

Appendix 1 The statistical results of plan complexity indices between optimized and negative plans.

The plan complexity indices were calculated through an open-source package (<https://github.com/quick0306/PlanComplexity>). The statistical results of all indices are listed in Table S1.

Table S1 The statistical results of plan complexity indices between optimized and negative plans

Complexity Index	Group	Median/mean	Standard difference	Z/T	P	Difference of median/mean	Cohen's d
Plan Irregularity [#]	Improved	5.12	2.704	-4.064	<0.001	2.735	1.206
	Negative	2.39	0.872				
Plan Modulation [#]	Improved	0.51	0.131	-2.508	0.012	0.100	0.91
	Negative	0.41	0.139				
Small Aperture Score 5 mm [#]	Improved	0	0.036	-2.225	0.026	0	0.234
	Negative	0	0.038				
Mean Field Area [#]	Improved	5231.51	2277.684	-3.299	0.001	2501.455	1.061
	Negative	2730.06	1759.252				
Mean Asymmetry Distance ^{#*}	Improved	62.02	19.575	2.853	0.006	17.965	0.894
	Negative	44.06	22.936				
Aperture Sub Regions [#]	Improved	2.24	1.198	-4.706	<0.001	1.145	1.233
	Negative	1.10	0.118				
Aperture Y Jaw [#]	Improved	144.11	75.681	-3.039	0.002	67.095	0.979
	Negative	77.02	46.436				
Leaf Gap Std	Improved	24.72	7.480	-2.998	0.003	6.375	1.002
	Negative	18.35	7.177				
Aperture Area Ratio Jaw Area	Improved	0.08	0.032	-0.448	0.654	0.005	0.215
	Negative	0.09	0.023				
Converted Aperture Metric	Improved	0.19	0.074	-0.998	0.318	0.055	0.334
	Negative	0.14	0.073				
Edge Metric	Improved	0.09	0.019	-0.887	0.375	0.005	0.223
	Negative	0.09	0.030				
Edge Area Metric	Improved	0.30	0.083	-0.663	0.507	0	0.218
	Negative	0.30	0.084				
Mean Leaf Area	Improved	162.90	63.360	-0.526	0.599	6.990	0.242
	Negative	169.89	45.187				
Leaf Travel	Improved	136.03	366.275	-1.755	0.079	29.74	0.668
	Negative	106.29	58.488				
Leaf Gap Average	Improved	32.26	13.309	-0.225	0.822	1.785	0.176
	Negative	34.05	9.107				
Small Aperture Score 10 mm	Improved	0.23	0.126	-1.948	0.051	0.125	0.642
	Negative	0.11	0.118				
Small Aperture Score 20 mm	Improved	0.42	0.182	-1.086	0.277	0.115	0.373
	Negative	0.31	0.190				
Modulation Complexity Score	Improved	0.36	0.137	-0.827	0.408	0.030	0.291
	Negative	0.39	0.117				

[#], the plan complexity index with a statistical difference; *, indicates the plan complexity index evaluated through the independent samples *T* test.