

Analyzing the Effectiveness of Combined Physiotherapy and Occupational Therapy in Improving Postural Control, Daily Living Skills, and Social Participation Among Children with Autism and Cerebral Palsy

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Abstract:

➤ Background:

Postural control is an important first step to mobility, hand use, and self-care, and allows for social participation. However, postural control is normally assessed in therapeutic outcome studies in isolation from the other constructs. The aim of this study was to determine if postural control, daily living skills, and social participation are improved to a greater degree by combined physiotherapy (PT) and occupational therapy (OT) than by usual care. Participants were children diagnosed with autism spectrum disorder (ASD) and cerebral palsy (CP) coming for rehabilitation in Viklang Bhawan Hospital, B.C.P.O., Patna Medical College & Hospital, Bihar. This study represents 90 children aged 4-14. Postural control was assessed three times (at baseline and at two follow-ups). Daily living skills and social participation were measured once before and once after the therapy sessions. Various statistical analyses were performed. The combined therapy group showed average changes of 12.4, 19.4, and 17.9 in postural control, daily living skills, and social participation, respectively. The usual care group showed average changes of 6.6, 10.0, and 9.2, respectively. Improvement in daily living skills was correlated with change in social participation ($r = 0.74$). The treatment effects were sustained after control for baseline levels, age, diagnosis, and adherence of the caregiver.

Keywords: Postural Control; Activities of Daily Living; Social Participation; Autism; Cerebral Palsy; Paediatric Rehabilitation.

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I. INTRODUCTION

Postural control refers to the ability to hold and restore the body alignment during static and dynamic activities. It relies on the integration of different sensory systems, anticipation and reaction, the state of the musculoskeletal system, and the level of focus and context regarding the task. In cerebral palsy, reduced trunk stability and balance can be generated by weakness, disturbed tone, impaired selective control, and asymmetrical loading (Faccioli et al., 2023; Koutenaei et al., 2023). In the case of autism spectrum disorder, postural control can be affected by the difficulty with planning of the motor actions, sensory reweighting, coordination, anxiety, and the limited experience with engagement in varied movement activities

(Bhat, 2021; Kangarani-Farahani et al., 2024; Watkyns et al., 2024).

Postural control is key in many activities, e.g., stable sitting enables hand use; dynamic balance enables movement through space and engagement in activities during play. There is a gap between the movement a child is able to do and the activities they are able to do, so a combined approach is used to bridge the gap.

For the analysis, we examine the magnitude of the treatment, changes over time, the interrelationships of the outcomes, and caregiver adherence.

➤ Aim and Objectives

The objective was to find out if combined physiotherapy (PT) and occupational therapy (OT) enhanced usual care, and, therefore, led to improved postural control, performance of ADLs, and social participation in children diagnosed with both autism spectrum disorder (ASD) and cerebral palsy (CP).

- Postural control from baseline to treatment mid-point and end of treatment.
- Changes in ADLs and social participation before and after treatment.
- Variability of treatment outcomes within ASD and CP.
- Gains in participation and postural control and ADLs.
- Caregiver adherence, attendance, and severity of child's condition and the outcome of the interventions.

II. MATERIALS AND METHODS

➤ Study Design and Participants

A diagnosis-stratified controlled pre–mid–post design was implemented. ASDs combined (n = 23), ASD control (n = 22), CP combined (n = 22), CP control (n = 23) made up the 90 participants, ages 4–14. The safety and eligibility of participants was in line with a pediatric outpatient neurorehabilitation program, at Viklang Bhawan Hospital, B.C.P.O., Patna Medical College & Hospital, Bihar.

In the combined group, PT and OT worked in collaboration over the 12 weeks. Usual care was the standard protocol with no collaboration. No data was generated in the absence of participants, hence complete-case mixed modelling was used.

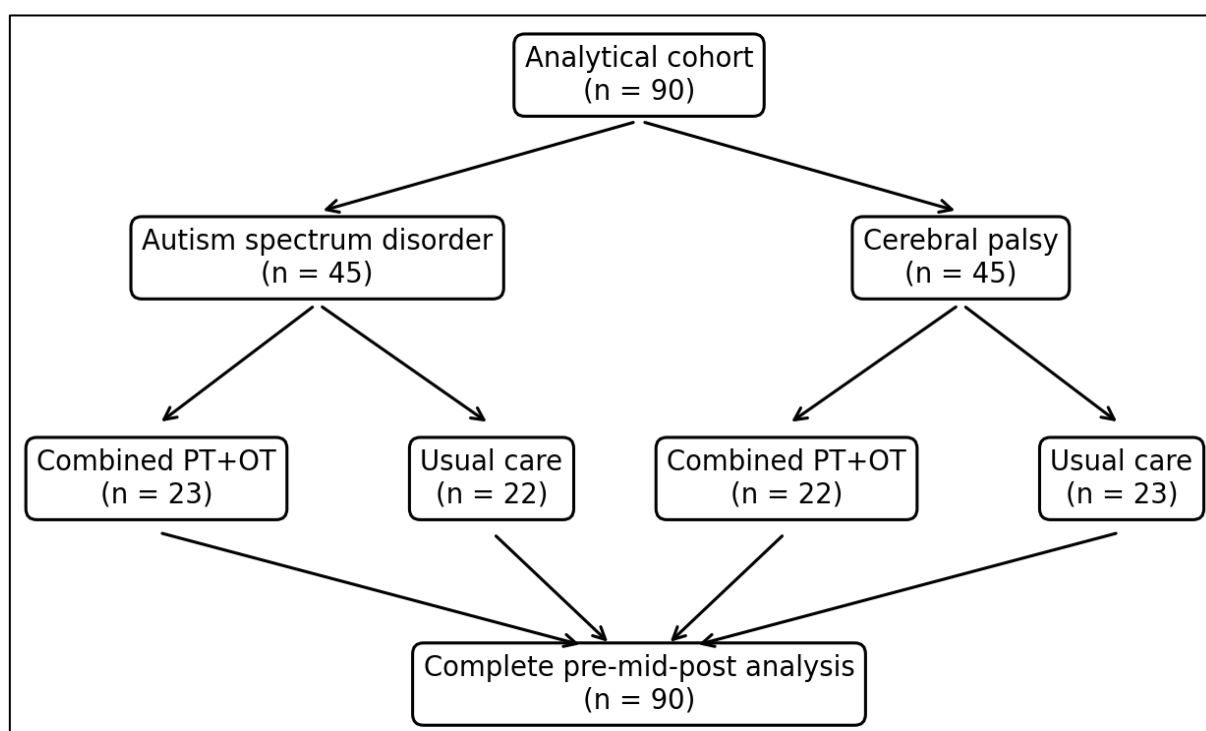


Fig 1 Diagnosis-Stratified Allocation and Analytical Flow.

