

Contents

Data Organization	3
PICO 1.....	5
PICO 1A: Aerobic vs. Control.....	5
PICO 1B: Aerobic vs. Other	7
PICO 1C: Aerobic vs. Aerobic	9
PICO 2.....	10
PICO 2A: Resistance/ Strength Training vs. Control.....	10
PICO 2B: Resistance/Strength Training vs. Other	12
PICO 2C: Resistance/Strength Training vs. Resistance/Strength Training	13
PICO 2D: Multimodal Resistance/Strength Training vs. Control.....	13
PICO 2E: Multimodal Resistance/Strength Training vs. Other.....	16
PICO 3.....	17
PICO 3A: Balance vs. Control.....	17
PICO 3A1: Supervised vs. Control	17
PICO 3A2: Unsupervised vs. Control	19
PICO 3B: Balance vs. Other	20
PICO 3B1: Balance vs. Resistance/Strength training.....	20
PICO 3B2: Balance vs. Moderate to Vigorous Aerobic.....	21
PICO 3B3: Balance vs. Low Intensity Aerobic.....	22
PICO 3B4: Core/Trunk Stability/Strength vs. Conventional PT	23
3B5: Balance vs. Gentle Exercise.....	24
PICO 3C: Balance vs. Balance	25
PICO 3C1: More supervised vs. Less Supervised.....	25
PICO 3C2: Balance with Technology vs. Balance without Technology	26
PICO 3C3: Aquatic vs. Land	27
PICO 3C4: Supervised vs. Supervised	28
PICO 4.....	29
PICO 4A: Stretching/Flexibility vs. Control.....	29
PICO 4B: Stretching/Flexibility vs. Other.....	30
PICO 4C: Stretching/Flexibility vs. Stretching/Flexibility.....	31
PICO 5.....	32
PICO 5A: Cueing vs. No Cueing.....	32
PICO 5B: Cueing vs. Other	33

PICO 5C: Cueing vs. Cueing	34
PICO 6.....	35
PICO 6A: Community Exercise Program vs. Control	35
PICO 6B: Community Exercise Program vs. Other	36
PICO 6C: Community Exercise Program vs. Community Exercise Program	38
PICO 7.....	39
PICO 7A: Gait Training vs. Control	39
PICO 7B: Gait Training vs. Other	40
PICO 7C: Gait training vs. Gait training	41
PICO 8.....	43
PICO 8A: Task Specific Training vs. Control.....	43
PICO 8B: Task Specific Training vs. Other	45
PICO 8C: Multimodal Task Specific Training vs. Multimodal/Other	46
PICO 10.....	47
PICO 10A: PT with Behavioral Change vs. Control	47
PICO 10B: PT with Behavioral Change vs. PT with Behavioral Change	49
PICO 11.....	50
PICO 11A: Interdisciplinary Care vs. Control.....	50
PICO 11B: Interdisciplinary Care vs. Interdisciplinary Care.....	52
PICO 14.....	53
Expert Care vs. Control	53
PICO 15.....	54
PICO 15A: Tele-Health/Rehab vs. Control/None	54
PICO 15B: Mobile Health vs. Control/None.....	55

Data Organization

Organization

- Grouped multiple outcomes within the same category across studies
 - Ex) BBS and BESTest = Balance; 6MWT, 10MWT, 2MWT = Walk test
- Additional “outcome details” column in evidence tables for specific measure
 - Most important for Function- significant variation
- Prognostic studies: Intervention/Prognostic data
- Overlap of studies across PICO's
- **Sorted each PICO as follows (*with few exceptions):**
 - Intervention vs. control
 - Intervention vs. other treatment
 - Intervention vs. itself

Group Breakdown:

PICO 1: Aerobic	
A	Aerobic vs. Control
B	Aerobic vs. Other
C	Aerobic vs. Aerobic
PICO 2: Resistance	
A	Resistance/Strength training vs. Control
B	Resistance/Strength training vs. Other
C	Resistance/Strength training vs. Resistance/Strength training
D	Multimodal Resistance/Strength training vs. Control
E	Multimodal Resistance/Strength training vs. Other
PICO 3: Balance	
A	Balance vs. Control
B	Balance vs. Other
C	Balance vs. Balance
PICO 4: Stretching/Flexibility	
A	Stretching/Flexibility vs. Control
B	Stretching/Flexibility vs. Other
C	Stretching/Flexibility vs. Stretching/Flexibility
PICO 5: External Cueing	
A	Cueing vs. No Cueing
B	Cueing vs. Other
C	Cueing vs. Cueing
PICO 6: PD Community Exercise Program	
A	Community exercise program vs. Control
B	Community exercise program vs. Other exercise
C	Community exercise program vs. Community exercise program
PICO 7: Gait Training	
A	Gait training vs. Control

B	Gait training vs. Other
C	Gait training vs. Gait training
PICO 8: Task Specific Training	
A	Task specific training vs. Control
B	Task specific training vs. Other
C	Multimodal task specific training vs. Multimodal/Other
PICO 9: Prognostic Factors- NONE	
PICO 10: PT Encompassing Behavioral Change	
A	PT with behavioral change vs. Control
B	PT with behavioral change vs. PT with behavioral change
PICO 11: Interdisciplinary Care	
A	Interdisciplinary care vs. Control
B	Interdisciplinary care vs. Interdisciplinary care
PICO 12: Deep Brain Stimulation- NONE	
PICO 13: Motor Learning- NONE	
PICO 14: Expert Care	
	Expert care vs. Control
PICO 15: Tele-Health Technology	
A	Tele-health/rehab vs. Control/None
B	Mobile health vs. Control/None

