TEXT BOUND INTO THE SPINE

PAGE NUMBERING AS ORIGINAL

ASPECTS OF COLONIC MOTILITY

IN

IDIOPATHIC SLOW TRANSIT CONSTIPATION.

Volume II of a thesis submitted to the University of Glasgow for the Degree of Doctor of Medicine.

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January 1995

Volume II of the thesis contains, in chronological order, the graphs, tables and illustrations relating to this research which should be reviewed in conjunction with Volume I. The corresponding graphs and tables have been printed together for the convenience of the reader.

INDEX TO FIGURES.

INDEX TO TABLES.

<u>Fig 1.</u> Shows the Arndorfer manometry catheter being manoeuvred over the guide wire into the right colon.

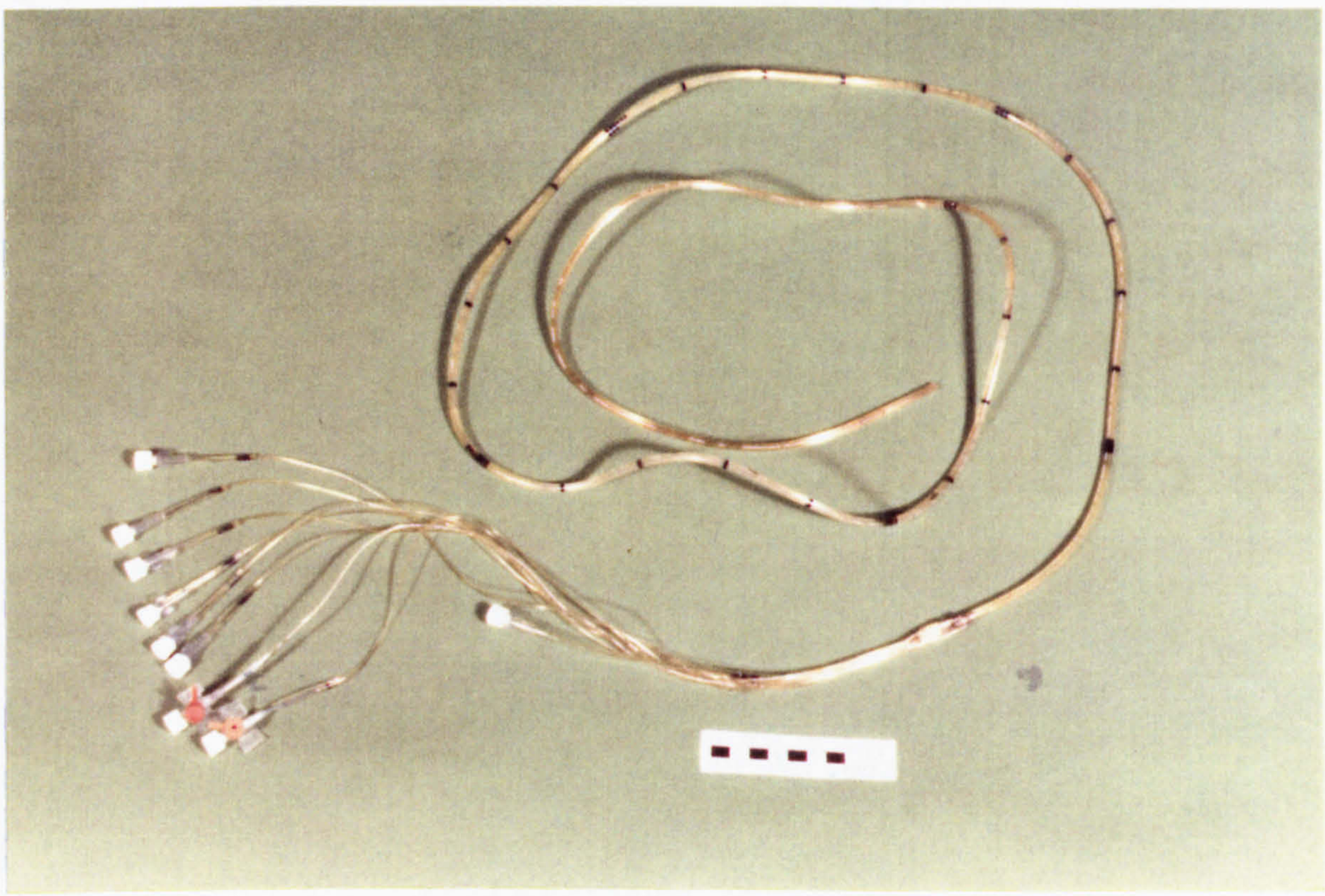


Fig 2. Photograph of Arndorfer water-perfusion catheter which was used to study colonic motility.

Orientaion of perfusion points in the Arndorfer catheter.

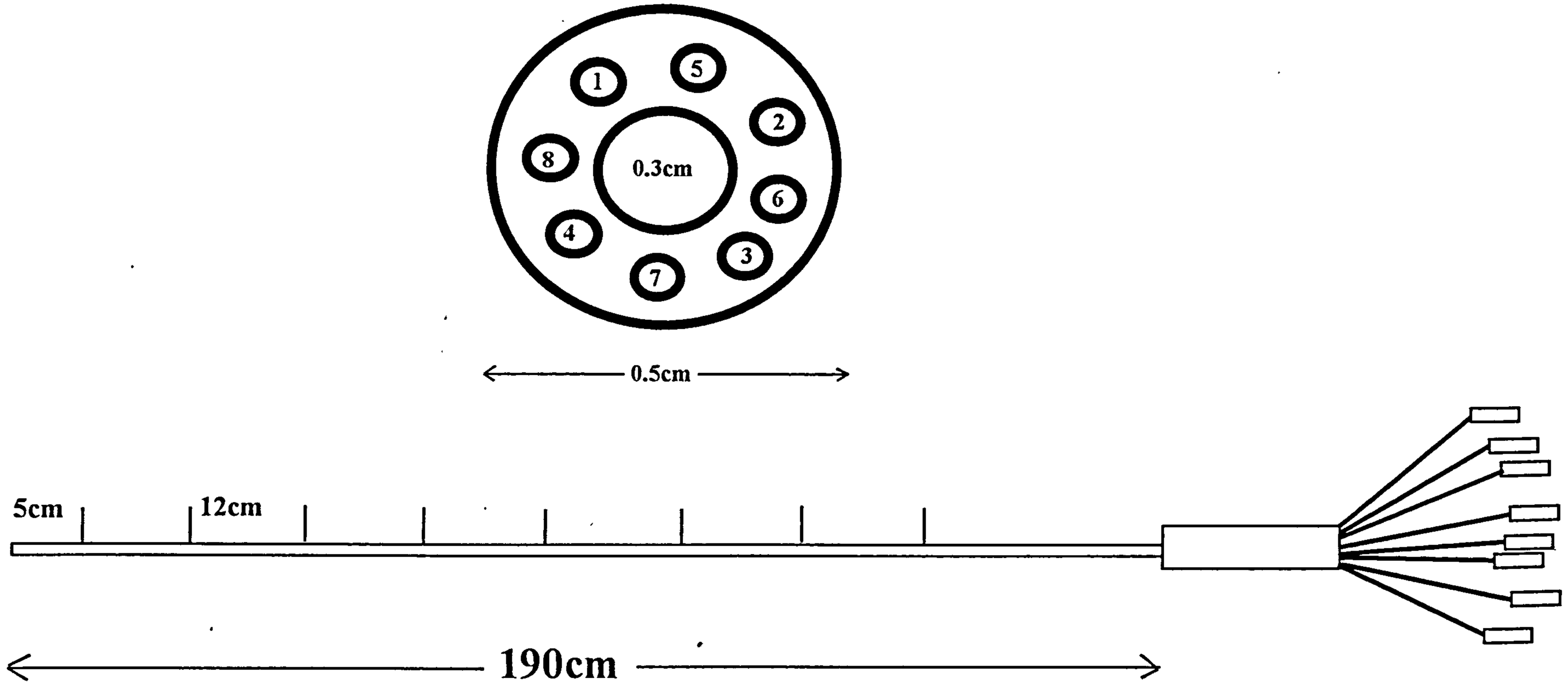


Fig 3. Diagram of Arndorfer catheter (not to scale) used in this study. The eight perfusion points were placed 12cm apart starting 5 cm from the tip.

Fig 4. Photograph of manometry system. An eight channel water-perfusion catheter (Arndorfer) is linked via a series of transducers to the recorder (Gaeltec). Data is stored on a Viglen computer for analysis.

