9.1 ± 7.4 years, and mean onset of dementia was 3.1 ± 1.6 years. For the PDD group, the mean MMSE score was 17.5 ± 5.8 and the mean MDS-UPDRS score was 37 ± 13.2. Results from the finger displacement test showed that among PDD patients, 53 of 56 (95%) exhibited bilateral downward drift of =5 cm and 3 (5%) exhibited <5 cm of downward drift. The mean bilateral downward finger drift was 6.8 ± 2.0 cm for the entire group.AD patients (n=35) included 14 female and 21 male patients with a mean age of 77.4 ± 7.8 years and mean dementia onset duration of 3.9 ± 2.9 years. For the AD group, the mean MMSE score was 17.8 ± 4.5 and the mean bilateral downward drift was 0.2 ± 0.2 cm (n=1). An unpaired t-test was used to analyze the difference in the number of patients in each group with bilateral downward drift of =5 cm. Finger displacement test in this study has sensitivity of 100% (93.28% to 100.00%) and specificity of 92.1% (78.62% t0 98.34%). Results showed a statistically significant difference between groups, with a lower mean finger displacement in patients with AD than in patients with PDD (p <0.0001, T=18.26 with 86 degrees of freedom). The 95% confidence interval of the difference ranged from −7.309 to −5.873 (mean, −6.591).

Conclusions: There is no simple bedside test available that can measure the progression of dementia. The simple and inexpensive bedside test of finger displacement may be used to help distinguish PDD from AD and also the progression of dementia in PD

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Does Age Impact Cognition and Balance in People with Parkinson's Disease Compared with Healthy Older Adults?

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Objective: To examine age-related differences on the Montreal Cognitive Assessment (MoCA) and the MinBESTest total scores in young and older adults with and without PD to determine the impact of age and PD disease state on these measures. Hypothesis: (1) older persons with PD would score lower than younger persons with PD, young healthy adults, and healthy older adults, and (2) there would be a positive relationship between Mini-BESTest and MoCA performance, which would be influenced by both age and disease state.

Background: Parkinson's disease is a progressive neurodegenerative disorder primarily affecting older adults. It is characterized by both motor and non-motor symptoms including cognitive impairment and postural instability. Older adults also show deficits in cognition and balance [1]. It is known that deficits in cognition negatively impact balance [2]. Thus, the combination of age and disease state in people with PD may compound the effects of cognition on balance.

Methods: 40 subjects with PD (mean age 67.03, median HY 2.0) and 28 healthy subjects (mean age 62.86) were tested with the MoCA and the MiniBESTest in a single testing session. Statistical Analysis: Univariate 2×2 ANOVAs compared MiniBESTest and MOCA scores by Age (under 65 or 65 and older) and group (PD or healthy controls). Post-hoc analyses used Spearman's correlations. Pearson's correlation was used to examine the relationship between MiniBEST and MOCA scores.

Results: As expected, people with PD performed significantly worse on the MiniBESTest (p=0.000) and the MoCA (p=0.003) compared to healthy controls. There was no significant main or interaction effect of Age on MiniBESTest or MoCA scores. A significant negative correlation between Age and MiniBESTest total score was found in the healthy adults (p=0.008).

Conclusions: Contrary to our hypothesis, disease state, but not the combination of age and disease influenced scores on the MiniBESTest and MoCA. Knowledge of the relationship between cognition and balance using clinic friendly tools such as the MoCA and the MiniBESTest may lead to more routine cognitive screening and more targeted interventions for people with PD who have balance deficits.

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The Impact on Mood in People Living with Parkinson's Disease When Participating in The Art Cart's Creativity and Movement Program

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Objective: To determine the impact on mood in people living with Parkinson's Disease before and after participating in The Art Cart's Smile Through Art Workshops. The Art Cart's Smile Through Art Workshops are a creativity and movement program developed for people living with Parkinson's Disease.

Background: The Art Cart's curriculum is developed taking a symptomatic approach to Parkinson's Disease (PD). Through art and exercise, patients with Parkinson's learn to temporarily alleviate symptoms of PD such as depression, tremor, rigidity, loss of fine and gross motor control.

Methods: As depression is a symptom of PD, this particular assessment was focused on analyzing patient's mood before and after the completion of each Smile Through Art Creativity and Movement workshop. Data was collected voluntarily from 20 post-workshop surveys including 82 people living with Parkinson's disease. Each workshop was focused on a different symptom of PD and participants learned methods of art and exercise to live better with PD. The moods that were an option for patients living with Parkinson's disease to select were content (pleased, satisfied, or calm), happy (joyful, glad, stimulated), angry alarmed, annoyed, frustrated), and sad (depressed, bored, or tired).

Results: 44% of patients living with PD went from feeling content to happy. 10% of patients living with PD went from feeling sad to feeling content. 7% of patients living with PD went from feeling sad to feeling happy. 2% of patients living with PD went from feeling angry to feeling happy. 1% of patients went from feeling angry to content. 22% of patients living with PD remained content and 11% of patients living with PD remained happy. 4% of patients living with PD went from feeling happy to content.