➤ Combined Intervention

Postural-control training addressed a range of skills such as trunk activation and dynamic standing, reaching, and reactive balance, as well as practicing transitions and gait. These skills were practiced with varying sensory challenges by manipulating the surface the individual stood or sat on, as well as the speed, vision, and environmental complexity.

Postural control was incorporated into various daily vertical habits (e.g. feeding, dressing, grooming, toileting) and into tasks such as object manipulation, tabletop tasks, play, and classroom activities.

Each patient was engaged in three 60-minute sessions with the therapist each week, as well as engage in a brief daily therapy session at home. Progressing to greater challenges in reaching, balancing, or dual tasks was only

allowed if the client previously mastered the task with the required safety and adequate engagement. The caregivers were shown how to perform the routines and provided written routines and feedback based on the goals.

➤ Outcome Framework

Postural control was scored on a 56-point scale with greater scores indicating greater control, and ADLs and participation were scored on a 100-point scale. In the 100-point ADL scale, greater scores indicated greater quality of and lesser assistance in daily ADLs. In the participation scale, greater scores and fuller participation indicated greater engagement in play, peer interactions, and community and family activities.

➤ Statistical Analysis

Postural-control change from baseline, week 6, and week 12 were analyzed with a linear mixed-effects model.

Random intercepts were specified for each participant. Fixed effects included time, treatment, diagnosis, interactions, and age. ADL and participation were analyzed with baseline-adjusted linear models. Fixed effects for linear models included treatment, diagnosis, treatment-by-diagnosis, age, and caregiver adherence. Correlation and multiple regression assessed the relationship between postural and ADL gains and participation change. Values are reported with intervals of confidence and adjusted R squared.

III. RESULTS

➤ Baseline Profile

Mean age was 8.5 years; 64.4% were male. Combined-therapy participants attended a mean of 37.6 sessions compared with 31.8 in usual care. Caregiver adherence averaged 86.6% and 77.5%, respectively. Baseline outcome values were broadly overlapping across treatment arms.

Table 1 Group Profile and Primary Outcomes

Group	n	Age	Posture_Pre	Posture_Mid	Posture_Post	Posture_Change	ADL_Change	Participation_Change	Caregiver_Adherence	Responder
ASD-Combined	23	8.95	29.34	35.56	41.65	12.31	19.10	19.12	86.07	95.65
ASD-Usual Care	22	7.94	32.20	35.53	38.91	6.71	10.25	10.91	80.44	18.18
CP-Combined	22	9.01	26.00	32.21	38.55	12.55	19.81	16.66	87.14	90.91
CP-Usual Care	23	8.02	23.96	26.93	30.52	6.56	9.84	7.51	74.64	8.70

Note. Responder Required ≥ 9 -Point Posture, ≥ 10 -Point ADL, and ≥ 8 -Point Participation Improvement.

➤ Postural Control over Time

Postural control improved progressively rather than only at the final assessment. The combined groups showed a steeper baseline-to-week-6 increase and continued improvement to week 12. The mixed model supported a

time-by-treatment effect, indicating that the difference was attributable to the pattern of change rather than baseline separation. Diagnosis modified absolute score levels but did not reverse the direction of treatment benefit.

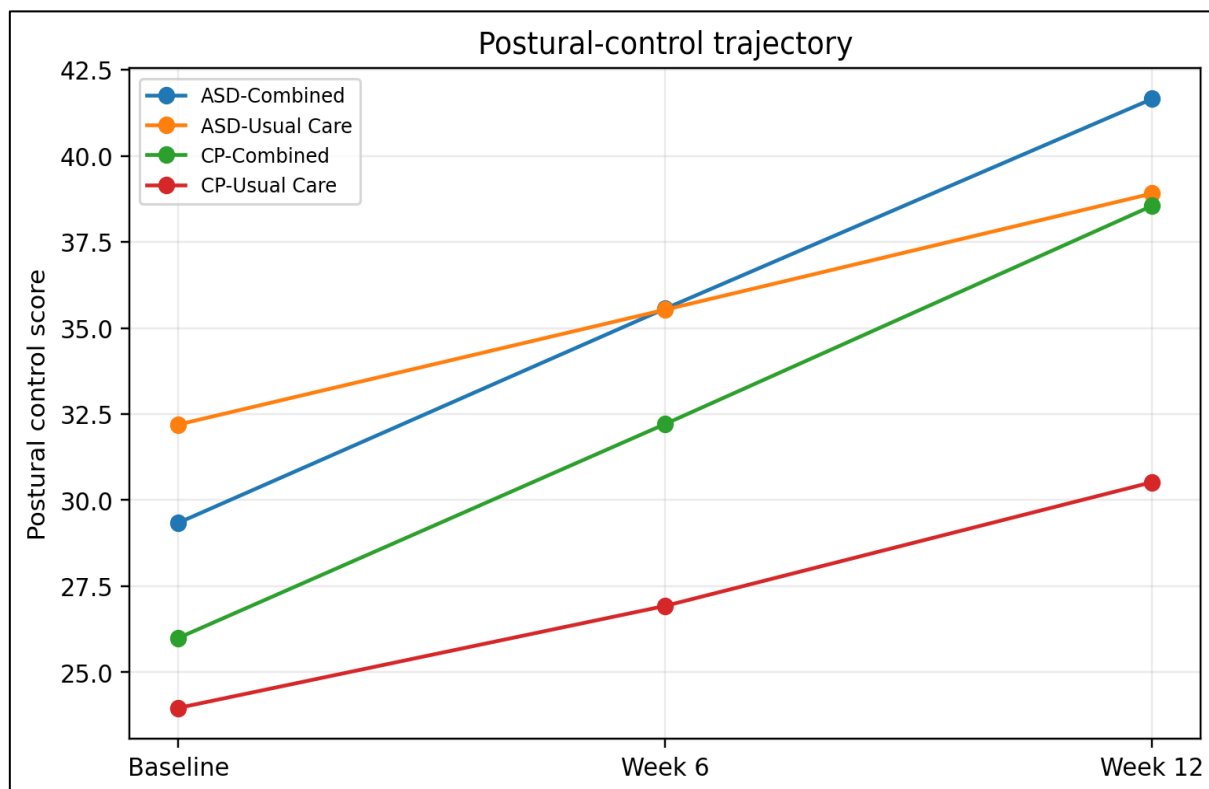


Fig 2 Postural-Control Change at Baseline, Week 6, and Week 12.

