

Can We Still Use a Single Value for Minimum Detectable Change and Minimum Clinically Important Difference of Health Related Quality of Life Parameters in Adult Spinal Deformity ?

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Conflict of Interest

The authors of this manuscript have no competing interests that influence the results and discussion of this paper

Disclosures

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Background

Core Outcome Measures Index (COMI), Oswestry Disability Index (ODI), Short Form (SF)-36 and Scoliosis Research Society (SRS)-22 was being reliable and valid in patients with adult spinal deformity (ASD) to measure HRQOL.

It may be important to know whether a change in the score of an HRQOL assessment tool is perceived by the patients in the same direction as well as at a magnitude relevant to them.

Minimum clinically important difference of the health-related quality of life scales in adult spinal deformity calculated by latent class analysis: is it appropriate to use the same values for surgical and nonsurgical patients?

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Aim

To understand whether minimal detectable change (MDC) and minimal clinically important difference (MCID) of the HRQOL parameters in ASD vary with characteristics of patients and disease

Patients and Methods

- Multicentric international database
 - A total of 893 ASD patients
 - 271 had completed an anchor question at pre-treatment and at 1-year follow-up
 - Surgical (185) and non-surgical (86) patients
- MDC and MCID values were calculated for:
 - COMI, ODI, SF-36 MCS, SF-36 PCS and SRS-22

Patients and Methods

- MDC was calculated by multiplying the standard error of measurement (SEM) by the z score associated with the desired confidence level and the square root of 2, adjusting for sampling from 2 different measures.
- MCID was calculated as mean change score on scales based on this anchor question, corresponding to patients with anchor question responses larger than 0; using latent class analysis.
- All these calculations were obtained for patient subgroups of treatment [(surgical vs. non-surgical), gender, diagnosis (degenerative vs. idiopathic) and age (<36 vs \geq 36)].

Results-I Threshold

Overall	COMI	ODI	SF-36 PCS	SF-36 MCS	SRS 22
Classification error	0.01	0.06	0.01	0.04	0.002
Pseudo R ² statistics	0.91	0.79	0.94	0.79	0.99
Threshold*	1	4	3	0	1
Surgical Group					
Classification error	0.07	0.04	0.01	0.02	0.002
Pseudo R ² statistics	0.78	0.87	0.96	0.93	0.99
Threshold*	3	4	4	4	5
Non-Surgical Group					
Classification error	0.009	0.001	0.003	0.01	0.0013
Pseudo R ² statistics	0.95	0.99	0.98	0.95	0.99
Threshold*	-2	-3	-2	-2	-1
Female					
Classification error	0.04	0.05	0.01	0.03	0.005
Pseudo R ² statistics	0.84	0.82	0.96	0.81	0.98
Threshold*	1	5	0	-3	1
Male					
Classification error	0.02	0.01	0.001	0.01	0.001
Pseudo R ² statistics	0.93	0.95	0.99	0.96	0.99
Threshold*	0	5	1	4	1

Results-II

Threshold

Degenerative					
Classification error	0.003	0.02	0.008	0.01	0.005
Pseudo R ² statistics	0.98	0.93	0.97	0.95	0.98
Threshold*	0	5	1	4	3
Idiopathic					
Classification error	0.05	0.01	0.01	0.03	0.001
Pseudo R ² statistics	0.85	0.92	0.95	0.82	0.99
Threshold*	4	-3	2	-3	1
≤36					
Classification error	0.02	0.06	0.02	0.03	0.006
Pseudo R ² statistics	0.91	0.78	0.93	0.83	0.98
Threshold*	1	5	0	-3	1
>36					
Classification error	0.02	0.02	0.006	0.005	0.005
Pseudo R ² statistics	0.94	0.94	0.98	0.98	0.98
Threshold*	2	3	2	2	3

Results-III MDC&MCIDs

Scale		SEM	MDC	Dissatisfied MCID	Satisfied MCID
COMI	Overall	0.56	1.55	0.27	2.62
	Surgical	0.51	1.42	1.53	2.76
	Non-surgical	0.57	1.59	0.32	1.20
	Female	0.57	1.57	0.22	2.67
	Male	0.48	1.34	0.37	2.42
	Degenerative	0.38	1.07	0.95	3.32
	Idiopathic	0.51	1.40	0.22	2.25
	≤36	0.55	1.53	0.25	2.64
	>36	0.30	0.83	0.64	2.68
	ODI	Overall	3.92	10.88	2.23
Surgical		3.74	10.37	8.36	14.96
Non-surgical		4.10	11.37	8.13	2.45
Female		3.85	10.67	4.24	15.26
Male		4.23	11.72	2.10	14.85
Degenerative		3.49	9.68	11.54	23.68
Idiopathic		3.60	9.98	3.38	6.62
≤36		3.81	10.57	3.90	15.29

Results-IV

MDC&MCIDs

SF-36 PCS	Overall	2.20	6.09	0.13	7.33
	Surgical	1.86	5.16	1.64	7.83
	Non-surgical	2.44	6.77	1.95	1.15
	Female	2.20	6.11	0.83	5.99
	Male	2.24	6.20	0.96	8.66
	Degenerative	1.83	5.07	1.75	8.51
	Idiopathic	2.15	5.96	0.65	6.09
	≤36	2.13	5.90	1.08	6.51
	>36	1.72	4.78	3.08	8.80
SF-36 MCS	Overall	2.21	6.14	0.24	4.37
	Surgical	2.18	6.05	2.51	5.14
	Non-surgical	2.05	5.67	2.34	2.03
	Female	2.23	6.17	1.49	4.13
	Male	1.92	5.31	0.91	3.08
	Degenerative	2.19	6.08	3.07	6.69
	Idiopathic	2.08	5.76	3.10	3.33
	≤36	2.23	6.18	2.53	3.50
	>36	2.05	5.67	6.54	7.99

Results-V

MDC&MCIDs

SRS 22	Overall	0.16	0.43	0.01	0.71
	Surgical	0.15	0.41	0.50	0.94
	Non-surgical	0.16	0.44	0.21	0.11
	Female	0.16	0.44	0.03	0.72
	Male	0.14	0.38	0.14	0.67
	Degenerative	0.11	0.30	0.21	0.92
	Idiopathic	0.16	0.44	0.01	0.65
	≤36	0.16	0.44	0.004	0.74
	>36	0.13	0.37	0.24	0.75

Conclusion

Both MDC and MCID estimates were used to interpret change scores on COMI, ODI, SF-36 PCS, SF-36 MCS and SRS-22 for all subgroups.

MDC and MCID differed notably between subgroups of patients.

This study has demonstrated that MCID and MDC values for a given HRQOL parameter can be sensitive to the aetiology of the deformity as well as the type of treatment chosen.