Overview

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- To determine the

- The implantable nerve stimulator consists of:
    External transmitter with a

IM-FES Defined[2-3]

- A footswitch placed under the heel of the patient's foot inside the shoe activates and deactivates the stimulation.
- The implantable nerve stimulator receives information carried by radiofrequency signals and converts them into the stimulation pulses of the desired amplitude and frequency.

IM-FES Parameters & Muscles[2,4-]

- IM-FES Parameters (within comfort):
  - Amplitude: 4 - 20 mA
  - Pulse width: 1 - 150 µs
  - Frequency: 15 - 50 Hz
- Muscles:
  - Tibialis anterior
  - Peroneus longus & brevis
  - Gastrocnemius, lateral head
  - Biceps femoris
- Nerves:
  - Superficial and Deep Peroneal

Methods

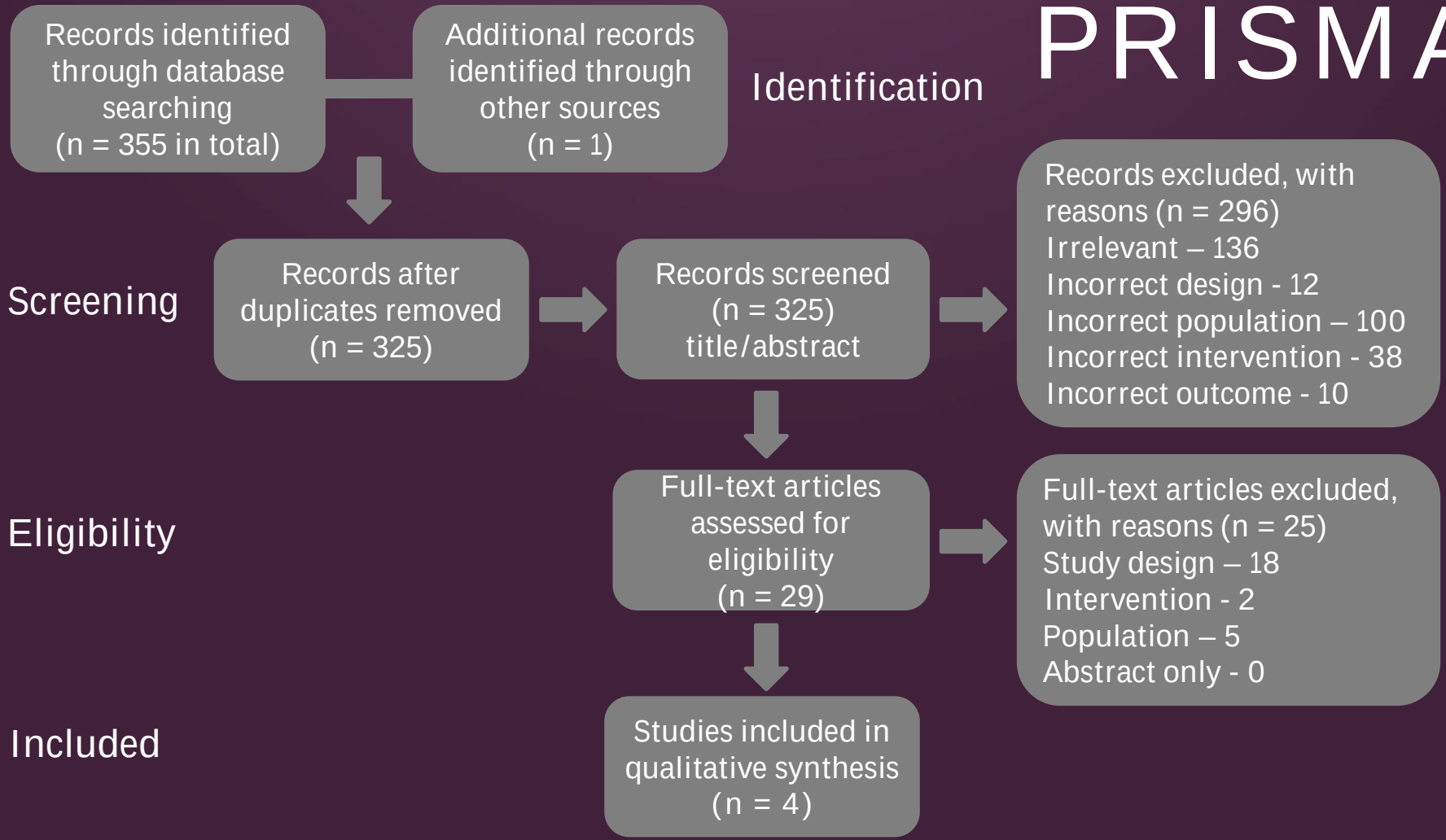
- The conducted literature search included:
  - CINAHL
  - PubMed
  - ProQuest Nursing and Allied Health
  - SAGE Journals
  - Cochrane Library

- Two reviewers independently assessed each

each

- (implant* FES OR neuroprosthetic OR neuroprosthesis OR implant* stimulator) AND (lower leg

PRISMA


Identification
Records identified through database searching (n = 355 in total)
Additional records identified through other sources (n = 1)
Screening
Records after duplicates removed (n = 325)
Records screened (n = 325) title/abstract
Records excluded, with reasons (n = 296)
Irrelevant – 136
Incorrect design - 12
Incorrect population – 100
Incorrect intervention - 38
Incorrect outcome - 10
Eligibility
Full-text articles assessed for eligibility (n = 29)
Full-text articles excluded, with reasons (n = 25)
Study design – 18
Intervention - 2
Population – 5
Abstract only - 0
Included
Studies included in qualitative synthesis (n = 4)

PEDro Scale

Author	1	2	3	4	5	6	7	8	9	10	Total
Kottink et al. (2012)[2]	Y	Y	Y	N	N	N	N	N	Y	Y	5/10
Daly et. al. (2004)[6]	Y	N	Y	N	N	Y	N	Y	Y	Y	6/10
Daly et. al. (2006)[5]											

Y

Results

Results

- Adverse effects of IM-FES included discomfort & erythema[4-5]
  No infections were reported

- Outcomes were assessed pre- and post-treatment[2,4-6]
  6 month follow-ups were used for 2 studies[4,6]

Results

- Greater gains in self-reported functional mobility[5]
- Retention of coordinated gait components occurred 6 months post-treatment and after IM-FES removal[4]
  Controls worsened significantly at follow-up[4]

Conclusion

Conclusion

- There is moderate evidence to support IM-FES for improving gait in patients with chronic CVA vs BWSTT or gait training alone[4-6]
- IM-FES resulted in normalized initial loading response in comparison to a conventional walking device[2]
- One study showed retention in gait kinematics 6 months post-treatment following removal of IM-FES[4]

- Clinicians should consider using IM-FES to promote greater retention of gait improvements vs. gait training alone in adults with chronic CVA
- IM-FES is a safe and feasible

Limitations

- Several articles were published by the same authors
- Small sample size
- Inability to blind
- Invasive surgery
- Adverse effects
- Co-intervention
- Varied outcome measures and protocols
- Inability to generalize to other populations

Future Research

- Future research should:
  - Compare IM-FES to transcutaneous FES with gait training
  - Include larger sample sizes
  - Include other populations

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Comments or Questions?