Conclusions: In conclusion, we found that our creativity and movement program brought positive results to the mood of patients living with Parkinson's disease. Furthermore, the mood of people living with Parkinson's Disease post-workshop was heightened 63% of the time. There were zero (0) occurrences of patients going from content to angry and content to sad, or happy to angry and happy to sad. One goal is to continue monitoring mood and to help people living with Parkinson's disease live a better life.

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Long-Term Effects of a Group Based Intervention among Individuals with PD

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Objective: Effects of a group-based intervention program (LOUD Crowd®) on speech, swallowing, cognition, and depression were examined among 10 individuals with Parkinson disease (PD) during a 6 month period. The study included a treatment and control group.

Background: Individuals with Parkinson disease (PD) often develop dementia after 10 or more years of diagnosis. No prior studies have examined the relationship between speech, swallowing, cognition and depression following LOUD Crowd® among individuals with PD.

Methods: The study included a treatment (4 males, 3 females) and a control group (2 males, 1 female). Based on H & Y scores, the PD disease severity ranged between mild and mild-moderate degrees. The treatment group received intervention while the control group did not receive any intervention during the 6-month period. All participants completed a series of questionnaires and/or tests related to cognitive status, depression status, and PD severity during pre and post phases. In addition, each participant maintained a log of their speech and cognitive activities (i.e., hours per week spent doing puzzles, newspaper readings) during the 6-month period. These logs were utilized as self-reports of speech and cognitive engagement by the participants.

Results: All participants completed a series of questionnaires and tests related to cognitive status (Dementia Rating Scale), depression status (Beck Depression Inventory), and PD severity (Hoehn & Yahr Scale) during baseline and at end of 6-month period. Pearson Product Moment Correlations were completed. Significant positive correlations were found between disease severity scores and hours of exercise, hours of socialization and self-reports of exercise. Comparison of baseline and at the end of 6-months indicated improved cognitive scores for 4/7,

improved depression scores for 3/7, and improved swallowing scores for 7/7 in the treatment group. In contrast, the control group demonstrated poorer scores for cognition, depression, and swallowing.

Conclusions: To the best of our knowledge, prior studies have not examined the relationship between speech, swallowing, cognition, and depression based on a group based intervention among different severities of PD. The presentation will therefore discuss the relationship between PD severity, self-reported speech and cognitive activity, cognitive, swallowing and depression scores of participants during the 6-month period. In conclusion, the study indicates benefits of a group-based intervention on speech, swallowing, and cognitive abilities of individuals with PD.

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Cognitive Impairment and Motor Asymmetric in Parkinsonś Disease

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Objective: To evaluate the relationship between cognitive impairment and side of motor onset in patients with Parkinson's disease (PD).

Background: The onset of motor symptoms in PD is usually unilateral, reflecting an asymmetric contralateral dopamine depletion in the basal ganglia, which has also been implicated as responsible for non-motor symptoms.

Methods: We recruited 89 subjects (53 male, 36 female) diagnosed with PD according to United Kingdom PD Society Brain Bank criteria for idiopathic PD. Participants were screened for history of hypertension, diabetes and the presence of recurrent falls in the last 3 months. They were valued using the Hoehn & Yahr state (HY stage), Mini–Mental State Examination (MMSE), Addenbrookès Cognitive Examination Revised (ACE-R), Ineco Frontal Screening (IFS) and Trail Making Test A and B (TMT-A and TMT-B). Subjects were divided into 3 groups according to the side of motor onset of the disease: right side symptoms (R-PD, n 48), left side symptoms (L-PD, n 26) and patients without dominant asymmetry (PD-sym, n 15).

Results: The demographic and clinical features of the sample are shown in Table I. Males were significantly prevalent in R-PD group (68.8% versus 46.7% L-PD). The mean age was 69.1 (7.83) years and a total education of 10.7 (4.48) years. The mean disease duration of 7.12 (4.71) years; the severity assessed by the HY stage of 2.11 (0.64) and a levodopa equivalent daily dose of 947.54 (431.82) mg. In the exploration of cognitive functions (Table II), a statistically significant decrease was observed in the total score of the ACE-R ($p = 0.01$), verbal fluency ($p = 0.01$), memory ($p = 0.03$), verbal working memory ($p = 0.02$) and TMT-B ($p = 0.05$) in the R-PD group with respect to the other groups.