➤ *Daily Living and Participation*

Combined therapy improved ADL by 19.4 points compared with 10.0 points in usual care. Participation improved by 17.9 and 9.2 points, respectively. Within-group

tests were significant, but confidence intervals and adjusted differences indicated substantially larger effects in the combined arm.

Table 2 Within-Group Pre–Post Comparisons

Group	Outcome	Pre Mean ± SD	Post Mean ± SD	Mean Change	95% CI Low	95% CI High	Paired t	p
ASD-Combined	Posture	29.3 ± 5.3	41.7 ± 4.9	12.31	11.40	13.22	27.95	<.001
ASD-Combined	ADL	52.8 ± 8.7	71.9 ± 9.9	19.10	17.62	20.57	26.84	<.001
ASD-Combined	Participation	43.2 ± 8.7	62.3 ± 9.3	19.12	18.02	20.22	36.08	<.001
ASD-Usual Care	Posture	32.2 ± 4.4	38.9 ± 5.0	6.71	5.49	7.93	11.45	<.001
ASD-Usual Care	ADL	54.7 ± 9.3	64.9 ± 8.9	10.25	8.74	11.76	14.12	<.001
ASD-Usual Care	Participation	39.4 ± 8.2	50.3 ± 8.3	10.91	9.54	12.27	16.63	<.001
CP-Combined	Posture	26.0 ± 5.9	38.5 ± 6.5	12.55	11.40	13.70	22.68	<.001
CP-Combined	ADL	44.7 ± 8.5	64.5 ± 10.3	19.81	18.04	21.58	23.28	<.001
CP-Combined	Participation	46.8 ± 8.4	63.4 ± 9.5	16.66	15.15	18.17	22.95	<.001
CP-Usual Care	Posture	24.0 ± 4.7	30.5 ± 6.1	6.56	5.39	7.72	11.68	<.001
CP-Usual Care	ADL	44.6 ± 10.6	54.4 ± 12.1	9.84	8.46	11.22	14.80	<.001
CP-Usual Care	Participation	45.5 ± 9.1	53.0 ± 9.6	7.51	6.09	8.92	10.97	<.001

Note. Positive Values Indicate Improvement.

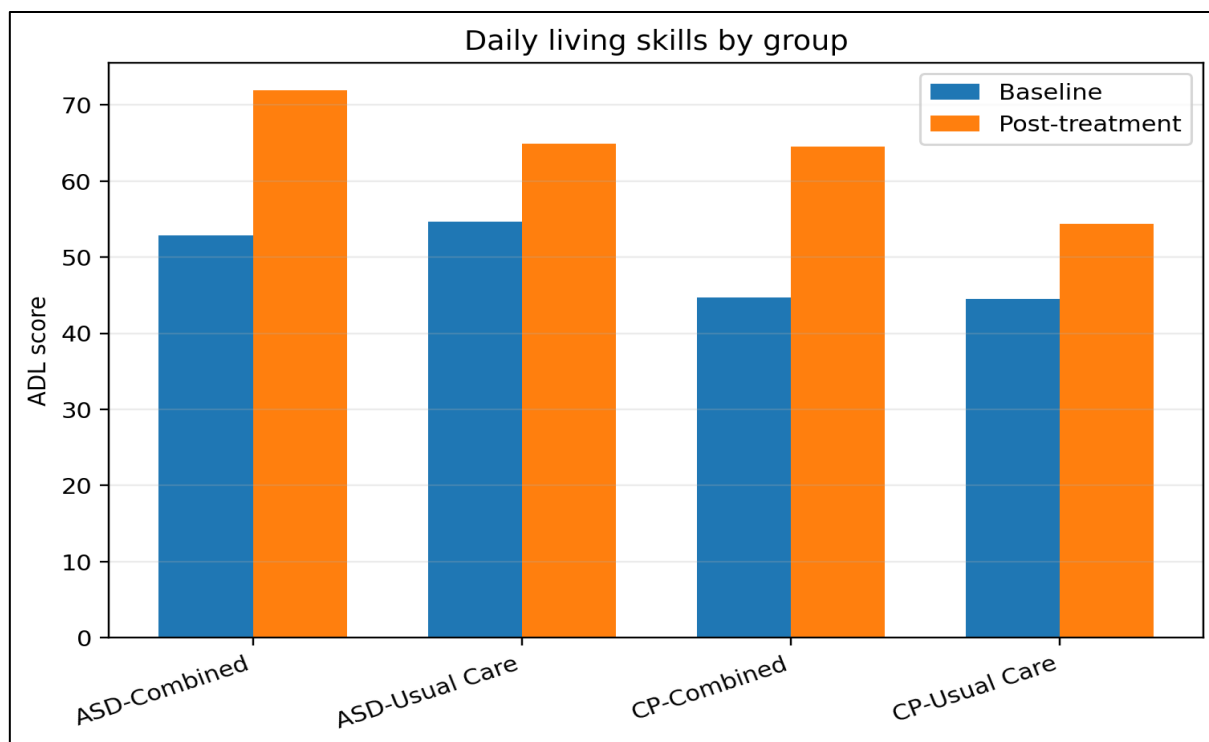


Fig 3 Daily Living Skills before and after Intervention.

