**Supplementary Online Content**

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| Supplementary Table 1. Comparison of Macular Microvascular Density Between the PD Patients and Healthy Controls in the 6mm Diameter Region | | | | | |
|  | PD (N=24) | | HC (N=23) | | *P* |
| Variable (mm-1) | Mean (SD) | Median (range) | Mean (SD) | Median (range) |
| Inner nasal | 13.7 (4.3) | 14.0 (11.5 to 17.0) | 15.1 (4.0) | 16.5 (13.7 to 18.0) | 0.195 |
| Inner temporal | 13.5 (5.0) | 15.5 (8.4 to 16.7) | 15.1 (4.9) | 16.9 (14.4 to 18.3) | 0.091 |
| Inner superior | 13.6 (4.1) | 15.7 (11.7 to 16.7) | 15.6 (3.9) | 16.5 (14.9 to 18.2) | 0.030a |
| Inner inferior | 14.2 (3.6) | 15.7 (11.5 to 16.9) | 15.4 (4.1) | 17.2 (14.2 to 18.1) | 0.063 |
| Outer nasal | 17.7 (2.3) | 18.2 (17.0 to 19.3) | 17.7 (3.6) | 18.8 (17.0 to 20.0) | 0.373 |
| Outer temporal | 13.4 (4.5) | 15.2 (10.1 to 16.8) | 14.3 (4.0) | 14.9 (13.1 to 17.1) | 0.684 |
| Outer superior | 14.8 (3.3) | 15.9 (11.7 to 17.2) | 15.7 (3.9) | 16.9 (14.8 to 18.0) | 0.160 |
| Outer inferior | 14.9 (3.0) | 16.0 (11.7 to 17.2) | 15.8 (3.6) | 16.7 (15.3 to 18.1) | 0.218 |
| Central | 4.9 (2.7) | 4.6 (2.9 to 6.6) | 6.3 (2.9) | 7.1 (3.4 to 8.3) | 0.089 |
| Inner ring | 13.8 (4.0) | 15.0 (10.6 to 16.4) | 15.3 (4.1) | 17.0 (14.4 to 18.5) | 0.052 |
| Outer ring | 15.2 (3.0) | 16.4 (13.8 to 17.6) | 15.9 (3.6) | 16.6 (14.9 to 18.2) | 0.184 |
| Full area | 14.6 (3.2) | 15.6 (12.8 to 17.1) | 15.5 (3.7) | 16.5 (14.9 to 17.8) | 0.106 |
| Abbreviations: PD, Parkinson’s disease; HC, healthy controls. | | | | | |

a: *P*＜0.05.

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| Supplementary Table 2. Comparison of Peripapillary Microvascular Density Between the PD Patients and Healthy Controls in the 6mm Diameter Region | | | |
|  | Mean (SD) | | *P* |
| Variable (mm-1) | PD (N=24) | HC (N=23） |
| Inner nasal | 16.1 (3.6) | 17.0 (2.3) | 0.375 |
| Inner temporal | 15.2 (4.3) | 16.2 (3.7) | 0.444 |
| Inner superior | 17.1 (2.7) | 17.4 (2.6) | 0.846 |
| Inner inferior | 17.2 (2.6) | 17.6 (2.0) | 0.846 |
| Outer nasal | 15.0 (3.9) | 16.5 (2.4) | 0.178 |
| Outer temporal | 17.5 (3.2) | 17.6 (2.6) | 0.923 |
| Outer superior | 16.9 (2.2) | 18.6 (1.4) | 0.003a |
| Outer inferior | 17.0 (3.8) | 18.4 (1.8) | 0.190 |
| Central | 3.2 (3.6) | 2.2 (2.1) | 0.706 |
| Inner ring | 16.4 (2.8) | 17.1 (2.3) | 0.437 |
| Outer ring | 16.7 (2.9) | 17.8 (1.7) | 0.215 |
| Full area | 16.2 (2.6) | 17.2 (1.7) | 0.290 |
| Abbreviations: PD, Parkinson’s disease; HC, healthy controls. | | | |
| a: *P* <0.05. |  |  |  |

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| Supplementary Table 3. Comparison of RNFL Thickness Between the PD Patients and Healthy Controls | | | |
|  | Mean (SD) | | *P* |
| Variable (μm) | PD (N=24) | HC (N=23) |
| Average | 93.4 (10.7) | 98.0 (9.4) | 0.128 |
| Nasal | 67.0 (10.2) | 70.0 (8.0) | 0.290 |
| Temporal | 70.4 (17.1) | 71.2 (10.2) | 0.958 |
| Superior | 114.7 (15.8) | 120.0 (19.0) | 0.300 |
| Inferior | 120.9 (20.1) | 130.8 (18.2) | 0.084 |

Abbreviations: RNFL, retinal nerve fiber layer; PD, Parkinson’s disease; HC, healthy controls.