Conclusions: Clear and significant differences between L-PD and R-PD were found within our cohort. Patients with predominantly right motor symptoms present cognitive impairment that are much more severe than patients with left symptomatology. These data support the

TABLE I. *Demographic and Clinical Features*

	Total n 89	Symmetries-PD n 15	Asymmetries-PD				
			Total n 74	*P value*	Right-PD n 48	Left-PD n 26	*P value*
Sex (male/female)	53/36	7/8	46/28	0.15	33/15	13/13	0.06
Age (years)	69.1 (7.83)	69.93 (7.9)	68.93 (7.86)	0.32	69.58 (6.87)	67.73 (9.45)	0.19
Total education (years)	10.71 (4.48)	10.13 (4.24)	10.82 (4.54)	0.28	10.44 (4.75)	11.53 (4.13)	0.15
Disease duration(years)	7.12 (4.71)	5.79 (3.75)	7.37 (4.86)	0.09	7.89 (4.83)	6.42 (4.85)	0.10
HY stage	2.11 (0.64)	2.44 (0.46)	2.04 (0.66)	**0.02**	2.01 (0.67)	2.1 (0.65)	0.33
LEDD (mg)	947.92 (431.81)	808.83 (452.21)	977.31 (424.85)	0.10	981.59 (400.57)	969.9 (472.13)	0.45
Trermor-dominant feature	55/89 (61.8%)	1/15 (6.67%)	54/74 (72.97%)	**<0.001**	34/14 (70.83%)	20/26 (76.92%)	0.28
Hypertension	39/89 (43.8%)	5/15 (33.33%)	34/74 (45.94%)	0.18	20/48 (41.67%)	14/26 (53.84%)	0.16
Diabetes	7/89 (7.87%)	2/15 (13.33%)	5/74 (6.75%)	0.25	3/48 (6.25%)	2/26 (7.69%)	0.41
Freezing and falls	38/89 (42.69%)	8/15 (53.33%)	30/74 (40.54%)	**0.04**	21/48 (43.75%)	9/26 (34.61%)	0.25

HY stage: Hoehn & Yahr stage, LEDD: Levodopa equivalent daily dose

TABLE II. *Cognitive Evaluation*

	Total n 89	Symmetries-PD n 15	Asymmetries-PD				
			Total n 74	*P value*	Right-PD n 48	Left-PD n 26	*P value*
MMSE	27.31 (2.42)	27.27 (2.34)	27.32 (2.45)	0.46	27.11 (2.68)	27.72 (1.92)	0.13
ACE-R	84.7 (8.81)	84.4 (6.45)	84.79 (9.26)	0.42	83.17 (9.47)	88.02 (8.06)	**0.01**
Orientation	9.58 (0.86)	9.67 (0.72)	9.56 (0.89)	0.32	9.52 (0.96)	9.65 (0.74)	0.25
Attention	7.52 (0.92)	7.47 (0.74)	7.53 (0.95)	0.39	7.58(0.37)	7.42 (1.1)	0.26
Memory	20.72 (3.58)	21.73 (2.28)	20.51 (3.77)	**0.05**	19.93 (3.77)	21.6 (3.6)	**0.03**
Fluency	8.65 (2.92)	7.33 (2.55)	8.91 (2.93)	**0.02**	8.33 (2.79)	10.04 (2.93)	**0.01**
Language	24.02 (2.22)	24.33 (1.87)	23.96 (2.29)	0.25	23.97 (2.3)	23.92 (2.33)	0.45
Visuospatial	13.8 (2.39)	12.86 (3.97)	14 (2.61)	0.15	13.69 (2.67)	14.58 (2.44)	0.08
IFS	20.74(4.75)	18.97 (4.43)	21.1 (4.75)	**0.05**	20.7 (5.17)	21.82 (3.87)	0.13
Motor programming	2.62 (0.77)	2.7 (0.94)	2.62 (0.75)	0.39	2.64 (0.69)	2.55 (2.85)	0.14
Conflicting Instructions	2.45 (0.34)	1.8 (1.39)	2.57 (0.63)	**0.05**	2.52 (0.7)	2.66 (0.48)	0.34
Go nogo	1.83 (1.04)	1.5 (1.08)	1.96 (1.03)	0.11	1.94 (1.07)	2 (0.97)	0.20
Backward Digit Span	3.8 (1.38)	3.2 (0.91)	3.91 (1.43)	**0.02**	3.94 (1.5)	3.84 (1.3)	0.39
Verbal Working Memory	1.43 (0.75)	1.3 (0.82)	1.46 (0.74)	0.28	1.33 (0.82)	1.72 (0.46)	**0.01**
Spatial Working Memory	2.84 (1.01)	2.2 (1.13)	2.96 (0.95)	**0.03**	3.02 (1.01)	2.84 (0.83)	0.23
Abstraction Capacity	1.86 (0.94)	1.55 (1.36)	1.92 (0.84)	0.21	1.82 (0.83)	2.11 (0.86)	0.12
Verbal Inhibitory Control	3.95 (1.48)	3.3 (1.33)	4.07 (1.49)	0.06	3.97 (1.5)	4.27 (1.48)	0.24
TMT-A (seconds)	80.14(59.25)	89.26 (35.82)	78.13 (63.3)	0.18	75.41 (55.53)	83.81 (78.25)	0.32
TMT-B (seconds)	301.23(290.28)	202.75(86.22)	318.42(309.7)	**0.006**	255.93(335.87)	243.39(238.53)	0.05

MMSE: Mini-Mental state Examination, ACE-R: Addenbrooke's Cognitive Examination Revised, IFS: Ineco Frontal Screening, TMT: Trail Making Test