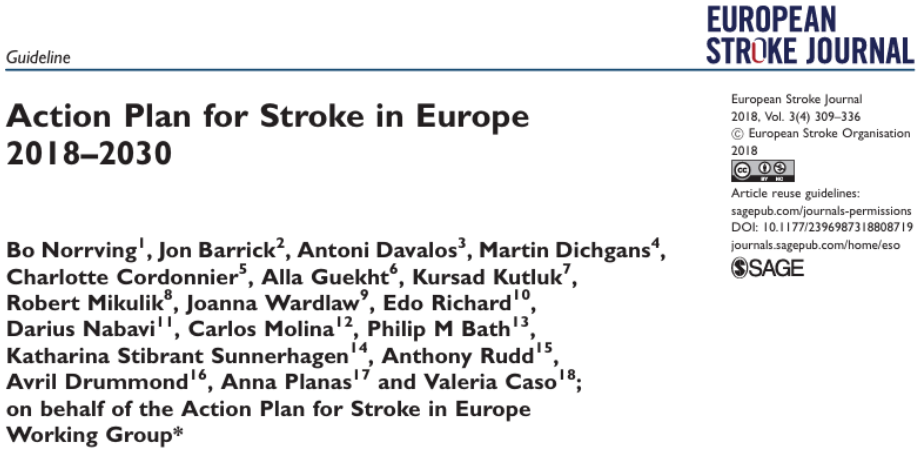
ESO research and development priorities



Guideline

EUROPEAN STROKE JOURNAL

Action Plan for Stroke in Europe 2018–2030

Bo Norrving[1], Jon Barrick[2], Antoni Davalos[3], Martin Dichgans[4], Charlotte Cordonnier[5], Alla Guekht[6], Kursad Kutluk[7], Robert Mikulik[8], Joanna Wardlaw[9], Edo Richard[10], Darius Nabavi[11], Carlos Molina[12], Philip M Bath[13], Katharina Stibrant Sunnerhagen[14], Anthony Rudd[15], Avril Drummond[16], Anna Planas[17] and Valeria Caso[18]; on behalf of the Action Plan for Stroke in Europe Working Group*

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- How can rehabilitation be implemented with **evidenced-based results on timing, level and type of intervention**?
- Can post-stroke language problems be more **effectively managed**?

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Aphasia rehabilitation expanding evidence base

Emerging RCTs

FCET2EC, Telerehabilitation, COMPARE, VERSE III and more…

REhabilitation and recovery of peopLE with Aphasia after StrokE (RELEASE)

5928 individual participants data (174 datasets from 28 countries)

Explored importance of SLT

- Frequency (therapy days per week)
- Intensity (therapy hours per week)
- Dose (total therapy hours delivered)

Suggested critical therapeutic range

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ESO Priority Guideline – Aphasia Rehabilitation

- ESO Standard Operating Procedures
- GRADE framework
- Updated evidence synthesis

PICOs (Patient, Intervention, Comparison, Outcomes)

Aphasia Rehabilitation Schedule

- SLT Dose
- SLT Intensity
- SLT Frequency

SLT Delivery

- Group versus 1-to-1 SLT
- Digital versus in-person SLT
- Tailored by functional relevance and level of language difficulty versus non-tailored
- tDCS with SLT

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Critical Outcomes (Delphi approach)

Post intervention and follow-up

- **Functional Communication**
- **Quality of Life**
- Overall language ability
- Expressive language (or naming)
- Auditory Comprehension
- Communicative confidence
- Wellbeing
- Side effects/adverse events (tDCS)

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Strength of Recommendations

Grade	Definition	Symbol
High	Further research is very unlikely to change our confidence in the estimate of effect.	⨁⨁⨁⨁
Moderate	Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.	⨁⨁⨁
Low	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.	⨁⨁
Very low	We are very uncertain about the estimate.	⨁

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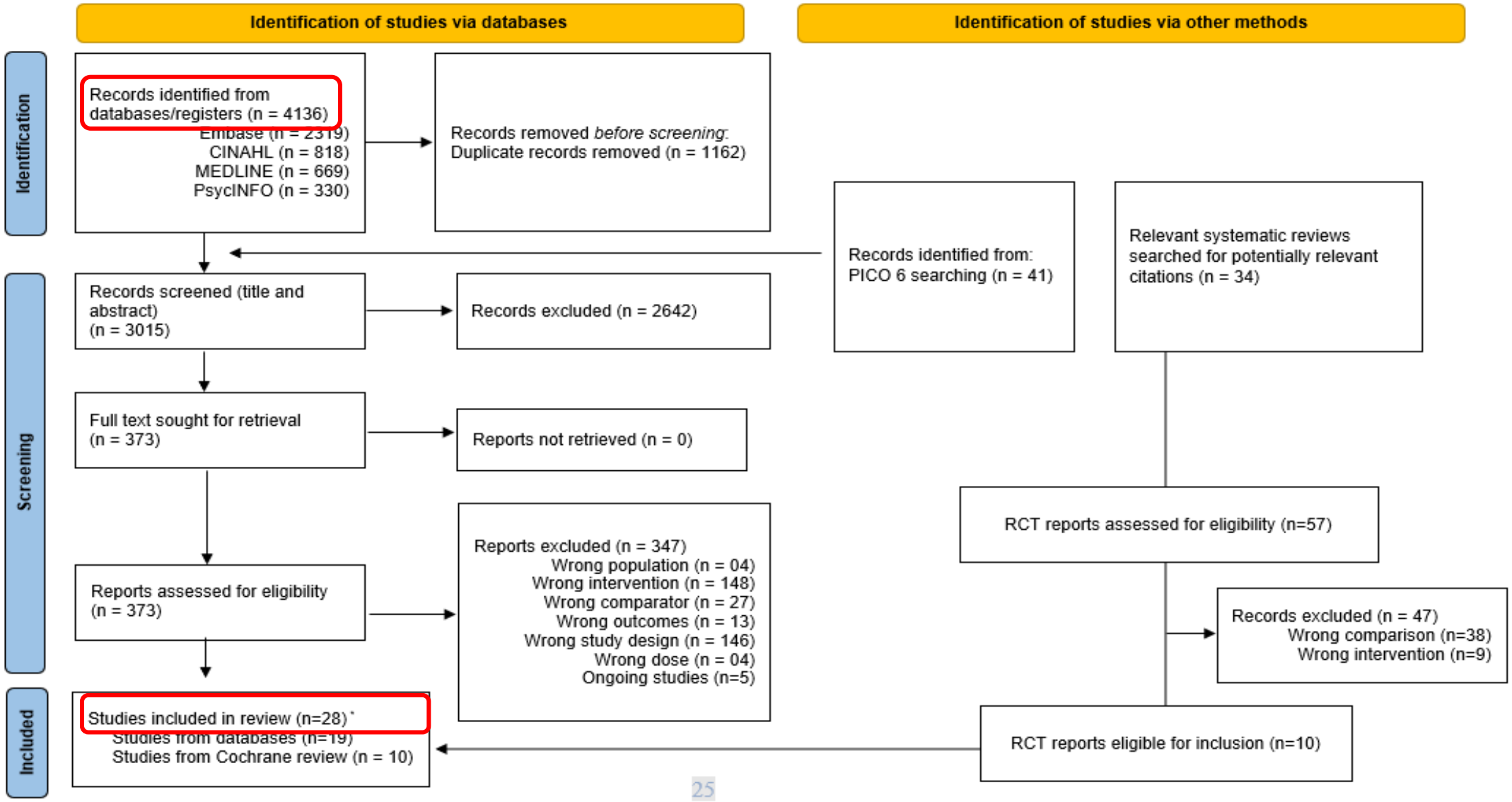
PRISMA PICO 1-5 and 7 (from 2015)



