Supplementary Materials

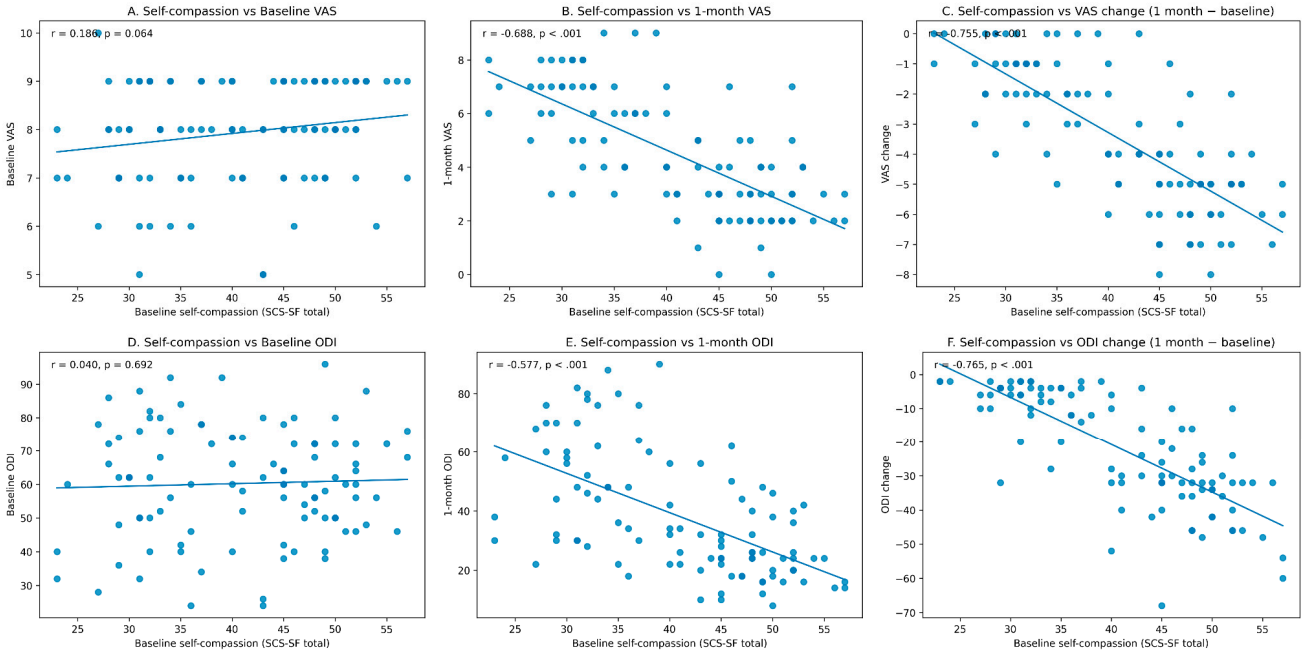


Figure S1. Associations of baseline self-compassion with baseline, 1-month, and change scores. Panels show scatter plots of baseline self-compassion (SCS-SF total score) against baseline, 1-month, and change scores for pain intensity (VAS) and disability (ODI). Change scores were calculated as 1-month minus baseline values; therefore, more negative values indicate greater improvement. Lines represent ordinary least-squares linear fits.

Table S1. Hierarchical regression testing the incremental contribution of resilience

Panel A. 1-month VAS						
Hierarchical step	**R^2**	**Adjusted R^2**	**ΔR^2**	**HC3 ΔF**	**df**	***p* for ΔF**
Step 1: Baseline outcome + age + sex + procedure	0.105	0.026				
Step 2: + Depression + anxiety	0.275	0.193	0.17	6.295	2, 89	0.003
Step 3: + Resilience	0.392	0.316	0.118	13.018	1, 88	< 0.001
Final model predictor	**B**	**HC3 SE**	**β**	**t**	**95% CI**	***p***
Intercept	7.288	1.949		3.739	[3.468, 11.109]	< 0.001
L3–4 DRG	0.138	1.228	0.013	0.112	[-2.269, 2.544]	0.911
L4–5 DRG	1.007	1.11	0.123	0.907	[-1.169, 3.183]	0.364
L5 DRG	-0.345	0.482	-0.072	-0.716	[-1.289, 0.599]	0.474
L5–S1 DRG	-0.301	0.731	-0.052	-0.411	[-1.733, 1.132]	0.681
L4 DRG	0.548	0.963	0.042	0.569	[-1.339, 2.435]	0.569
Baseline VAS	0.272	0.172	0.131	1.577	[-0.066, 0.609]	0.115
Age	0	0.024	-0.001	-0.007	[-0.047, 0.046]	0.995
Sex (male vs female)	-0.28	0.453	-0.063	-0.618	[-1.167, 0.608]	0.537
Depression (HD)	0.134	0.103	0.223	1.294	[-0.069, 0.337]	0.196
Anxiety (HA)	-0.074	0.093	-0.131	-0.803	[-0.256, 0.107]	0.422
Resilience (PDÖ)	-0.256	0.071	-0.47	-3.608	[-0.396, -0.117]	< 0.001
Panel B. 1-month ODI						
Hierarchical step	**R^2**	**Adjusted R^2**	**ΔR^2**	**HC3 ΔF**	**df**	***p* for ΔF**
Step 1: Baseline outcome + age + sex + procedure	0.446	0.397				
Step 2: + Depression + anxiety	0.515	0.461	0.07	3.563	2, 89	0.032
Step 3: + Resilience	0.59	0.539	0.075	11.292	1, 88	0.001
Final model predictor	**B**	**HC3 SE**	**β**	**t**	**95% CI**	***p***
Intercept	24.94	14.184		1.758	[-2.859, 52.740]	0.079
L3–4 DRG	0.531	9.899	0.006	0.054	[-18.871, 19.934]	0.957
L4–5 DRG	4.888	6.34	0.065	0.771	[-7.537, 17.313]	0.441
L5 DRG	-0.359	3.562	-0.008	-0.101	[-7.340, 6.622]	0.92
L5–S1 DRG	-4.031	6.02	-0.076	-0.67	[-15.830, 7.768]	0.503
L4 DRG	8.061	7.228	0.067	1.115	[-6.106, 22.228]	0.265
Baseline ODI	0.802	0.12	0.641	6.705	[0.568, 1.037]	< 0.001
Age	0.024	0.194	0.014	0.123	[-0.356, 0.404]	0.902
Sex (male vs female)	0.884	3.27	0.022	0.27	[-5.524, 7.293]	0.787
Depression (HD)	0.64	0.827	0.116	0.773	[-0.982, 2.262]	0.439
Anxiety (HA)	-0.562	0.77	-0.107	-0.729	[-2.071, 0.948]	0.466
Resilience (PDÖ)	-1.843	0.548	-0.367	-3.36	[-2.918, -0.768]	< 0.001

