

Post-injury bladder overdistention deteriorates lower urinary tract storage function in patients with spinal cord injury

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Introduction and Objective

Spinal cord injury (SCI) eliminates voluntary control of voiding, leading initially to areflexic bladder (spinal shock). However, a few month later, detrusor overactivity (DO) appears and causes urinary incontinence, which affects quality of life (QoL). In our hospital, we previously believed that bladder over-distension (OD) in the period of spinal shock could prevent the recovery of involuntary bladder contraction, which may reduce urinary incontinence. In the present study, we examined the long-term effect of bladder OD in the period of spinal shock on lower urinary tract storage function in patients with complete spinal cord injuries through urodynamic studies.

Materials and Methods

We included 31 patients with OD (OD(+) group) and 19 patients without OD (OD(-) group). All patients were hospitalized within 14 days after SCI and confirmed complete paralysis. In OD group, intermittent catheterization was performed 2 times/day with 600-1000ml urine volume on each occasion, whereas in OD(-) group intermittent catheterization was performed 4-5 times/day with less than 400ml of capacity on each occasion. These managements were continued until self-catheterization was initiated. Median OD periods were 21 days. Urodynamic assessment was performed 1-, 3- and 5-years after injury and QoL was assessed using Qualiveen-30.

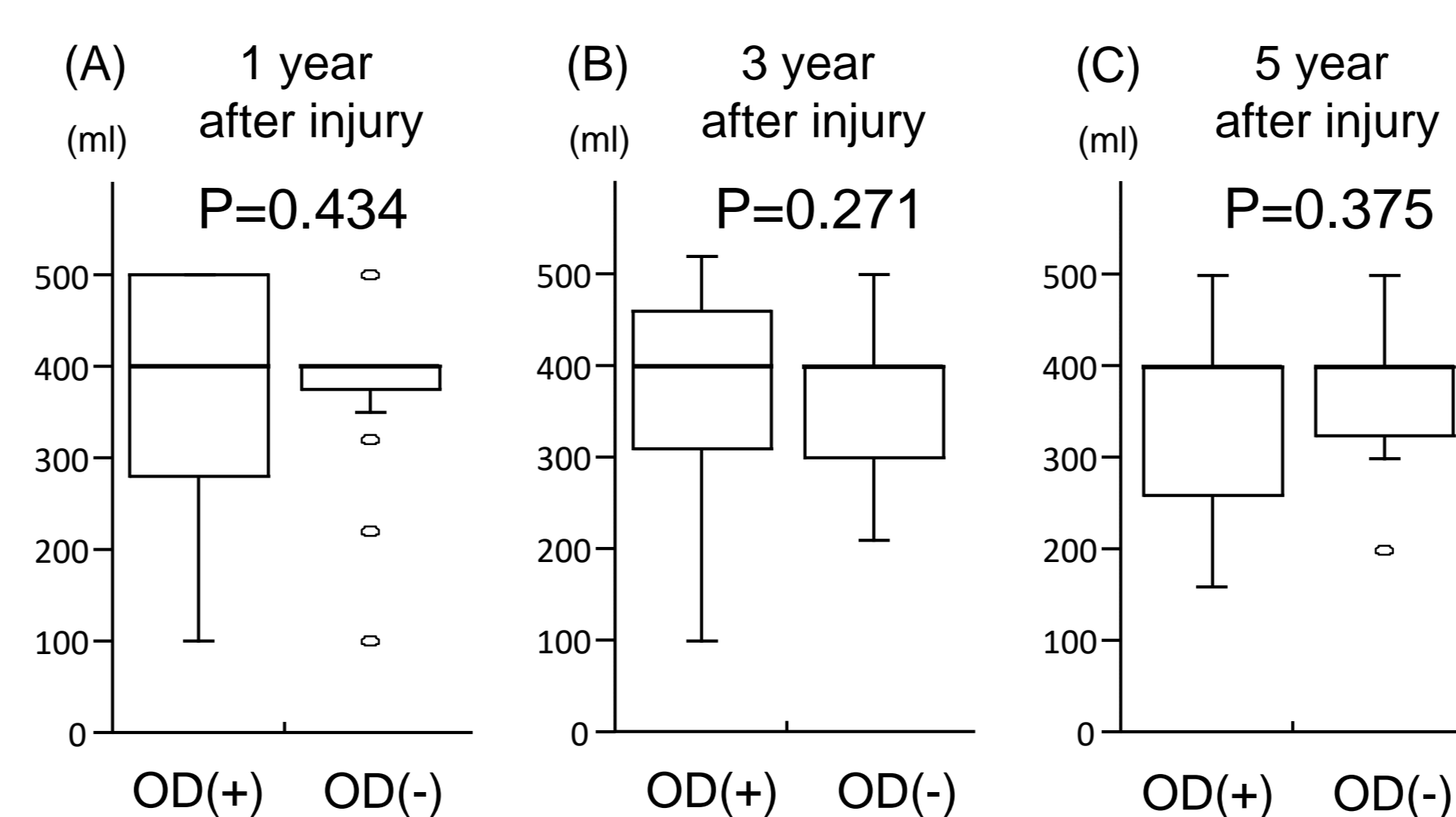
Results

~patient characteristics~

	OD(+)	OD(-)
Number of Patient	31	19
Sex (male:female)	28:3	15:4
Age at injury	27 (22.5 - 36)	30 (21.5 - 37.5)
Duration of OD (days)	21 (17.5 - 32)	—
Level of paralysis (C/T/L)	1/23/7	3/11/5