*In some cases individual studies were informed by multiple reports

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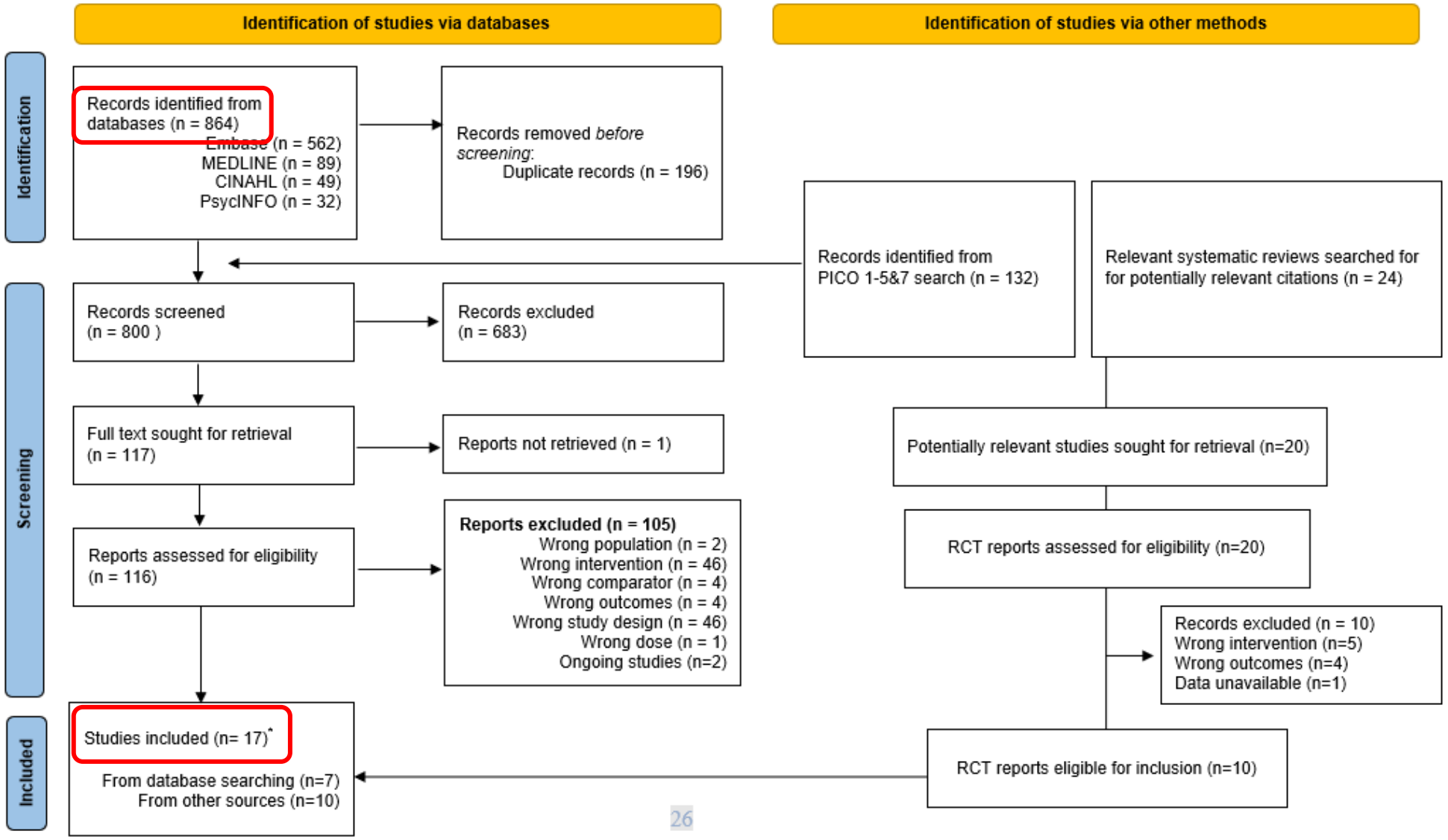
PRISMA PICO 6 (tDCS from 2018)



*In some cases individual studies were informed by multiple reports

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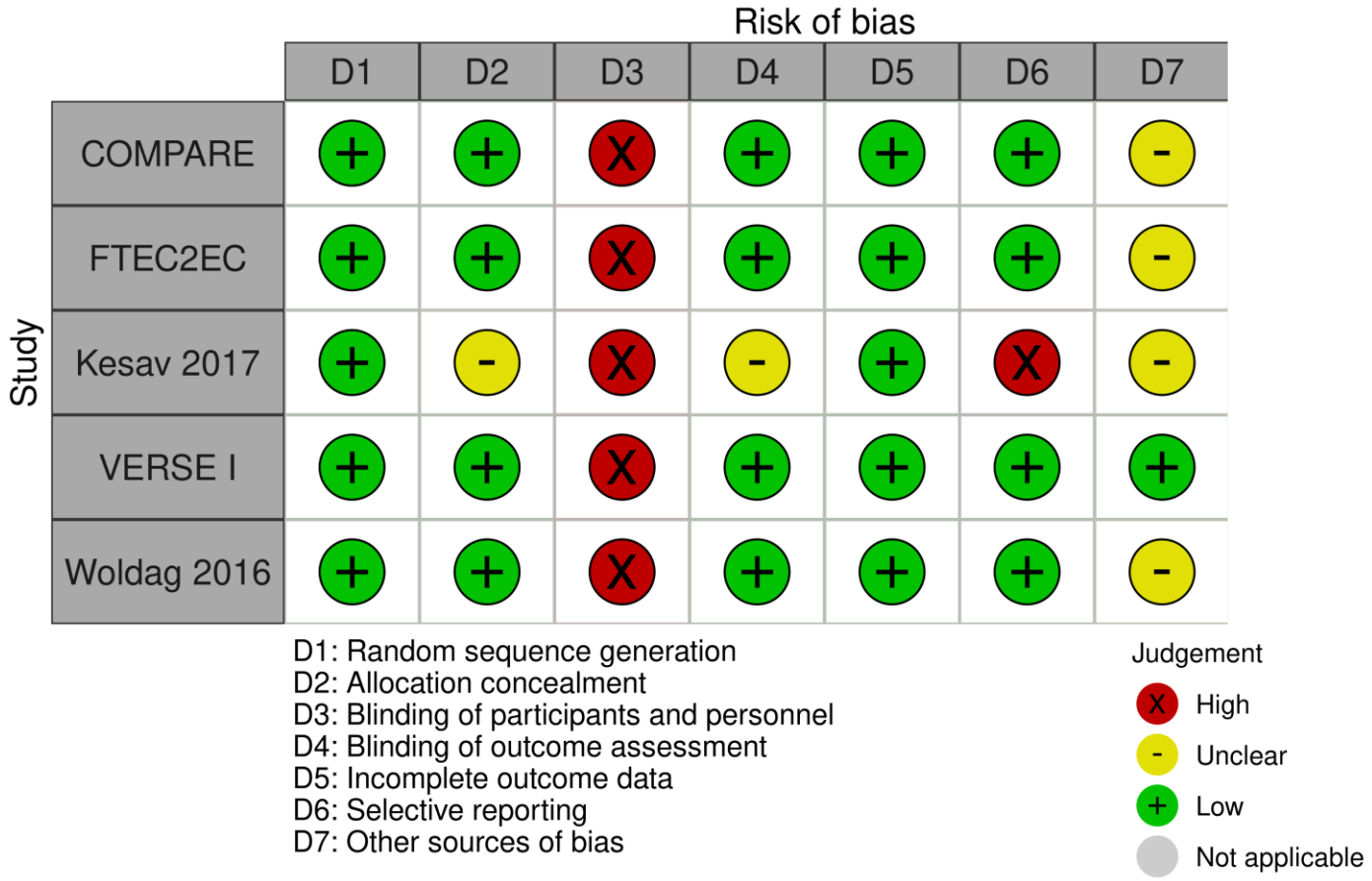
In people with aphasia after stroke, is a higher dose of SLT (≥ 20 hours) compared to a lower dose of SLT (< 20 hours) associated with greater improvements language, communication, or quality of life?