Note. N = 100. S1 DRG was the reference procedure category. Step 3 tests whether resilience explains additional variance beyond baseline outcome severity, age, sex, procedure type, depression, and anxiety. HC3 heteroskedasticity-robust standard errors and robust joint F tests are reported.

Table S2. Hierarchical regression testing the incremental contribution of well-being

Panel A. 1-month VAS						
Hierarchical step	**R^2**	**Adjusted R^2**	**ΔR^2**	**HC3 ΔF**	**df**	***p* for ΔF**
Step 1: Baseline outcome + age + sex + procedure	0.105	0.026				
Step 2: + Depression + anxiety	0.275	0.193	0.17	6.295	2, 89	0.003
Step 3: + Well-being	0.443	0.374	0.169	25.638	1, 88	< .001
Final model predictor	**B**	**HC3 SE**	**β**	**t**	**95% CI**	***p***
Intercept	10.166	2.383		4.265	[5.494, 14.838]	< 0.001
L3–4 DRG	0.061	1.051	0.006	0.058	[-2.000, 2.121]	0.954
L4–5 DRG	0.946	1.098	0.115	0.862	[-1.205, 3.097]	0.389
L5 DRG	-0.391	0.491	-0.082	-0.797	[-1.352, 0.571]	0.426
L5–S1 DRG	-0.39	0.647	-0.067	-0.603	[-1.659, 0.879]	0.547
L4 DRG	1.397	0.813	0.107	1.719	[-0.196, 2.991]	0.086
Baseline VAS	0.313	0.184	0.151	1.704	[-0.047, 0.673]	0.088
Age	-0.013	0.022	-0.073	-0.606	[-0.056, 0.030]	0.545
Sex (male vs female)	-0.285	0.467	-0.064	-0.609	[-1.201, 0.631]	0.542
Depression (HD)	0.021	0.1	0.035	0.208	[-0.175, 0.217]	0.835
Anxiety (HA)	-0.034	0.079	-0.059	-0.429	[-0.189, 0.121]	0.668
Well-being (IOÖ)	-0.161	0.032	-0.619	-5.063	[-0.223, -0.099]	< 0.001
Panel B. 1-month ODI						
Hierarchical step	**R^2**	**Adjusted R^2**	**ΔR^2**	**HC3 ΔF**	**df**	***p* for ΔF**
Step 1: Baseline outcome + age + sex + procedure	0.446	0.397				
Step 2: + Depression + anxiety	0.515	0.461	0.07	3.563	2, 89	0.032
Step 3: + Well-being	0.644	0.6	0.129	26.277	1, 88	< 0.001
Final model predictor	**B**	**HC3 SE**	**β**	**t**	**95% CI**	***p***
Intercept	52.729	16.315		3.232	[20.752, 84.707]	0.001
L3–4 DRG	0.243	9.053	0.003	0.027	[-17.500, 17.986]	0.979
L4–5 DRG	4.623	6.141	0.061	0.753	[-7.414, 16.660]	0.452
L5 DRG	-0.66	3.584	-0.015	-0.184	[-7.684, 6.364]	0.854
L5–S1 DRG	-4.554	5.237	-0.085	-0.87	[-14.818, 5.710]	0.384
L4 DRG	14.06	5.363	0.117	2.622	[3.549, 24.570]	0.009
Baseline ODI	0.83	0.109	0.662	7.577	[0.615, 1.044]	< 0.001
Age	-0.074	0.177	-0.044	-0.419	[-0.422, 0.273]	0.675
Sex (male vs female)	0.969	3.194	0.024	0.303	[-5.290, 7.229]	0.762
Depression (HD)	-0.351	0.794	-0.064	-0.442	[-1.907, 1.205]	0.658
Anxiety (HA)	-0.27	0.644	-0.052	-0.42	[-1.532, 0.991]	0.675
Well-being (IOÖ)	-1.271	0.248	-0.532	-5.126	[-1.757, -0.785]	< 0.001

Note. N = 100. S1 DRG was the reference procedure category. Step 3 tests whether well-being explains additional variance beyond baseline outcome severity, age, sex, procedure type, depression, and anxiety. HC3 heteroskedasticity-robust standard errors and robust joint F tests are reported.