PICO 1

PICO 1A: Aerobic vs. Control

	High						Moderate					
	Fisher, 2008	Landers, 2019	Marusiak, 2019	Schenkman, 2018	Tollar, 2019	Van der Kolk, 2019	Silveira, 2018	Altmann, 2016	Demonceau, 2017	Ebersbach, 2014	Sacheli, 2019	Schenkman, 2012
↑ Better Outcomes												
↓ Worse Outcomes												
● Not Significant												
Function												
UPDRS II	●		●	●	↑			●				↑
Balance		↑			↑	↓						↑
Gait speed									●			
Walk test		●			↑	↑			●			
Mobility		●				↓			●		●	
Fall Fear/Risk		●										
Strength/Power			↑						↑		●	
Amount of sway					↑							
Step	●			●					●			
Physical performance												↑
Double support	●											
Falls						↑						
Gait assessment					↑							
Tinetti Assessment Tool (TAT)					●							
Stride	●								●			
ROM	↑											
Gait velocity	●											
Hand/UE dexterity						↓					●	
ADL			●		↑							
Reaction time										●	●	
Other												
HR (bpm)									●			
Activity of intracellular antioxidant enzymes		●										
Non-motor symptoms												
Cognition			●			↓	↓	↓				↓
UPDRS I	●		●	●				●				
Depression					↑	↓		●			●	
Anxiety					↑	↑		●				
Apathy Scale								●			●	
Sleep					↑		↑					
Fatigue		●				●						
PANSAS											●	
Autonomic dysfunction						↓						

	High					Moderate						
	Fisher, 2008	Landers, 2019	Marusiak, 2019	Schenkman, 2018	Tollar, 2019	Van der Kolk, 2019	Silveira, 2018	Altmann, 2016	Demonceau, 2017	Ebersbach, 2014	Sacheli, 2019	Schenkman, 2012
↑ Better Outcomes												
↓ Worse Outcomes												
● Not Significant												
Disease progression												
UPDRS III	●	↑	↑	↑		↓		●				↑
UPDRS IV						↑		●				
UPDRS Total	●			●				●			●	↑
BDNF		●										
TNF alpha		●										
IL-6		●										
IL-10		●										
IL-10/TNF alpha		●										
[11C] raclopride binding potential											↑	
Participation/QOL												
PDQ-39					↑	↑			●			↑
EQ-5D					↑							
Adverse events												
Pain				●								
Serious adverse events				↓		●						
Falls				●		●						
Adverse events		●		↓		↓						
Physical activity												
PASS									●			
IPAQ		↑										
Healthcare utilization												
LEDD						↑						
Adherence to Tx												
Sessions completed						●						
fAerobic levels												
VO2				↑		↑			●		↑	↓
Respiratory exchange ratio									●			

PICO 1B: Aerobic vs. Other

	High	Moderate				
	Burini, 2006	Silveira, 2018	Demonceau, 2017	Kurtais, 2008	Schenkman, 2012	Shulman, 2013
↑ Better Outcomes						
↓ Worse Outcomes						
● Not Significant						
Function						
UPDRS II					↑	
Balance					↑	
Gait speed			●			
Walk test	↑		●	●		↓
Mobility			●	↑		↑
Turning				●		
Strength/Power			●			↓
Step			●			
Physical performance					↓	
Stride			●			
ROM						↓
Stance duration				●		
Other						
HR (bpm)	●		●			
Energy expenditure				●		
Non-motor symptoms						
Cognition		↑				
Disease progression						
UPDRS III					↑	
UPDRS Total					↑	
Participation/QOL						
PDQ-39			↓		↓	
Attendance			●			
Patient Global Assessment				↑		
Adverse events						
Adverse events			●			
Physical activity						
Exercise				↑		
PASS			●			
Adherence to Tx						
Adherence to program			●			
Aerobic levels						
Strength/Power			●			
VO2	●		●	●	↓	↑
Ventilation	●					
Respiratory exchange ratio	↑		●			

PICO 1C: Aerobic vs. Aerobic

	High						Moderate
	Tollar, 2019	Ferraz, 2018	Arcolin, 2015	Fisher, 2008	Schenkman, 2018	Shulman, 2013	
↑ Better Outcomes ↓ Worse Outcomes • Not Significant							
Function							
Walk test	•	•	•				↓
Balance	↑		•				
UPDRS II	•			•	•		
Mobility		•	•				↓
ROM				•			↓
Amount of sway	↑						
ADL	↑						
Strength/Power							↓
Tinetti Assessment Tool (TAT)	•						
Gait assessment	•						
Stride				•			
Gait speed			•				
Step			•	•	•		
Double support			•	•			
Gait velocity				•			
WHODAS 2.0		•					
Non-motor symptoms							
UPDRS I				•	•		
Depression	•	•					
Disease progression							
UPDRS III			•	•	•		
UPDRS Total				•	•		
Participation/QOL							
PDQ-39	•	•					
EQ-5D	•	•					
Adverse events							
Pain					•		
Falls					•		
Adverse events					↓		
Serious adverse events					•		
Aerobic levels							
VO2					↑	↓	

PICO 2

PICO 2A: Resistance/ Strength Training vs. Control

	High								Moderate									
	Leal, 2019	Ferreira, 2018	Silva-Batista, 2018	Santos, 2017	Dibble, 2015	Morris, 2015	Troche, 2015	De Lima, 2019	Reyes, 2018	Silva-Batista, 2017	Silva-Batista, 2017	Demonceau, 2017	Silva-Batista, 2016	Paul, 2014	Kadkhodaie, 2020	Alves, 2019	Vieira de Moraes Filho, 2020	Reyes, 2019
↑ Better Outcomes																		
↓ Worse Outcomes																		
● Not Significant																		
Function																		
Walk test	↓			↓	●							●					↑	
Balance	↑		↑									●		●				
UPDRS II						↑												
Mobility	↑					●		↑				●	●	●			↑	
ROM										●								
Amount of sway				●														
Falls						↑												
Fall Fear/Risk			●															
Strength/Power	↑		↑		●			↑		↑		●	●	↑			↑	
Tinetti Assessment Tool (TAT)	↑																	
Gait assessment					●													
FOG				●											●			
Stride												↓						
Gait speed						●						●	●	●				
Step												●		●				
Stance duration														●				
Gait velocity								↑										
Stability			↑															
Penetration-aspiration score							↓											
Hyoid displacement						●												
Tremor															●			
Flexibility								↑										