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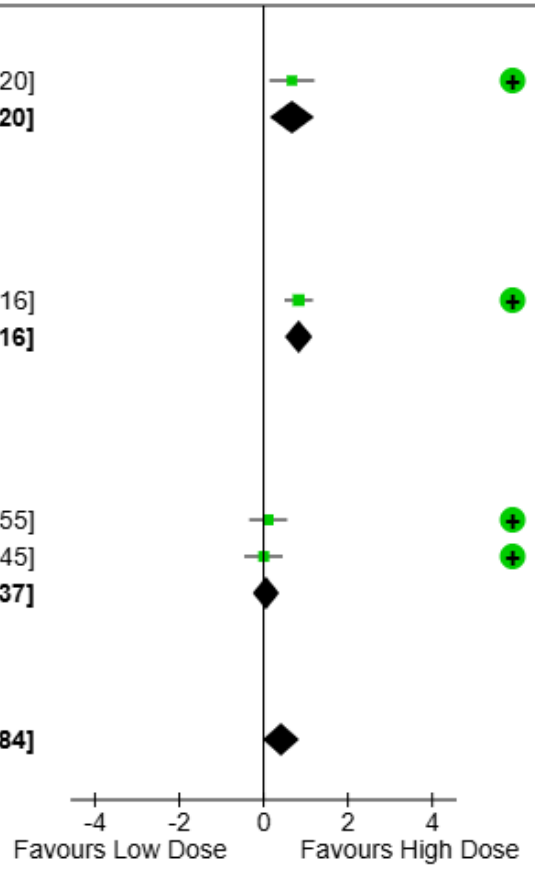
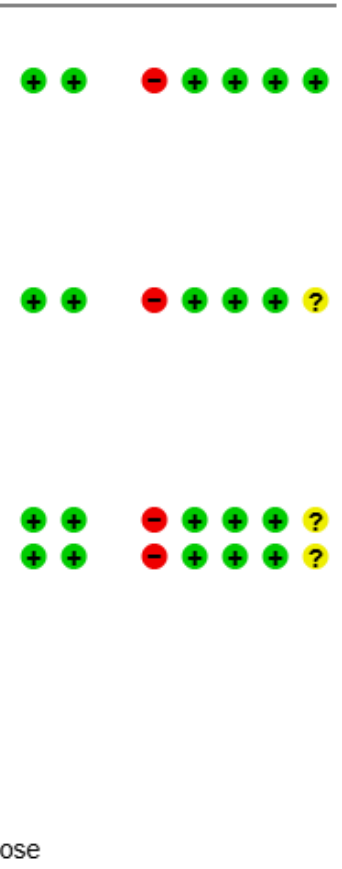
Is a higher dose of SLT (≥ 20 hours) compared to a lower dose of SLT (< 20 hours) associated with greater improvements … **functional communication?**

Study or Subgroup	High Dose SLT Mean	SD	Total	Low Dose SLT Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI
30.1.1 Functional Communication Profile								
VERSE I	50.231	27.3032	32	32.119	25.7642	27	22.3%	0.67 [0.14 , 1.20]
Subtotal			**32**			**27**	**22.3%**	**0.67 [0.14 , 1.20]**
Test for overall effect: Z = 2.50 (P = 0.01)								
Heterogeneity: Not applicable								
30.1.2 ANELT-A								
FCET2EC 2017	28.79	10.9	78	19.6	11.1	78	28.2%	0.83 [0.50 , 1.16]
Subtotal			**78**			**78**	**28.2%**	**0.83 [0.50 , 1.16]**
Test for overall effect: Z = 4.98 (P < 0.00001)								
Heterogeneity: Not applicable								
30.1.3 Communication Effectiveness Index								
COMPARE 2022 CIAT Plus	59.17	18.29	66	57.21	17.49	28	24.8%	0.11 [-0.33 , 0.55]
COMPARE 2022 M-MAT	57.28	17.7	66	57.21	17.49	27	24.7%	0.00 [-0.44 , 0.45]
Subtotal (Wald[a])			**132**			**55**	**49.5%**	**0.06 [-0.26 , 0.37]**
Test for overall effect: Z = 0.35 (P = 0.73)								
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.10, df = 1 (P = 0.75); I² = 0%								
Total (Wald[a])			**242**			**160**	**100.0%**	**0.41 [-0.02 , 0.84]**
Test for overall effect: Z = 1.88 (P = 0.06)								
Test for subgroup differences: Chi² = 11.87, df = 2 (P = 0.003), I² = 83.2%								
Heterogeneity: Tau² (DL[b]) = 0.14; Chi² = 11.98, df = 3 (P = 0.007); I² = 75%								





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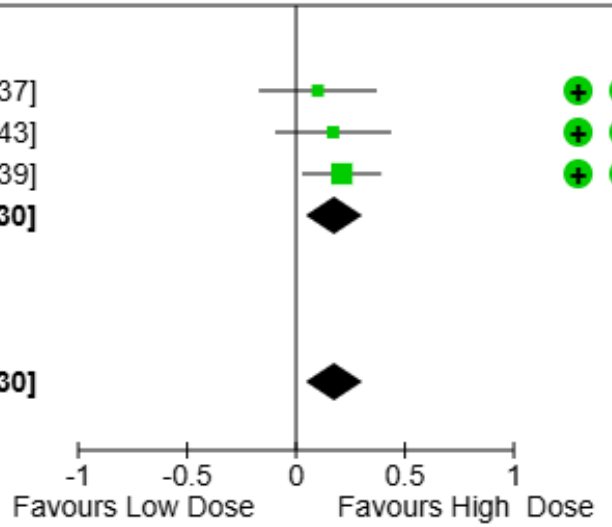
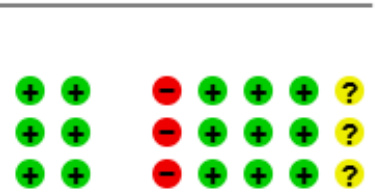
Is a higher dose of SLT (≥ 20 hours) compared to a lower dose of SLT (< 20 hours) associated with greater improvements …**quality of life**?

Study or Subgroup	High Dose SLT Mean	SD	Total	Low Dose SLT Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI
30.8.1 SAQoL								
COMPARE 2022 CIAT Plus	3.76	0.65	69	3.66	0.61	30	23.8%	0.10 [-0.17 , 0.37]
COMPARE 2022 M-MAT	3.83	0.64	69	3.66	0.61	31	24.5%	0.17 [-0.09 , 0.43]
FCET2EC 2017	3.9	0.54	78	3.69	0.61	78	51.7%	0.21 [0.03 , 0.39]
Subtotal (Wald[a])			**216**			**139**	**100.0%**	**0.17 [0.04 , 0.30]**
Test for overall effect: Z = 2.62 (P = 0.009)								
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.45, df = 2 (P = 0.80); I² = 0%								
Total (Wald[a])			**216**			**139**	**100.0%**	**0.17 [0.04 , 0.30]**

Test for overall effect: Z = 2.62 (P = 0.009)
Test for subgroup differences: Not applicable
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.45, df = 2 (P = 0.80); I² = 0%





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Evidence-based Recommendation

In people with aphasia post-stroke, we recommend high dose SLT interventions (≥ 20 hours) rather than lower dose SLT (<20 hours) should be offered.

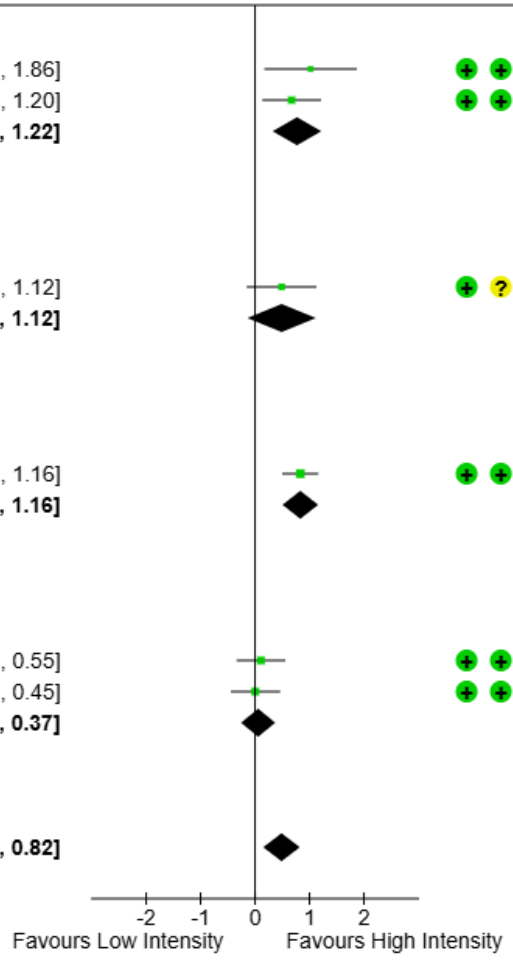
Quality of evidence: Low ⊕⊕

Strength of recommendation: Strong for high dose SLT intervention ↑↑

Is a higher intensity of SLT (≥ 3 hours per week) compared to a lower intensity of SLT (< 3 hours per week) associated with greater improvements in …**functional communication** …?