Table S3. Full coefficients from separate adjusted GEE models containing one Time × psychological predictor interaction at a time

VAS: single-interaction model with Time × resilience					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	8.404	0.234	35.988	[7.946, 8.862]	< 0.001
Time (baseline → 1 month)	-3.46	0.193	-17.97	[-3.837, -3.083]	< 0.001
Self-compassion	-0.047	0.02	-2.348	[-0.086, -0.008]	0.019
Resilience	0.155	0.034	4.591	[0.089, 0.221]	< 0.001
Well-being	-0.014	0.025	-0.562	[-0.062, 0.035]	0.574
Depression	0.12	0.048	2.534	[0.027, 0.214]	0.011
Anxiety	-0.036	0.033	-1.117	[-0.100, 0.027]	0.264
Age	0.004	0.011	0.351	[-0.018, 0.026]	0.726
Sex (male vs female)	-0.688	0.234	-2.935	[-1.148, -0.229]	0.003
L3–4 DRG	-0.108	0.505	-0.214	[-1.098, 0.882]	0.83
L4–5 DRG	0.38	0.616	0.617	[-0.827, 1.588]	0.537
L5 DRG	-0.358	0.262	-1.364	[-0.872, 0.156]	0.173
L5–S1 DRG	-0.113	0.304	-0.37	[-0.709, 0.484]	0.712
L4 DRG	-0.113	0.5	-0.226	[-1.094, 0.867]	0.821
Time × resilience	-0.306	0.04	-7.561	[-0.385, -0.227]	< 0.001
VAS: single-interaction model with Time × well-being					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	8.404	0.232	36.206	[7.949, 8.859]	< 0.001
Time (baseline → 1 month)	-3.46	0.187	-18.461	[-3.827, -3.093]	< 0.001
Self-compassion	-0.047	0.02	-2.348	[-0.086, -0.008]	0.019
Resilience	0.002	0.038	0.054	[-0.072, 0.076]	0.957
Well-being	0.063	0.025	2.583	[0.015, 0.111]	0.01
Depression	0.12	0.048	2.534	[0.027, 0.214]	0.011
Anxiety	-0.036	0.033	-1.117	[-0.100, 0.027]	0.264
Age	0.004	0.011	0.351	[-0.018, 0.026]	0.726
Sex (male vs female)	-0.688	0.234	-2.935	[-1.148, -0.229]	0.003
L3–4 DRG	-0.108	0.505	-0.214	[-1.098, 0.882]	0.83
L4–5 DRG	0.38	0.616	0.617	[-0.827, 1.588]	0.537
L5 DRG	-0.358	0.262	-1.364	[-0.872, 0.156]	0.173
L5–S1 DRG	-0.113	0.304	-0.37	[-0.709, 0.484]	0.712
Other procedure	-0.113	0.5	-0.226	[-1.094, 0.867]	0.821
Time × well-being	-0.155	0.016	-9.739	[-0.186, -0.123]	< 0.001
VAS: single-interaction model with Time × depression					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	8.404	0.236	35.577	[7.941, 8.867]	< 0.001
Time (baseline → 1 month)	-3.46	0.216	-15.994	[-3.884, -3.036]	< 0.001
Self-compassion	-0.047	0.02	-2.348	[-0.086, -0.008]	0.019
Resilience	0.002	0.038	0.054	[-0.072, 0.076]	0.957
Well-being	-0.014	0.025	-0.562	[-0.062, 0.035]	0.574
Depression	0.017	0.047	0.363	[-0.075, 0.109]	0.717
Anxiety	-0.036	0.033	-1.117	[-0.100, 0.027]	0.264
Age	0.004	0.011	0.351	[-0.018, 0.026]	0.726
Sex (male vs female)	-0.688	0.234	-2.935	[-1.148, -0.229]	0.003
L3–4 DRG	-0.108	0.505	-0.214	[-1.098, 0.882]	0.83
L4–5 DRG	0.38	0.616	0.617	[-0.827, 1.588]	0.537
L5 DRG	-0.358	0.262	-1.364	[-0.872, 0.156]	0.173
L5–S1 DRG	-0.113	0.304	-0.37	[-0.709, 0.484]	0.712
L4 DRG	-0.113	0.5	-0.226	[-1.094, 0.867]	0.821