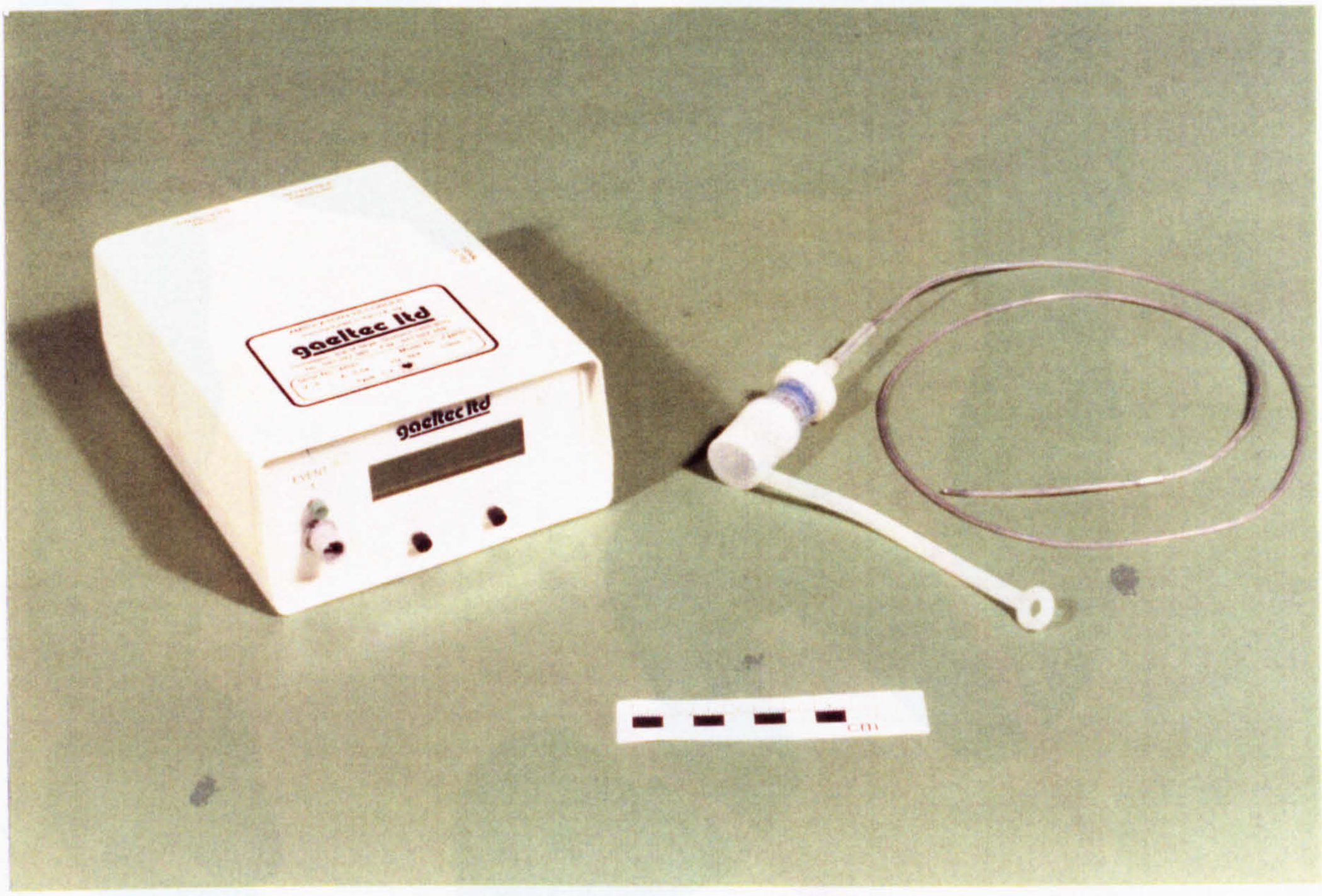


Fig 5. Photograph of Gaeltec recording system on which was stored the data from the colonic manometry studies. The pressure-tip transducer (Gaeltec) used to record ano-rectal manometry is also shown.

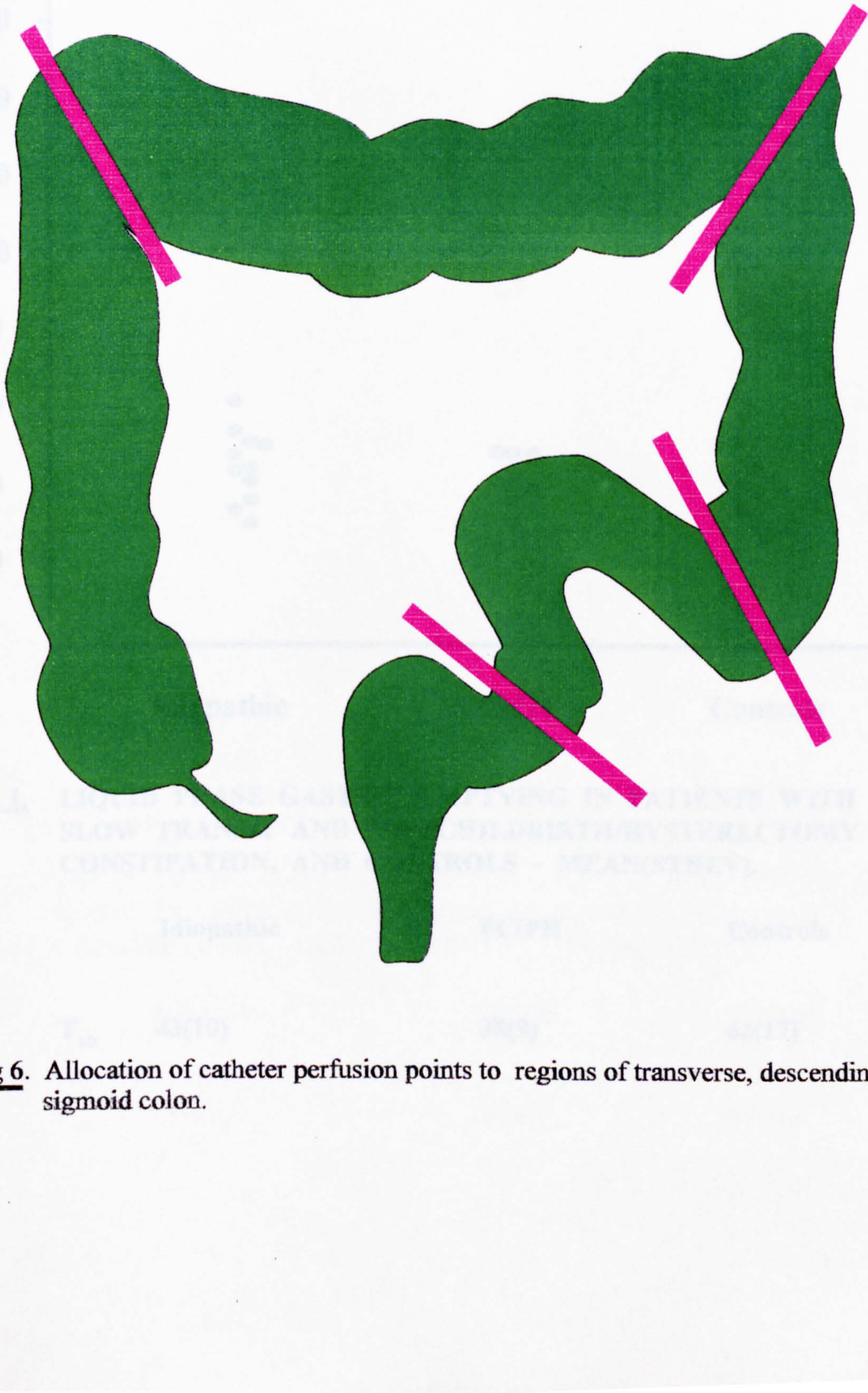


Fig 6. Allocation of catheter perfusion points to regions of transverse, descending and sigmoid colon.

FIG 7. LIQUID PHASE GASTRIC EMPTYING IN PATIENTS WITH IDIOPATHIC SLOW TRANSIT AND POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION, AND CONTROLS.

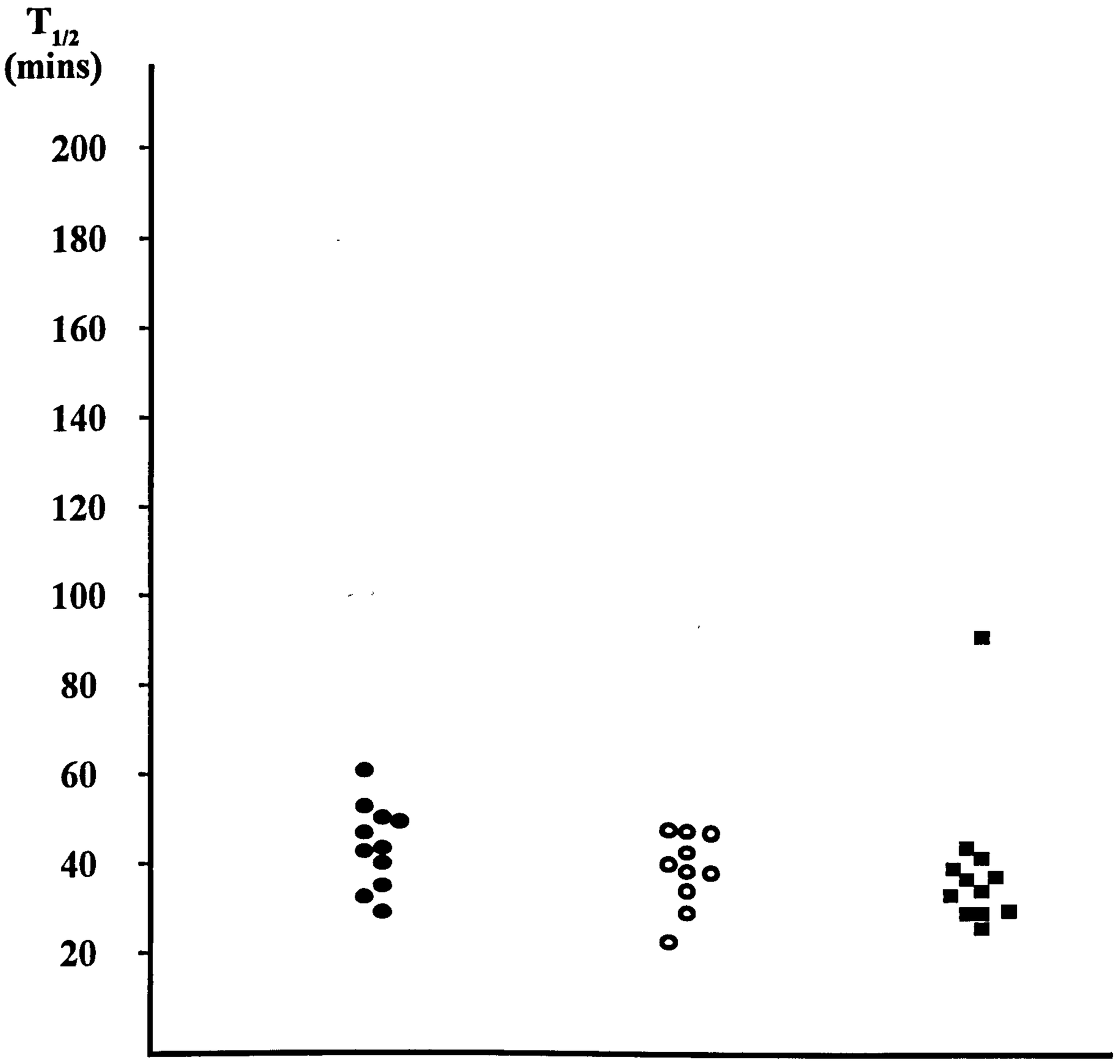


TABLE 1. LIQUID PHASE GASTRIC EMPTYING IN PATIENTS WITH IDIOPATHIC SLOW TRANSIT AND POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION, AND CONTROLS - MEAN(STDEV).

	Idiopathic	PC/PH	Controls
$T_{1/2}$	43(10)	38(9)	42(17)

FIG 8. SOLID PHASE GASTRIC EMPTYING IN PATIENTS WITH IDIOPATHIC SLOW TRANSIT AND POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION, AND CONTROLS.

