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Sakakibara R[1], Tsunoyama K[2], Hosoi H[3], Takahashi O[4], Sugiyama M[4], Kishi M[1], Ogawa E[1], Terada H[5], Uchiyama T[6], Yamanishi T[7]

1. *Neurology, Internal Medicine, Sakura Medical Center, Toho University,* ***2.*** *Urology, Tokyo Women's Medical University,* ***3.*** *Aishin Seiki Inc.,* ***4.*** *Clinical Physiology Unit, Sakura Medical Center, Toho University,* ***5.*** *Radiology, Sakura Medical Center, Toho University,* ***6.*** *Neurology, Chiba University,* ***7.*** *Urology, Dokkyo Medical College*

INFLUENCE OF BODY POSITION ON DEFECATION IN HUMANS

Hypothesis / aims of study

Normal defecation necessitates proper straining together with anal canal relaxation and an enlarged anorectal angle. A previous study pared three positions (sitting, sitting on a low chair, and squatting) for defecation, showing that squatting for defecation required the shortest amount of time and the least subjective effort for defecation [1]. However, the underlying mechanisms remain unclear. The aim of this study was to compare three positions (sitting, sitting with the hip flexed, and squatting) for defecation by measuring abdominal pressure and the anorectal angle simultaneously using anorectal videomanometry.

Study design, materials and methods

We recruited six healthy volunteers. The videomanometric measures included simultaneous fluoroscopic images, abdominal pressures, subtracted rectal pressures, and anal sphincter pressures. Three positions were used: sitting, sitting with the hip flexing at 60 degrees with respect to the rest of the body, and squatting with the hip flexing at 22.5 degrees with respect to the body.

Results

Basal abdominal pressure before defecation on hip-flex sitting was lower than that with normal sitting, although the difference did not reach statistical significance. Basal abdominal pressure before defecation on squatting (26 cmH2O) was lower than that with normal sitting ($p<0.01$). Abdominal pressure increase (strain) on hip-flex sitting was lower than that with normal sitting, although this difference did not reach statistical significance. Similarly, the abdominal pressure increase on squatting was smaller than that with normal sitting, and yet the difference did not reach statistical significance. The rectoanal angle on defecation on hip-flex sitting) did not differ from that with normal sitting. The rectoanal angle on defecation on squatting (126 degree) was larger than that with normal sitting (100 degrees) ($p<0.05$), and was also larger than that with hip-flex sitting (99 degrees) ($p<0.01$). **(Fig 1, Table 1)**.

Interpretation of results

The lower abdominal pressure achieved with squatting may well reflect reduction in effort upon defecation in these subjects. These findings are consistent with the previous observation that squatting for defecation required the shortest amount of time and the least subjective effort for defecation1. The present study showed larger rectoanal angle achieved with squatting as a putative mechanism of the lower abdominal pressure, which is most probably brought about by relaxation of the puborectal and pelvic floor muscles. Lower abdominal pressure on squatting-like defecation might not only help people with difficult defecation, but also reduce the risk of defecation syncope, stroke [2], and deep vein thrombosis [3].

Concluding message

The results of the present study, taken together with the data previously reported in the literature, suggest that the greater the hip flexion achieved by squatting, the straighter the rectoanal canal will be, and accordingly, less strain will be required for defecation.

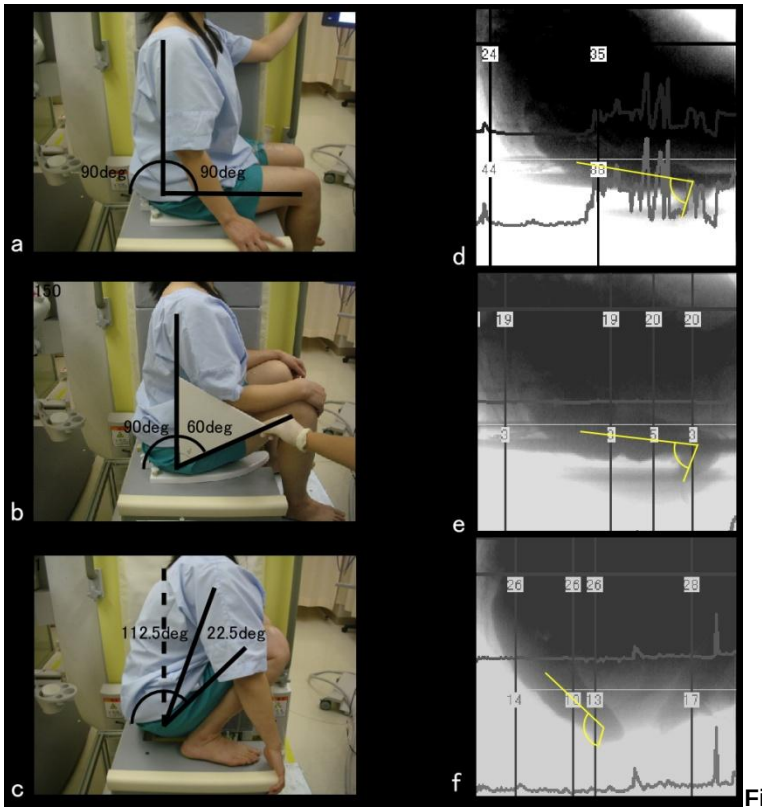

Figure 1 Three positions.

position			sitting	sitting with the hip flexing	squatting with the hip most flexir
patient no.	age	sex	basal abdominal pressure (cmH_2O)		
1	42	F	25	18	18
2	39	F	42	15	13
3	40	F	66	11	24
4	44	F	67	91	29
5	43	F	46	24	41
6	36	M	73	16	32
average			53	29	26
			p=0.056	p=0.41	
			p=0.0056		
patient no.	age	sex	abdominal pressure increase (cmH_2O)		
1	42	F	65	39	19
2	39	F	50	55	45
3	40	F	45	29	28
4	44	F	48	49	52
5	43	F	91	90	67
6	36	M	93	58	99
average			65	53	52
			p=0.065	p=0.43	
			p=0.21		
patient no.	age	sex	anorectal angle (degree)		
1	42	F	109	97	122
2	39	F	73	68	127
3	40	F	117	133	141
4	44	F	77	80	103
5	43	F	98	98	121
6	36	M	125	120	142
average			100	99	126
			p=0.45	p=0.0061	
			p=0.042		
patient no.	age	sex	post-defecation residuals (ml)		
1	42	F	30	20	10
2	39	F	40	20	65
3	40	F	40	55	15
4	44	F	0	0	0
5	43	F	0	0	0
6	36	M	0	0	0
average			18	16	15
			p=0.31	p=0.47	
			p=0.42		

Table 1 Results.

References

1. Digestive Diseases and Sciences. 2003; 48: 1201–1205
2. Acta Neurol Scand 2002; 105: 124-127
3. Jpn Heart J. 1996; 37: 409-415

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Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Ethics Committee in Sakura Medical Centre, Toho University.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**