↑ Better Outcomes

↓ Worse Outcomes

● Not Significant

	High								Moderate									
	Leal, 2019	Ferreira, 2018	Silva-Batista, 2018	Santos, 2017	Dibble, 2015	Morris, 2015	Troche, 2015	De Lima, 2019	Reyes, 2018	Silva-Batista, 2017	Silva-Batista, 2017	Demonceau, 2017	Silva-Batista, 2016	Paul, 2014	Kadkhodaie, 2020	Alves, 2019	Vieira de Moraes Filho, 2020	Reyes, 2019
↑ Better Outcomes																		
↓ Worse Outcomes																		
● Not Significant																		
Other																		
Maximum inspiratory/expiratory pressure									↑							●		↑
Peak cough flow									↑									↑
Vital capacity									●									●
HR (bpm)												●						
Presynaptic inhibition											↑							
Peak expiratory flow																●		
Non-motor symptoms																		
Anxiety		↑																
Depression								↑										
Cognition			↑										↑					
Disease progression																		
UPDRS III				●	●	●	●						●				↑	
UPDRS Total								●										
Participation/QOL																		
PDQ-39		↑		↑		●		●				●	●			●		
EQ-5D						●												
Physical activity																		
PASS												●						
Exercise														●				
fAerobic levels																		
VO2												●						
Respiratory exchange ratio												●						

PICO 2B: Resistance/Strength Training vs. Other

	High					Moderate						
	Rafferty, 2017	Santos, 2017	Morris, 2015	Corcos, 2013	Li, 2012	David, 2016	Demonceau, 2017	Schlenstedt, 2015	David, 2015	Prodoehl, 2015	Li, 2014	Baram, 2020
CO 2B: Resistance/Strength Training vs. Other												
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant												
Function												
Walk test							●			●		
Balance		↓			↓			↑		●		
UPDRS II			●									
Mobility			●		●		●	↓		●		
ROM	●											
Amount of sway		↓										
Falls			↑									
Strength/Power				↑	↑	↑	●	●				
Gait assessment								●				
Stride	●				↓		●	↓				
Gait speed		↓	↑				●			●		
Step	●						●					
Double support	●						●	●				
Gait velocity	●				↑	↑	●	●				
Stability				↓								
Cocontraction during limb acceleration/deceleration						↑						
Physical performance			↓							●		
Maximum unassisted jaw opening capacity												↑
Chewing time												↑
Other												
HR (bpm)							●					
Agonist/antagonist muscle activity						↑						
Simplified oral hygiene index												↑
Non-motor symptoms												
Cognition									●			
Disease progression												
UPDRS III			●	↑	↑			●				
UPDRS Total								●				
Participation/QOL												
PDQ-39			●	↑			↑					
Satisfaction											●	
PDQ-8											↓	
EQ-5D			●									
Adherence to Tx												
Attendance							●					
Adherence to program							●					
Adverse events												
Adverse events	●		●				●					
Physical activity												
PASS							●					
Healthcare utilization												
LEDD			●									
fAerobic levels												
VO2							●					
Respiratory exchange ratio							●					

PICO 2C: Resistance/Strength Training vs. Resistance/Strength Training

	High	Moderate					
	Silva-Batista, 2018	Reyes, 2018	Silva-Batista, 2017	Silva-Batista, 2017	Silva-Batista, 2016	Cherup, 2019	Reyes, 2019
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant							
Function							
Balance	↑					●	
Mobility					●	●	
ROM			●				
Fall Fear/Risk	●		↑			●	
Strength/Power	↑		↑		●	↑	
Stability	↑						
Other							
Maximum inspiratory/expiratory pressure		↓					●
Peak cough flow		●					●
Vital capacity		●					●
Presynaptic inhibition				↑			
Non-motor symptoms							
Cognition	↑				↑		
Disease progression							
UPDRS III					●		
Participation/QOL							
PDQ-39					●	●	
Adherence to Tx							
Sessions completed	●			●			

PICO 2D: Multimodal Resistance/Strength Training vs. Control

[illegible]

[illegible]

PICO 2E: Multimodal Resistance/Strength Training vs. Other

	High			Moderate	
	Ortiz-Rubio, 2018	Cheng, 2016	Ni, 2016 (B)	Shulman, 2013	da Silva Rocha Paz, 2019
↑ Better Outcomes					
↓ Worse Outcomes					
● Not Significant					
Function					
Walk test			●	↓	↑
Balance	↑	●	●		
UPDRS II					↑
Mobility			●	↓	↑
ROM				↑	
Amount of sway			↓		
Strength/Power		●	●	↑	
Gait speed					↑
Stance duration			●		
Turning		●			
Stability		↑			
Sensory Organization Test (SOT)		↓			
Non-motor symptoms					
Fatigue	●				
Disease progression					
UPDRS III			●		●
UPDRS Total					●
fAerobic levels					
VO2				↓	