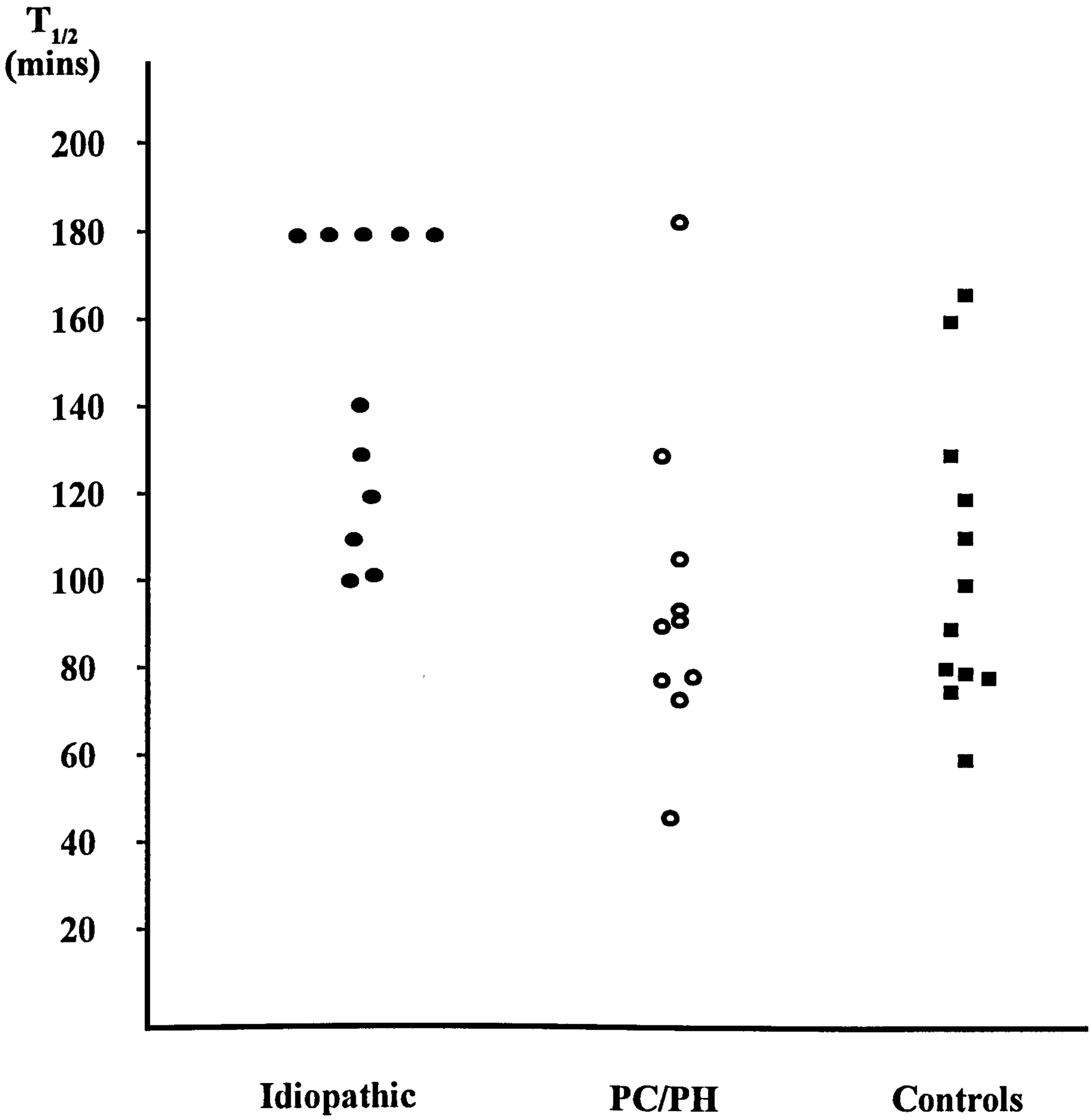


TABLE 2. SOLID PHASE GASTRIC EMPTYING IN PATIENTS WITH IDIOPATHIC SLOW TRANSIT AND POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION, AND CONTROLS - MEAN(STDEV).

	Idiopathic	PC/PH	Controls
$T_{1/2}$	144(31)	83(24)	89(22)

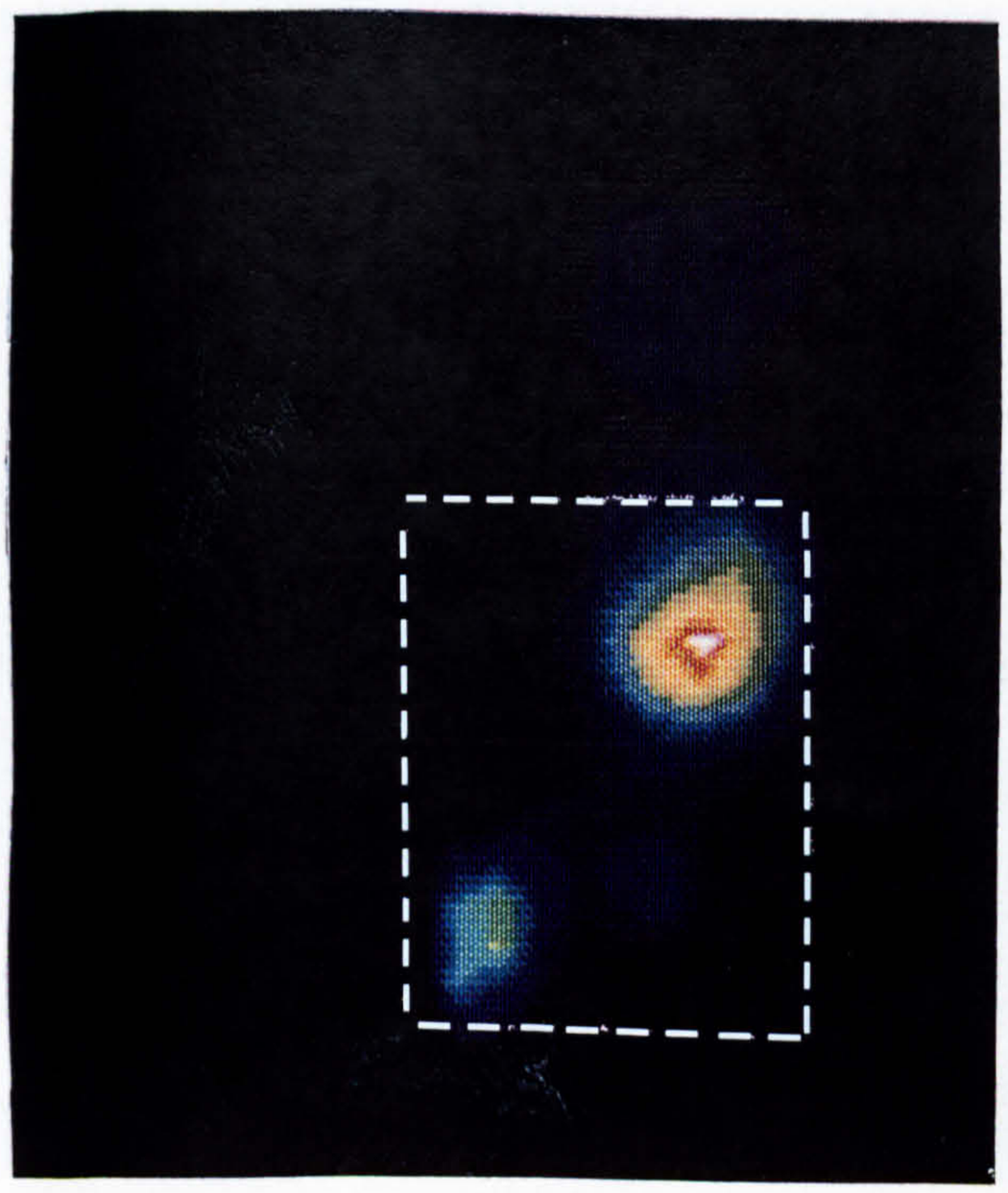


Plate 1.

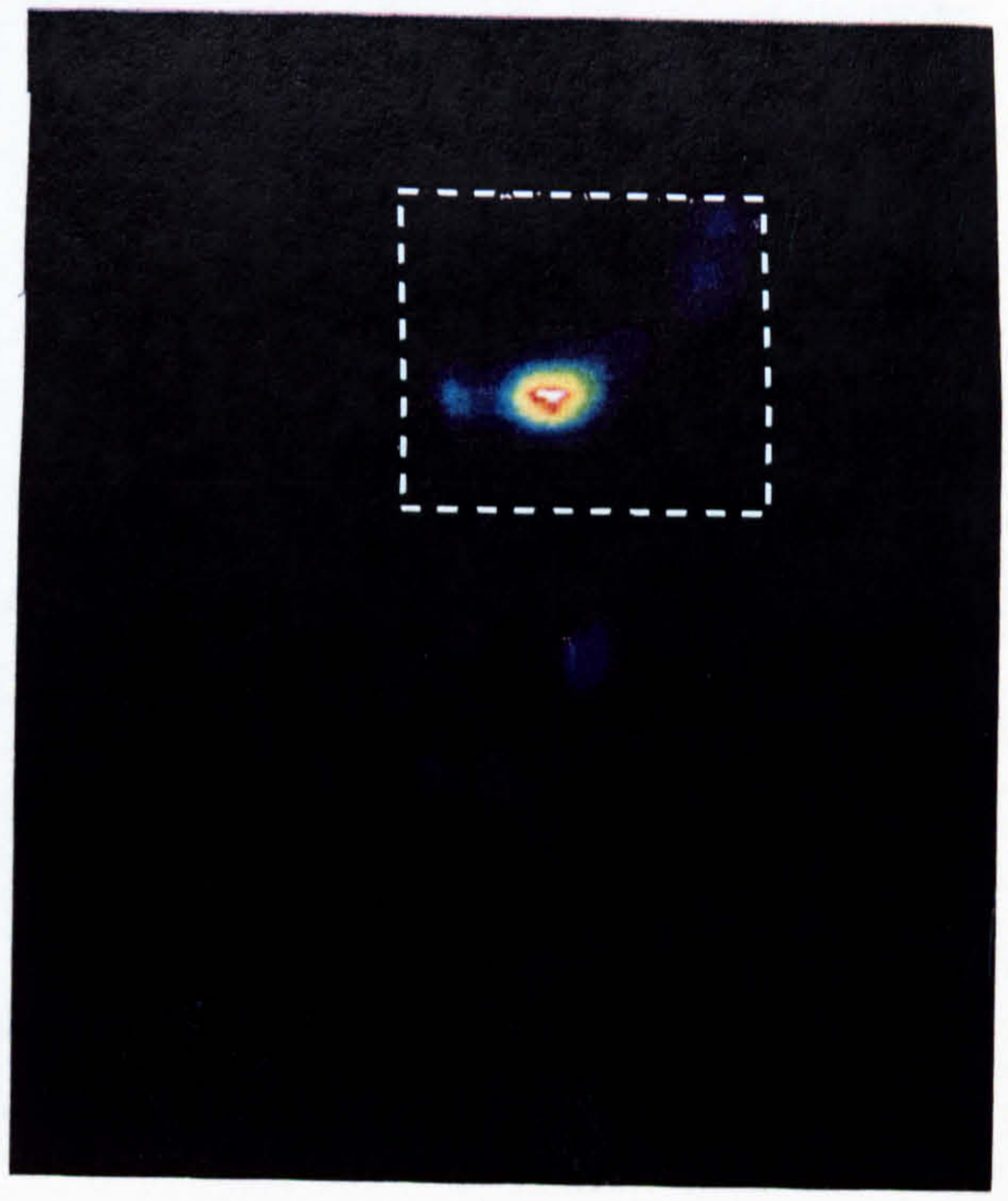


Plate 2.

