

Effectiveness of Technology-Assisted Tai Chi in Older Adults: A Systematic Review

Exergaming Innovations

AUTHOR:

Vic Cho-wai WONG, MSW, ROT
Doctor of Clinical Science Candidate

AFFILIATIONS:

Hong Kong Metropolitan University, Hong Kong

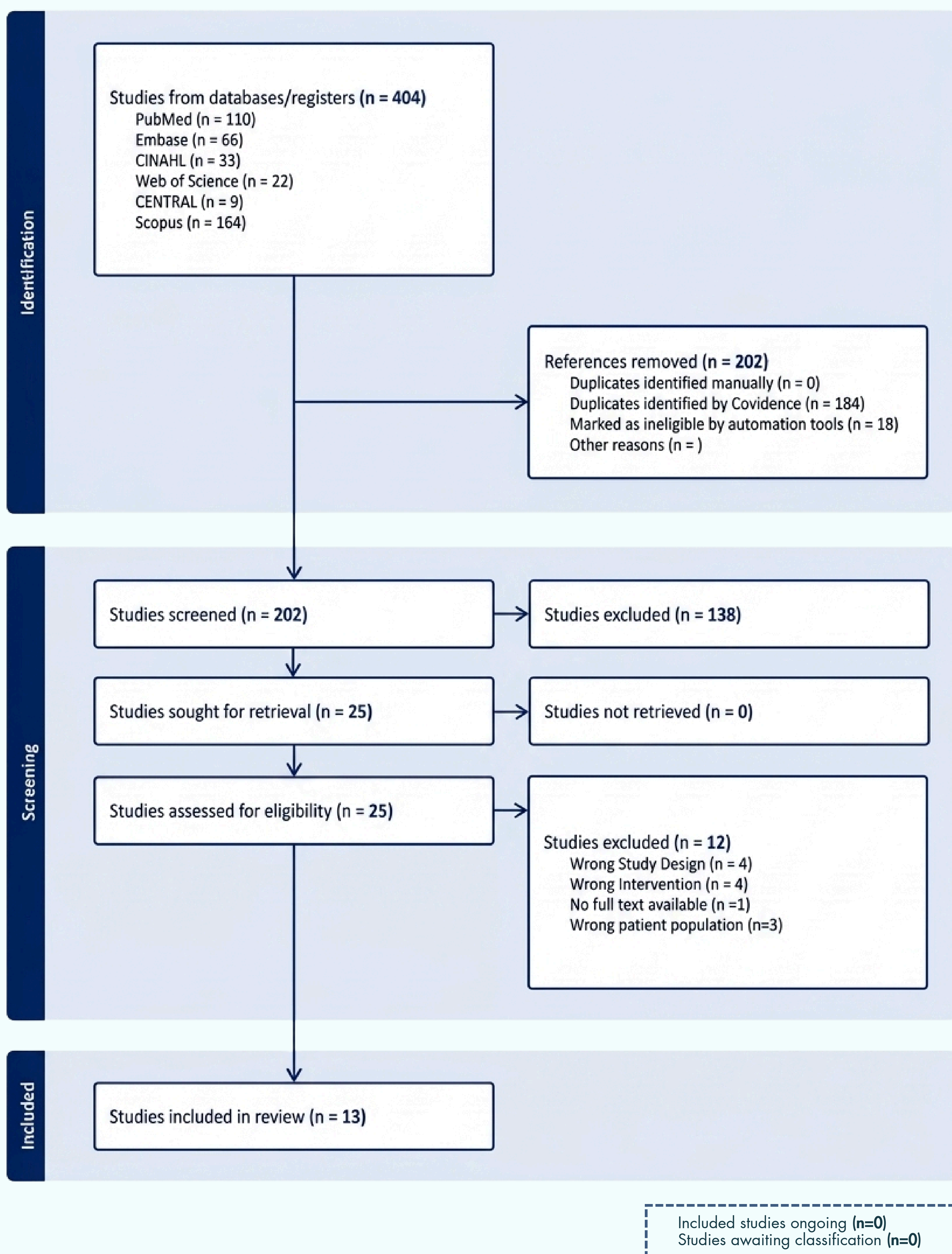
BACKGROUND

Population ageing accelerates physical and cognitive decline, increasing fall risks and compromising independence. While traditional Tai Chi is a proven low-impact intervention, adherence is frequently limited by mobility, transport, and service availability barriers. Technology-assisted Tai Chi-integrating Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and tele-delivery-presents a scalable alternative. However, its clinical efficacy and operational feasibility require systematic evaluation.

METHODS

Adhering to PRISMA 2020 guidelines, a systematic review was conducted across six major databases up to December 2025. Thirteen studies (RCTs and quasi-experimental designs) evaluating VR, AR, exergaming, and tele-health Tai Chi programmes were narratively synthesised. Risk of bias was appraised using RoB 2 and ROBINS-I.