Study or Subgroup	High Intensity SLT Mean	SD	Total	Low Intensity SLT Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI	Risk of Bias A B C D E F G H
32.1.1 Functional Communication Profile									
SP-I-RiT	58.23	6.52	13	48.88	10.85	12	10.1%	1.02 [0.18 , 1.86]	+ + − + + + ?
VERSE I	50.231	27.3032	32	32.119	25.7642	27	16.5%	0.67 [0.14 , 1.20]	+ + − + + + +
Subtotal (Wald[a])			**45**			**39**	**26.6%**	**0.77 [0.32 , 1.22]**	
Test for overall effect: Z = 3.37 (P = 0.0007)									
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.47, df = 1 (P = 0.49); I² = 0%									
32.1.2 WAB Sponataneous Speech									
Zhang 2019	8.7	3.13	20	7.05	3.49	20	14.1%	0.49 [-0.14 , 1.12]	+ ? − + + ? ?
Subtotal			**20**			**20**	**14.1%**	**0.49 [-0.14 , 1.12]**	
Test for overall effect: Z = 1.52 (P = 0.13)									
Heterogeneity: Not applicable									
32.1.3 ANELT-A									
FCET2EC 2017	28.79	10.9	78	19.6	11.1	78	22.0%	0.83 [0.50 , 1.16]	+ + − + + + ?
Subtotal			**78**			**78**	**22.0%**	**0.83 [0.50 , 1.16]**	
Test for overall effect: Z = 4.98 (P < 0.00001)									
Heterogeneity: Not applicable									
32.1.4 Communicative Effectiveness Index									
COMPARE 2022 CIAT Plus	59.17	18.29	66	57.21	17.49	28	18.8%	0.11 [-0.33 , 0.55]	+ + − + + + ?
COMPARE 2022 M-MAT	57.28	17.7	66	57.21	17.49	27	18.6%	0.00 [-0.44 , 0.45]	+ + − + + + ?
Subtotal (Wald[a])			**132**			**55**	**37.4%**	**0.06 [-0.26 , 0.37]**	
Test for overall effect: Z = 0.35 (P = 0.73)									
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.10, df = 1 (P = 0.75); I² = 0%									
Total (Wald[a])			**275**			**192**	**100.0%**	**0.49 [0.15 , 0.82]**	

Test for overall effect: Z = 2.84 (P = 0.005)
Test for subgroup differences: Chi² = 12.97, df = 3 (P = 0.005), I² = 76.9%
Heterogeneity: Tau² (DL[b]) = 0.11; Chi² = 13.54, df = 5 (P = 0.02); I² = 63%



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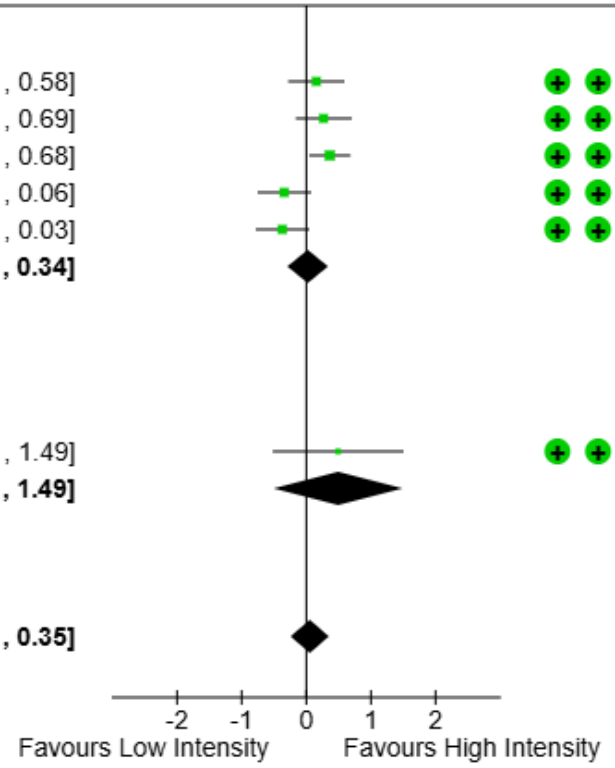
Is a higher intensity of SLT (≥ 3 hours per week) compared to a lower intensity of SLT (< 3 hours per week) associated with greater improvements in …**quality of life**?

Study or Subgroup	High Intensity SLT Mean	SD	Total	Low Intensity SLT Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI
32.8.1 SAQoL								
COMPARE 2022 CIAT Plus	3.76	0.65	69	3.66	0.61	30	17.6%	0.16 [-0.27 , 0.58]
COMPARE 2022 M-MAT	3.83	0.64	69	3.66	0.61	31	17.7%	0.27 [-0.16 , 0.69]
FCET2EC 2017	3.9	0.54	78	3.69	0.61	78	21.2%	0.36 [0.05 , 0.68]
VERSE III Usual Care Plus	3.3	0.9	75	3.6	0.8	35	18.4%	-0.34 [-0.75 , 0.06]
VERSE III VERSE SLT	3.3	0.8	72	3.6	0.8	35	18.3%	-0.37 [-0.78 , 0.03]
Subtotal (Wald[a])			**363**			**209**	**93.3%**	**0.02 [-0.29 , 0.34]**
Test for overall effect: Z = 0.13 (P = 0.89)								
Heterogeneity: Tau² (DL[b]) = 0.09; Chi² = 12.75, df = 4 (P = 0.01); I² = 69%								
32.8.2 ASHA QCL								
Simic 2021	4.06	0.75	8	3.67	0.75	8	6.7%	0.49 [-0.51 , 1.49]
Subtotal			**8**			**8**	**6.7%**	**0.49 [-0.51 , 1.49]**
Test for overall effect: Z = 0.96 (P = 0.33)								
Heterogeneity: Not applicable								
Total (Wald[a])			**371**			**217**	**100.0%**	**0.05 [-0.24 , 0.35]**
Test for overall effect: Z = 0.35 (P = 0.72)								
Test for subgroup differences: Chi² = 0.77, df = 1 (P = 0.38), I² = 0%								
Heterogeneity: Tau² (DL[b]) = 0.08; Chi² = 13.48, df = 5 (P = 0.02); I² = 63%								



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Evidence-based Recommendation 2

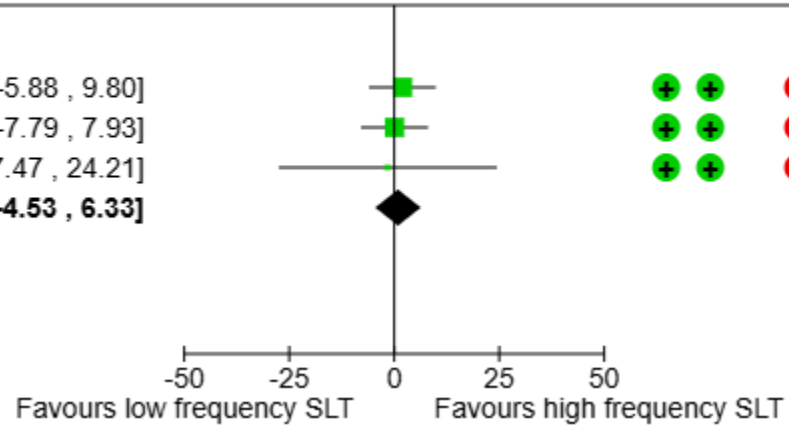
In people with aphasia post-stroke, we suggest high intensity SLT (≥ 3 hours per week) rather than lower intensity should be offered.

Quality of evidence: Low ⊕⊕

Strength of recommendation: Weak for high intensity SLT intervention ↑?

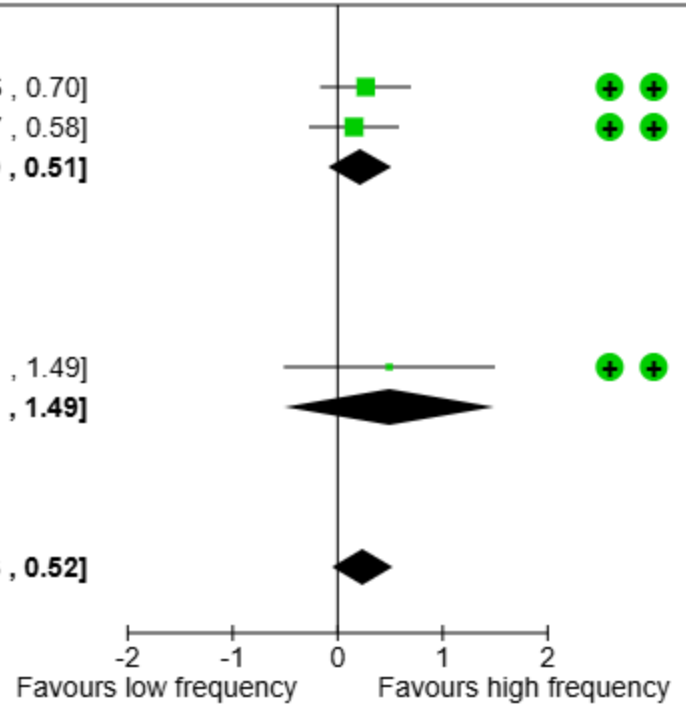
In people with aphasia after stroke is a higher frequency of SLT (≥ 4 days per week) compared to a lower frequency of SLT (< 4 days per week) associated with greater improvements in …**functional communication** …?