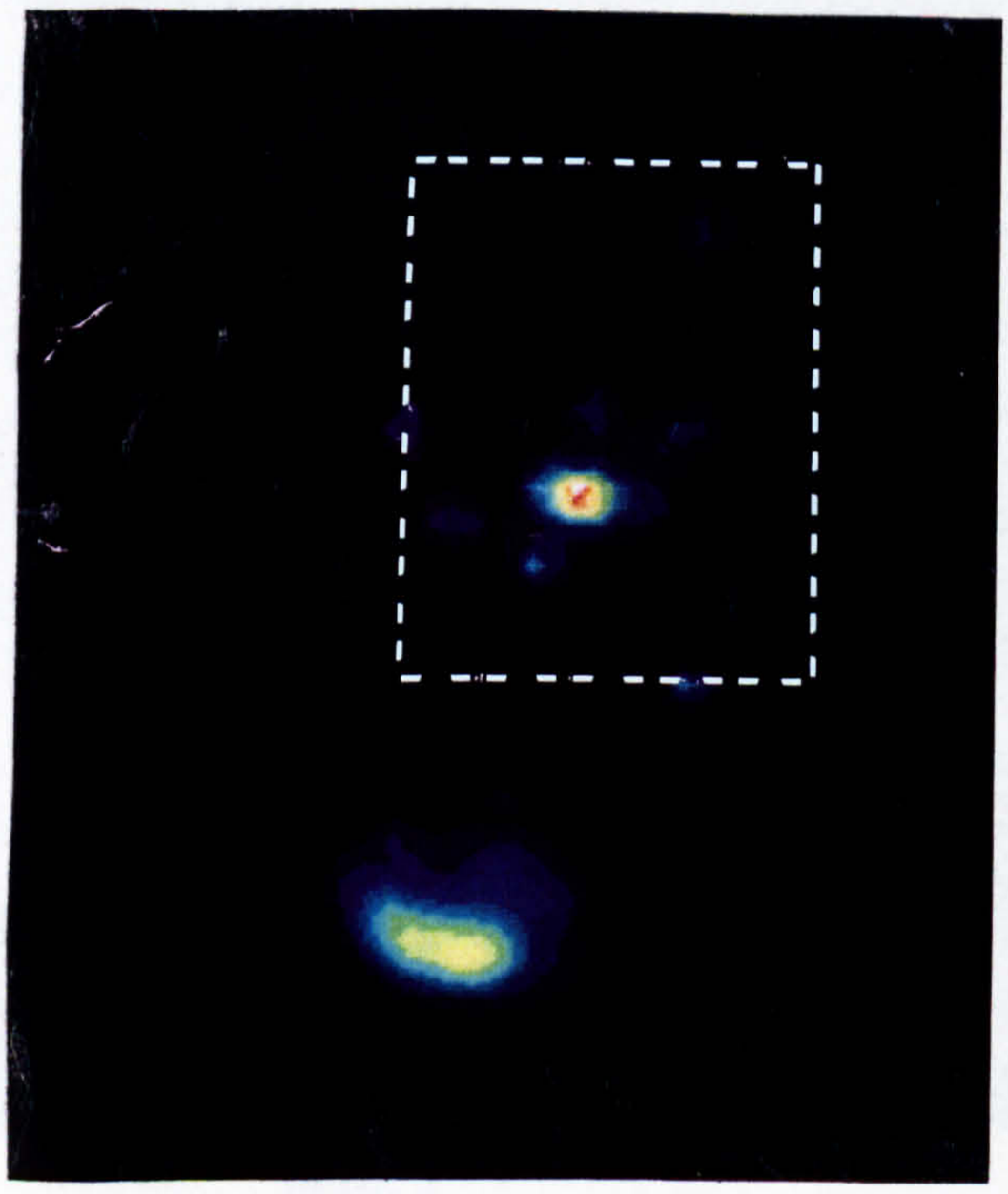


Plate 3.

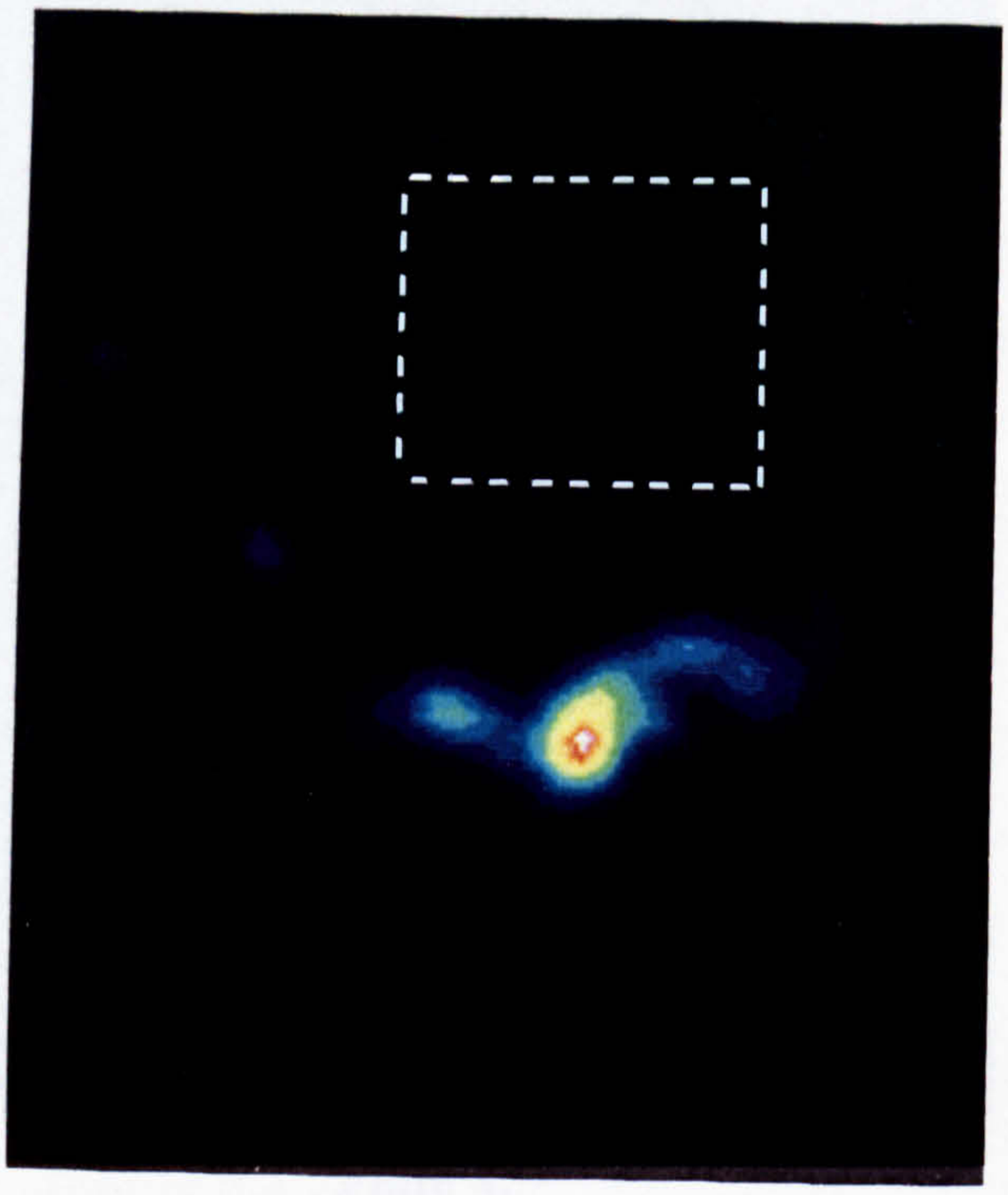


Plate 4.

Fig 9. **Solid phase gastric emptying in a patient with idiopathic slow transit constipation. In plate 1 radio-isotope is present in the fundus of the stomach with no emptying apparent at 1 hour. In contrast, radio-isotope is mainly in the antrum of the control with some contrast in the jejunum (plate 2). At 6 hours, there has been migration of some isotope into the jejunum but the bulk of the contrast is still within the stomach in the constipated patient (plate 3). In the control at 6 hours (plate 4) gastric emptying is complete and isotope has reached the terminal ileum.**