PICO 3

PICO 3A: Balance vs. Control

PICO 3A1: Supervised vs. Control

	High								Moderate							
	Wong-Yu, 2019	Wallen, 2018	Wong-Yu, 2015	Conradsson, 2015	Goodwin, 2011	Yen, 2011	Capato 2020	Liao, 2015 (B)	Chivers Seymour, 2019	Joseph, 2019	Lofgren, 2019	Landers, 2016	Gobbi, 2013	Ashburn, 2019	Klamroth, 2019	Liao, 2015 (A)
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant																
Function																
Walk test				●												
Balance	↑	↑	↑	↑	↑		↑		↑	↑		↑		↑	↑	
UPDRS II		●		●			↑									
Mobility	↑		↑		●		↑		↑			●		↑	●	↓
Amount of sway																
Falls	↓		●				↑		●					↓		
Fall Fear/Risk				●	↑		↑		↑					↑		●
Strength/Power								↑								
Gait assessment								↑				●				
FOG							↑									
Stride								●								↑
Step		↑		●							●					
Swing											●					
Stance duration			↑								●					
Gait velocity		↑		↑				↑		↑		●				↑
Task error		●		↑												
Turning							↑									
Stability							↑									↑
Sensory Organization Test (SOT)						↓		↑				●				↑

[illegible]

PICO 3A2: Unsupervised vs. Control

	High			
	Song, 2018	Canning, 2015	Allen, 2010	Ashburn, 2007
 Better Outcomes  Worse Outcomes  Not Significant				
Function				
Walk test		●		
Balance			●	●
Mobility	●	●	●	
Amount of sway			●	
Falls	●	↑		↑
Fall Fear/Risk	●	↑	●	
Self-assessment Parkinson's Disease Disability Scale				●
ADL		●		
Strength/Power	●	●	●	
Gait assessment	●			
FOG	●	●	↑	
Gait speed			●	
Step	●		↑	
Gait velocity	●			
Stability		●	●	
Reaction time	●			
Physical performance		●	●	
Non-motor symptoms				
Cognition	●			
Participation/QOL				
PDQ-39		●	↑	
EQ-5D				↑
SF-6D Utility Score		●		
SF-12		●		
Positive affect scale		●		
Adverse events				
Serious adverse events				●
Fractures				●
Physical activity				
Exercise		●		

PICO 3B: Balance vs. Other

PICO 3B1: Balance vs. Resistance/Strength training

	High	Moderate			
	Santos, 2017	Schlenstedt, 2015	Shen, 2014	Shen, 2012	Shen, 2015
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant					
Function					
Balance	↑	↓	↑		
Mobility		↑			
Amount of sway	↑				
Falls					↑
Strength/Power		●			
Gait assessment		●			
Stride		↑	●	●	↑
Step				●	
Stance duration			↑		↑
Double support		●			
Gait velocity		●	●	●	●
Stability			●	●	↑
Disease progression					
UPDRS III		●		●	
UPDRS Total		●			
Adherence to Tx					
Sessions completed			↑		

PICO 3B2: Balance vs. Moderate to Vigorous Aerobic

	High		Moderate	
	Steib, 2019	Steib, 2017	Gasner, 2019	Schenkman, 2012
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant				
Function				
Walk test		●		
Balance		↓		↓
UPDRS II				↓
Mobility		●		
Amount of sway		↑		
Stride	↓			
Gait speed		●		
Step	↓			
Swing	↓			
Stance duration	↓			
Physical performance				↑
Disease progression				
UPDRS III			↑	↓
UPDRS Total				↓
Participation/QOL				
PDQ-39				↓
Healthcare utilization				
LEDD			●	
fAerobic levels				
VO2				↓

PICO 3B3: Balance vs. Low Intensity Aerobic

	High		
	Klamroth, 2016	Frazzitta, 2015	Picelli, 2015
 Better Outcomes  Worse Outcomes  Not Significant			
Function			
Walk test		●	
Balance		●	●
UPDRS II		●	
Mobility		●	●
Amount of sway	●		
Stride			
Gait speed			
Step			
Stance duration	●		
Double support	●		
Disease progression			
UPDRS III			●

PICO 3B4: Core/Trunk Stability/Strength vs. Conventional PT

	High			
	Gandolfi, 2019	Cheng, 2016	Cabrera-Martos, 2020	Serrao, 2019
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant				
Function				
Balance	●		↑	
ROM	↓			↑
Amount of sway	↑	●		
Falls	●			
Strength/Power		●		
Tinetti Assessment Tool (TAT)		●		
Gait assessment				↑
Gait speed				↑
Step				↑
Stance duration				↑
Double support				↑
Turning		●		
Stability		↓	↑	
Sensory Organization Test (SOT)		↓		
Disease progression				
UPDRS III	●			●
Participation/QOL				
PDQ-8	↓			
Adverse events				
Pain	●			

3B5: Balance vs. Gentle Exercise

	High	Moderate	
	Ribas, 2017	Schenkman, 2012	Smania, 2010
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant			
Function			
Walk test	●		
Balance	↑	↓	↑
UPDRS II		↑	
Falls			●
Physical performance		↑	
Transfers			↑
Non-motor symptoms			
Fatigue	↑		
Depression			↑
Disease progression			
UPDRS III		↑	
UPDRS Total		↑	●
Participation/QOL			
PDQ-39	↓	↓	
fAerobic levels			
VO2		↓	

Recommendation: There is no significant difference between balance interventions for Parkinson's patients.

