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Biofeedback Therapy in Patients with Non-relaxing Puborectalis Syndrome

- Are there differences of therapeutic effect according to methods of diagnosis? -

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Purpose: To evaluate therapeutic effect of biofeedback therapy according to methods of diagnosis in patients with nonrelaxing puborectalis syndrome.

Methods: From September, 1, 1998 to February, 30, 1999, the patients who were diagnosed with nonrelaxing puborectalis syndrome on anal electromyography (EMG) and cinedefecography (CD) underwent biofeedback therapy. The patients were divided into 3 groups according to diagnostic method; CD group - only diagnosed on cinedefecography, EMG group - only diagnosed on anal electromyography, CD+EMG group - diagnosed on both tests.

Results: Nineteen patients were diagnosed with nonrelaxing puborectalis syndrome on CD and/or EMG. There were 14 females and 5 males with a mean age of 40.8 ± 18.4 years. The patients were classified into CD group; five patients (26.3%); EMG group, eight patients (42.1%); CD+EMG group, six patients (31.6%). The patients had 5 sessions of outpatient EMG-based biofeedback therapy. Subjective symptoms after biofeedback therapy improved in 4 (80.0%), 6 (75%), 5 (83%) patients in CD, EMG, CD+EMG groups, respectively. There was a statistically significant increase in spontaneous bowel movements, and a reduction in assisted bowel movements after biofeedback therapy in patients in all three groups ($p < 0.05$). There was no significant difference found among the three groups. **Conclusion:** This study demonstrated that biofeedback therapy had a high therapeutic effect regardless of diagnostic method. Therefore, biofeedback therapy can be performed if one test results in the diagnosis of nonrelaxing puborectalis syndrome in patients with constipation. 2001;17:26-32

Key Words: Nonrelaxing puborectalis syndrome, Biofeedback therapy, Cinedefecography, Electromyography

(paradoxical puborectalis contraction),¹
(anismus),^{2,3} (spastic pelvic floor syndrome)⁴,
(tenesmus),
(straining)
(pelvic outlet obstruction)
(colonic transit time study),⁵ (anorectal manometry),^{6,7}
(cinedefecography, CD),^{4,8}
(electromyography, EMG)^{2,4,8,9}

가 가 5,7

(biofeedback therapy)¹⁰⁻¹⁸가

(discrepancy)

^{5,7,19,20}

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1999

가 가 , ,

(Table 1).

2)

(1) (Cinedefecography, CD):

1) (Solutop[®], 140%) 50 ml

1998 9 1999 2

caulking gun 가

29 (Cinedefeco- (commode)

graphy, CD) (rest), (squeeze), (push)

(EMG)

19 (TOSHIBA[™] DBW-30A 90°/90°, KXO-80N)

19 40.8 (40.8±

18.4) 1 : 2.8 (5 : 14) , 1 : 1 (Solutop[®], 140%)

7.0±4.5

5.4 (5.4±3.7) 10% 가 80%

5.4±4.8 ,²¹⁻²⁴

EMG CD , EMG , CD+

EMG /

EMG CD , 0.9

20

(Fig. 1).²³

(2) (Anal Electromyography, EMG):

CD+EMG , 50 ml 1

Table 1. Patients demographics

	CD*	EMG [†]	CD+EMG [‡]	P-value [§]
Number of patients	5	8	6	NS
Male/Female	2/3	2/6	1/5	NS
Mean age (year)	42.4±19.5	41.6±15.5	38.5±20.2	NS
Duration of constipation (year)	8.4±4.4	6.5±4.2	6.2±4.9	NS
Duration of follow up (year)	5.3±4.8	5.9±6.1	4.9±3.6	NS

*only diagnosed as nonrelaxing puborectalis syndrome on cinedefecography, [†] only diagnosed as nonrelaxing puborectalis syndrome on electromyography, [‡] diagnosed as nonrelaxing puborectalis syndrome on both tests, [§] P-value between three groups, mean ± SD.