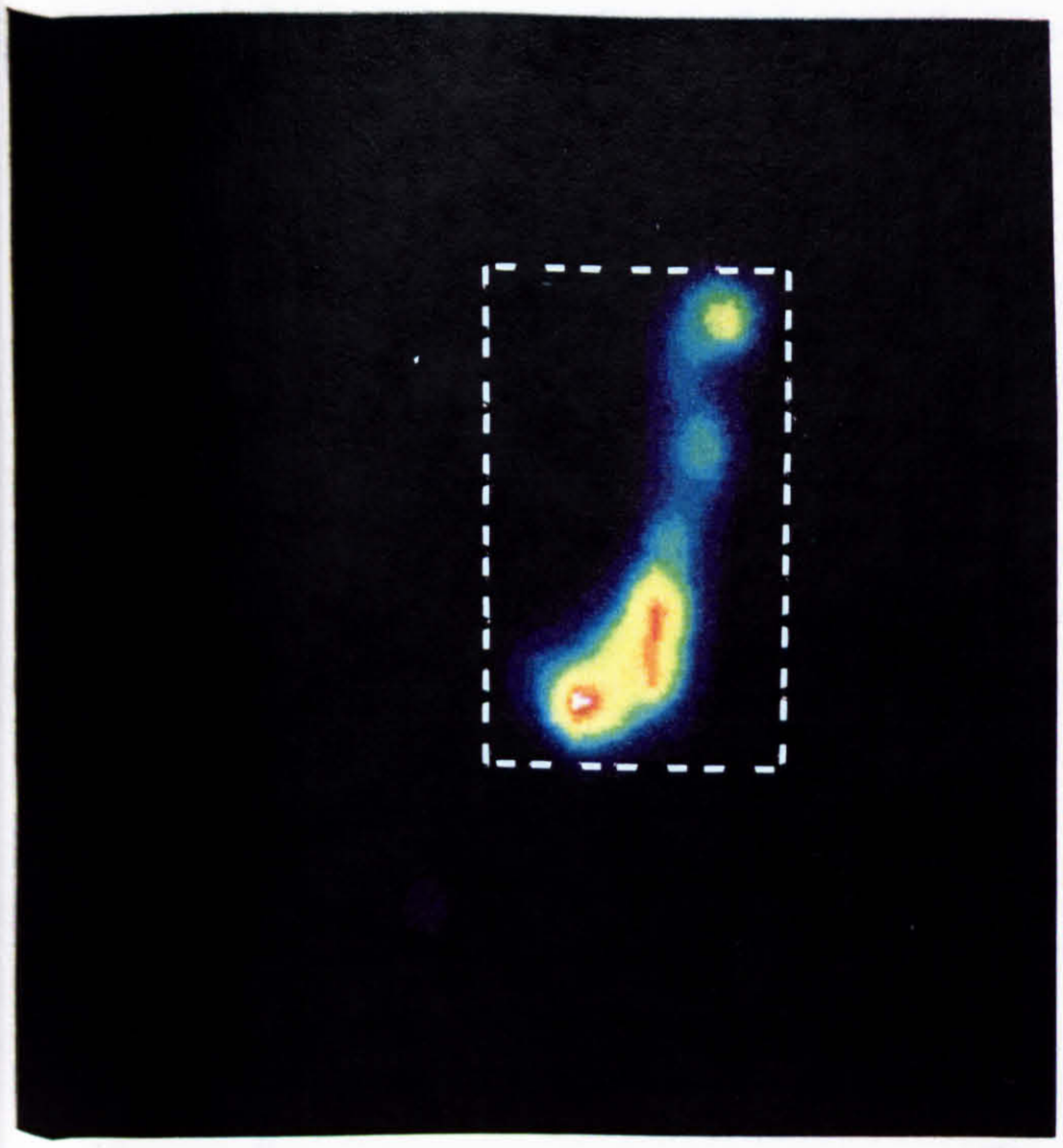


Plate 1.

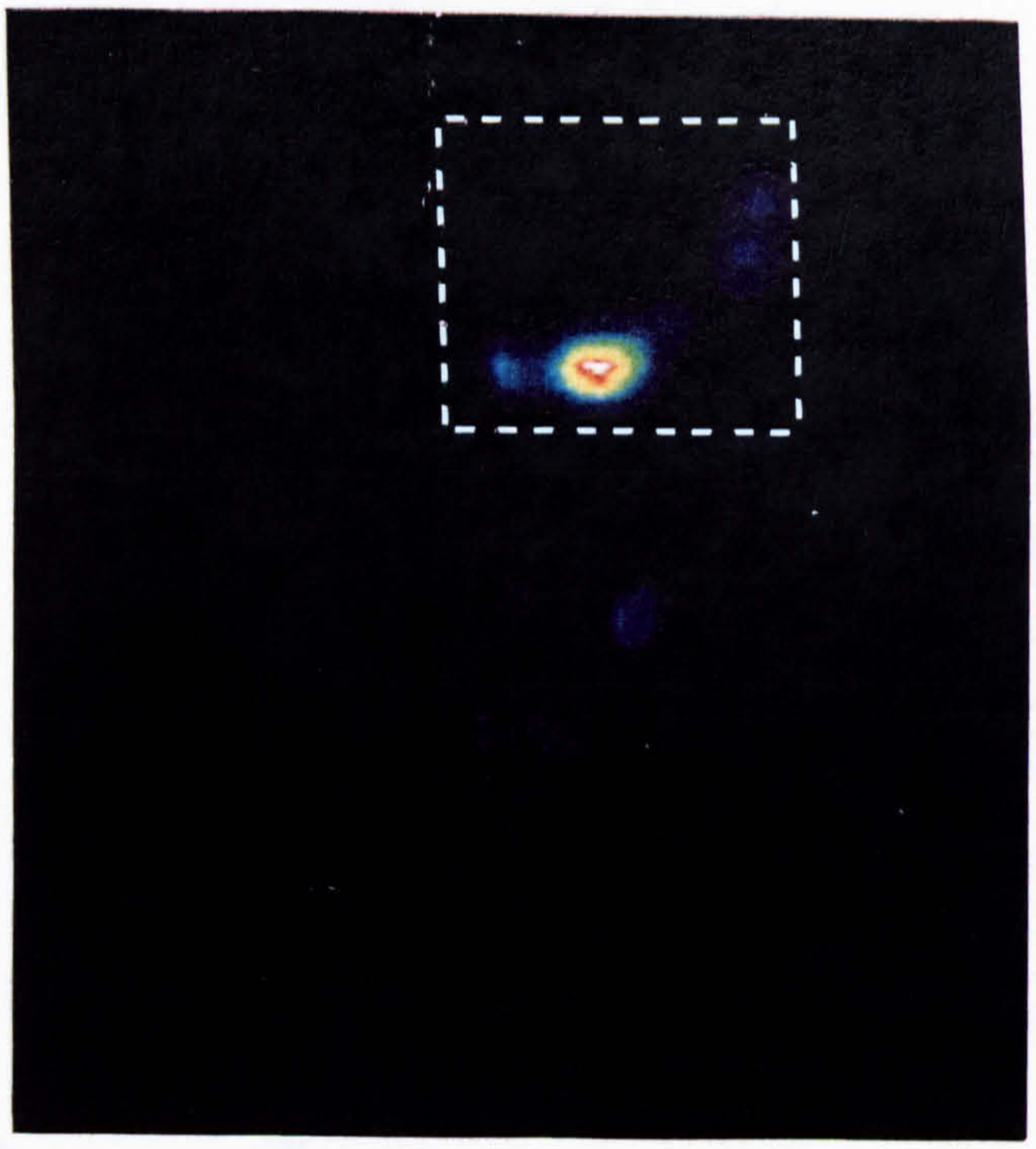


Plate 2.

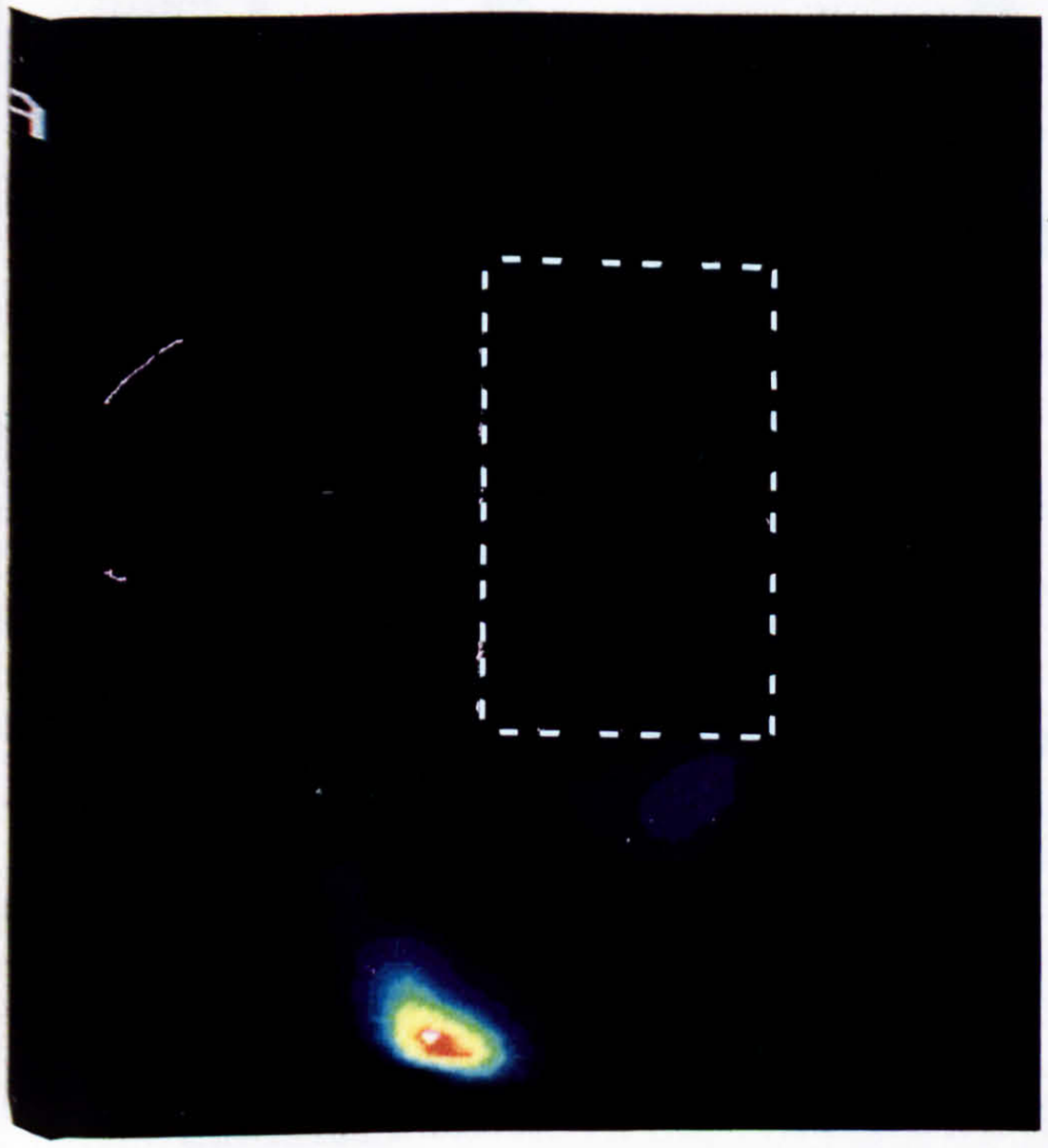


Plate 3.