Effectiveness of Technology-Assisted Tai Chi in Older Adults: A Systematic Review



OBJECTIVE

To systematically evaluate the feasibility, safety, and effectiveness of technology-assisted Tai Chi interventions for older adults (aged ≥ 60) across physical, cognitive, and psychosocial domains.

Figure 1: Technology-Assisted Tai Chi Modalities

Hardware configurations and their specific therapeutic mechanisms

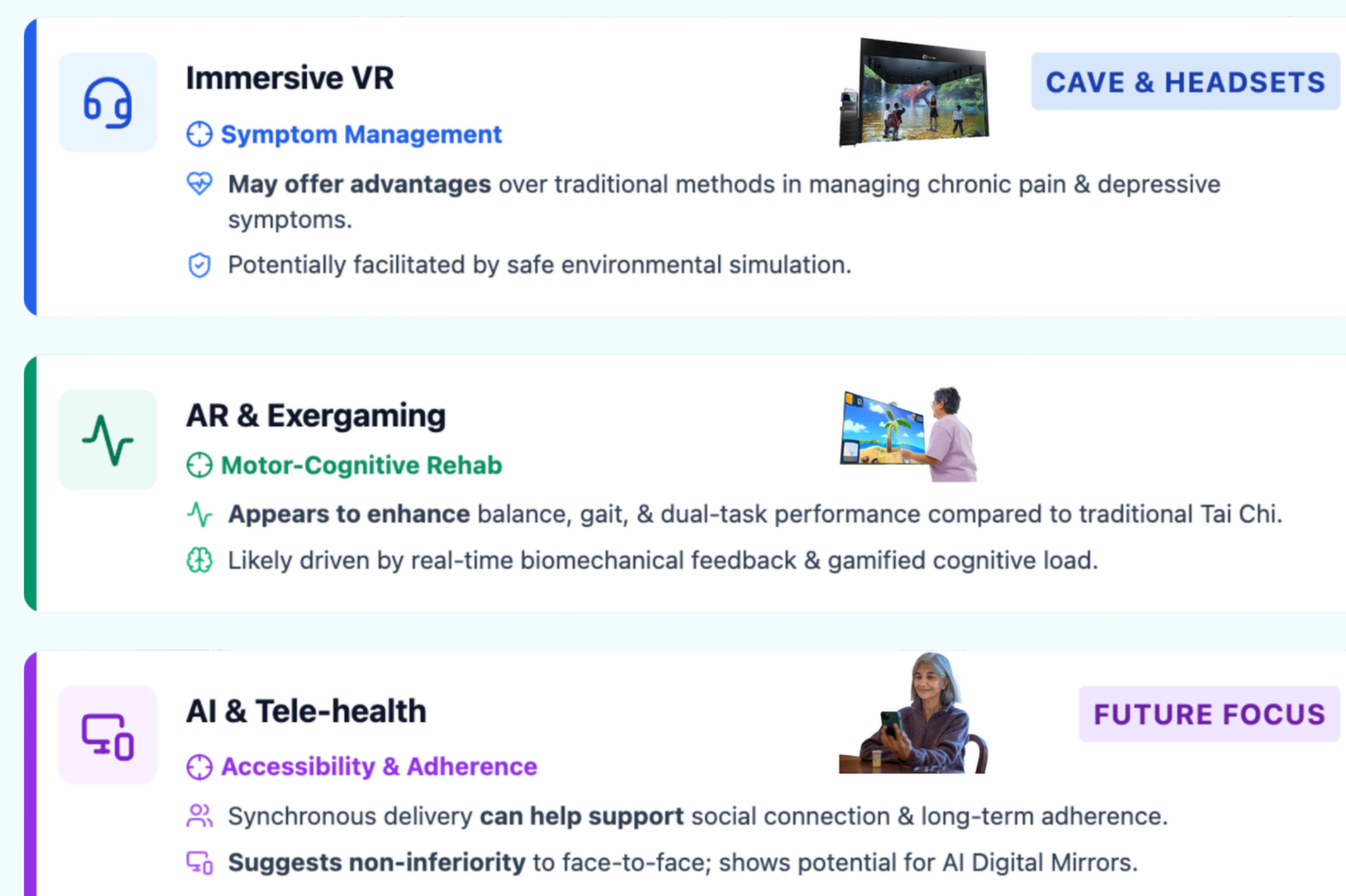
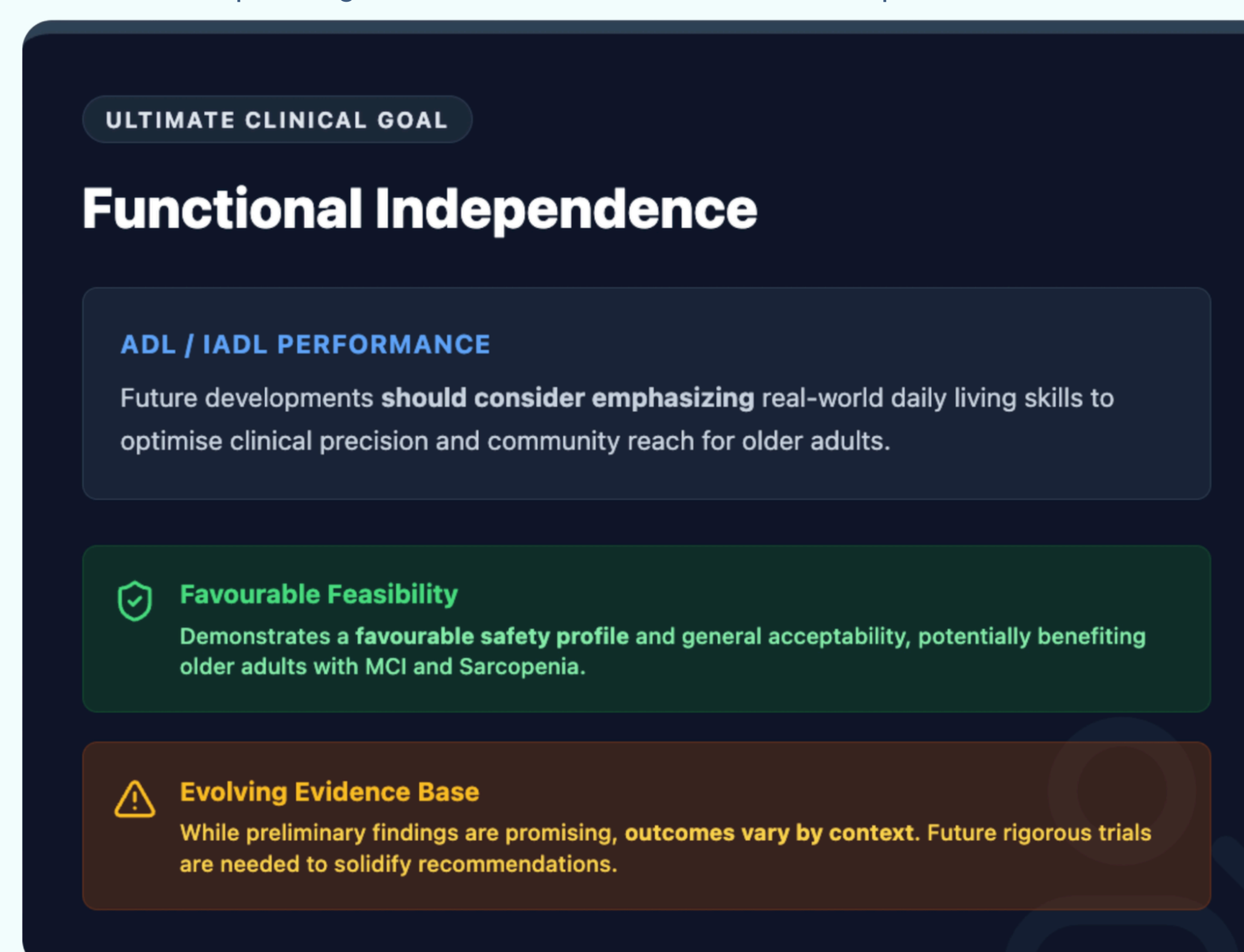