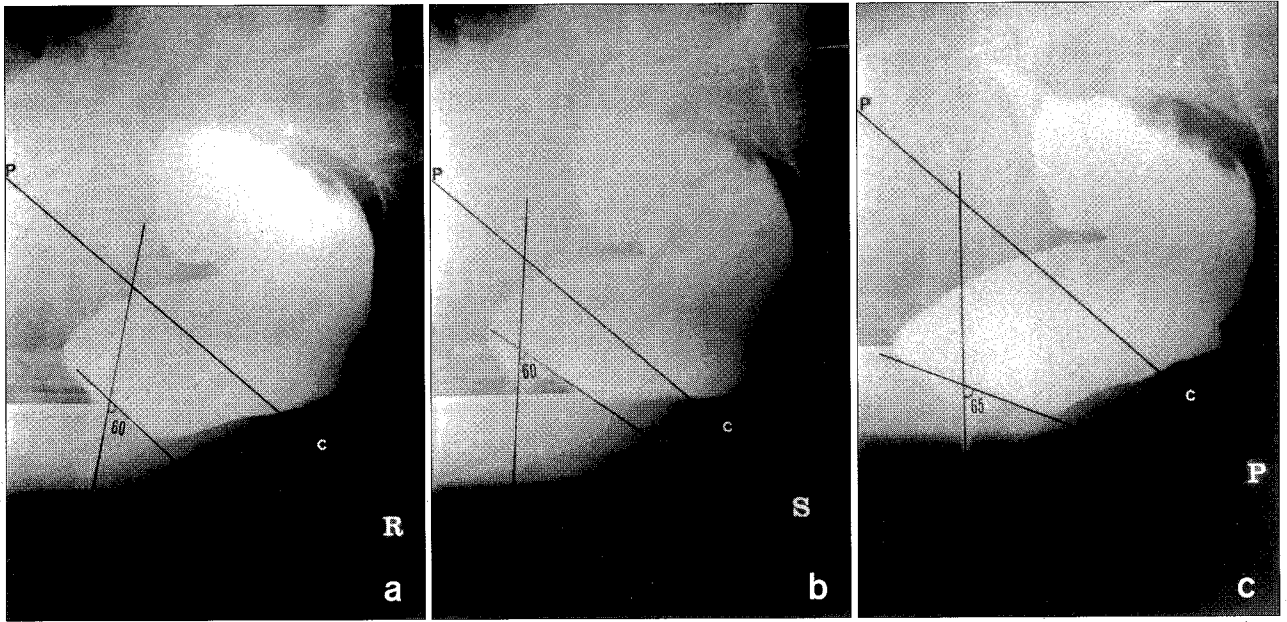


Fig. 1. Nonrelaxing puborectalis syndrome on cinedefecography. Despite a small increase in the anorectal angle between rest (R) and push (P), the angle is still too acute to permit evacuation. Note that the puborectalis impression remains quite prominent. S=squeeze.

를 시행하였다. 검사에 사용되는 전극은 양극성 동심성 침 전극(bipolar concentric needle electrode)을 사용하였으며, 이 전극은 직경 0.45 mm, 길이 40 mm, 게이 지 26×1½인치, 기록범위 0.07 mm²의 크기로 구성되어 있고, 가느다란 전선을 통해 근전도(DANTEC™ Neutrometer 2000 C)와 연결되었다. 환자에게 검사에 대해 자세하게 설명한 후 항문괄약근이나 치골직장근에 전극을 주입하고 안정, 압착, 배변긴장기에 나타나는 운동단위 전위의 동원(recruitment)을 모니터를 통해 보면서 비교 분석하였다. 정상인에서는 안정 시에는 동원의 현저한 감소를 보이고 압착기간 동안에는 증가하고, 배변긴장이나 배변기간에는 안정 시와 비슷한 정도의 감소를 보이는 소견으로 나타나나 치골직장근 이완부전증에서는 배변기간 동안에 오히려 동원의 현저한 증가 소견을 보이게 된다(Fig. 2).

(3) 생체피먹이기 치료(Biofeedback therapy): 생체 피먹이기 치료에는 항문 근전도를 이용하는 방법과 항문압력계를 이용하는 방법이 있는데 본 연구에서는 표면 근전도(surface EMG)에 기초를 둔 기기(DANTEC™ Neutrometer 2000 C)를 이용하였다. 환자는 특별한 전 처치 없이 좌측와위 자세를 취하게 한 후 직장수지 검사를 하여 대변 잔존여부나 항문과 직장의 이상소견이 없음을 확인하고 플러그 형태의 표면전극을 항문 내에 삽입하였다. 그후 환자를 다시 생체피먹이기