Study or Subgroup	High frequency SLT Mean	SD	Total	Low frequency SLT Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI	Risk of Bias A B C D E F G H
34.1.1 Communicative Effectiveness Index									
COMPARE 2022 CIAT Plus	59.17	18.29	66	57.21	17.49	28	47.9%	1.96 [-5.88 , 9.80]	+ + − + + + ?
COMPARE 2022 M-MAT	57.28	17.7	66	57.21	17.49	27	47.7%	0.07 [-7.79 , 7.93]	+ + − + + + ?
Wenke 2017	72.04	19.9	4	73.67	19.34	5	4.4%	-1.63 [-27.47 , 24.21]	+ + − + − ? −
Subtotal (Wald[a])			**136**			**60**	**100.0%**	**0.90 [-4.53 , 6.33]**	
Test for overall effect: Z = 0.33 (P = 0.74)									
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.15, df = 2 (P = 0.93); I² = 0%									
Test for subgroup differences: Not applicable									



In people with aphasia after stroke is a higher frequency of SLT (≥ 4 days per week) compared to a lower frequency of SLT (< 4 days per week) associated with greater improvements in … **quality of life**?

Study or Subgroup	High Frequency SLT Mean	SD	Total	Low Frequency SLT Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI	Risk of Bias A B C D E F G H
34.8.1 SAQoL									
COMPARE 2022 M-MAT	3.83	0.64	69	3.66	0.61	30	45.2%	0.27 [-0.16 , 0.70]	+ + − + + + ?
COMPARE 2022 CIAT Plus	3.76	0.65	69	3.66	0.61	31	46.5%	0.16 [-0.27 , 0.58]	+ + − + + + ?
Subtotal (Wald[a])			**138**			**61**	**91.6%**	**0.21 [-0.09 , 0.51]**	
Test for overall effect: Z = 1.37 (P = 0.17)									
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.13, df = 1 (P = 0.72); I² = 0%									
34.8.2 ASHA-QoCL									
Simic 2021	4.06	0.75	8	3.67	0.75	8	8.4%	0.49 [-0.51 , 1.49]	+ + − + + ? ?
Subtotal			**8**			**8**	**8.4%**	**0.49 [-0.51 , 1.49]**	
Test for overall effect: Z = 0.96 (P = 0.33)									
Heterogeneity: Not applicable									
Total (Wald[a])			**146**			**69**	**100.0%**	**0.23 [-0.06 , 0.52]**	
Test for overall effect: Z = 1.59 (P = 0.11)									
Test for subgroup differences: Chi² = 0.28, df = 1 (P = 0.60), I² = 0%									
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.41, df = 2 (P = 0.81); I² = 0%									



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Evidence-based Recommendation 3

In people with aphasia post-stroke, we suggest high frequency SLT (≥ 4 days per week) should be offered rather than lower frequency SLT (< 4 days per week).

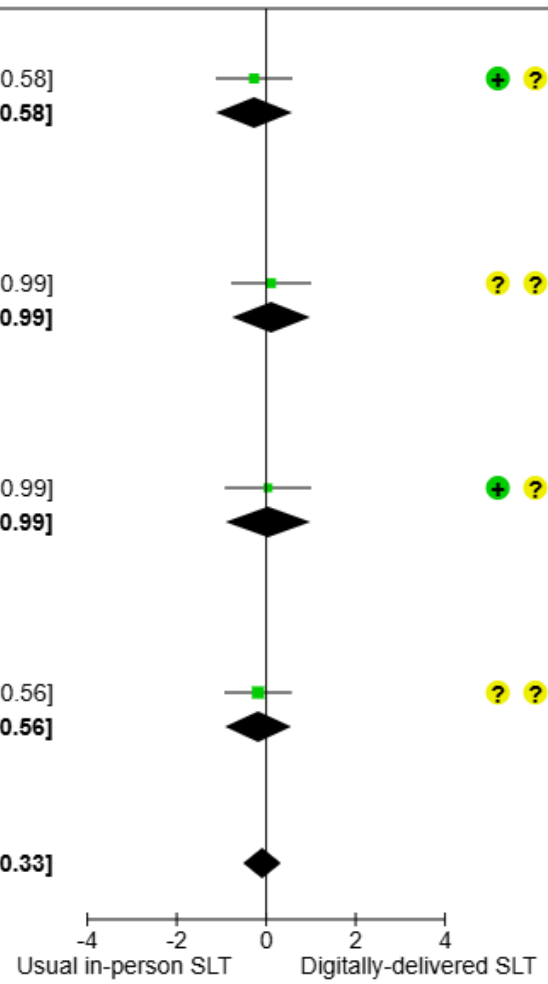
Quality of evidence: Low ⊕⊕

Strength of recommendation: Weak for high frequency SLT intervention ↑?

PICO 4a

In people with aphasia after stroke is digitally delivered SLT (using telerehabilitation, virtual reality therapist or similar) compared to usual in-person SLT associated with similar improvements in …**functional communication**…?

Study or Subgroup	Digitally-delivered SLT Mean	SD	Total	In-person SLT Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI
36.1.1 Functional Outcome Questionnaire- Aphasia (FOQ)								
Spaccavento 2021	102.16	51.22	13	115.25	38.51	9	24.5%	-0.27 [-1.12 , 0.58]
Subtotal			**13**			**9**	**24.5%**	**-0.27 [-1.12 , 0.58]**
Test for overall effect: Z = 0.62 (P = 0.53)								
Heterogeneity: Not applicable								
36.1.2 CADL								
Zhou 2018 (Inpatient)	35.9	21.8	10	33.4	21.7	10	23.3%	0.11 [-0.77 , 0.99]
Subtotal			**10**			**10**	**23.3%**	**0.11 [-0.77 , 0.99]**
Test for overall effect: Z = 0.25 (P = 0.81)								
Heterogeneity: Not applicable								
36.1.3 Communication Activity Log								
Grechuta 2019	50	7.01	9	49.41	19.32	8	19.7%	0.04 [-0.91 , 0.99]
Subtotal			**9**			**8**	**19.7%**	**0.04 [-0.91 , 0.99]**
Test for overall effect: Z = 0.08 (P = 0.94)								
Heterogeneity: Not applicable								
36.1.4 WAB Spontaneous Speech								
Meltzer 2017	11.6	6.2	14	12.6	4.4	14	32.5%	-0.18 [-0.92 , 0.56]
Subtotal			**14**			**14**	**32.5%**	**-0.18 [-0.92 , 0.56]**
Test for overall effect: Z = 0.48 (P = 0.63)								
Heterogeneity: Not applicable								
Total (Wald[a])			**46**			**41**	**100.0%**	**-0.09 [-0.51 , 0.33]**
Test for overall effect: Z = 0.42 (P = 0.67)								
Test for subgroup differences: Chi² = 0.50, df = 3 (P = 0.92), I² = 0%								
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 0.50, df = 3 (P = 0.92); I² = 0%								