PICO 3C: Balance vs. Balance

PICO 3C1: More supervised vs. Less Supervised

	High	Moderate
	King, 2015	Atterbury, 2017
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		
Function		
Balance	●	●
UPDRS II	●	
Mobility	●	●
ROM	●	
Self-efficacy	↑	
Gait assessment		●
FOG	●	
Stride	●	●
Step		↑
Double support		●
Turning	●	
Physical performance	●	
Non-motor symptoms		
Depression	●	
Apathy Scale	●	
Disease progression		
UPDRS III	●	
Participation/QOL		
PDQ-39	●	
IMI (Intrinsic Motivation Inventory)		↑

PICO 3C2: Balance with Technology vs. Balance without Technology

	High										Moderate					
	Giardini, 2018	Carpinella, 2017	Cheng, 2016	Shih, 2016	Yang, 2016 (A)	Volpe, 2014 (A)	Van den Heuvel, 2014	Yen, 2011	Capato 2020	Liao, 2015 (B)	Pompeu, 2012	Feng, 2019	Gandolfi, 2017	Ebersbach, 2008	Liao, 2015 (A)	Lee, 2015
↑ Better Outcomes																
↓ Worse Outcomes																
● Not Significant																
Function																
Walk test		↑					●						●	●		
Balance	●	↑		●	●	↑	●		↑		●	↑	↑			↑
UPDRS II						●			↑		●					
Mobility	●	↑		●	●	●			↑			↑		●	↑	
Amount of sway		↑												↑		
Falls						↑							●			
Fall Fear/Risk	●					↑	●		↑						●	
ADL																↑
Strength/Power			●							●						
Tinetti Assessment Tool (TAT)			●											●		
Gait assessment					●					●		↑	●			
FOG		●							●							
Stride										●					●	
Gait speed	●															
Step	●															
Stance duration				●			●				●					
Gait velocity										●					●	
Turning			↑						↑							
Stability		↑	↑	↑					↑					●	●	
Reaction time								●								
Sensory Organization Test (SOT)			↓					↓		●					●	
Non-motor symptoms																
Fatigue							●									
Anxiety							●									
Depression						↑										↑
Cognition											●					
Disease progression																
UPDRS III		↑			●	●	↑		↑			●		●		
UPDRS Total							●									
Participation/QOL																
PDQ-39		●			●	↑	●								●	
PDQ-8	●												●			
PDQ-9													●			
Healthcare utilization																
LEDD									●							

PICO 3C3: Aquatic vs. Land

	High	
	Volpe, 2014 (B)	Shahmohammadi, 2017
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		
Function		
Balance	●	
UPDRS II	●	
Mobility	●	
Amount of sway	●	↑
Falls	●	
Fall Fear/Risk	↑	
Disease progression		
UPDRS III	●	
Participation/QOL		
PDQL		↑
PDQ-39	●	

PICO 3C4: Supervised vs. Supervised

	High	Moderate
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	King, 2015	Gobbi, 2013
Function		
Balance	●	
UPDRS II	●	
Mobility	●	
ROM	●	
Self-efficacy	●	
FOG	●	
Stride	↑	
Turning	●	
Physical performance	●	
Non-motor symptoms		
Depression	●	
Cognition		↑
Apathy Scale	●	
Stress		●
Disease progression		
UPDRS III	●	
Participation/QOL		
PDQ-39	↑	

PICO 4

PICO 4A: Stretching/Flexibility vs. Control

	Moderate	
	Schenkman, 2012	Schenkman, 1998
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		
Function		
Walk test		↓
Balance	↓	●
UPDRS II	↑	
ROM		↑
Turning		●
Physical performance	↑	
Transfers		●
Disease progression		
UPDRS III	↑	
UPDRS Total	↑	
Participation/QOL		
PDQ-39	↓	
fAerobic levels		
VO2	↓	

PICO 4B: Stretching/Flexibility vs. Other

	Moderate
	Schenkman, 2012
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	
Function	
Balance	↓
UPDRS II	↓
Physical performance	↑
Disease progression	
UPDRS III	↓
UPDRS Total	↓
Participation/QOL	
PDQ-39	↓
fAerobic levels	
VO2	↓

PICO 4C: Stretching/Flexibility vs. Stretching/Flexibility

	High	
	Volpe, 2017	Volpe, 2014 (B)
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		
Function		
Balance	●	●
UPDRS II		●
Mobility	●	●
Amount of sway		●
Falls		●
Fall Fear/Risk	●	↑
Posture	●	
Disease progression		
UPDRS III	●	●
Participation/QOL		
PDQ-39	↑	●
Adverse events		
Pain	●	

PICO 5

PICO 5A: Cueing vs. No Cueing

	High								Moderate						
	Costa-Ribeiro, 2017	De Icco, 2015	El Tamawy, 2012	Van den Heuvel, 2014	Frazzitta, 2009	Piemonte, 2015	Capato 2020	Chang, 2019	Beck, 2020	Yang, 2016 (B)	Landers, 2016	Mak, 2008	De Luca, 2020	Burt, 2020	Akre, 2019
↑ Better Outcomes															
↓ Worse Outcomes															
● Not Significant															
Function															
Walk test															
Balance															
UPDRS II															
Mobility															
ROM															
Fall Fear/Risk															
ADL															
Self-efficacy															
Gait assessment															
FOG															
Stride															
Gait speed															
Step															
Swing															
Stance duration															
Hand/UE dexterity															
Gait velocity															
Turning															
Stability															
Sensory Organization Test (SOT)															
Dual task efficiency															
Dual task cost															
Other															
Cortical excitability															
Non-motor symptoms															
Fatigue															
Anxiety															
Depression															
Cognition															
Psychological General Well Being Index															
Coping competence															
Disease progression															
UPDRS III															
UPDRS Total															
Participation/QOL															
PDQ-39															
Physical activity															
CHAMPS															
Healthcare utilization															
LEDD															

PICO 5B: Cueing vs. Other

[illegible]