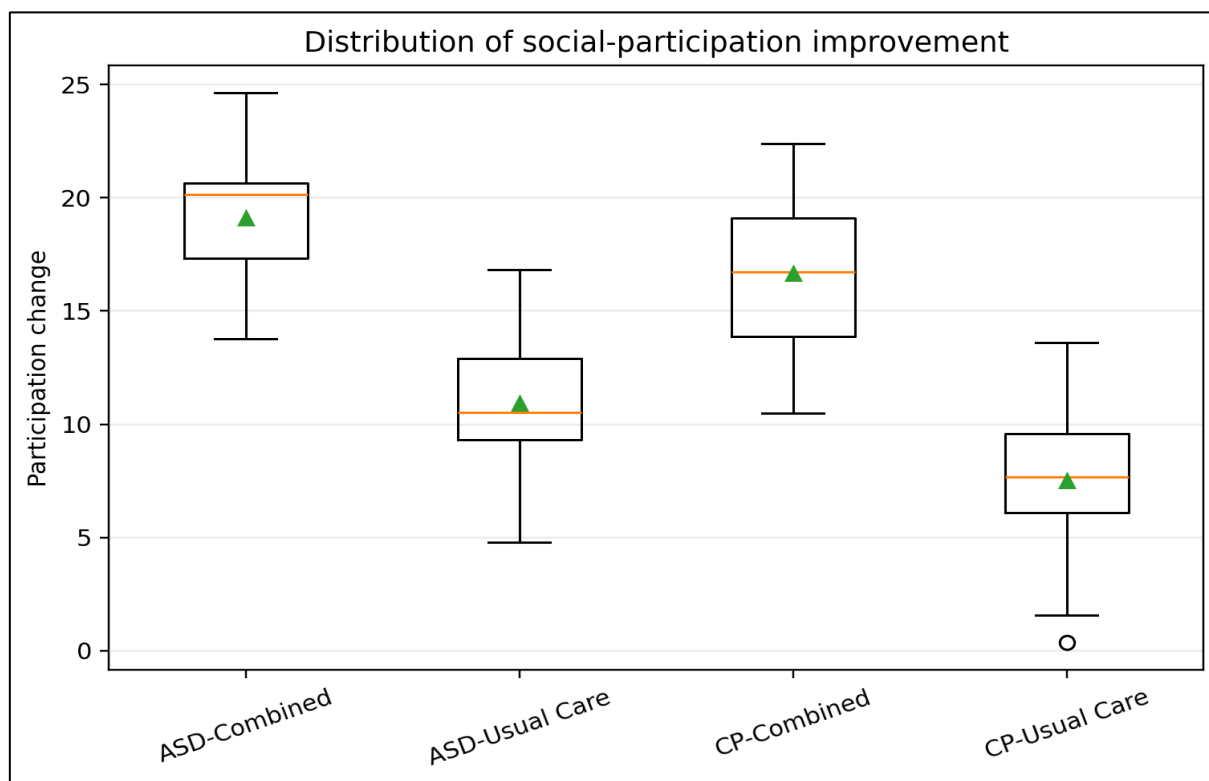


Fig 4 Distribution of Participation Improvement.

➤ Adjusted Effects and Outcome Relationships

Baseline-adjusted models favored combined therapy for both ADL and participation. Treatment-by-diagnosis interactions were smaller than the treatment main effect, suggesting a shared benefit with diagnosis-specific expression. Postural improvement correlated with ADL

change, and ADL change showed the strongest association with participation. This pattern is consistent with a pathway in which postural capacity enables task performance, while occupational practice and environmental opportunity determine whether task gains become participation gains.

Table 3 Baseline-Adjusted Effects of Combined Therapy

Outcome	Adjusted Combined-Therapy Effect	95% CI Low	95% CI High	p	Adjusted R ²
ADL	8.24	6.17	10.30	<.001	0.92
Participation	7.84	5.97	9.70	<.001	0.92

Note. Positive Values Favor Coordinated Physiotherapy and Occupational Therapy.

Table 4 Correlations Among Change Scores and Caregiver Adherence

Variable	Posture_Change	ADL_Change	Participation_Change	Caregiver_Adherence
Posture_Change	1.00	0.81	0.62	0.40
ADL_Change	0.81	1.00	0.74	0.52
Participation_Change	0.62	0.74	1.00	0.52
Caregiver_Adherence	0.40	0.52	0.52	1.00

Table 5 Predictors of Participation Improvement

Predictor	B	SE	t	p
Intercept	-0.74	3.53	-0.21	0.830
C(Diagnosis)[T.CP]	-2.88	0.72	-3.98	<.001
Posture_Change	0.07	0.16	0.41	0.690
ADL_Change	0.60	0.11	5.30	<.001
Caregiver_Adherence	0.08	0.04	1.83	0.070
Age	-0.04	0.14	-0.28	0.780