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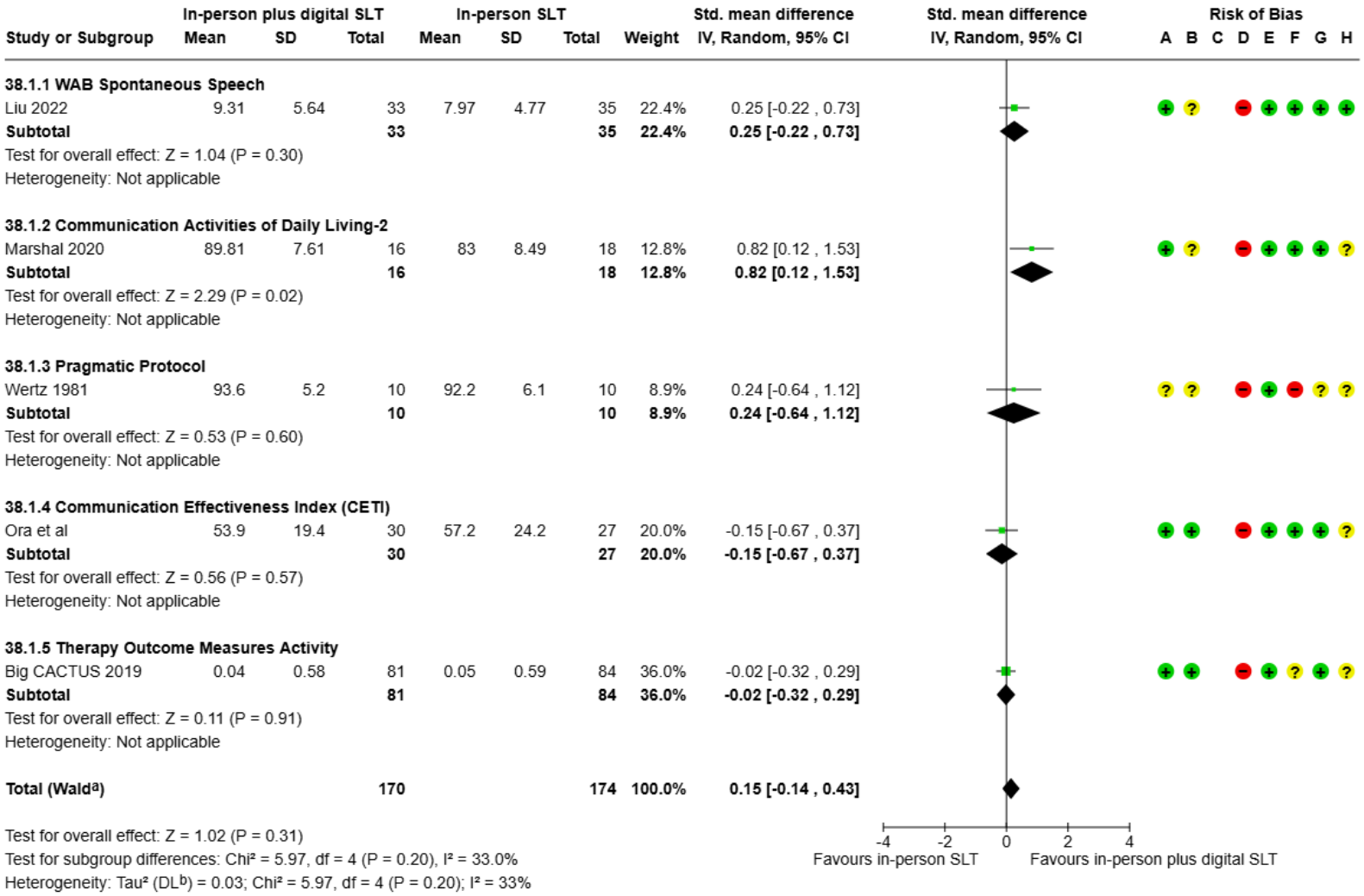
Evidence-based Recommendation 4a

In people with aphasia after stroke, we suggest using either in-person or digitally delivered SLT

Quality of evidence: Very low ⊕

Strength of recommendation: Weak that digitally delivered and in person SLT interventions lead to similar gains↑?

In people with aphasia after stroke is in-person SLT plus digital augmentation (using computer or tablet-based software, virtual reality or similar) compared to usual in-person SLT associated with greater improvements in …**functional communication**?



EUROPEAN STROKE ORGANISATION

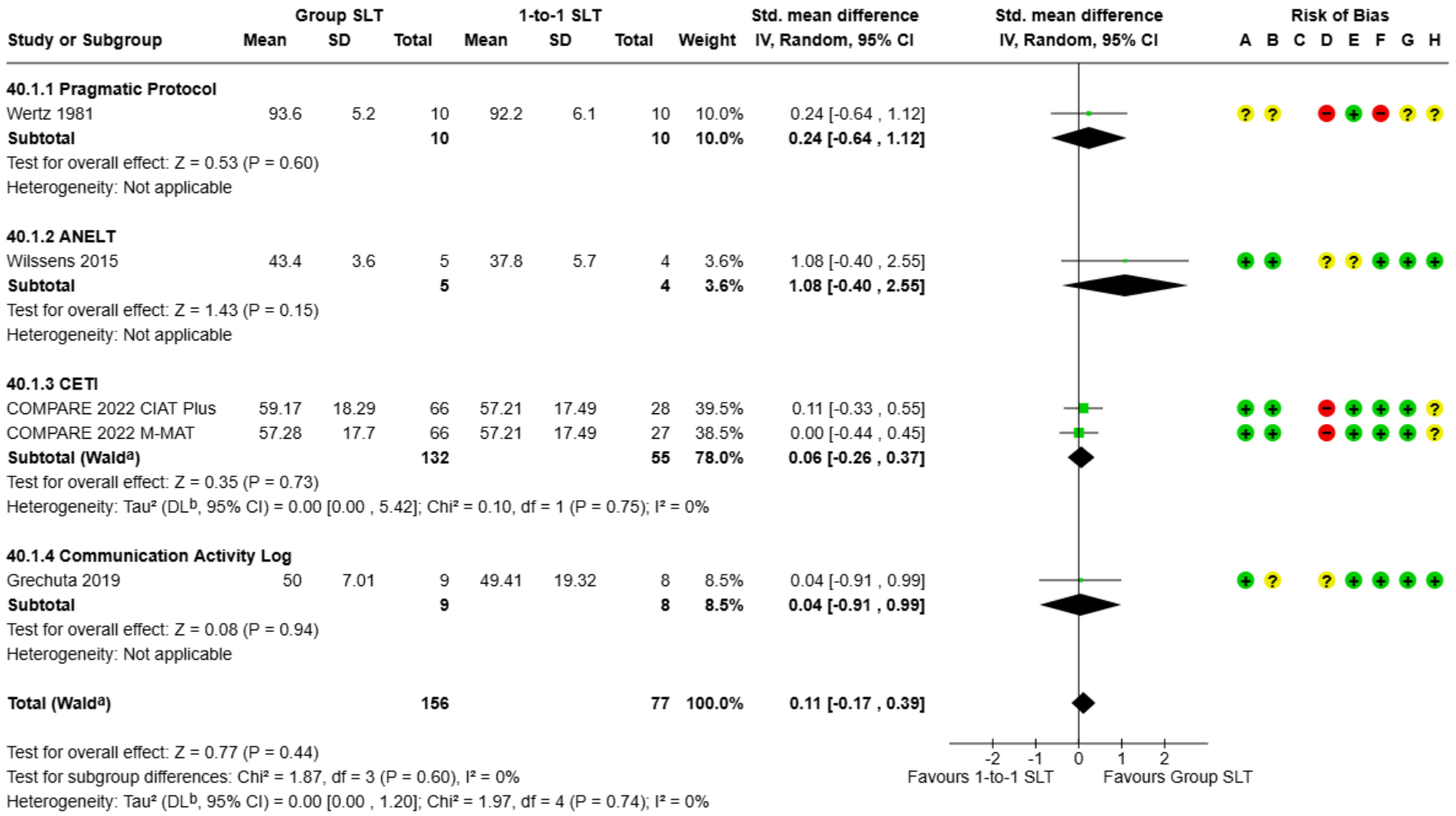
Evidence-based Recommendation 4b

In people with aphasia after stroke, we suggest in-person SLT plus digital augmentation should be offered rather than usual in-person SLT.

Quality of evidence: Very low ⊕

Strength of recommendation: Weak for SLT plus digital augmentation↑?

In people with aphasia after stroke is group SLT compared to one-to-one SLT associated with similar improvements in …**functional communication** …?



EUROPEAN STROKE ORGANISATION

Evidence-based Recommendation 5a

In people with aphasia post-stroke, we suggest using either one-to-one or group therapy.

Quality of evidence: Low ⊕⊕

Strength of recommendation: Weak that one-to-one and group SLT interventions lead to similar gains ↑?

Expert consensus statement

The decision on the format of the intervention may be made with reference to the health service context and resources available.