Time × depression	0.207	0.056	3.68	[0.097, 0.317]	< 0.001
VAS: single-interaction model with Time × anxiety					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	8.404	0.244	34.45	[7.926, 8.882]	< 0.001
Time (baseline → 1 month)	-3.46	0.228	-15.173	[-3.907, -3.013]	< 0.001
Self-compassion	-0.047	0.02	-2.348	[-0.086, -0.008]	0.019
Resilience	0.002	0.038	0.054	[-0.072, 0.076]	0.957
Well-being	-0.014	0.025	-0.562	[-0.062, 0.035]	0.574
Depression	0.12	0.048	2.534	[0.027, 0.214]	0.011
Anxiety	-0.07	0.032	-2.215	[-0.132, -0.008]	0.027
Age	0.004	0.011	0.351	[-0.018, 0.026]	0.726
Sex (male vs female)	-0.688	0.234	-2.935	[-1.148, -0.229]	0.003
L3–4 DRG	-0.108	0.505	-0.214	[-1.098, 0.882]	0.83
L4–5 DRG	0.38	0.616	0.617	[-0.827, 1.588]	0.537
L5 DRG	-0.358	0.262	-1.364	[-0.872, 0.156]	0.173
L5–S1 DRG	-0.113	0.304	-0.37	[-0.709, 0.484]	0.712
L4 DRG	-0.113	0.5	-0.226	[-1.094, 0.867]	0.821
Time × anxiety	0.067	0.056	1.192	[-0.043, 0.177]	0.233
ODI: single-interaction model with Time × resilience					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	66.856	3.285	20.35	[60.417, 73.295]	< 0.001
Time (baseline → 1 month)	-22.04	1.401	-15.727	[-24.787, -19.293]	< 0.001
Self-compassion	-0.602	0.266	-2.259	[-1.123, -0.080]	0.024
Resilience	1.491	0.595	2.505	[0.324, 2.658]	0.012
Well-being	0.151	0.276	0.546	[-0.391, 0.692]	0.585
Depression	1.243	0.567	2.193	[0.132, 2.353]	0.028
Anxiety	0.015	0.434	0.035	[-0.834, 0.865]	0.972
Age	-0.044	0.14	-0.314	[-0.319, 0.231]	0.753
Sex (male vs female)	-10.464	3.278	-3.192	[-16.889, -4.039]	0.001
L3–4 DRG	-7.105	9.392	-0.757	[-25.513, 11.303]	0.449
L4–5 DRG	-1.423	5.501	-0.259	[-12.205, 9.359]	0.796
L5 DRG	-3.689	3.755	-0.982	[-11.049, 3.672]	0.326
L5–S1 DRG	0.896	4.296	0.209	[-7.524, 9.316]	0.835
L4 DRG	6.296	9.064	0.695	[-11.469, 24.062]	0.487
Time × resilience	-2.046	0.3	-6.81	[-2.635, -1.457]	< 0.001
ODI: single-interaction model with Time × well-being					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	66.856	3.264	20.481	[60.458, 73.254]	< 0.001
Time (baseline → 1 month)	-22.04	1.318	-16.721	[-24.623, -19.457]	< 0.001
Self-compassion	-0.602	0.266	-2.259	[-1.123, -0.080]	0.024
Resilience	0.468	0.605	0.773	[-0.718, 1.653]	0.439
Well-being	0.712	0.282	2.527	[0.160, 1.264]	0.012
Depression	1.243	0.567	2.193	[0.132, 2.353]	0.028
Anxiety	0.015	0.434	0.035	[-0.834, 0.865]	0.972
Age	-0.044	0.14	-0.314	[-0.319, 0.231]	0.753
Sex (male vs female)	-10.464	3.278	-3.192	[-16.889, -4.039]	0.001
L3–4 DRG	-7.105	9.392	-0.757	[-25.513, 11.303]	0.449
L4–5 DRG	-1.423	5.501	-0.259	[-12.205, 9.359]	0.796
L5 DRG	-3.689	3.755	-0.982	[-11.049, 3.672]	0.326
L5–S1 DRG	0.896	4.296	0.209	[-7.524, 9.316]	0.835
L4 DRG	6.296	9.064	0.695	[-11.469, 24.062]	0.487
Time × well-being	-1.122	0.118	-9.503	[-1.354, -0.891]	< 0.001

ODI: single-interaction model with Time × depression					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	66.856	3.258	20.522	[60.471, 73.241]	< 0.001
Time (baseline → 1 month)	-22.04	1.536	-14.345	[-25.051, -19.029]	< 0.001
Self-compassion	-0.602	0.266	-2.259	[-1.123, -0.080]	0.024
Resilience	0.468	0.605	0.773	[-0.718, 1.653]	0.439
Well-being	0.151	0.276	0.546	[-0.391, 0.692]	0.585
Depression	0.501	0.588	0.852	[-0.651, 1.653]	0.394
Anxiety	0.015	0.434	0.035	[-0.834, 0.865]	0.972
Age	-0.044	0.14	-0.314	[-0.319, 0.231]	0.753
Sex (male vs female)	-10.464	3.278	-3.192	[-16.889, -4.039]	0.001
L3–4 DRG	-7.105	9.392	-0.757	[-25.513, 11.303]	0.449
L4–5 DRG	-1.423	5.501	-0.259	[-12.205, 9.359]	0.796
L5 DRG	-3.689	3.755	-0.982	[-11.049, 3.672]	0.326
L5–S1 DRG	0.896	4.296	0.209	[-7.524, 9.316]	0.835
L4 DRG	6.296	9.064	0.695	[-11.469, 24.062]	0.487
Time × depression	1.483	0.406	3.651	[0.687, 2.280]	< 0.001
ODI: single-interaction model with Time × anxiety					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	***p***
Intercept	66.856	3.288	20.333	[60.412, 73.301]	< 0.001
Time (baseline → 1 month)	-22.04	1.625	-13.564	[-25.225, -18.855]	< 0.001
Self-compassion	-0.602	0.266	-2.259	[-1.123, -0.080]	0.024
Resilience	0.468	0.605	0.773	[-0.718, 1.653]	0.439
Well-being	0.151	0.276	0.546	[-0.391, 0.692]	0.585
Depression	1.243	0.567	2.193	[0.132, 2.353]	0.028
Anxiety	-0.179	0.455	-0.394	[-1.070, 0.712]	0.694
Age	-0.044	0.14	-0.314	[-0.319, 0.231]	0.753
Sex (male vs female)	-10.464	3.278	-3.192	[-16.889, -4.039]	0.001
L3–4 DRG	-7.105	9.392	-0.757	[-25.513, 11.303]	0.449
L4–5 DRG	-1.423	5.501	-0.259	[-12.205, 9.359]	0.796
L5 DRG	-3.689	3.755	-0.982	[-11.049, 3.672]	0.326
L5–S1 DRG	0.896	4.296	0.209	[-7.524, 9.316]	0.835
L4 DRG	6.296	9.064	0.695	[-11.469, 24.062]	0.487
Time × anxiety	0.389	0.458	0.848	[-0.510, 1.287]	0.397

Note. Separate GEE models were fitted for each Time × psychological predictor interaction. Continuous predictors and age were mean-centered, Time was coded 0 = baseline and 1 = 1-month follow-up, and S1 DRG was the reference procedure category. Robust sandwich standard errors are reported.