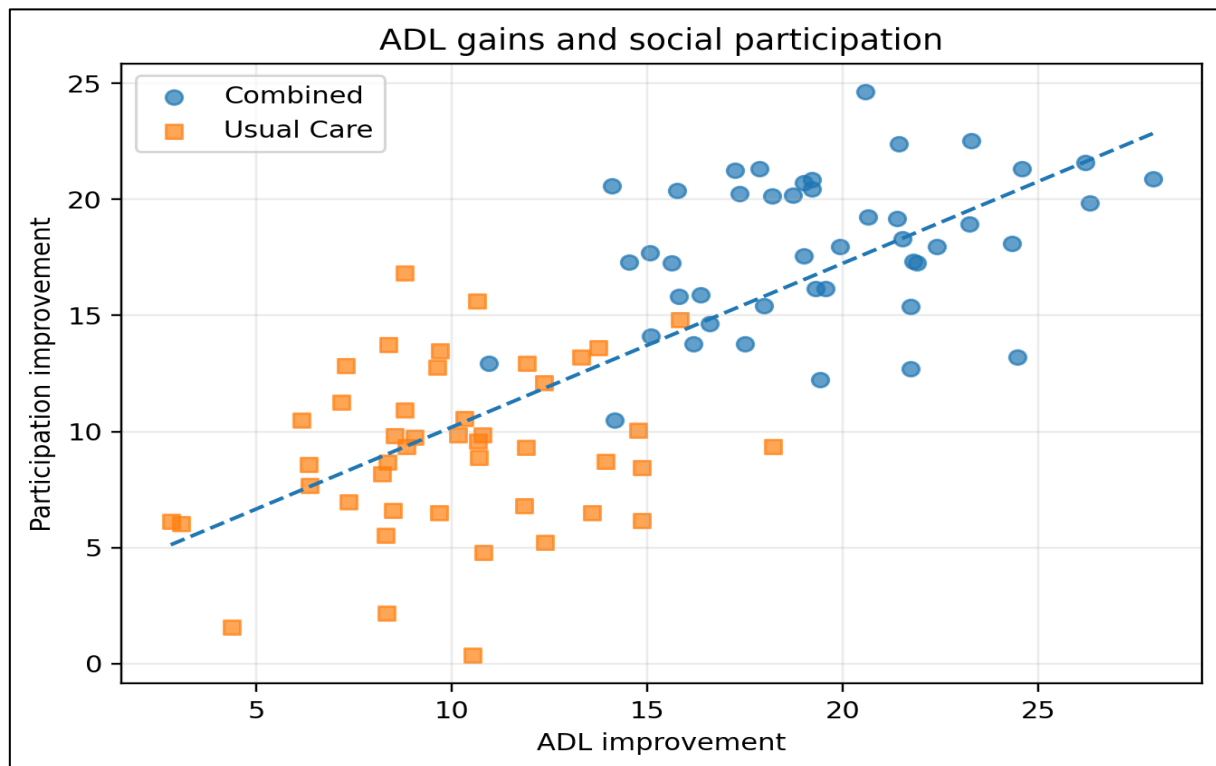


Fig 5 Relationship Between ADL Improvement and Social Participation.

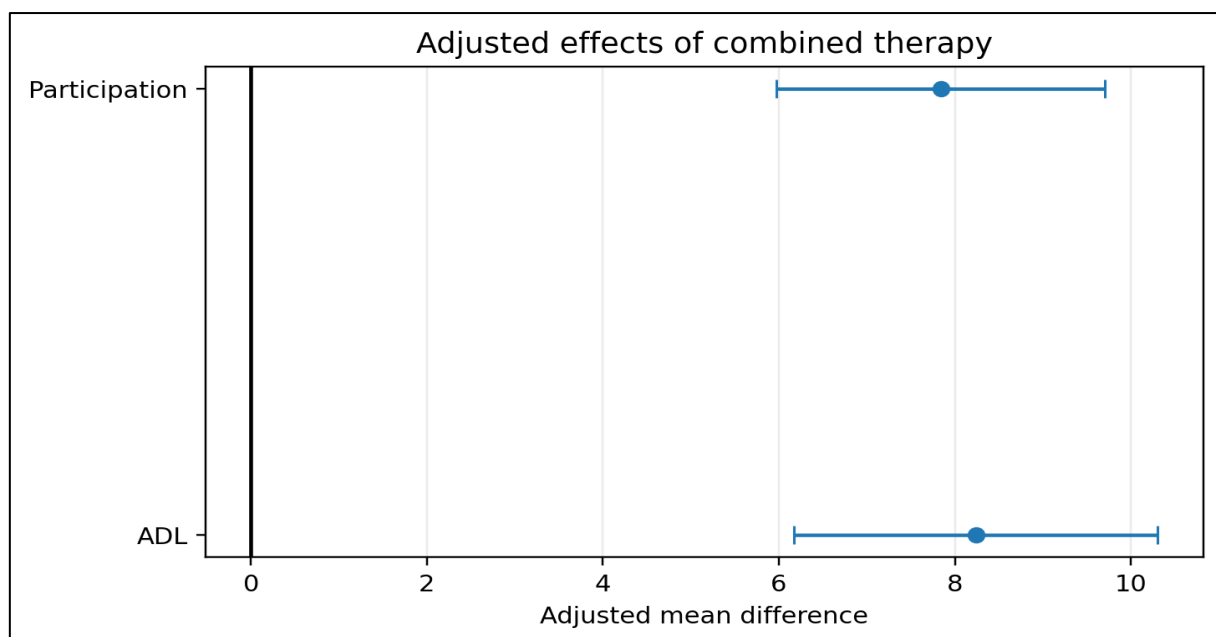


Fig 6 Adjusted Effects of Combined Therapy.

➤ Responder and Safety Analysis

The multidomain responder rate was 93.3% in combined therapy and 13.3% in usual care. No serious adverse events were generated; 93.3% had no event, with occasional fatigue, transient irritability, or mild soreness.

IV. DISCUSSION

The findings indicate that a unified model is needed to connect posture control to occupations and participation. Balance therapy alone did not translate to gains in ADL and

participation. However, this therapy model showed statistically significant connections among these constructs. The model also focuses on therapy at various levels to encourage transfer. For example, an improved ability to sit or stand at a therapist's office may not mean that assistance is no longer needed for this activity at home. The model also encourages participation in peer activities.

Therapies for trunk and postural control in CP may show gains in balance and other CP symptoms if the therapy is active, adaptive, and focuses on a particular task. All these

therapies closely interact with postural control. The CP model showed significant gains in postural control and ADLs in relation to the integrated therapy. Occupation-based therapy and sensory adaptations create fewer barriers to participation and control while also allowing for the development of new skills.

In ASD, difficulties with postural control and flexible movement may also include deficits in sensory processing, communication, and confidence (Bhat, 2021; Kangarani-Farahani et al., 2024; Watkyns et al., 2024). The integrated therapy model focuses on the practitioner gaining control through a clearly defined activity and sensory adaptation that is in the control of the practitioner. Integration of therapy in everyday life is most important for developing postural control and participation.

The link between ADL and participation affirms the occupational perspective in that independence and involvement are related but distinct. For instance, some children may have the opportunity to learn and practice a skill, but may have an inaccessible environment, an adult providing too much assistance, or an overly condensed daily schedule. Therefore, the exercise must be coupled with an evaluation of the environment, coaching of the adults, and collaboration with the school.

Caregiver adherence remained significant for the adapted models, particularly in the telehealth and autism practice studies, because home implementation was part of the effective dose. These studies focus on adherence, implementation, and caregiver involvement (Hume et al., 2021; Su et al., 2023). Caregivers should not be provided with lengthy, impersonal prescriptions for exercise. A more effective approach is to use timely feedback along the continuum of participation to incorporate some high-priority interventions and adapt the tasks when the level of effort to complete the intervention exceeds the expected benefits.