12/12 (100%) writing group members agreed

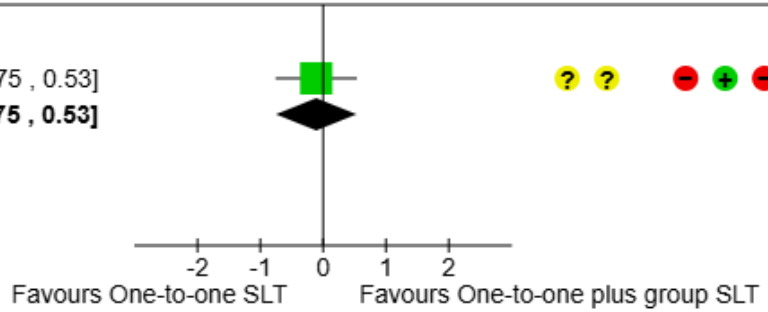
In people with aphasia after stroke is one-to-one plus group SLT compared to one-to-one SLT alone associated with greater improvements in … functional communication and quality of life?

Functional Communication

Study or Subgroup	One-to-one SLT plus group SLT plus Mean	SD	Total	One-to-one SLT Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI
42.1.1 ASHA-FACS								
Efstratiadou 2019	5.44	0.97	14	5.55	0.94	22	100.0%	-0.11 [-0.75 , 0.53]
Subtotal			**14**			**22**	**100.0%**	**-0.11 [-0.75 , 0.53]**

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

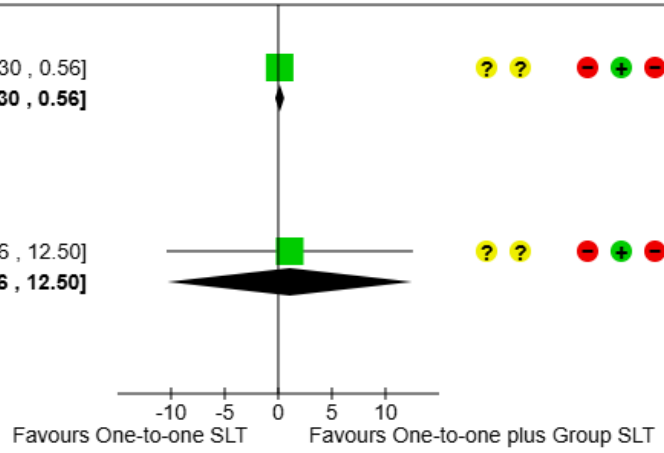
Test for subgroup differences: Not applicable



Risk of Bias: A B C D E F G H

Quality of Life

Study or Subgroup	One-to-one SLT plus Group SLT Mean	SD	Total	One-to-one SLT Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI
42.3.1 SAQoL Total								
Efstratiadou 2019	3.62	0.57	14	3.49	0.73	22	100.0%	0.13 [-0.30 , 0.56]
Subtotal			**14**			**22**	**100.0%**	**0.13 [-0.30 , 0.56]**
Test for overall effect: Z = 0.60 (P = 0.55)								
Heterogeneity: Not applicable								
42.3.2 EQ5D								
Efstratiadou 2019	68.21	17.05	14	67.14	17.06	22	100.0%	1.07 [-10.36 , 12.50]
Subtotal			**14**			**22**	**100.0%**	**1.07 [-10.36 , 12.50]**
Test for overall effect: Z = 0.18 (P = 0.85)								
Heterogeneity: Not applicable								



Risk of Bias: A B C D E F G H

EUROPEAN STROKE ORGANISATION

Evidence-based Recommendation 5b

In people with aphasia post-stroke, the benefits of providing one-to-one plus group SLT compared to one-to-one SLT alone are uncertain and therefore we cannot make a recommendation.

Quality of evidence: Very low ⊕

Strength of recommendation: -

Expert consensus statement 5b

In people with aphasia following stroke where access to one-to-one therapy is constrained by resource availability, we suggest that group therapy delivered in addition to one-to-one SLT may facilitate increased therapy time, provide additional opportunities to use language in a social context and enhance communication confidence.

We also suggest that the therapy timing and format should follow other recommendations in this clinical guideline, aiming to enhance language recovery, communication, participation, and quality of life.

12/12 (100%) writing group members agreed

In people with aphasia after stroke is SLT plus tDCS compared to SLT plus sham tDCS associated with greater improvements in language and communication with no changes to safety?

a. Left Hemisphere anodal tDCS plus SLT versus sham tDCS plus SLT

b. Left Hemisphere cathodal tDCS plus SLT versus sham tDCS plus SLT

c. Right Hemisphere anodal tDCS plus SLT versus sham tDCS plus SLT

d. Right Hemisphere cathodal tDCS plus SLT versus sham tDCS plus SLT

e. Cerebellar (anodal or cathodal) tDCS plus SLT versus sham tDCS plus SLT

f. Individualised Left Hemisphere (anodal or cathodal) tDCS plus SLT versus sham tDCS plus SLT

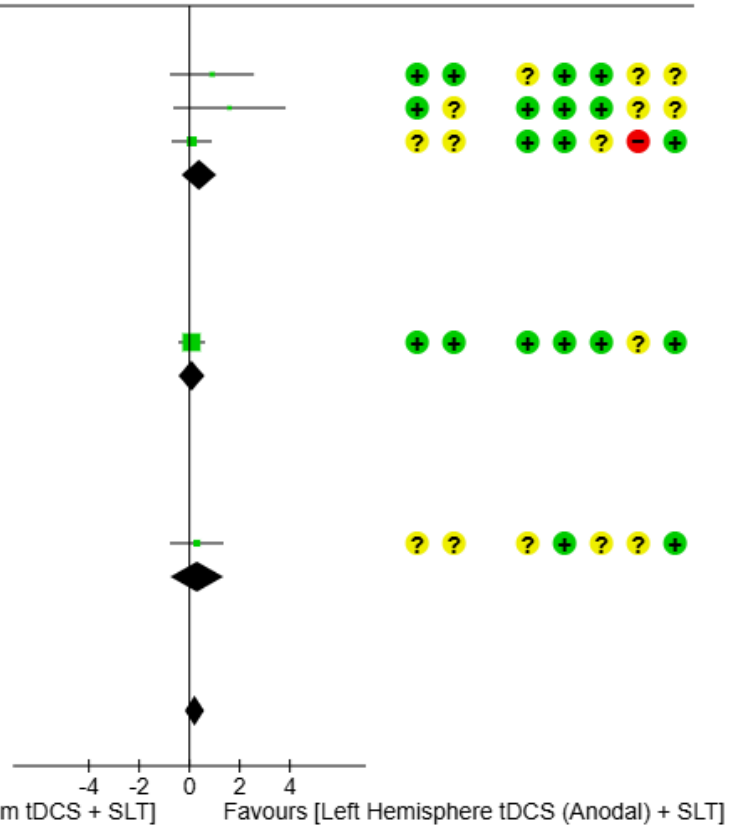
In people with aphasia after stroke is SLT plus tDCS compared to SLT plus sham tDCS associated with greater improvements in language and communication with no changes to safety?

a. **Left Hemisphere anodal tDCS plus SLT versus sham tDCS plus SLT**
b. Left Hemisphere cathodal tDCS plus SLT versus sham tDCS plus SLT
c. Right Hemisphere anodal tDCS plus SLT versus sham tDCS plus SLT
d. Right Hemisphere cathodal tDCS plus SLT versus sham tDCS plus SLT
e. Cerebellar (anodal or cathodal) tDCS plus SLT versus sham tDCS plus SLT
f. Individualised Left Hemisphere (anodal or cathodal) tDCS plus SLT versus sham tDCS plus SLT

In people with aphasia after stroke is SLT plus tDCS compared to SLT plus sham tDCS associated with greater improvements in …functional communication?