Table S4. Sensitivity GEE models including all Time × psychological predictor interactions simultaneously

Panel A. VAS					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	**p**
Intercept	8.404	0.236	35.602	[7.941, 8.867]	< 0.001
Time (baseline → 1 month)	−3.460	0.143	−24.246	[−3.740, −3.180]	< 0.001
Self-compassion	0.046	0.017	2.703	[0.013, 0.080]	0.007
Resilience	0.028	0.031	0.888	[−0.033, 0.088]	0.375
Well-being	−0.006	0.022	−0.264	[−0.049, 0.037]	0.792
Depression	0.113	0.038	2.966	[0.038, 0.188]	0.003
Anxiety	0.03	0.026	1.136	[−0.021, 0.081]	0.256
Age	0.004	0.011	0.351	[−0.018, 0.026]	0.726
Sex (male vs female)	−0.688	0.234	−2.935	[−1.148, −0.229]	0.003
L3–4 DRG	−0.108	0.505	−0.214	[−1.098, 0.882]	0.83
L4–5 DRG	0.38	0.616	0.617	[−0.827, 1.588]	0.537
L5 DRG	−0.358	0.262	−1.364	[−0.872, 0.156]	0.173
L5–S1 DRG	−0.113	0.304	−0.370	[−0.709, 0.484]	0.712
L4 DRG	−0.113	0.5	−0.226	[−1.094, 0.867]	0.821
Time × self-compassion	**−0.186**	**0.025**	**−7.554**	**[−0.235, −0.138]**	**< 0.001**
Time × resilience	−0.051	0.057	−0.902	[−0.162, 0.060]	0.367
Time × well-being	−0.016	0.033	−0.495	[−0.080, 0.048]	0.621
Time × depression	0.015	0.074	0.2	[−0.131, 0.161]	0.841
Time × anxiety	−0.132	0.047	−2.804	[−0.224, −0.040]	0.005
Panel B.					
Predictor	**B**	**Robust SE**	**z**	**95% CI**	**p**
Intercept	66.856	3.334	20.053	[60.322, 73.391]	< 0.001
Time (baseline → 1 month)	−22.040	0.982	−22.449	[−23.964, −20.116]	< 0.001
Self-compassion	0.099	0.265	0.374	[−0.420, 0.618]	0.708
Resilience	0.443	0.635	0.697	[−0.802, 1.689]	0.486
Well-being	0.257	0.309	0.831	[−0.349, 0.863]	0.406
Depression	1.136	0.617	1.84	[−0.074, 2.346]	0.066
Anxiety	0.534	0.427	1.252	[−0.302, 1.370]	0.211
Age	−0.044	0.14	−0.314	[−0.319, 0.231]	0.753
Sex (male vs female)	−10.464	3.278	−3.192	[−16.889, −4.040]	0.001
L3–4 DRG	−7.105	9.392	−0.757	[−25.513, 11.302]	0.449
L4–5 DRG	−1.423	5.501	−0.259	[−12.205, 9.359]	0.796
L5 DRG	−3.689	3.755	−0.982	[−11.049, 3.672]	0.326
L5–S1 DRG	0.896	4.296	0.209	[−7.524, 9.316]	0.835
L4 DRG	6.296	9.064	0.695	[−11.469, 24.062]	0.487
Time × self-compassion	**−1.401**	**0.176**	**−7.973**	**[−1.746, −1.057]**	**< 0.001**
Time × resilience	0.049	0.435	0.113	[−0.802, 0.901]	0.91
Time × well-being	−0.213	0.226	−0.940	[−0.656, 0.231]	0.347
Time × depression	0.213	0.557	0.382	[−0.879, 1.305]	0.702
Time × anxiety	−1.037	0.363	−2.855	[−1.750, −0.325]	0.004

Note. N = 100 participants with two observations per participant (baseline and 1-month follow-up). Both models used a Gaussian family with an identity link and an exchangeable working correlation structure. Robust sandwich standard errors are reported. Time was coded as 0 = baseline and 1 = 1-month follow-up. Continuous psychological predictors and age were mean-centered before analysis. Sex and procedure type were entered as categorical variables, with S1 DRG as the reference procedure category. All five psychological main effects and their corresponding Time × predictor interactions were entered simultaneously. These models were conducted as secondary sensitivity analyses and should not be interpreted as independent validation of the primary baseline-adjusted regression models.

Table S5. Pearson correlations among continuous predictors and clinical outcomes

Variable	Age	BRS	FS	HADS-D	HADS-A	SCS-SF	Baseline VAS	1-month VAS	Baseline ODI
BRS	−0.092 [−0.283, 0.107]	—							
FS	−0.225 [−0.403, −0.030]	0.746 [0.644, 0.822]	—						
HADS-D	0.193 [−0.003, 0.376]	−0.624 [−0.731, −0.487]	−0.717 [−0.801, −0.606]	—					
HADS-A	0.064 [−0.135, 0.257]	−0.413 [−0.563, −0.235]	−0.346 [−0.508, −0.160]	0.515 [0.354, 0.646]	—				
SCS-SF	−0.096 [−0.287, 0.102]	0.665 [0.539, 0.762]	0.702 [0.587, 0.790]	−0.442 [−0.587, −0.269]	−0.373 [−0.530, −0.190]	—			
Baseline VAS	0.098 [−0.100, 0.289]	0.004 [−0.193, 0.200]	−0.031 [−0.226, 0.166]	0.260 [0.067, 0.434]	0.245 [0.051, 0.421]	0.185 [−0.012, 0.368]	—		
1-month VAS	0.107 [−0.091, 0.297]	−0.559 [−0.680, −0.407]	−0.609 [−0.720, −0.469]	0.470 [0.301, 0.610]	0.235 [0.041, 0.413]	−0.683 [−0.775, −0.562]	0.179 [−0.018, 0.363]	—	
Baseline ODI	−0.074 [−0.267, 0.124]	−0.019 [−0.214, 0.178]	0.011 [−0.186, 0.207]	0.166 [−0.032, 0.351]	0.241 [0.046, 0.417]	0.035 [−0.162, 0.230]	0.549 [0.395, 0.673]	0.265 [0.073, 0.439]	—
1-month ODI	0.041 [−0.157, 0.235]	−0.423 [−0.572, −0.247]	−0.461 [−0.603, −0.291]	0.401 [0.222, 0.553]	0.266 [0.074, 0.440]	−0.577 [−0.694, −0.429]	0.266 [0.074, 0.440]	0.860 [0.798, 0.904]	0.628 [0.493, 0.734]