Result ①

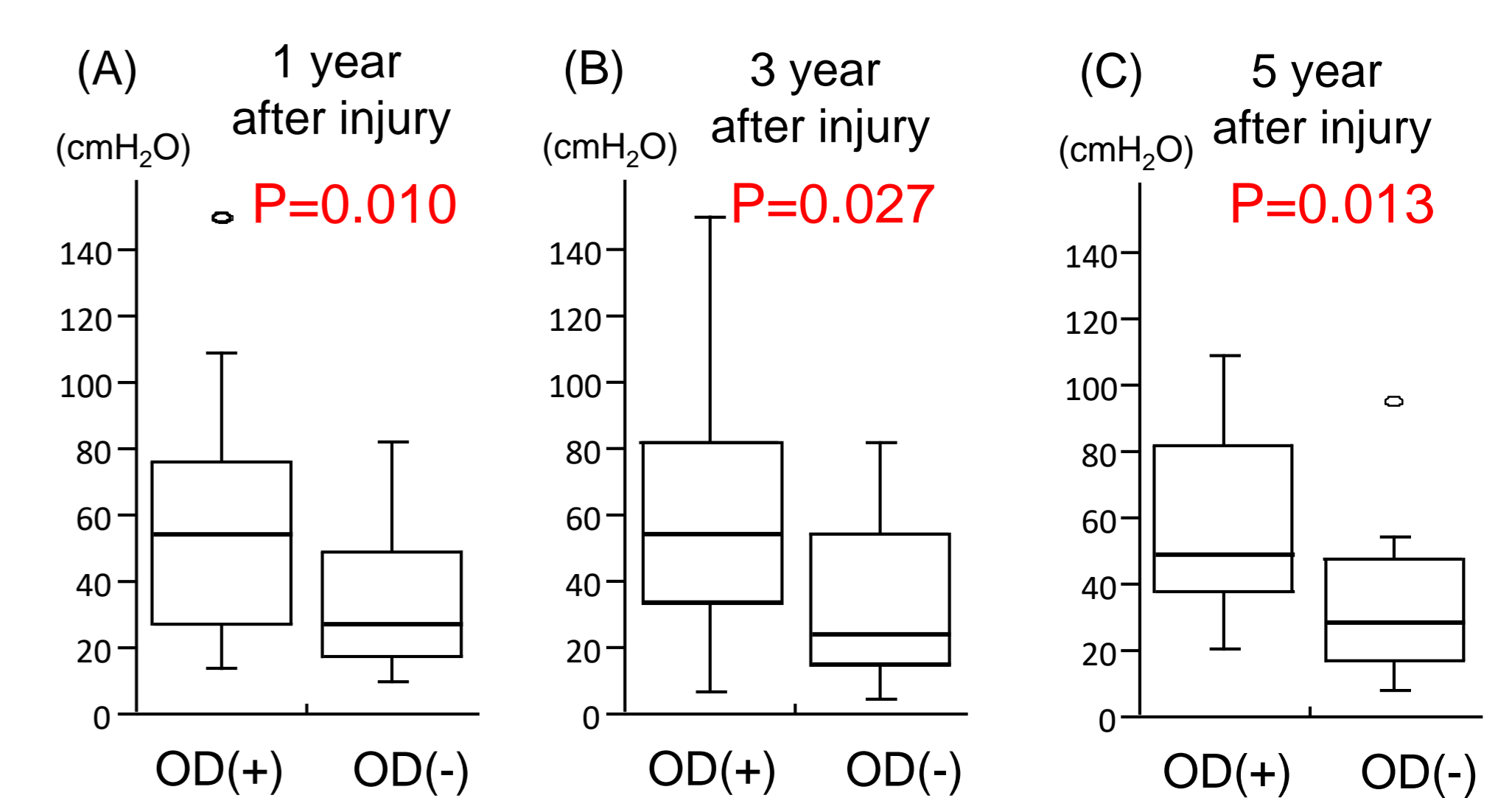
~maximum cystometric capacity~



no significant difference

Result ②

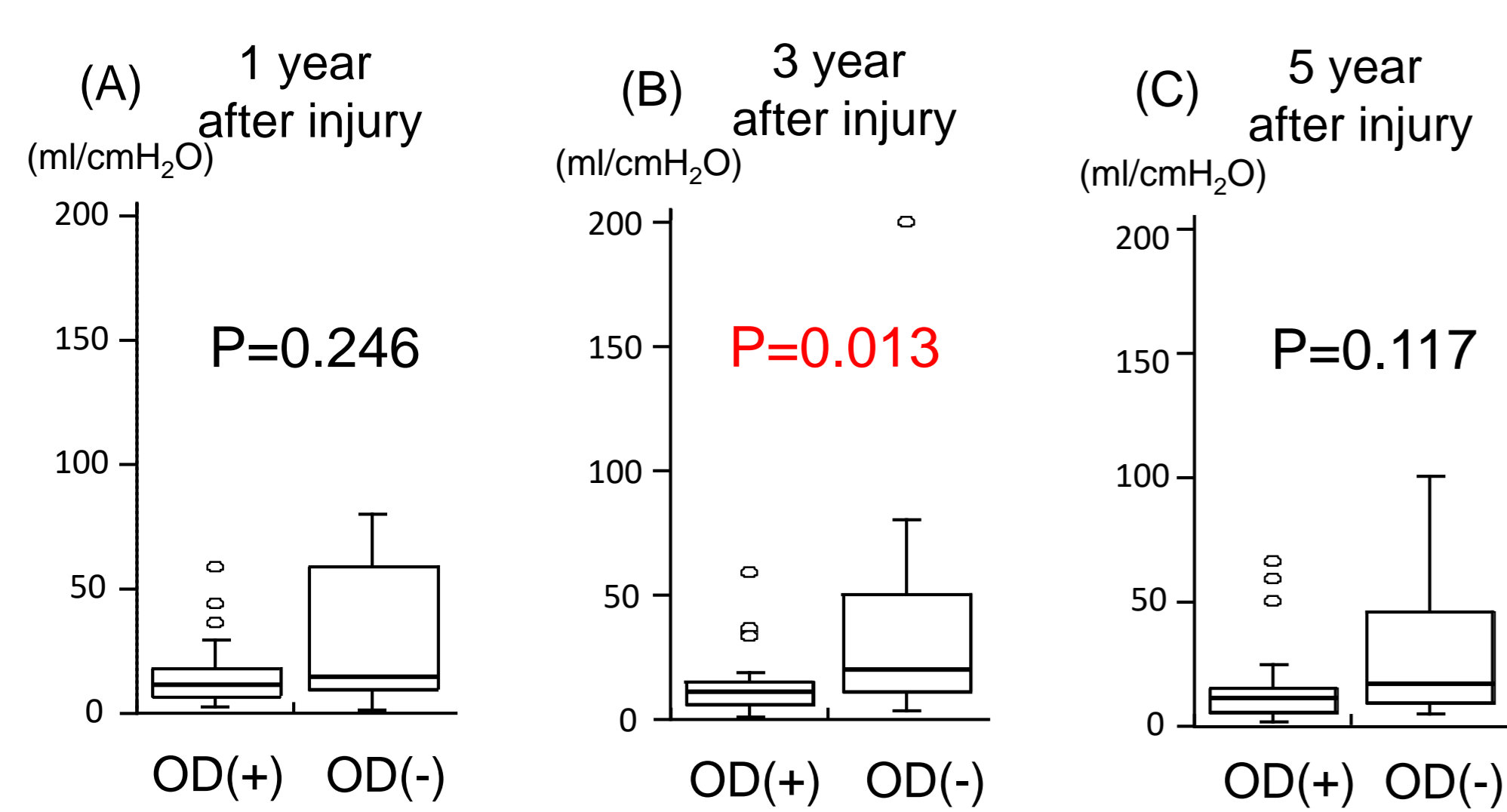
~maximum bladder pressure~



lower in OD(-) group

Result ③

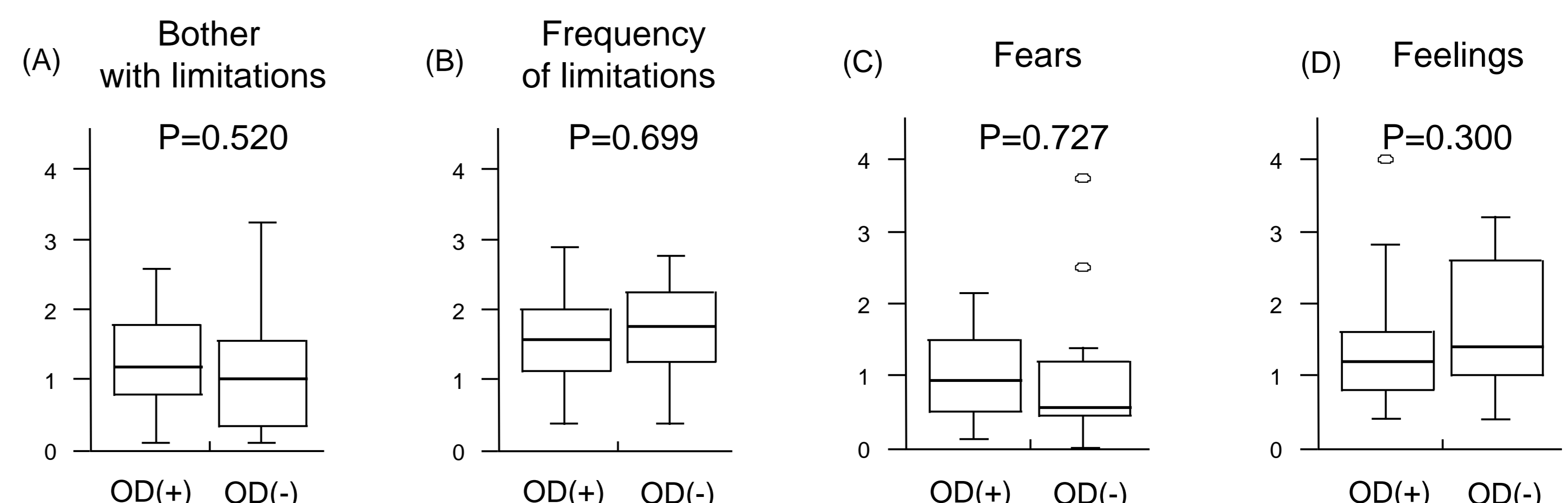
~bladder compliance~



better in OD(-) group

Result ④

~Qualiveen 30~



no significant difference

Result ⑤

~incidence of DO~

	OD(+)	OD(-)	Pvalue
1 year after injury	14/28=50%	4/16=25%	P=0.125
3 year after injury	13/25=52%	6/18=33%	P=0.351
5 year after injury	12/22=55%	4/12=33%	P=0.297

no significant difference but lower tendency in OD(-) group

Result ⑥

~prescription frequency of anticholinergics~

	OD(+)	OD(-)	Pvalue
1 year after injury	18/29=62%	4/16=25%	P= 0.029
3 year after injury	14/25=56%	3/18=17%	P= 0.013
5 year after injury	14/22=64%	2/12=17%	P=0.013

lower in OD(-) group

Results ~summary~

The maximum cystometric capacity (MCC) was not significantly different between OD and non-OD group at 1-, 3-, 5-years after SCI. However, the maximum bladder pressure (MBP) in OD group was significantly higher than that in non-OD group at 1-, 3-, 5-years after SCI. In addition, the bladder compliance in OD group was significantly lower than that in non-OD group at 3 years after SCI. No significant difference was observed in Qualiveen-30 subscores between these two groups. Incidence of DO tended to be higher in OD group than that in non-OD group, but no significant difference was observed. The use rate of anticholinergics in OD group was significantly higher than that in non-OD group at 1-, 3-, 5-years after SCI.

Conclusion

The present study demonstrates that lower urinary tract storage function in OD group was significantly deteriorated than that in non-OD group. These results suggest that the initial post-injury bladder management with regular intermittent catheterization is important to maintain lower urinary tract storage function in a better condition after SCI.