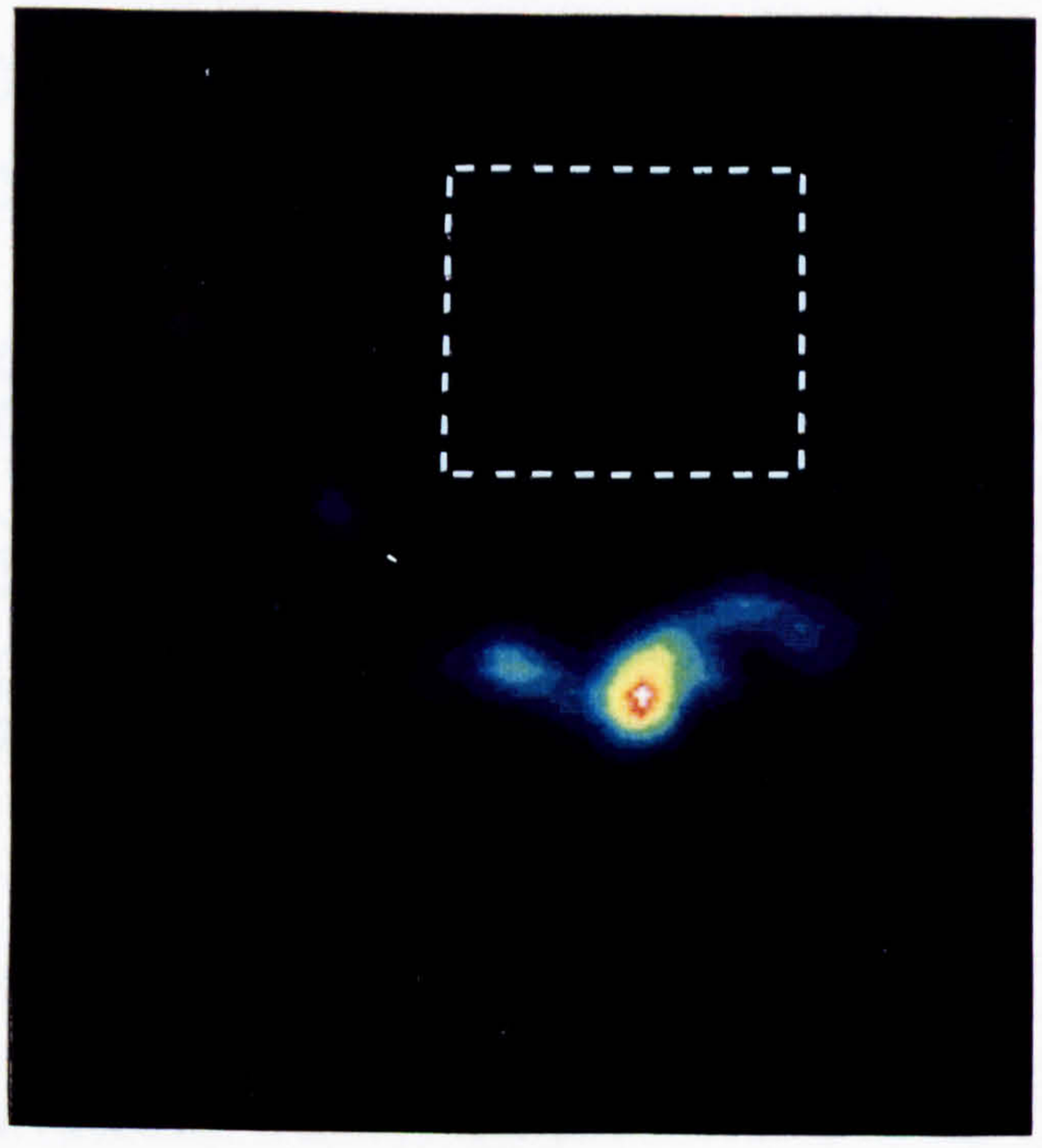


Plate 4.

Fig 10. **Solid phase gastric emptying in a patient with postchildbirth/hysterectomy constipation. In plate 1, radio-isotope is present in the body of the stomach with some contrast in the duodenum emptying at 1 hour. In the control at 1 hour, radio-isotope is mainly in the antrum with some contrast in the jejunum (plate 2). At 6 hours, there has been migration of isotope to the distal ileum with complete emptying of the stomach (plate 3). In the control at 6 hours (plate 4) gastric emptying is complete and isotope has reached the terminal ileum.**

FIG 11. SEGMENTAL TRANSIT TIMES IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS.

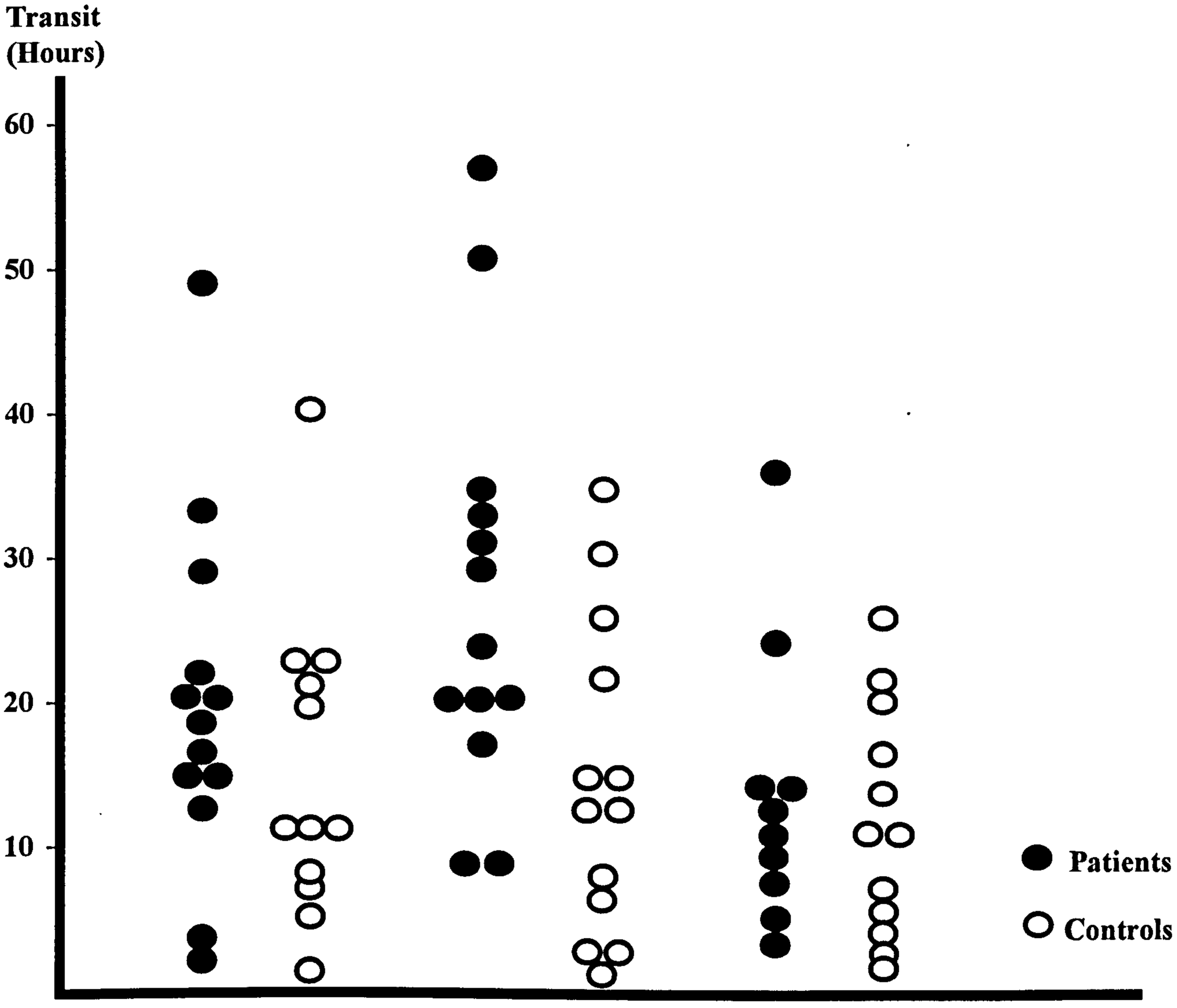


TABLE 3. SEGMENTAL TRANSIT TIMES IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

	Right Colon	Left Colon	Rectosigmoid
Patients	19.4(24)	26(14.7)	13.5(10)
Controls	14(10.2)	13.5(10)	10.9(7.8)
P<	0.38	0.024	0.64

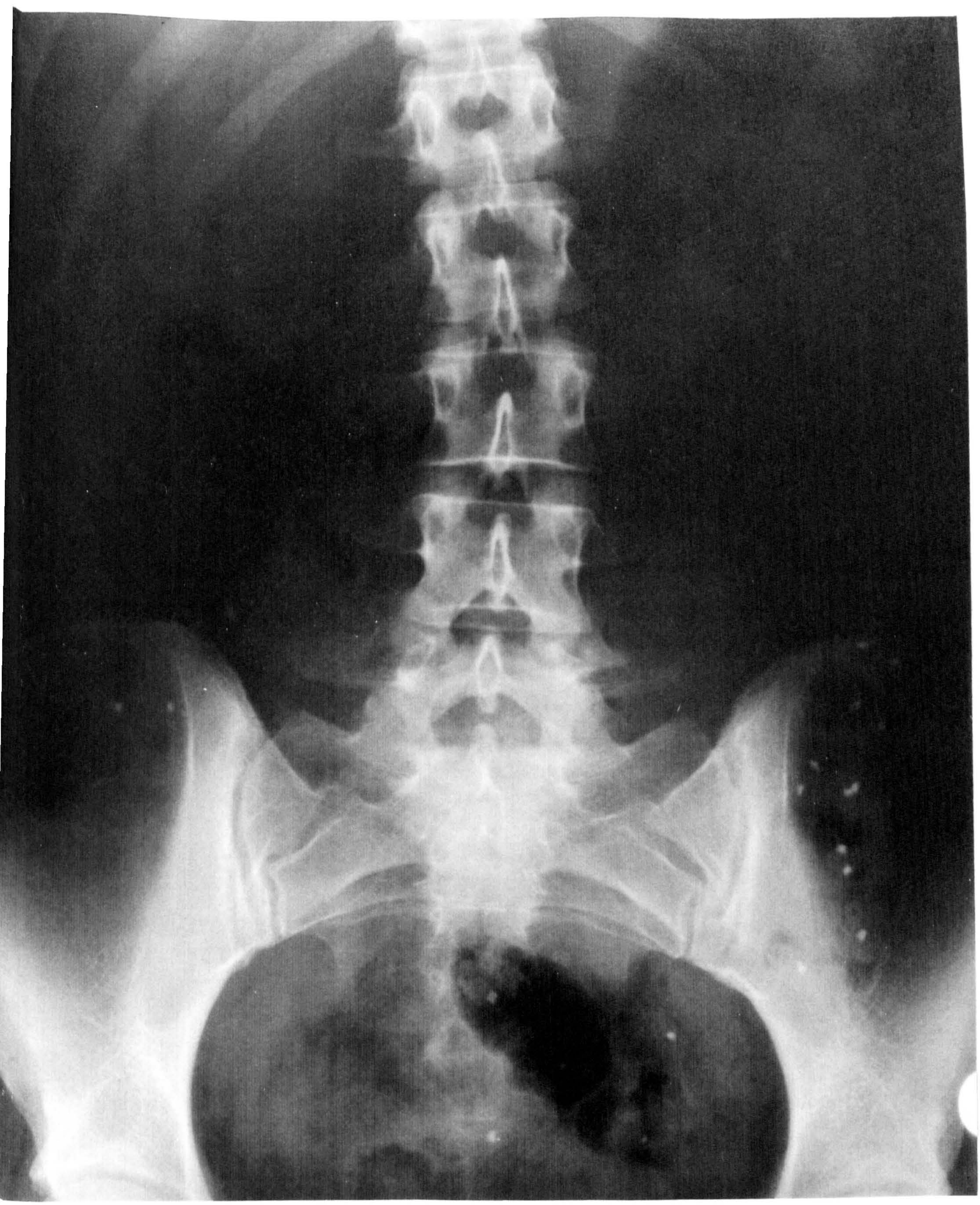


Fig 12. **Segmental marker studies in a patient with post childbirth/hysterectomy constipation. Note the absence of markers in the right colon suggesting that proximal transit is normal. Markers are held up in the descending colon indicating that delay is confined to the left colon.**