Figure 2: Clinical Translation & Feasibility

Ultimate therapeutic goals and current evidence landscape



RESULTS

To systematically evaluate the feasibility, safety, and effectiveness of technology-assisted Tai Chi interventions for older adults (aged ≥ 60) across physical, cognitive, and psychosocial domains. Technology-assisted Tai Chi demonstrated high feasibility, acceptability, and an excellent safety profile, even among older adults with mild cognitive impairment (MCI) and sarcopenia. Effectiveness varied distinctly by modality. AR and exergaming outperformed traditional Tai Chi in physical and cognitive outcomes (balance, executive function, dual-task performance) by providing real-time biomechanical feedback and gamified cognitive loading. AI-assisted tele-rehabilitation was non-inferior to face-to-face instruction. Psychosocially, immersive VR effectively reduced chronic pain and depressive symptoms via environmental simulation, whilst synchronous tele-delivery sustained social connection and long-term adherence. Itive, and psychosocial domains.

CONCLUSION

Technology-assisted Tai Chi is a safe, promising modality for maintaining older adults' functional capacities. Given the current low-to-moderate evidence quality, findings warrant cautious interpretation. Clinically, technology selection must align with specific therapeutic goals and environmental contexts: immersive VR for symptom management, AR/AI for motor-cognitive rehabilitation, and tele-health for scalability. Future rigorous trials should investigate AI digital mirrors to maximise clinical precision and functional independence (ADL/IADL).

AUTHOR KEYWORDS:

#Tai Chi #Gerontechnology #Virtual Reality #Author keywords #Telerehabilitation #Postural Balance #MCI