➤ *Clinical Guidance*

Assess the ability to balance when engaged in active play.

Articulate balance goals for PTs and OTs, and specify tasks for home, school, and play.

Balance tasks should be offered along a continuum of challenge, ranging from ease of balancing on one leg, to balancing while reaching, to balancing while maintaining a sensory load, to balancing while engaged in competing tasks.

Balance participation and burden of care along a continuum with outcomes for ADL and impairment.

Balance the fidelity of care, the dose, and the evidence along a continuum of care with the participatory outcomes and the burden of care.

V. LIMITATIONS AND FUTURE RESEARCH

The model does not include blinded assessors or consider attrition, therapist clustering, or long-term maintenance. Future studies will need to use diagnosis-appropriate instruments, preregister primary outcome measures, and include a treatment fidelity evaluation. They also will need to take GMFCS levels and autism support needs into account and measure participation in everyday settings.

VI. CONCLUSION

Within this model, combining physiotherapy and occupational therapy leads to greater improvements in postural control and performance of activities of daily living, and greater social participation, than usual care. This model also demonstrates the effect of combining movement, occupation, and context, and shows the importance of considering opportunities.

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APPENDIX A. PARTICIPANT-LEVEL DATASET

Variable names and scoring directions are defined in the Methods section.

Complete Participant-Level Dataset

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
P 2 - 0 0 1	4. 7	Fe ma le	AS D	Co mbi ned	Mo dera te	28.3	33.6	39.3	60.0	75.1	38.0	55.7	39	75.4	1
P 2 - 0 0 2	1 0. 0	Fe ma le	AS D	Co mbi ned	Mil d	29.4	36.3	44.6	53.9	81.9	61.4	82.3	41	91.5	1
P 2 - 0 0 3	6. 4	Fe ma le	AS D	Co mbi ned	Mo dera te	28.1	32.3	41.0	48.7	66.7	47.0	62.4	33	73.9	1
P 2 - 0 0 4	1 2. 8	Ma le	AS D	Co mbi ned	Sev ere	31.2	35.8	39.2	50.5	67.9	30.0	50.3	40	85.2	0
P 2 - 0 0 5	5. 4	Fe ma le	AS D	Co mbi ned	Mo dera te	30.6	35.0	43.4	48.9	67.9	49.0	69.7	35	84.5	1
P 2 - 0 0 6	6. 3	Ma le	AS D	Co mbi ned	Mo dera te	37.8	44.4	47.3	43.4	59.7	53.3	69.2	33	87.3	1
P 2 - 0 0 7	1 4. 0	Fe ma le	AS D	Co mbi ned	Mo dera te	26.6	32.4	39.4	50.8	71.3	40.2	64.8	33	99.7	1
P 2 - 0 0 8	7. 0	Ma le	AS D	Co mbi ned	Mo dera te	30.4	39.2	45.6	56.9	71.0	47.1	67.7	41	86.3	1
P 2 - 0	5. 2	Ma le	AS D	Co mbi ned	Mo dera te	26.3	33.6	39.4	66.0	85.3	38.3	54.4	39	75.3	1

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
0 9															
P 2 - 0 1 0	9. 0	Ma le	AS D	Co mbi ned	Mo dera te	25.3	32.4	37.8	55.5	80.1	32.3	53.7	39	99.9	1
P 2 - 0 1 1	7. 6	Ma le	AS D	Co mbi ned	Mo dera te	35.2	40.1	44.6	52.3	67.9	43.9	61.2	40	88.0	1
P 2 - 0 1 2	1 1. 2	Ma le	AS D	Co mbi ned	Mo dera te	22.4	27.3	32.2	36.8	54.7	54.8	76.2	44	84.5	1
P 2 - 0 1 3	6. 7	Ma le	AS D	Co mbi ned	Mo dera te	37.9	42.6	49.3	37.2	55.9	37.0	57.2	37	76.8	1
P 2 - 0 1 4	1 2. 1	Fe ma le	AS D	Co mbi ned	Mil d	19.2	28.4	35.2	57.2	79.6	39.2	57.2	36	80.6	1
P 2 - 0 1 5	9. 7	Ma le	AS D	Co mbi ned	Mo dera te	20.4	26.9	36.6	70.6	93.9	44.5	67.0	38	87.8	1
P 2 - 0 1 6	9. 4	Ma le	AS D	Co mbi ned	Mo dera te	38.5	45.9	51.1	62.5	80.7	37.9	58.0	44	76.4	1
P 2 - 0 1 7	9. 0	Fe ma le	AS D	Co mbi ned	Mo dera te	32.5	40.1	45.4	49.2	63.8	58.7	76.0	36	93.8	1
P 2 - 0 1 8	9. 1	Fe ma le	AS D	Co mbi ned	Mo dera te	32.4	37.9	43.7	57.1	77.8	39.9	59.2	34	100.0	1
P	7.	Ma	AS	Co	Mo	26.7	34.6	38.2	55.1	76.9	33.2	50.6	33	88.3	1

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
2 - 0 1 9	7	le	D	mbi ned	dera te										
P 2 - 0 2 0	1 3. 2	Ma le	AS D	Co mbi ned	Mo dera te	26.0	32.8	38.6	61.7	79.2	29.4	43.2	37	83.1	1
P 2 - 0 2 1	8. 1	Ma le	AS D	Co mbi ned	Mil d	30.7	38.8	43.8	39.1	60.6	49.6	67.9	42	80.7	1
P 2 - 0 2 2	1 1. 7	Fe ma le	AS D	Co mbi ned	Sev ere	25.1	29.4	35.3	54.5	73.8	40.4	60.9	31	100.0	1
P 2 - 0 2 3	9. 6	Ma le	AS D	Co mbi ned	Mil d	34.0	38.1	47.0	47.1	62.9	47.9	68.2	40	80.8	1
P 2 - 0 2 4	1 1. 7	Ma le	AS D	Usu al Care	Mo dera te	36.3	40.8	43.3	52.2	63.0	41.5	46.3	32	64.7	0
P 2 - 0 2 5	9. 5	Ma le	AS D	Usu al Care	Mil d	35.7	41.2	43.7	75.0	83.8	51.4	68.2	29	77.9	0
P 2 - 0 2 6	4. 0	Ma le	AS D	Usu al Care	Mo dera te	31.5	35.3	38.5	51.7	62.0	21.8	32.4	29	70.3	0
P 2 - 0 2 7	9. 9	Ma le	AS D	Usu al Care	Mil d	30.6	35.6	39.3	59.0	69.7	44.3	53.9	41	69.8	0
P 2 - 0	7. 0	Ma le	AS D	Usu al Care	Mo dera te	31.6	32.9	35.6	49.0	59.6	37.1	52.7	30	78.2	0