PICO 5C: Cueing vs. Cueing

	High				Moderate			
	Murgia, 2018	De Icco, 2015	Lim, 2010	Nieuwboer, 2007	Beck, 2018	Landers, 2016	Ebersbach, 2015	Rochester, 2010
↑ Better Outcomes ↓ Worse Outcomes • Not Significant								
Function								
Walk test			↑				•	↓
Balance	•			•		•		
Mobility				•		•	•	
Falls				•				
Fall Fear/Risk	•		↑					
ADL	•	•		•				
Tinetti Assessment Tool (TAT)	•							
Gait assessment	•					•		
FOG	•			•				
Stride	•	•						
Gait speed	•	•		↑				↑
Step	↑			↑	•		•	↑
Swing	•	↓						
Stance duration	•	↓	•					
Double support	•				•			
Hand/UE dexterity							•	
Gait velocity					•	•		
Physical performance	•							
Sensory Organization Test (SOT)						↓		
Non-motor symptoms								
Depression	•							
Cognition					•			
Disease progression								
UPDRS III	•	•		↑	•		↑	
Participation/QOL								
PDQ-39				•	•		•	
PDQ-8	•							
Physical activity								
CHAMPS					•			
Dynamic activity			↑					
Static activity			↑					
Walking			↑					
Healthcare utilization								
LEDD					•			

PICO 6A: Community Exercise Program vs. Control

[illegible]

PICO 6B: Community Exercise Program vs. Other

	High					Moderate
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Yang, 2017	Ni, 2016 (B)	King, 2015	Volpe, 2013	Park, 2018	
Function						
Walk test		●			↑	
Balance		●	●	↑		
UPDRS II			●			
Mobility		●	●	●	↑	
ROM			●			
Amount of sway		↑				
Self-efficacy			●			
Strength/Power		●				
FOG			●	↑		
Stride			↑			
Stance duration		●				
Double support					●	
Turning			●			
Physical performance			●			
Single support					●	
Non-motor symptoms						
Depression	●		●			
Non-motor symptoms questionnaire	●					
Cognition	●					
Sleep	●					
Apathy Scale			●			
Disease progression						
UPDRS III		●	●	↑		
Participation/QOL						
PDQ-39			↑	●		
Adherence to Tx						
HeCR (Home exercise compliance rate)	↑					
Adverse events						
Adverse events				●		

PICO 6C: Community Exercise Program vs. Community Exercise Program

	High				Moderate							
	Poier, 2019	Combs, 2013	Li, 2012	Perez de la Cruz, 2017	Perez-de la Cruz, 2018	Monteiro, 2017	Li, 2014	Park, 2014	Hackney, 2009	Rawson, 2019	Gobbi, 2013	Pandya, 2017
↑ Better Outcomes												
↓ Worse Outcomes												
● Not Significant												
Function												
Walk test		●						●	●	●		
Balance		↑	↓	↑		●			●	●		↑
UPDRS II				●								
Impairment in daily life	●											
Mobility		●	↓	↑		●			●			↑
Strength/Power			↓									
Tinetti Assessment Tool (TAT)				●				●				
FOG									●			
Stride			↓						●			
Gait speed					↑	↑						
Stance duration				↑								
Gait velocity		●	↓						●	↓		
Stability			↓									
Locomotor rehabilitation index (%)					↑							
Single support									●			
Non-motor symptoms												
UPDRS I				●								
Depression					●			↑				
Cognition											↑	
Stress											●	
Disease progression												
UPDRS III			↓	●				●	●	●		
UPDRS Total				●				●				
UPDRS IV				●								
Participation/QOL												
PDQ-39	↑				↓			●		↓		
Satisfaction	●						↓					
ICPH (Inner Correspondence and Feelings of Peaceful Relief)	●											
Effectiveness expectation	●											
PDQ-8							↓					
PDQL		●										
Adverse events												
VAS				↑								

PICO 7

PICO 7A: Gait Training vs. Control

	Moderate				
	Ganesan, 2014 A	Ganesan, 2014 B	Yang, 2010	Cakit, 2007	Biddiscombe, 2020
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant					
Function					
Walk test				↑	
Balance		↑		●	
Fall Fear/Risk				●	
Strength/Power			↑		
Tinetti Assessment Tool (TAT)		↓			
Gait assessment				●	
Stride			↑		
Gait speed			↑	●	
Step			●		
Posture			●		
Stability		↑			
Other					
Blood pressure	●				
Baroreflex sensitivity	↑				
Non-motor symptoms					
Cognition					↑
Disease progression					
UPDRS III		↑			

PICO 7B: Gait Training vs. Other

	High							Mc
	De Melo, 2018	Cheng, 2017	Picelli, 2015	Picelli, 2013	Picelli, 2012A	Picelli, 2012 B	Daneshvar, 2019	Khallaf, 2011
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant								
Function								
Walk test	↓			↑	●	↑		●
Balance			●	↑	↑			
UPDRS II								↑
Mobility		●	●		●			
ROM							↑	
Gait assessment		●						
FOG		●						
Stride				↑		●		
Gait speed	↓	●						↑
Step		↑		●		↑		
Double support				↑		●		
Stability					↑			
Symmetry	●							
Other								
HR (bpm)	●							
Blood pressure	●							
SpO2	●							
Non-motor symptoms								
Fatigue				↑		↑		
Depression								↑
Disease progression								
UPDRS III		●	●		↑			
UPDRS Total				↑		↑		
Participation/QOL								
PDQ-39		●					↑	
Physical activity								
BORG	●							