FIG 13. DYNAMIC RADIOISOTOPE TRANSIT STUDIES IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

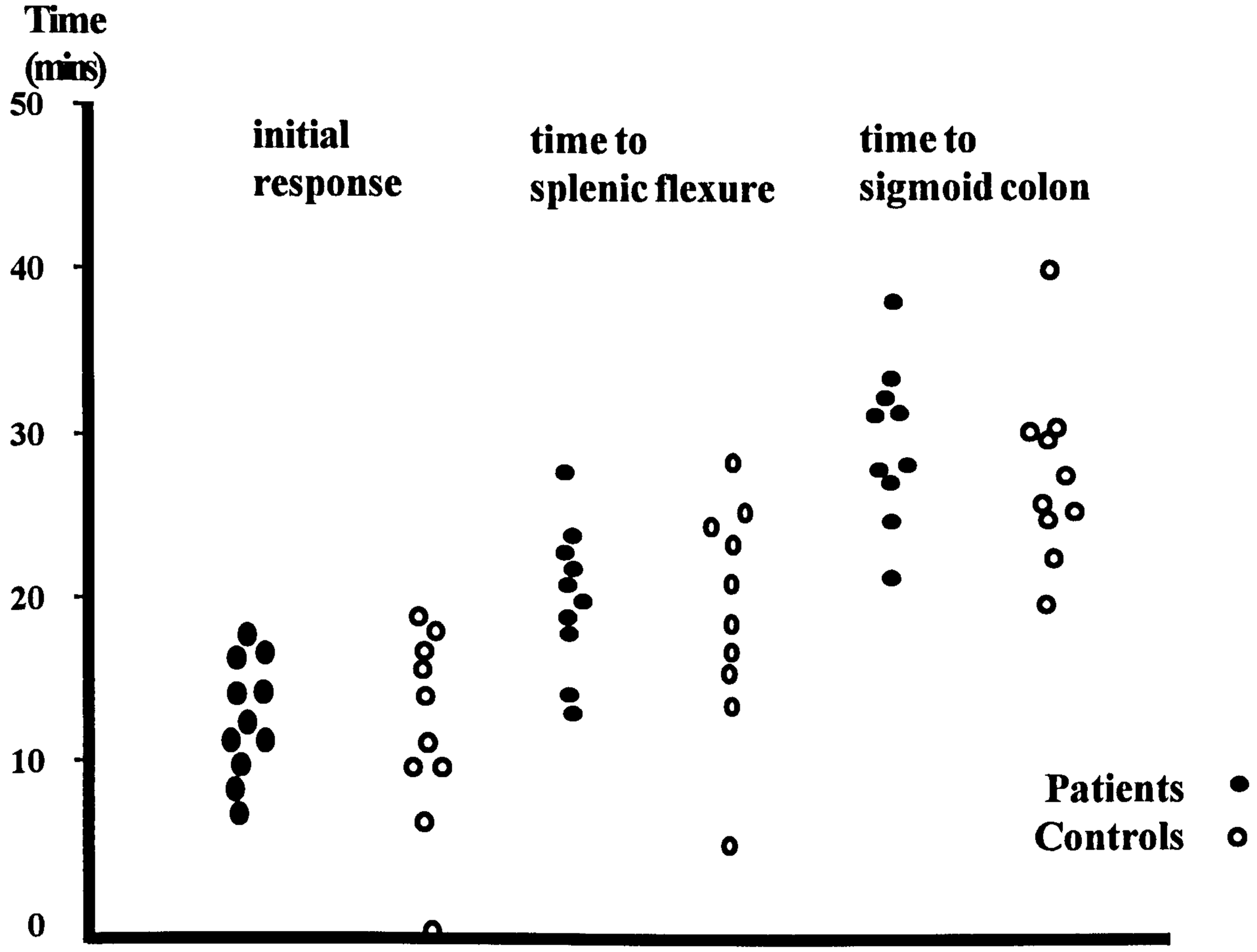


TABLE 4.

RADIOISOTOPE TRANSIT TIMES IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

	initial response	time to splenic flexure	time to sigmoid colon
patients	12.5(5.7)	19.1(6.7)	28.3(5.6)
controls	13.1(3.5)	20.0(4.3)	29.9(4.7)
p <	0.9	1	0.38

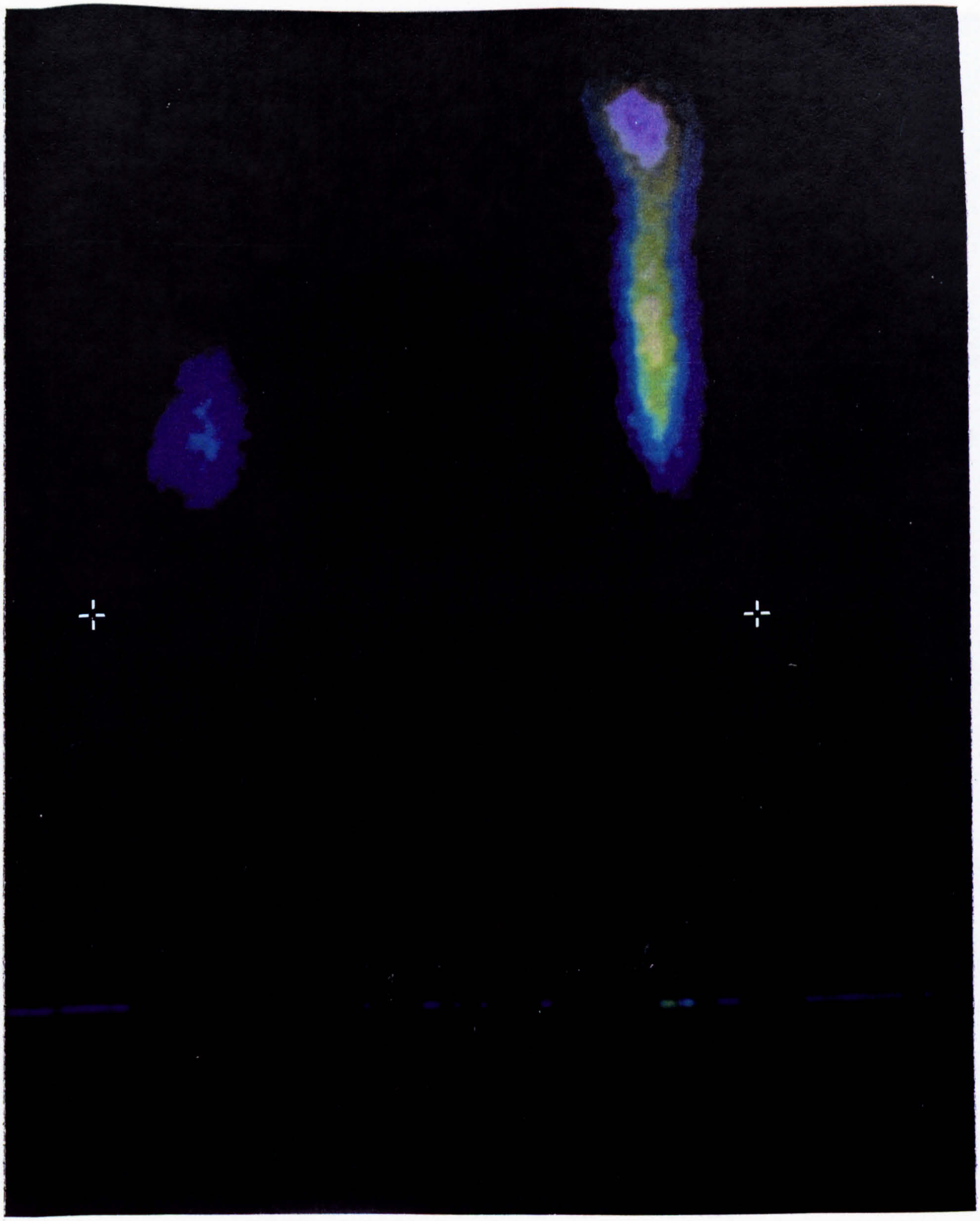


Fig 14. **Dynamic radio-isotope scan of a patient at 2 hours. This demonstrates arrest of the isotope at the junction of the descending colon and the sigmoid colon. This suggests that there is a physiological obstruction in the sigmoid colon.**