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
28															
P2-029	4.7	Female	ASD	Usual Care	Severe	31.3	32.6	34.7	62.0	71.1	50.4	60.1	34	85.0	0
P2-030	7.3	Female	ASD	Usual Care	Mild	29.9	34.7	39.7	47.2	59.6	39.4	51.5	32	93.7	1
P2-031	7.5	Female	ASD	Usual Care	Mild	32.4	38.4	42.9	48.6	62.5	45.8	54.5	29	86.4	1
P2-032	11.4	Male	ASD	Usual Care	Moderate	33.1	34.0	35.6	55.0	61.3	26.0	34.5	30	67.2	0
P2-033	9.0	Female	ASD	Usual Care	Moderate	45.0	47.1	51.8	53.4	63.1	38.2	51.7	34	64.6	0
P2-034	9.9	Male	ASD	Usual Care	Moderate	32.6	33.6	37.2	61.2	64.0	51.4	57.5	29	76.6	0
P2-035	8.1	Male	ASD	Usual Care	Severe	37.2	40.5	40.8	42.3	51.9	34.1	46.9	35	83.9	0
P2-036	9.0	Male	ASD	Usual Care	Moderate	26.1	31.9	36.3	75.0	88.6	43.6	50.1	29	85.3	0
P2-037	8.8	Male	ASD	Usual Care	Severe	31.1	31.4	32.7	64.7	73.1	40.8	54.6	30	92.4	0
P	1	Ma	AS	Usu	Mil	29.4	35.1	40.9	49.3	59.5	40.0	49.8	32	81.7	1

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
2 - 0 3 8	0. 1	le	D	al Care	d										
P 2 - 0 3 9	7. 7	Ma le	AS D	Usu al Care	Mo dera te	30.9	33.5	37.4	50.6	62.5	40.2	49.5	36	90.8	0
P 2 - 0 4 0	4. 5	Ma le	AS D	Usu al Care	Mo dera te	33.4	36.1	39.0	57.1	64.4	28.4	41.3	33	86.0	0
P 2 - 0 4 1	7. 4	Fe ma le	AS D	Usu al Care	Mo dera te	32.5	34.8	39.8	52.8	71.0	33.2	42.6	30	72.8	0
P 2 - 0 4 2	5. 7	Ma le	AS D	Usu al Care	Mo dera te	30.9	35.2	40.2	43.7	55.6	47.2	60.2	30	89.5	1
P 2 - 0 4 3	5. 4	Ma le	AS D	Usu al Care	Mil d	31.3	35.2	39.0	43.3	59.2	27.9	42.7	28	96.9	0
P 2 - 0 4 4	1 0. 2	Ma le	AS D	Usu al Care	Mo dera te	21.2	24.0	25.3	63.8	70.0	44.8	55.3	31	85.1	0
P 2 - 0 4 5	5. 9	Fe ma le	AS D	Usu al Care	Mo dera te	34.2	38.0	42.1	46.1	53.2	39.8	51.1	32	70.9	0
P 2 - 0 4 6	7. 2	Fe ma le	CP	Co mbi ned	Mo dera te	35.7	40.6	45.1	44.4	61.7	45.6	66.8	43	88.0	1
P 2 - 0	8. 8	Fe ma le	CP	Co mbi ned	Mo dera te	29.0	33.1	41.3	48.1	69.5	46.6	69.0	44	84.4	1

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
4 7															
P 2 - 0 4 8	7. 3	Ma le	CP	Co mbi ned	Mo dera te	32.2	40.4	45.4	35.9	57.6	48.4	61.1	39	98.0	1
P 2 - 0 4 9	1 0. 8	Fe ma le	CP	Co mbi ned	Mil d	32.0	37.2	42.6	47.7	64.3	57.7	72.3	33	86.2	1
P 2 - 0 5 0	6. 9	Ma le	CP	Co mbi ned	Mo dera te	17.6	25.5	30.4	41.1	62.5	53.5	72.6	44	84.3	1
P 2 - 0 5 1	8. 3	Fe ma le	CP	Co mbi ned	Mil d	32.5	41.2	49.4	48.9	75.2	38.9	58.8	33	91.9	1
P 2 - 0 5 2	1 1. 2	Fe ma le	CP	Co mbi ned	Sev ere	25.5	28.5	37.1	39.1	55.3	61.3	75.1	36	81.4	1
P 2 - 0 5 3	4. 0	Ma le	CP	Co mbi ned	Mo dera te	21.2	27.1	33.2	47.3	63.1	61.2	77.0	34	92.4	1
P 2 - 0 5 4	7. 4	Fe ma le	CP	Co mbi ned	Sev ere	17.3	22.1	26.6	63.4	77.5	37.5	48.0	38	83.1	1
P 2 - 0 5 5	5. 5	Ma le	CP	Co mbi ned	Mo dera te	24.7	31.3	40.0	47.9	71.2	45.7	64.6	34	77.6	1
P 2 - 0 5 6	1 3. 6	Fe ma le	CP	Co mbi ned	Mo dera te	29.6	35.9	44.2	51.6	71.2	40.5	56.7	41	85.2	1
P	8.	Fe	CP	Co	Mo	20.8	26.0	32.1	49.6	68.8	54.9	75.7	35	76.8	1