Note. Values are Pearson correlation coefficients with 95% confidence intervals in brackets. SCS-SF totals were recalculated from the 12 scored items following dataset verification. BRS = Brief Resilience Scale; FS = Flourishing Scale; HADS-D = Hospital Anxiety and Depression Scale–Depression; HADS-A = Hospital Anxiety and Depression Scale–Anxiety; SCS-SF = Self-Compassion Scale–Short Form; VAS = Visual Analog Scale; ODI = Oswestry Disability Index.

Table S6. Partial correlations with 1-month outcomes controlling for corresponding baseline values

Baseline predictor	1-month VAS, controlling for baseline VAS, partial *r* [95% CI]	*p*	1-month ODI, controlling for baseline ODI, partial *r* [95% CI]	*p*
BRS	−0.569 [−0.689, −0.418]	<0.001	−0.529 [−0.657, −0.370]	<0.001
FS	−0.614 [−0.724, −0.474]	<0.001	−0.601 [−0.714, −0.458]	<0.001
HADS-D	0.445 [0.272, 0.591]	<0.001	0.387 [0.205, 0.543]	<0.001
HADS-A	0.201 [0.004, 0.383]	0.046	0.152 [−0.046, 0.340]	0.132
SCS-SF	**−0.740 [−0.818, −0.636]**	**<0.001**	**−0.771 [−0.840, −0.676]**	**<0.001**

Note. Partial correlations between each baseline psychological predictor and the 1-month outcome were adjusted for the corresponding baseline outcome. Thus, VAS analyses controlled for baseline VAS and ODI analyses controlled for baseline ODI. N = 100.

Table S7. Sensitivity analyses addressing functional-form deviation in the ODI model

Panel A. Quadratic specification				
Term	**B**	**HC3 SE**	**95% CI**	**p**
Baseline ODI, linear term	0.871	0.072	[0.730, 1.012]	< 0.001
Baseline ODI²	0.007	0.004	[0.0002, 0.0145]	0.044
Self-compassion, linear term	−1.368	0.156	[−1.674, −1.061]	< 0.001
Self-compassion²	−0.014	0.014	[−0.042, 0.014]	0.329

Model $R^2 = 0.804$; adjusted $R^2 = 0.779$

Panel B. Flexible spline specification							
Model	**N**	**Self-compassion B**	**HC3 SE**	**95% CI**	**p**	**R^2**	**Adjusted R^2**
Baseline ODI modeled using a cubic B-spline (df = 3)	100	−1.359	0.17	[−1.693, −1.026]	< 0.001	0.803	0.778

Note. Functional-form diagnostics indicated possible nonlinearity in the primary ODI regression model. In Panel A, centered baseline ODI and centered SCS-SF scores were entered together with their squared terms, while age, sex, procedure category, HADS-D, and HADS-A were retained as covariates. The significant quadratic term for baseline ODI ($p = 0.044$), together with the non-significant quadratic term for self-compassion ($p = 0.329$), suggested that the detected functional-form deviation was more likely attributable to the baseline ODI–follow-up ODI relationship than to a nonlinear association involving self-compassion. In Panel B, baseline ODI was modeled flexibly using a cubic B-spline with 3 degrees of freedom, while the remaining covariates were unchanged. The self-compassion estimate remained essentially unchanged in the spline model (B = −1.359, 95% CI [−1.693, −1.026], $p < 0.001$). HC3 heteroskedasticity-robust standard errors were used in both sensitivity analyses.

Table S8. Sensitivity analyses using the collapsed four-category procedure variable

Panel A. Final multivariable model for 1-month VAS					
Predictor	**B**	**HC3 SE**	**β**	**95% CI**	**p**
Intercept	7.93	1.523	—	[4.945, 10.914]	< 0.001
Baseline VAS	0.623	0.18	0.301	[0.271, 0.975]	< 0.001
Age	−0.008	0.018	−0.044	[−0.044, 0.027]	0.655
Sex (male vs female)	−0.335	0.352	−0.075	[−1.026, 0.356]	0.342
HADS-D	0.115	0.065	0.192	[−0.012, 0.243]	0.077
HADS-A	−0.144	0.06	−0.253	[−0.261, −0.027]	0.016
SCS-SF	−0.184	0.021	−0.732	[−0.224, −0.143]	< 0.001
Procedure: L5	−0.068	0.378	−0.014	[−0.807, 0.672]	0.858
Procedure: L5–S1	−0.321	0.495	−0.055	[−1.291, 0.648]	0.516
Procedure: Other	0.542	0.646	0.089	[−0.725, 1.808]	0.402