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| Supplementary Table 4. Comparison of CST Between the PD Patients and Healthy Controls | | | |
|  | Mean (SD) | | *P* |
| Variable (μm) | PD (N=24) | HC (N=23) |
| Central | 246.0 (18.3) | 247.7 (13.1) | 0.710 |
| Average | 272.8 (10.3) | 274.7 (11.0) | 0.534 |
| Inner superior | 314.9 (16.8) | 316.5 (11.5) | 0.698 |
| Inner nasal | 318.8 (16.8) | 320.3 (13.2) | 0.734 |
| Inner inferior | 313.7 (16.2) | 314.8 (13.8) | 0.808 |
| Inner temporal | 305.6 (16.7) | 305.0 (11.5) | 0.882 |
| Outer superior | 271.9 (12.0) | 274.7 (12.5) | 0.433 |
| Outer nasal | 290.8 (15.1) | 294.0 (12.9) | 0.432 |
| Outer inferior | 263.2 (14.4) | 262.9 (11.0) | 0.926 |
| Outer temporal | 257.5 (13.7) | 258.0 (10.3) | 0.904 |
| Abbreviations: CFT, central subfield thickness; PD, Parkinson’s disease; HC, healthy controls. | | | |

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| Supplementary Table 5. Comparison of the GCIPL Thickness Between Patients with PD and Healthy Controls | | | |
|  | Mean (SD) | | *P* |
| Variable (μm) | PD (N=24) | HC (N=23) |
| Average | 80.5 (5.6) | 82.3 (6.2) | 0.303 |
| Superior | 80.3 (6.2) | 82.3 (8.0) | 0.331 |
| Inferior | 78.4 (6.3) | 81.6 (6.3) | 0.100 |
| Superonasal | 82.8 (8.4) | 85.2 (7.2) | 0.200 |
| Inferonasal | 80.5 (7.5) | 82.6 (8.0) | 0.387 |
| Superotemporal | 80.0 (6.4) | 80.1 (6.1) | 0.943 |
| Inferotemporal | 81.1 (4.9) | 82.5 (6.5) | 0.432 |
| Abbreviations: GCIPL, ganglion cell-inner plexiform layer; PD, Parkinson’s disease; HC, healthy controls. | | | |

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| Supplementary Table 6. Correlations Between Clinical Data and Macular Microvascular Density of 3mm Diameter Region in PD patients | | | | | | | |
|  | Nasal | Temporal | Superior | Inferior | Central | Inner ring | Full area |
| PD History (year) | -0.442(0.035a) | -0.314(0.145) | -0.294(0.174) | -0.408(0.054) | -0.279(0.198) | -0.431(0.040a) | -0.411(0.051) |
| UPDRS III rating | -0.081(0.726) | -0.160(0.489) | -0.195(0.397) | 0.129(0.577) | 0.047(0.840) | 0.053(0.821) | -0.030(0.896) |
| MMSE | -0.072(0.745) | 0.251(0.247) | 0.106(0.630) | -0.099(0.653) | 0.249(0.253) | 0.049(0.825) | 0.089(0.688) |
| Abbreviations: PD, Parkinson’s disease; UPDRS III, Unified Parkinson Disease Rating Scale III; MMSE, Mini-Mental State Examination. | | | | | | | |
| a: *P*＜0.05. |  |  |  |  |  |  |  |

Supplementary Table 7. Studies using optical coherence tomography angiography in Parkinson’s disease.

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| Study | Sample size | OCTA type | Mean age (years) | PD history (years) | UPDRS III | HY rating | Macular thickness | RNFL | GCL/GCIPL | FAZ area | Microvascular density of SCP (macula) | Microvascular density of SCP (ONH) | AUROC |
| (Kwapong et al., 2018) | P-38, C-28 | SD-OCTA, Optovue | 61.18±5.74 | 3.84±2.80 | NS | NA | Thinner in the superior, nasal, and inferior quadrants | Thinner in the inner ring of inferior quadrant | Thinner in all but the temporal inner ring and the central region | NS | Decreased in all 4 quadrants (3mm) | NS | NS |
| (Zou et al., 2020) | P-35, C-35 | SD-OCTA, Zeiss | 61.86±5.46 | 3.2±2.0 | NS | 2（1-2） | Thinner  (average) | Thinner in temporal quadrant | Thinner  (average) | No diff | Decreased in central, inner ring and full area (6mm) | NS | 0.618-0.756 |
| (Robbins et al., 2020) | P-69, C-137 | SD-OCTA, Zeiss | 71.1±7.0 | NS | NS | NS | No diff | No diff | No diff | No diff | Decreased in inner ring and full area (6mm) | NS | 0.50-0.63 |
| (Rascunà et al., 2020) | P-21, C-17 | SD-OCTA, Optovue | 61.5±6.5 | 2.3±1.2 | 25.0±6.9 | 1.9±0.4 | NA | Thinner  (average) | Thinner  (average) | NA | No diff (3mm) | NA | NS |
| (Shi et al., 2020) | P-25, C-25 | SD-OCTA, Optovue | 61.9±7.6 | 3.7±2.4 | NS | 2.2±1.0 | Thinner  (average) | No diff | Thinner  (average) | NA | Decreased in all 4 quadrants (3mm)a | NS | NS |
| Our study | P-24, C-23 | SD-OCTA, Zeiss | 65.88±6.50 | 5.3±4.2 | 26.5±12.3 | 2.0±0.3 | No diff | No diff | No diff | No diff | Decreased in inner superior sector(6mm); Decreased in all 4 quadrants (3mm) | Decreased in outer superior (6mm) | 0.655-0.723 |

Abbreviations: P, Patients; C, Controls; SD-OCTA, spectral domain-optical coherence tomography angiography; UPDRS III, Unified Parkinson Disease Rating Scale III; H&Y, Hoehn and Yahr; RNFL, retinal nerve fiber layer; GCL, ganglion cell layer; GCIPL, ganglion cell-inner plexiform layer; FAZ, foveal avascular zone; SCP, superficial capillary plexus; ONH, optic nerve head; AUROC, the area under receiver operating characteristic curve; diff, difference; NA, not available; NS, not studied.

a retinal capillary skeleton density.