Left Hemisphere anodal tDCS plus SLT versus sham tDCS plus SLT

Study or Subgroup	Left Hemisphere tDCS + SLT Mean	SD	Total	Sham tDCS + SLT Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI
43.1.1 Communication Effectiveness Index								
Cherney 2021	64.23	21.94	3	48.33	6.67	4	5.3%	0.90 [-0.76 , 2.56]
Matar 2022	75.33	6.66	3	60	8.54	3	2.9%	1.60 [-0.62 , 3.83]
Turkeltaub 2017	6.6	2	18	6.4	1.9	10	24.3%	0.10 [-0.67 , 0.87]
Subtotal (Wald[a])			**24**			**17**	**32.6%**	**0.38 [-0.31 , 1.07]**
Test for overall effect: Z = 1.08 (P = 0.28)								
Heterogeneity: Tau² (DL[b]) = 0.01; Chi² = 2.05, df = 2 (P = 0.36); I² = 2%								
43.1.2 Amsterdam Nijmegen Everyday Language Test								
Spielmann 2018	33	12.75	26	32	11.31	32	54.3%	0.08 [-0.44 , 0.60]
Subtotal			**26**			**32**	**54.3%**	**0.08 [-0.44 , 0.60]**
Test for overall effect: Z = 0.31 (P = 0.76)								
Heterogeneity: Not applicable								
43.1.3 Western Aphasia Battery Spontaneous Speech								
You 2011	4.57	2.76	7	3.71	2.69	7	13.1%	0.30 [-0.76 , 1.35]
Subtotal			**7**			**7**	**13.1%**	**0.30 [-0.76 , 1.35]**
Test for overall effect: Z = 0.55 (P = 0.58)								
Heterogeneity: Not applicable								
Total (Wald[a])			**57**			**56**	**100.0%**	**0.20 [-0.18 , 0.58]**
Test for overall effect: Z = 1.04 (P = 0.30)								
Test for subgroup differences: Chi² = 0.49, df = 2 (P = 0.78), I² = 0%								
Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 2.51, df = 4 (P = 0.64); I² = 0%								



EUROPEAN STROKE ORGANISATION

Evidence-based Recommendation 6 a-f

In people with aphasia post-stroke, the benefits of SLT plus tDCS compared to SLT plus sham tDCS are uncertain and therefore we cannot make a recommendation.

Quality of evidence: Very low ⊕
Strength of recommendation: -

Expert consensus statement 6 a-f

In people with aphasia following stroke, we suggest that in the clinical context, SLT should be delivered alone, rather than SLT alongside tDCS. Individualised tDCS protocols for post-stroke aphasia may be beneficial, but further evidence is required.

10/12 working group members agreed with first statement
12/12 agreed with the second statement

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In people with aphasia after stroke, is **individually-tailored SLT by functional relevance** compared to non-tailored SLT associated with greater improvements in language, communication or quality of life?

No trials identified comparing tailored to non-tailored interventions.

RELEASE IPD network meta-analysis

Controlled for baseline age, sex, aphasia severity and time poststroke

Significant gains from baseline were …

only associated with functionally relevant SLT

- auditory comprehension 5.26 AAT-TT, 95% CI [2.05 - 8.47], 194 IPD, 7 RCTs)

higher in functionally relevant SLT than non-tailored SLT

- overall language ability (16.47 WAB-AQ points, 95% CI [10.95 - 21.99], 232 IPD, 6 RCTs)
- naming (8.79 Boston Naming Test (BNT) points, 95% CI [1.95 - 15.63],113 IPD, 5 RCTs)
- functional communication (0.74 AAT-SSC points, 95% CI [0.38 - 1.10], 249 IPD, 6 RCTs)

Dosage, intensity and Frequency of Language Therapy for Aphasia. Stroke 2022; 53(3) 959-967

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EUROPEAN STROKE ORGANISATION

Evidence-based Recommendation 7a

In people with aphasia post-stroke, we suggest tailored SLT by functional relevance rather than non-tailored SLT by functional relevance should be offered.

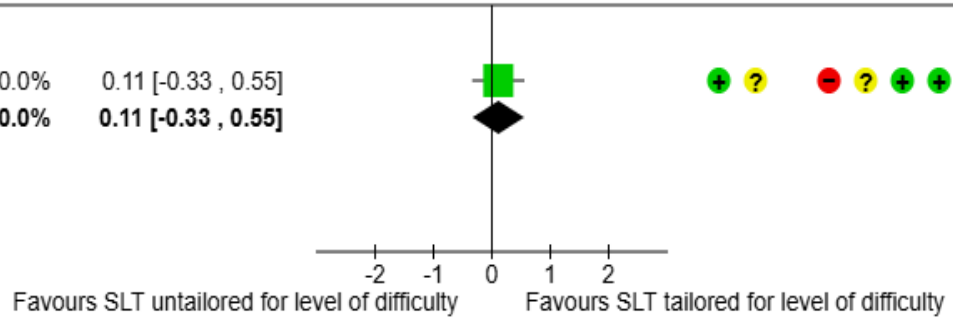
Quality of evidence: Very low ⊕

Strength of recommendation: Weak for SLT tailored by functional relevance intervention ↑?

In people with aphasia after stroke is individually-tailored SLT by level of language task difficulty, compared to non-tailored SLT associated with greater improvements in language, communication or **quality of life**?

Study or Subgroup	Favours SLT tailored for level of difficulty Mean	SD	Total	Favours SLT untailored for level of difficulty Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI
45.4.1 SAQOL-39								
Braley 2021	3.77	0.56	17	3.66	0.7	15	100.0%	0.11 [-0.33 , 0.55]
Subtotal			**17**			**15**	**100.0%**	**0.11 [-0.33 , 0.55]**

Test for overall effect: Z = 0.49 (P = 0.63)
Heterogeneity: Not applicable



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Evidence-based Recommendation 7b

In people with aphasia post-stroke, we suggest that SLT individually-tailored by level of language task difficulty should be offered.

Quality of evidence: Very low ⊕

Strength of recommendation: Weak for SLT tailored by language task difficulty intervention ↑?

Areas of future research

- Target clinical-evidence gaps
- More specific aphasia intervention trials, of sufficient size and power that employ the highest quality methodologies
  - aphasia core outcome set
  - demographic description of participants
  - SLT intervention and comparison
  - routinely captured follow-up data (up to a year post-intervention)
- Language and culturally relevant outcome measurements for multilingual global population

ESO Guideline
Aphasia Rehabilitation 2025

EUROPEAN STROKE ORGANISATION

Aphasia rehabilitation should be ...

- frequent - at least 4 times weekly
- intensive - at least 3 hours weekly
- at a sufficient dose - at least 20 hours of SLT
- functionally relevant to the person with aphasia
- at a sufficient level of language task difficulty for the individual
- augmented by digitally-delivered or group-based provision

ESO Guideline
Aphasia Rehabilitation 2025

EUROPEAN STROKE ORGANISATION

Key Recommendations

European Stroke Organisation Aphasia Rehabilitation Guideline

A third of stroke survivors develop aphasia resulting in problems speaking, understanding speech, reading and writing. Aphasia is associated with depression and poorer stroke recovery. This guideline addresses important questions to support optimal speech and language therapy for aphasia rehabilitation. We considered the available evidence and analysed data from 45 trials. We make the following recommendations and multidisciplinary expert consensus statements to support aphasia rehabilitation clinical decisions.

In people with aphasia post-stroke to improve language, communication and quality of life ...

Rehabilitation dose

we recommend speech and language therapy interventions of ≥ 20 hours

Rehabilitation frequency

we suggest speech and language therapy ≥ 4 days per week

Rehabilitation intensity

we suggest ≥ 3 speech and language therapy hours per week

Digital rehabilitation

we suggest that speech and language therapy can be delivered in-person or digitally.

Rehabilitation context

we suggest using either one-to-one or group speech and language therapy. The decision on the format of the therapy intervention may be made with reference to the health service context and resources available.

Tailoring rehabilitation

we suggest that speech and language therapy should be tailored to the person with aphasia so that it is functionally relevant and at the right level of language difficulty for their rehabilitation needs.

In-person or digital therapy

we suggest that augmentation of in-person speech and language with digital therapy should be offered.

European Stroke Organisation Aphasia Rehabilitation Guideline

Where research information was lacking, and clinical uncertainties remained we developed the following expert consensus statements to guide clinical decision making

In people with aphasia post-stroke to improve language, communication and quality of life ...

Augmenting dose

where access to one-to-one therapy is constrained by resource availability, we suggest that group therapy delivered in addition to one-to-one speech and therapy may facilitate increased therapy time, provide additional opportunities to use language in a social context, and enhance communication confidence.

We also suggest that the therapy timing and format should follow other recommendations in this clinical guideline, aiming to enhance language recovery, communication, participation, and quality of life.

Brain stimulation and speech and language therapy

we suggest that in the clinical context, speech and language therapy should be delivered alone rather than with transcranial direct current stimulation. Further evidence is required of the effectiveness of SLT with such brain stimulation. Individualised approaches to the brain stimulation rehabilitation delivery protocol for people with aphasia may be beneficial, but again, further evidence is required.

Full guideline can be

ESO Guideline
Aphasia Rehabilitation 2025

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European Stroke Organisation Guideline on Aphasia Rehabilitation

Professor Marian Brady on behalf of the Aphasia Rehabilitation Guideline Working Group