Model $R^2 = 0.615$; adjusted $R^2 = 0.576$

Step 1 $R^2 = 0.092$; Step 2 $R^2 = 0.268$; final Step 3 $R^2 = 0.615$

ΔR^2 for adding self-compassion = 0.346

Panel B. Final multivariable model for 1-month ODI					
Predictor	**B**	**HC3 SE**	**β**	**95% CI**	**p**
Intercept	49.713	9.911	—	[30.288, 69.138]	< 0.001
Baseline ODI	0.856	0.076	0.684	[0.707, 1.006]	< 0.001
Age	−0.005	0.139	−0.003	[−0.278, 0.268]	0.971
Sex (male vs female)	−0.902	2.398	−0.022	[−5.602, 3.799]	0.707
HADS-D	0.6	0.472	0.109	[−0.325, 1.526]	0.203
HADS-A	−1.111	0.435	−0.212	[−1.963, −0.258]	0.011
SCS-SF	−1.419	0.143	−0.615	[−1.699, −1.140]	< 0.001
Procedure: L5	1.141	2.467	0.026	[−3.693, 5.976]	0.644
Procedure: L5–S1	−3.797	3.755	−0.071	[−11.157, 3.563]	0.312
Procedure: Other	2.943	4.483	0.053	[−5.843, 11.729]	0.511

Model $R^2 = 0.789$; adjusted $R^2 = 0.768$

Step 1 $R^2 = 0.430$; Step 2 $R^2 = 0.507$; final Step 3 $R^2 = 0.789$

ΔR^2 for adding self-compassion = 0.282

Note. The procedure variable was collapsed into four categories: S1 (n = 34), L5 (n = 32), L5–S1 (n = 18), and other less frequent procedures (n = 16). S1 was the reference category. Models adjusted for the corresponding baseline outcome, age, sex, procedure category, HADS-D, and HADS-A, with SCS-SF entered in the final step. Sex was coded as 0 = female and 1 = male. HC3 heteroskedasticity-robust standard errors were used for inference.

Table S9. Influence and robust-regression sensitivity analyses for the primary self-compassion models

Outcome/model	N	Self-compassion B	95% CI	p
VAS, primary HC3 model	100	−0.184	[−0.224, −0.143]	< 0.001
VAS, excluding Cook's D > 4/N	92	−0.174	[−0.208, −0.139]	< 0.001
VAS, Huber robust regression	100	−0.180	[−0.222, −0.138]	< 0.001
ODI, primary HC3 model	100	−1.419	[−1.699, −1.140]	< 0.001
ODI, excluding Cook's D > 4/N	91	−1.333	[−1.571, −1.094]	< 0.001
ODI, Huber robust regression	100	−1.414	[−1.662, −1.166]	< 0.001

Note. The conservative influence threshold was Cook's D > 4/N = 0.040. Eight observations exceeded this threshold in the VAS model and nine in the ODI model. The primary models included the corresponding baseline outcome, age, sex, four-category procedure coding, HADS-D, HADS-A, and SCS-SF. HC3 heteroskedasticity-robust standard errors were used in the primary and Cook's D exclusion models. Huber M-estimation was used for the robust-regression sensitivity analysis.

Table S10. Adjusted logistic regression models for clinically meaningful improvement

Panel A. VAS responder: ≥30% reduction from baseline					
Predictor	B	SE	OR	95% CI for OR	p
Intercept	−8.017	3.082	0.0003	[<0.001, 0.138]	0.009
SCS-SF	0.246	0.055	1.279	[1.149, 1.423]	< 0.001
Baseline VAS	−0.220	0.332	0.802	[0.418, 1.539]	0.508
Age	0.009	0.028	1.009	[0.956, 1.065]	0.739
Sex, male vs female	−0.330	0.701	0.719	[0.182, 2.842]	0.638
Procedure: L5	0.33	0.835	1.392	[0.271, 7.149]	0.692
Procedure: L5–S1	0.469	0.894	1.598	[0.277, 9.212]	0.6
Procedure: Other	−0.997	1.033	0.369	[0.049, 2.797]	0.335
HADS-D	−0.161	0.101	0.852	[0.699, 1.039]	0.113
HADS-A	0.177	0.1	1.194	[0.981, 1.454]	0.078

Model diagnostics: responders/nonresponders = 62/38; model converged; maximum VIF = 1.79; McFadden pseudo-R^2 = 0.440; AIC = 94.38. Firth sensitivity estimate for SCS-SF: OR = 1.232, 95% CI [1.122, 1.353].

Panel B. ODI responder: ≥10-point reduction from baseline					
Predictor	B	SE	OR	95% CI for OR	p
Intercept	−12.263	4.027	<0.001	[<0.001, 0.013]	0.002
SCS-SF	0.336	0.076	1.399	[1.206, 1.623]	< 0.001
Baseline ODI	0.006	0.022	1.006	[0.964, 1.050]	0.779
Age	−0.020	0.035	0.98	[0.916, 1.050]	0.568
Sex, male vs female	0.241	0.814	1.272	[0.258, 6.274]	0.767
Procedure: L5	0.19	0.972	1.209	[0.180, 8.127]	0.845
Procedure: L5–S1	−0.345	1.057	0.708	[0.089, 5.625]	0.744
Procedure: Other	0.49	1.183	1.633	[0.161, 16.597]	0.679
HADS-D	−0.189	0.107	0.828	[0.671, 1.022]	0.079
HADS-A	0.262	0.14	1.299	[0.988, 1.709]	0.061

Model diagnostics: responders/nonresponders = 68/32; model converged; maximum VIF = 1.67; McFadden pseudo-R^2 = 0.565; AIC = 74.52. Firth sensitivity estimate for SCS-SF: OR = 1.310, 95% CI [1.168, 1.470].