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
2 - 0 5 7	8	ma le		mbi ned	dera te										
P 2 - 0 5 8	1 3. 6	Ma le	CP	Co mbi ned	Mil d	34.7	43.4	48.5	35.3	57.0	37.5	52.8	33	79.7	1
P 2 - 0 5 9	7. 3	Fe ma le	CP	Co mbi ned	Sev ere	32.3	35.4	40.7	51.9	71.8	46.2	64.2	43	98.0	0
P 2 - 0 6 0	8. 3	Ma le	CP	Co mbi ned	Mil d	23.2	31.8	37.3	36.5	55.5	37.2	54.8	37	90.0	1
P 2 - 0 6 1	7. 3	Ma le	CP	Co mbi ned	Mil d	26.7	35.5	41.5	46.8	73.0	52.0	73.6	34	97.8	1
P 2 - 0 6 2	1 3. 1	Ma le	CP	Co mbi ned	Sev ere	22.5	26.8	31.0	46.6	68.5	57.6	74.9	32	91.8	0
P 2 - 0 6 3	8. 7	Ma le	CP	Co mbi ned	Mo dera te	17.6	22.4	28.7	31.9	42.8	43.8	56.8	44	76.4	1
P 2 - 0 6 4	6. 5	Ma le	CP	Co mbi ned	Mil d	20.8	30.4	36.6	39.7	59.1	35.0	47.2	33	90.6	1
P 2 - 0 6 5	1 0. 5	Ma le	CP	Co mbi ned	Mil d	23.5	31.1	40.9	52.4	76.7	33.7	51.8	44	87.0	1
P 2 - 0	1 2. 2	Ma le	CP	Co mbi ned	Mo dera te	31.9	37.2	42.6	52.6	77.0	45.8	59.0	39	85.6	1

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
6 6															
P 2 - 0 6 7	1 1. 0	Ma le	CP	Co mbi ned	Sev ere	20.8	25.7	32.6	25.0	40.1	48.3	62.4	34	90.7	1
P 2 - 0 6 8	9. 4	Ma le	CP	Usu al Care	Mo dera te	31.4	34.4	38.3	26.1	34.6	47.7	54.3	32	78.3	0
P 2 - 0 6 9	1 1. 6	Ma le	CP	Usu al Care	Mil d	23.5	27.4	32.7	32.5	43.0	42.9	43.3	24	63.1	0
P 2 - 0 7 0	9. 2	Ma le	CP	Usu al Care	Mil d	29.3	32.3	36.5	52.1	66.9	43.7	49.8	32	75.7	0
P 2 - 0 7 1	1 0. 7	Ma le	CP	Usu al Care	Mil d	22.1	25.5	30.4	51.6	65.3	58.1	71.7	32	64.9	0
P 2 - 0 7 2	1 0. 9	Ma le	CP	Usu al Care	Mo dera te	27.6	31.0	33.9	30.2	36.6	49.1	56.8	25	87.5	0
P 2 - 0 7 3	5. 1	Ma le	CP	Usu al Care	Mo dera te	24.6	27.5	33.3	43.9	52.4	37.9	47.7	33	69.0	0
P 2 - 0 7 4	1 4. 0	Ma le	CP	Usu al Care	Sev ere	17.8	21.1	23.1	45.4	49.8	38.7	40.3	33	51.2	0
P 2 - 0 7 5	6. 3	Ma le	CP	Usu al Care	Sev ere	18.8	19.1	19.5	47.7	56.5	33.8	43.1	32	74.5	0
P	9.	Ma	CP	Usu	Sev	20.9	22.9	23.3	65.0	73.2	51.5	59.6	31	66.7	0

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
2 - 0 7 6	1	le		al Care	ere										
P 2 - 0 7 7	4. 0	Ma le	CP	Usu al Care	Mil d	31.0	36.9	41.7	71.5	86.3	35.0	45.0	31	69.6	1
P 2 - 0 7 8	1 2. 4	Fe ma le	CP	Usu al Care	Mo dera te	29.2	33.1	37.5	52.3	63.0	43.7	52.6	32	75.6	0
P 2 - 0 7 9	5. 0	Fe ma le	CP	Usu al Care	Mo dera te	24.6	27.3	30.1	53.7	63.3	43.2	49.6	30	78.5	0
P 2 - 0 8 0	9. 3	Ma le	CP	Usu al Care	Sev ere	18.2	20.2	25.9	34.6	42.9	47.5	53.1	35	88.0	0
P 2 - 0 8 1	9. 0	Ma le	CP	Usu al Care	Mil d	17.6	23.2	27.2	50.9	64.2	44.9	58.1	33	81.3	1
P 2 - 0 8 2	4. 9	Fe ma le	CP	Usu al Care	Mil d	24.8	28.5	34.3	40.5	52.3	34.8	41.6	40	97.1	0
P 2 - 0 8 3	1 2. 2	Fe ma le	CP	Usu al Care	Mo dera te	28.2	31.3	33.0	37.1	47.9	58.1	67.9	29	69.1	0
P 2 - 0 8 4	6. 0	Ma le	CP	Usu al Care	Mo dera te	18.0	21.0	23.1	48.0	56.8	21.5	32.4	31	73.5	0
P 2 - 0	8. 4	Fe ma le	CP	Usu al Care	Sev ere	16.8	19.6	24.3	34.7	43.1	49.8	52.0	38	73.5	0

I D	A g e	Se x	Dia gno sis	The rap y	Sev erit y	Postu re_Pr e	Postu re_M id	Postu re_Po st	AD L_P re	AD L_P ost	Particip ation_P re	Particip ation_P ost	Atte ndan ce	Caregiver _Adheren ce	Resp onde r
8 5															
P 2 - 0 8 6	4. 0	Ma le	CP	Usu al Care	Mo dera te	26.3	31.4	33.3	41.4	48.8	55.1	62.1	31	75.2	0
P 2 - 0 8 7	5. 7	Fe ma le	CP	Usu al Care	Mo dera te	21.1	22.0	24.1	40.8	49.2	55.7	64.4	31	76.6	0
P 2 - 0 8 8	6. 4	Ma le	CP	Usu al Care	Mil d	27.7	28.8	36.1	40.6	55.5	49.3	57.7	35	82.8	0
P 2 - 0 8 9	4. 8	Fe ma le	CP	Usu al Care	Sev ere	22.4	24.0	23.9	43.2	46.2	57.3	63.3	31	70.4	0
P 2 - 0 9 0	5. 8	Fe ma le	CP	Usu al Care	Mo dera te	29.3	30.7	36.5	40.9	53.2	46.6	51.8	34	74.8	0

Note:- Higher Scores Indicate Better Status Except Pain, Disability, and Fear-Avoidance Variables.