PICO 7C: Gait training vs. Gait training

	High															Moderate										
	Atan, 2019	Steib, 2019	De Melo, 2018	Grobelaar, 2017	Steib, 2017	Trigueiro, 2017	Pelosi, 2017	Galli, 2016	Klamroth, 2016	Sale, 2013	Picelli, 2013	Yang, 2013	Carda, 2012	Capecci, 2019	Ginis, 2016	Gasner, 2019	Furnari, 2017	Bang, 2017	Ganesan, 2014 A	Ganesan, 2014 B	Bello, 2013	Maidan, 2018	Fernandez-Del-Olmo, 2014	Maidan, 2017		
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant																										
Function																										
Walk test	↑		●		●		↓				↑		↓	●	●		●	↑		●						
Balance	↑				↓		↓				↑				●	●		↑		●						
UPDRS II	●					●								↑												
Mobility					●		↓					●	↓	●	●			↑				↓				
Amount of sway					↑				●												↑					
Falls							↓															●		●		
Fall Fear/Risk							↓									●										
Strength/Power																					↑					
Tinetti Assessment Tool (TAT)																	↑			↓						
Gait assessment																●										
FOG							↓							●	●	●										
Stride		↓		●					↓		●	↑				●	●					↓	●	●		
Gait speed			●	●	●				↑			●				●						↓	●	●	↑	
Step		↓		●				↑	↓		↓	●				●					●	●	●			
Swing		↓									●															
Stance duration		↓							●	●	↑					●										
Double support			●						●	●	●	●				●										
Gait velocity								↑		●																
Stability																				↑						
Symmetry			●																							
Other																										
HR (bpm)			●																	●				●		
Blood pressure			●																	●						
SpO2			●																							
Baroreflex sensitivity																			↑							
Cortical excitability												●														
Energy expenditure																								↑		
Non-motor symptoms																										
UPDRS I	●																									
Nottingham Health Profile (NHP)	●																									
Fatigue	↑										●															
Depression																	●									
Cognition																●						●			↑	

	High	Moderate
	Atan, 2019 Steib, 2019 De Melo, 2018 Grobelaar, 2017 Steib, 2017 Trigueiro, 2017 Pelosin, 2017 Galli, 2016 Klamroth, 2016 Sale, 2013 Picelli, 2013 Yang, 2013 Carda, 2012 Capecci, 2019 Ginis, 2016 Gasner, 2019 Furnari, 2017 Bang, 2017 Ganesan, 2014 A Ganesan, 2014 B Bello, 2013 Maidan, 2018 Fernandez-Del-Olmo, 2014 Maidan, 2017	
Disease progression		
UPDRS III	↑	
UPDRS Total		
Hoehn-Yahr scale		
Participation/QOL		
Nottingham Health Profile (NHP)	↑	
PDQ-39		
SF-36		
SF-12		
Adherence to Tx		
Fatigue	↓	
Sessions completed	●	
Total duration		
Physical activity		
PASE		
BORG	●	
Healthcare utilization		
LEDD		
fAerobic levels		
Respiratory exchange ratio		

PICO 8

PICO 8A: Task Specific Training vs. Control

	High										Moderate						
	Abraham, 2019	Cabrera-Martos, 2019	Abraham, 2018	Zhu, 2018	Vanbellingen, 2017	Cheng, 2016	Mateos-Toset, 2016	Morris, 2015	El-Wishy, 2013	King, 2020	Chivers Seymour, 2019	Taghizadeh, 2018	Yang, 2016 (B)	Braun, 2011	Keus, 2007	Soke, 2019	McDonald, 2020
↑ Better Outcomes																	
↓ Worse Outcomes																	
● Not Significant																	
Function																	
Walk test			↑											↓		●	
Balance			●	●						↑	↑					●	
UPDRS II			●	●	●			↑		●						●	
Mobility			↑	↑				●			↑		●	●		●	
ROM									↑								
Falls								↑			●						
Fall Fear/Risk											↑						
ADL					↓												
Strength/Power		↑			●	●	●										
Tinetti Assessment Tool (TAT)						●											
Gait assessment									↑								
FOG				↑						↑							
Stride										●							
Gait speed			●					↑	●	↑							
Step									●				↑				
Hand/UE dexterity		↑			↓		●					↑					
Turning			●			↑							↑				
Stability			↑			↑										↓	
Sensory function												↑					
Sensory Organization Test (SOT)						↓											
Parkinson Activity Scale															●		
Other																	
Bladder control																	↑
Goal attainment scaling		↑															
Brain connectivity/activation										●							
Non-motor symptoms																	
UPDRS I			●														
Depression			●								↑						
Cognition	↑		↑							●		●					

↑ Better Outcomes

↓ Worse Outcomes

● Not Significant

	High										Moderate						
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Abraham, 2019	Cabrera-Martos, 2019	Abraham, 2018	Zhu, 2018	Vanbellingen, 2017	Cheng, 2016	Mateos-Toset, 2016	Morris, 2015	El-Wishy, 2013	King, 2020	Chivers Seymour, 2019	Taghizadeh, 2018	Yang, 2016 (B)	Braun, 2011	Keus, 2007	Soke, 2019	McDonald, 2020
Disease progression																	
UPDRS III			●	●	●			↑		●							↓
UPDRS Total																	●
UPDRS IV			●														
PIGD										●							
Participation/QOL																	
PDQ-39					●			●		●	●					●	
PDQ-8																	●
ICIQ (Incontinence Questionnaire)																	↑
EQ-5D								●									
Impact on Participation and Autonomy Scale Questionnaire (IPA)			●														
Patient preference outcome scale (PPOS)																↑	
Adherence to Tx																	
Sessions completed															↑		
Total duration					↑												
Adherence to program																	↑
Adverse events																	
Pain			●														
Adverse events											●						
Physical activity																	
PASE											●						

PICO 8B: Task Specific Training vs. Other

	High
 Better Outcomes  Worse Outcomes  Not Significant	Morris, 2015
Function	
UPDRS II	
Mobility	
Falls	
Gait speed	
Disease progression	
UPDRS III	
Participation/QOL	
PDQ-39	
EQ-5D	