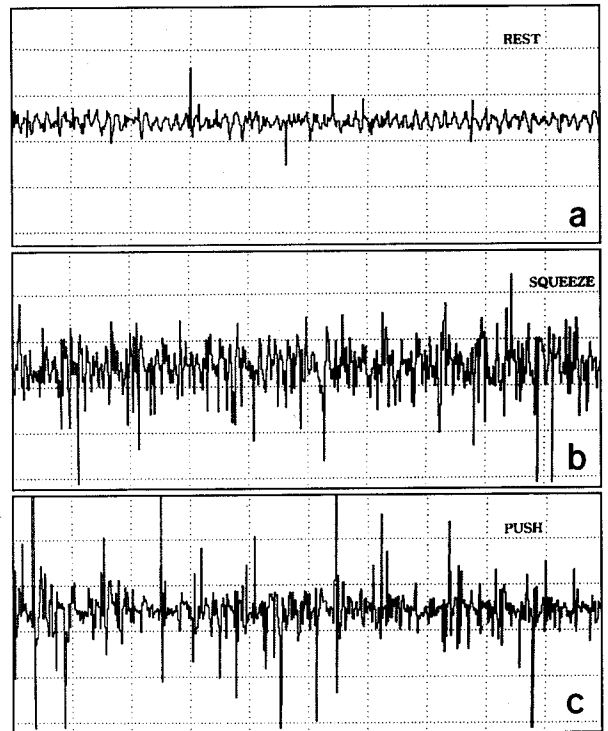


Fig. 2. Nonrelaxing puborectalis syndrome on EMG. The EMG pattern showed adequate recruitment of motor unit potentials with normal amplitude and duration during squeeze (middle) and decreased activity at rest (top). However, there is paradoxically increased activity during push (bottom).

가 가

가

10 1

가 2.0 μV

(EMG < 2.0 μV)

10 5.0 μV

2.0 μV

(EMG < 2.0 μV or < resting values).²⁵

가 (audio-visual biofeedback)

30 1

가

exercise) / (squeeze/rest exercise, Kegel exercise)

10 10 20 3

가 /

10 15

가

3 10

가 가()

가

(no change) (improved) (worse)

가

(spontaneous bowel movement) (assisted bowel movement)

ANOVA test

paired t-test , chi-square test

P-value 0.05

19 5 (26.3%) (CD), 8 (42.1%) (EMG), 6 (31.6%) (CD+EMG). 29

10 (34.5%)

55.2% (16/29) (Table 2).

CD 80%, EMG 75% CD+EMG 83%

CD 3.2 , EMG 4.4 , CD+EMG

Table 2. Correlation between cinedefecography (CD) and electromyography (EMG)

		CD		Total
		NRPR (+)	NRPR (-)	
EMG	NRPR (+)	6	8	14
	NRPR (-)	5	9	15
Total		11	18	29

NRPR = Nonrelaxing puborectalis syndrome

Table 3. The results of biofeedback therapy

	CD*	EMG [†]	CD+EMG [‡]	P-value [§]
Session of biofeedback	4.6±3.8	4.8±4.2	6.8±3.1	NS
Subjective symptoms				
Improved (%)	4 (80)	6 (75)	5 (83)	NS
No change or worse (%)	1 (20)	2 (25)	1 (17)	NS
Spontaneous bowel movement (per week) ¹				
Pre-biofeedback	0.8±0.6	0.6±0.8	0.5±0.6	NS
Post-biofeedback	4.0±1.7	5.0±2.7	4.8±1.9	NS
Assisted bowel movement (per week) ²				
Pre-biofeedback	3.6±1.7	3.8±2.5	4.5±2.9	NS
Post-biofeedback	1.0±0.6	1.2±0.4	2.1±1.1	NS

*only diagnosed as nonrelaxing puborectalis syndrome on cinedefecography, [†] only diagnosed as nonrelaxing puborectalis syndrome on electromyography, [‡] diagnosed as nonrelaxing puborectalis syndrome on both tests, [§] P-value between three groups, ^{1,2} P<0.05 between pre-biofeedback and post-biofeedback in three groups, mean ±SD.

4.3 가 1974 Engel ³¹ 가 (P<0.05), CD 가 2.6 , EMG 2.6 , CD+EMG 가 (P<0.05), 가 (Table 3).

2.4 가

18,32

26-28 , Botulinum A toxin “ ” 29,30 10-18 . Barnes²⁷ Kamm ²⁸ 22% . Hallon 29 7 4 (57%) 15 1 7 2 78% 가 100% 가 55% 10-17 Loening-Baucke ³³ 41 77%

19
5 79%

가

가

CD , EMG , CD+EMG

가 70%

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