

Supplementary Table 1. Stratified analysis by surgery type for effects of FSN treatment on pain measurement, inflammatory biomarkers, and muscle hardness.

Outcome Measure	Discectomy			Fusion		
	FSN (n = 15)	Control (n = 15)	P-value	FSN (n = 10)	Control (n = 9)	P-value
Pain measurement						
Pain intensity (0-10)						
Before	6.83 ± 1.44	6.53 ± 1.80	0.601	6.75 ± 1.50	8.11 ± 0.89	0.010
1 hour	5.63 ± 0.81	6.9 ± 1.63	0.005	5.55 ± 1.40	7.17 ± 1.30	0.006
24 hours	3.97 ± 1.08	5.37 ± 1.82	0.008	3.85 ± 1.18	5.94 ± 1.94	0.003
48 hours	3.13 ± 1.45	4.13 ± 1.17	0.031	3.20 ± 0.95	4.78 ± 1.12	<0.001
72 hours	2.60 ± 1.12	3.17 ± 0.96	0.123	2.45 ± 0.60	4.33 ± 1.46	<0.001
Pain interference (0-10)						
Before	5.47 ± 2.22	5.67 ± 2.30	0.802	5.40 ± 1.88	7.06 ± 1.40	0.021
1 hour	4.00 ± 1.10	5.30 ± 1.37	0.003	3.95 ± 1.12	4.78 ± 1.33	0.122
24 hours	3.43 ± 1.15	4.13 ± 1.45	0.128	3.20 ± 1.23	4.44 ± 1.78	0.063
48 hours	2.50 ± 0.76	3.17 ± 1.19	0.058	2.50 ± 0.78	3.67 ± 0.83	<0.001
72 hours	2.10 ± 0.76	2.40 ± 0.76	0.264	2.30 ± 0.63	3.44 ± 1.24	0.008
ODI (%)						
Before	51.66 ± 13.24	45.48 ± 16.61	0.244	53.78 ± 20.28	65.43 ± 14.15	4.446
72 hours	32.59 ± 9.45	37.48 ± 4.35	0.060	40.22 ± 11.06	47.9 ± 16.52	5.192
1 month	21.39 ± 15.5	19.26 ± 7.35	0.618	18.67 ± 10.43	18.52 ± 7.45	2.342
2 months	12.62 ± 13.84	12.89 ± 5.39	0.943	9.11 ± 8.14	14.07 ± 5.56	1.746
3 months	7.91 ± 13	6.03 ± 4.24	0.581	4.44 ± 6.87	9.26 ± 7.58	2.381
Muscle Hardness						
Latissimus dorsi muscle						
Before	71.53 ± 8.18	63.74 ± 8.20	0.007	61.49 ± 7.52	58.63 ± 7.50	0.381
1 hour	59.81 ± 8.78	64.92 ± 7.91	0.083	65.90 ± 5.51	63.88 ± 7.60	0.489
24 hours	60.96 ± 9.01	66.59 ± 5.66	0.034	57.63 ± 3.20	65.30 ± 9.67	0.016
48 hours	55.60 ± 8.19	66.19 ± 6.34	<0.001	54.26 ± 8.41	67.41 ± 9.55	0.001
72 hours	52.84 ± 11.00	64.69 ± 8.20	0.001	50.37 ± 7.08	60.48 ± 9.82	0.007
L3 paraspinal muscle						
Before	61.31 ± 8.53	63.01 ± 9.78	0.601	63.41 ± 10.63	50.91 ± 8.91	0.003
1 hour	54.64 ± 10.16	60.17 ± 7.44	0.078	61.40 ± 12.94	56.78 ± 8.56	0.328
24 hours	52.61 ± 9.06	59.70 ± 7.89	0.018	50.46 ± 7.85	51.42 ± 11.45	0.824
48 hours	52.74 ± 11.41	62.17 ± 6.67	0.004	50.11 ± 8.64	57.83 ± 11.69	0.086
72 hours	45.53 ± 5.49	60.57 ± 8.23	<0.001	47.35 ± 9.87	55.47 ± 13.26	0.112
Gluteus maximus muscle						
Before	54.39 ± 11.68	54.51 ± 10.38	0.974	55.03 ± 10.33	50.94 ± 12.89	0.423
1 hour	53.87 ± 9.75	59.07 ± 6.24	0.071	57.28 ± 5.02	52.86 ± 5.54	0.055
24 hours	52.50 ± 6.26	60.70 ± 7.59	0.001	49.60 ± 6.98	54.75 ± 12.50	0.247