Note. Binary responder outcomes were defined as ⩾30% reduction in VAS and ⩾10-point reduction in ODI. Models included baseline SCS-SF, the corresponding baseline outcome, age, sex, HADS-D, HADS-A, and four-category procedure coding (S1, L5, L5–S1, and other), with S1 as the reference category. Because the number of nonresponders was limited relative to the number of parameters, conventional maximum-likelihood estimates may be susceptible to small-sample bias. Firth bias-reduced logistic regression using the same covariate specification was therefore conducted as a sensitivity analysis. These analyses were secondary and exploratory.

Table S11. Completed STROBE checklist for observational studies.

STROBE item	No.	Recommended reporting item	Where reported in revised manuscript
Title and abstract	1a	Indicate the study design with a commonly used term	Abstract / Methods; study described as a retrospective observational study
	1b	Provide an informative and balanced summary of methods and findings	Abstract
Background/rationale	2	Explain the scientific background and rationale	Introduction
Objectives	3	State specific objectives and hypotheses	End of Introduction; primary aim focuses on association of preprocedural self-compassion with 1-month clinical outcomes
Study design	4	Present key elements of study design early	Methods, Section 2.1
Setting	5	Describe setting, location, and relevant dates	Methods, Section 2.1; Pain Management Clinic, Şişli Hamidiye Etfal Training and Research Hospital; January–December 2025; 1-month follow-up
Participants	6a	Give eligibility criteria and sources/methods of participant selection; describe follow-up	Methods, Section 2.1; clinical-record screening, inclusion/exclusion criteria, baseline and 1-month assessments
	6b	For matched studies, give matching criteria	Not applicable; study was not matched
Variables	7	Define outcomes, exposures, confounders, effect modifiers, and diagnostic criteria	Methods, Sections 2.1–2.5; VAS, ODI, SCS-SF, BRS, FS, HADS-D, HADS-A, demographic and procedural covariates
Data sources/measurement	8	Give sources of data and methods of assessment for each variable	Methods, Measures/Procedure sections; routinely collected clinical records and validated scales
Bias	9	Describe efforts to address potential sources of bias	Methods and Discussion; baseline adjustment, multivariable analyses, HC3 robust SEs, sensitivity analyses, influence diagnostics; limitations acknowledge residual confounding and selection bias
Study size	10	Explain how study size was determined	Methods, sample-size calculation section; G*Power 3.1, $f^2 = 0.08–0.10$, $\alpha = .05$, 80% power; retrospective available sample N = 100
Quantitative variables	11	Explain how quantitative variables were handled; describe categorizations	Methods, Statistical Analyses; continuous psychological scores analyzed continuously; sex and procedure coding described; procedure collapsed to four categories in sensitivity analyses
Statistical methods	12a	Describe all statistical methods and methods for controlling confounding	Methods, Section 2.5; correlations, paired tests, baseline-adjusted hierarchical regression, HC3 inference

	12b	Describe methods for subgroup/interactions	Methods, Section 2.5; Time × psychological variable interactions in secondary GEE analyses
	12c	Explain how missing data were addressed	Methods, Section 2.1/2.5; complete-record analysis; no statistical imputation
	12d	Explain how loss to follow-up was addressed	Methods and participant-flow diagram; 8 records excluded because 1-month follow-up data were unavailable
	12e	Describe sensitivity analyses	Methods and Supplementary Material; Cook's D exclusion, Huber robust regression, collapsed procedure coding, nonlinear ODI models, spline sensitivity analyses
Participants	13a	Report numbers at each stage	Methods and participant-flow diagram; 112 potentially eligible records, 12 excluded, 100 analysed
	13b	Give reasons for exclusion/non-participation	Flow diagram; 8 missing 1-month follow-up, 4 incomplete baseline assessment
	13c	Consider use of a flow diagram	Participant-flow diagram added
Descriptive data	14a	Report participant characteristics and potential confounders	Results, Table 1
	14b	Indicate numbers with missing data for variables	Methods/flow diagram; final analytic sample complete for required variables
	14c	Summarize follow-up time	Methods/Results; outcomes reassessed at 1 month
Outcome data	15	Report outcome events or summary measures over time	Results, Table 2; baseline and 1-month VAS and ODI
Main results	16a	Give unadjusted and adjusted estimates with precision; state adjusted confounders	Results, Tables 3–4 and Supplementary Material; Pearson correlations and baseline-adjusted regression estimates with 95% CIs
	16b	Report category boundaries when continuous variables are categorized	Not applicable to primary continuous psychological variables; clinically meaningful responder thresholds explicitly stated
	16c	If relevant, translate relative risk into absolute risk	Not applicable; primary analyses used continuous outcomes rather than relative risks
Other analyses	17	Report subgroup, interaction, and sensitivity analyses	Results and Supplementary Material; GEE, joint psychological-resource model, influence/robust regression, nonlinear ODI and procedure-coding sensitivity analyses
Key results	18	Summarize key results with reference to objectives	Discussion, opening paragraphs
Limitations	19	Discuss limitations, including direction/magnitude of possible bias	Discussion; observational treated-only design, regression to mean, natural history, complete-record selection,

			unmeasured confounding, sample size/model complexity, short follow-up
Interpretation	20	Give cautious overall interpretation considering objectives, limitations, multiplicity, and other evidence	Discussion and Conclusions; explanatory-association framing and avoidance of causal/prognostic claims
Generalisability	21	Discuss external validity/generalizability	Discussion; need for replication in larger independent cohorts and longer follow-up
Funding	22	Give source of funding and role of funders	Funding statement; no external funding