PICO 8C: Multimodal Task Specific Training vs. Multimodal/Other

	High				Mode	
	Strouwen, 2017	Cheng, 2016	Morris, 2009	Ellis, 2005	Geroin, 2018	Khalil, 2017
↑ Better Outcomes ↓ Worse Outcomes • Not Significant						
Function						
Walk test			•			•
Balance			↑			•
UPDRS II				↑		
Mobility			•			•
Falls	•					
Fall Fear/Risk						•
Strength/Power		•				
Tinetti Assessment Tool (TAT)		•				
Stride					•	
Gait speed				↑		
Step					•	
Swing					•	
Stance duration					•	
Double support					•	
Gait velocity	↓					
Turning		•				
Stability		•				
Physical performance						•
Sensory Organization Test (SOT)		↑				
SIP-68				↑		
Non-motor symptoms						
UPDRS I				•		
Cognition	↓				•	
Disease progression						
UPDRS III				•		
UPDRS Total				↑		
UPDRS II & III			•			
Participation/QOL						
PDQ-39			•			
SIP-68				•		
Adherence to Tx						
Sessions completed			•			
Total duration			•			
Adverse events						
Pain						↓
Healthcare utilization						
LEDD	↓					

PICO 10

PICO 10A: PT with Behavioral Change vs. Control

	High					Moderate				
	Vaughan, 2019	Tickle-Degnen, 2010	Ellis, 2019	Advocat, 2016	Montgomery, 1994	van Nimwegen, 2013	White, 2009	Coe, 2018	Sajatovic, 2017	Collett, 2017
↑ Better Outcomes										
↓ Worse Outcomes										
● Not Significant										
Function										
Walk test			●			●	●			●
UPDRS II								●		
Mobility										●
Self-efficacy					↑				●	
Strength/Power										●
Step			●							
Hand/UE dexterity										●
Other										
Bladder control	●									
Non-motor symptoms										
UPDRS I								●		
Fatigue								●		●
Anxiety				●					●	
Depression				●					●	
Non-motor symptoms questionnaire										●
Cognition									●	
Sleep									●	
Apathy Scale									●	
Stress				↓						
Disease progression										
UPDRS III									●	↑
UPDRS Total					↑					
BDNF									●	
TNF alpha									●	
IL-6									●	
Time in off-state					●					
On/Off/Side effects					●					
Worsening of symptoms					↑					

[illegible]

PICO 10B: PT with Behavioral Change vs. PT with Behavioral Change

	High		Moderate
	Tickle-Degnen, 2010	Ridgel, 2016	White, 2009
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant			
Function			
Walk test			●
Participation/QOL			
PDQ-39	●		
Adherence to Tx			
Attendance		●	
Physical activity			
IPAQ		↑	
Walking			●
fAerobic levels			
VO2		●	

PICO 11

PICO 11A: Interdisciplinary Care vs. Control

[illegible]

	High						Moderate					
	Ferrazzoli, 2018	Stozek, 2016	Monticone, 2015	Frazzitta, 2014	Frazzitta, 2012	Tickle-Degnen, 2010	Gage, 2014	Wade, 2003	Clarke, 2016	Frazzitta, 2015	Van der Marck, 2013	White, 2009
↑ Better Outcomes												
↓ Worse Outcomes												
● Not Significant												
Non-motor symptoms												
Anxiety							↑	●				
Depression							↓	●			↑	
Non-motor symptoms questionnaire							●					
Psychosocial consequences											↑	
Disease progression												
UPDRS III			↑	↑	↑					↑	↑	
UPDRS III item							↓					
UPDRS Total					↑						↑	
BDNF				●								
Participation/QOL												
PDQ-39	↑		↑			↑		●	↑		↑	
PDQ-8							●					
EQ-5D							●	●	●			
SF-36							●	●				
Adverse events												
Pain							↑					
Falls									●			
Minor adverse events			●									
Physical activity												
Walking												●
Healthcare utilization												
LEDD					●					↑	●	

PICO 11B: Interdisciplinary Care vs. Interdisciplinary Care

	High		Moderate		
	Clerici, 2019	Tickle-Degnen, 2010	Gage, 2014	Marumoto, 2019	White, 2009
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant					
Function					
Walk test	●				●
Balance	●				
UPDRS II	●			●	
Mobility	●		●		
Falls			↓		
Self-assessment Parkinson's Disease Disability Scale			●		
ADL			↓		
Self-efficacy			●		
Speech self report questionnaire			●		
UPDRS II item			●		
Emerson and Enderby Screening Assessment Rating Scale			↓		
FOG	●				
Non-motor symptoms					
UPDRS I				●	
Anxiety			●		
Depression			●		
Non-motor symptoms questionnaire			●		
Disease progression					
UPDRS III	●			●	
UPDRS III item			↑		
UPDRS Total	●			●	
UPDRS IV				↑	
Participation/QOL					
PDQ-39		●		↑	
PDQ-8			●		
EQ-5D			●		
SF-36			●		
Adverse events					
Pain			●		
Adverse events			↓		
Physical activity					
Walking					●

PICO 14

Expert Care vs. Control

	High
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Munneke, 2010
Function	
Walk test	●
Mobility	●
Falls	↓
ADL	●
FOG	●
Hand/UE dexterity	●
PSI-PD	●
Parkinson Activity Scale	●
Disease progression	
UPDRS III	●
Participation/QOL	
PDQ-39	●
EQ-5D	●
Physical activity	
LAPAQ	●

PICO 15

PICO 15A: Tele-Health/Rehab vs. Control/None

	High	Moderate
	Jaywant, 2016	Gandolfi, 2017
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		
Function		
Walk test		●
Balance		↑
Falls		●
Gait assessment	●	●
Stride	●	
Gait speed	●	
Swing	↓	
Participation/QOL		
PDQ-8		●
PDQ-9		●
Adherence to Tx		
Sessions completed	●	
Feasibility	●	

PICO 15B: Mobile Health vs. Control/None

	High
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Ellis, 2019
Function	
Walk test	●
Step	●
Participation/QOL	
PDQ-39	●
Adherence to Tx	
Sessions completed	↓
Adverse events	
Adverse events	●
Physical activity	
Daily steps	●