48 hours	48.70 ± 9.10	59.59 ± 9.09	0.001	48.51 ± 8.34	56.55 ± 13.08	0.095
72 hours	44.42 ± 8.91	57.66 ± 10.11	<0.001	45.90 ± 6.74	49.72 ± 14.69	0.448
Inflammatory biomarkers						
C-reactive protein (ng/ml)						
Before	937.02 (645.68-2703.66)	1637.05 (1132.94-3745.58)	0.229	1142.42 (146.62-3218.37)	2099.58 (761.51-4140.55)	0.713
24 hours	4679.40 (3569.90-4910.08)	5134.59 (4378.74-5447.67)	0.038	5293.97 (4689.39-5511.02)	5337.37 (5153.10-5668.81)	0.488
72 hours	4437.67 (3011.49-5249.89)	4499.56 (4164.17-5350.16)	0.481	5369.80 (5319.41-5460.12)	5503.59 (5157.24-5633.21)	0.348
1 month	2096.21 (551.86-3602.57)	2290.69 (726.41-3653.57)	0.740	1721.88 (579.99-3567.69)	1578.34 (1438.00-3630.25)	0.775
IL-1β (pg/ml)						
Before	0.00 (0.00-5.68)	3.04 (0.01-5.76)	0.269	0.32 (0.00-2.58)	0.00 (0.00-6.15)	1.000
24 hours	3.68 (0.00-13.92)	8.13 (0.84-20.47)	0.212	12.63 (5.84-21.36)	14.77 (11.02-24.54)	0.596
72 hours	6.78 (1.83-12.31)	10.46 (0.00-14.01)	0.616	7.87 (0.51-12.35)	7.25 (5.52-11.44)	0.967
1 month	2.18 (0.00-11.15)	1.13 (0.22-6.53)	0.646	2.41 (0.00-5.12)	1.47 (0.27-2.17)	0.487
IL-2 (pg/ml)						
Before	1.76 (0.00-3.72)	1.98 (1.24-4.27)	0.708	0.56 (0.00-1.69)	2.09 (0.67-3.35)	0.101
24 hours	3.67 (1.71-5.12)	3.41 (1.72-5.15)	0.803	1.78 (1.04-4.11)	2.77 (2.01-4.18)	0.307
72 hours	2.74 (0.45-3.70)	2.75 (0.97-3.98)	0.771	1.81 (1.32-2.33)	3.02 (1.27-3.68)	0.624
1 month	2.54 (0.92-3.43)	2.05 (0.95-4.29)	1.000	2.34 (1.44-6.25)	1.99 (1.45-2.43)	0.438
IL-6 (pg/ml)						
Before	2.38 (0.00-7.13)	4.61 (3.27-9.59)	0.194	4.73 (0.00-10.96)	6.41 (1.82-7.32)	1.000
24 hours	9.73 (5.75-18.72)	11.03 (6.33-18.98)	0.917	11.96 (9.57-15.61)	9.78 (8.95-11.95)	0.253
72 hours	3.85 (0.00-9.56)	2.38 (0.00-11.59)	0.767	8.60 (5.20-11.63)	4.61 (2.30-6.84)	0.176
1 month	8.15 (4.90-15.36)	11.20 (6.71-17.53)	0.229	14.80 (10.06-16.11)	8.31 (8.24-18.05)	0.391
TNF-α (pg/ml)						
Before	0.29 (0.00-5.79)	0.00 (0.00-5.11)	1.000	0.00 (0.00-0.36)	1.29 (0.00-3.25)	0.112
24 hours	0.58 (0.00-10.91)	0.48 (0.00-1.93)	0.668	2.03 (0.50-4.26)	1.04 (0.00-2.38)	0.387
72 hours	0.12 (0.00-3.47)	0.00 (0.00-2.03)	0.356	0.00 (0.00-2.43)	0.00 (0.00-0.00)	0.255
1 month	2.44 (0.00-6.40)	0.19 (0.00-0.94)	0.090	0.62 (0.00-3.66)	0.64 (0.00-0.96)	0.645

FSN: Fu's subcutaneous needling group. Control: control group. Before: before operation. 24 hours: 24 hours after operation. 72 hours: 72 hours after operation. Pain measurement and muscle hardness data are expressed as means ± standard deviations (SDs) and analyzed for between-group differences using Student's t-test; Inflammatory biomarkers are expressed as median (25th - 75th percentile) and were analyzed for between-group differences using Wilcoxon rank sum test and the significant level was 0.0125.

Significant results are shown in bold.