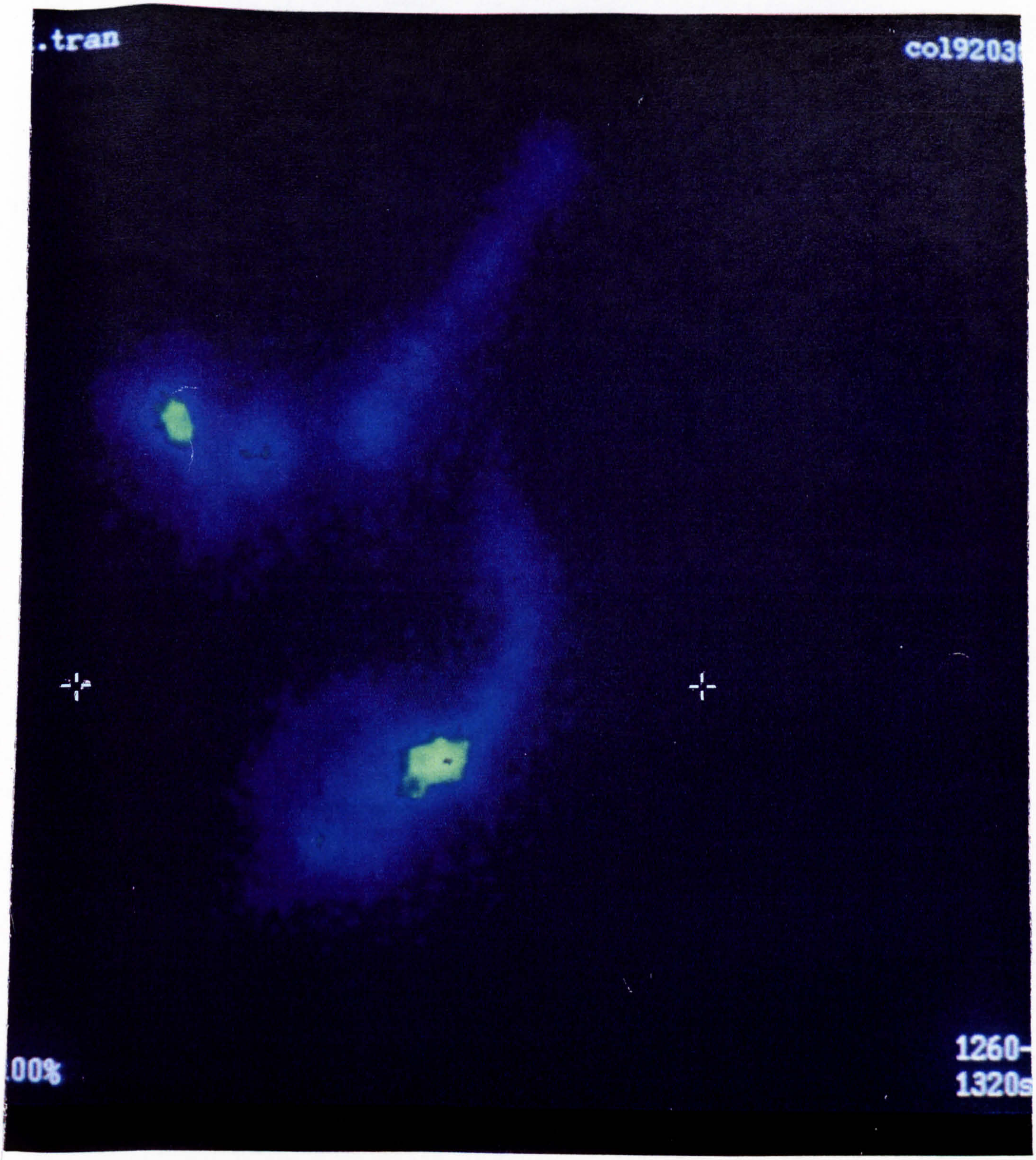


Fig 15. **Dynamic radio-isotope scan of a control at 45 mins. This demonstrates transit of the isotope to the rectum. Controls frequently required to move their bowels soon after isotope had reached the rectum.**

FIG 16. THE EFFECT OF NEOSTIGMINE ON > 5CM H_2O CONTRACTIONS IN CONTROLS.

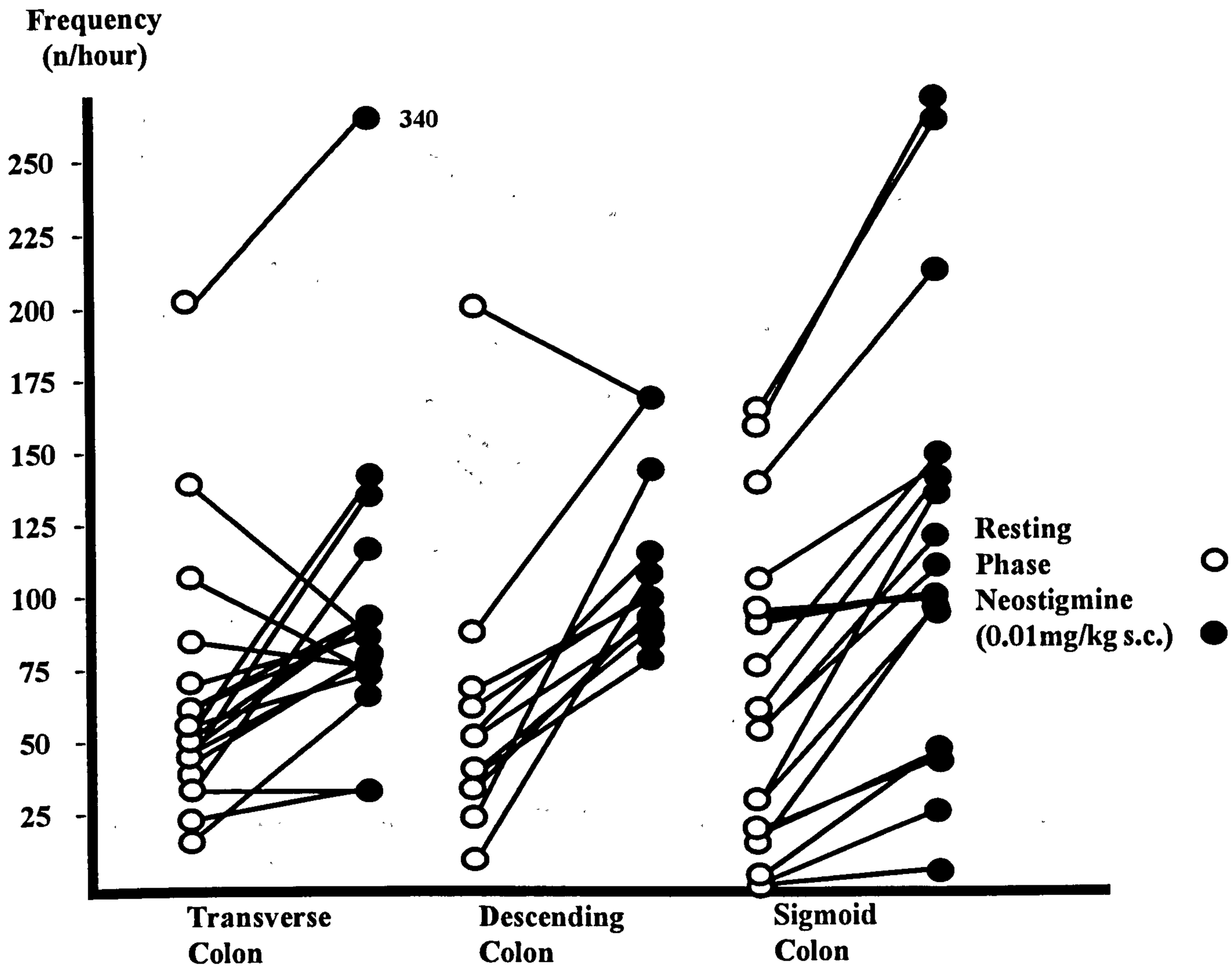


TABLE 5. **> 5CM H_2O CONTRACTIONS AT REST AND FOLLOWING THE ADMINISTRATION OF NEOSTIGMINE 0.01MG/KG S.C. IN CONTROLS - MEAN(STDEV).**

	Transverse	Descending	Sigmoid
Resting Phase	64(45)	60(51)	65(51)
Neostigmine (0.01mg/kg s.c.)	96(67)	112(32)	116(70)
P<	0.01	0.003	0.01

FIG 17. THE EFFECT OF NEOSTIGMINE ON > 5CM H_2O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION.

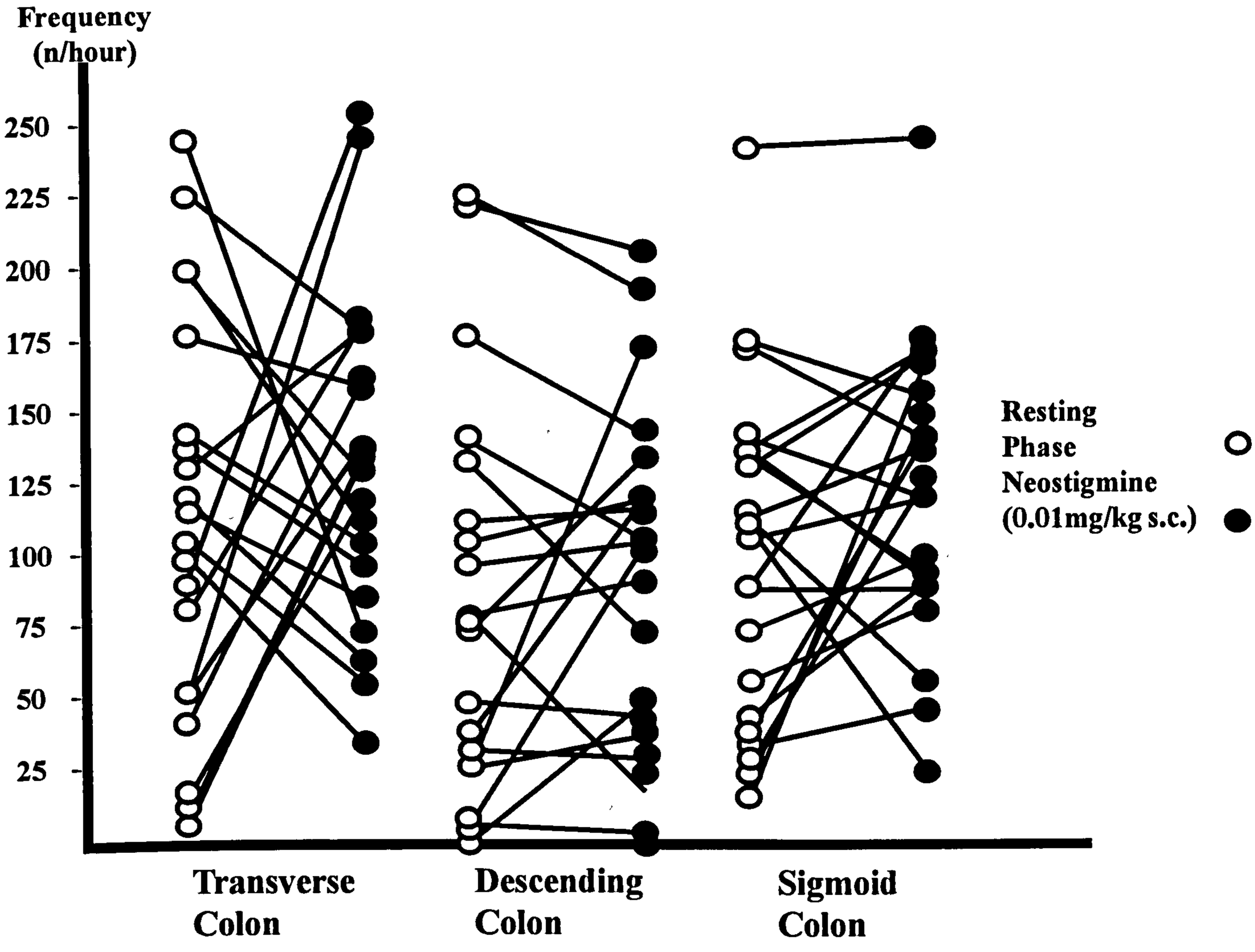


TABLE 6. THE EFFECT OF NEOSTIGMINE ON >5CM H_2O CONTRACTIONS IN PATIENTS.

	Transverse	Descending	Sigmoid
Resting Phase	105(70)	83(71)	101(58)
Neostigmine (0.01mg/kg s.c.)	124(60)	93(60)	122(50)
P<	0.3	0.5	0.2

FIG 18. THE EFFECT OF NEOSTIGMINE ON >5 CM H_2O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS.

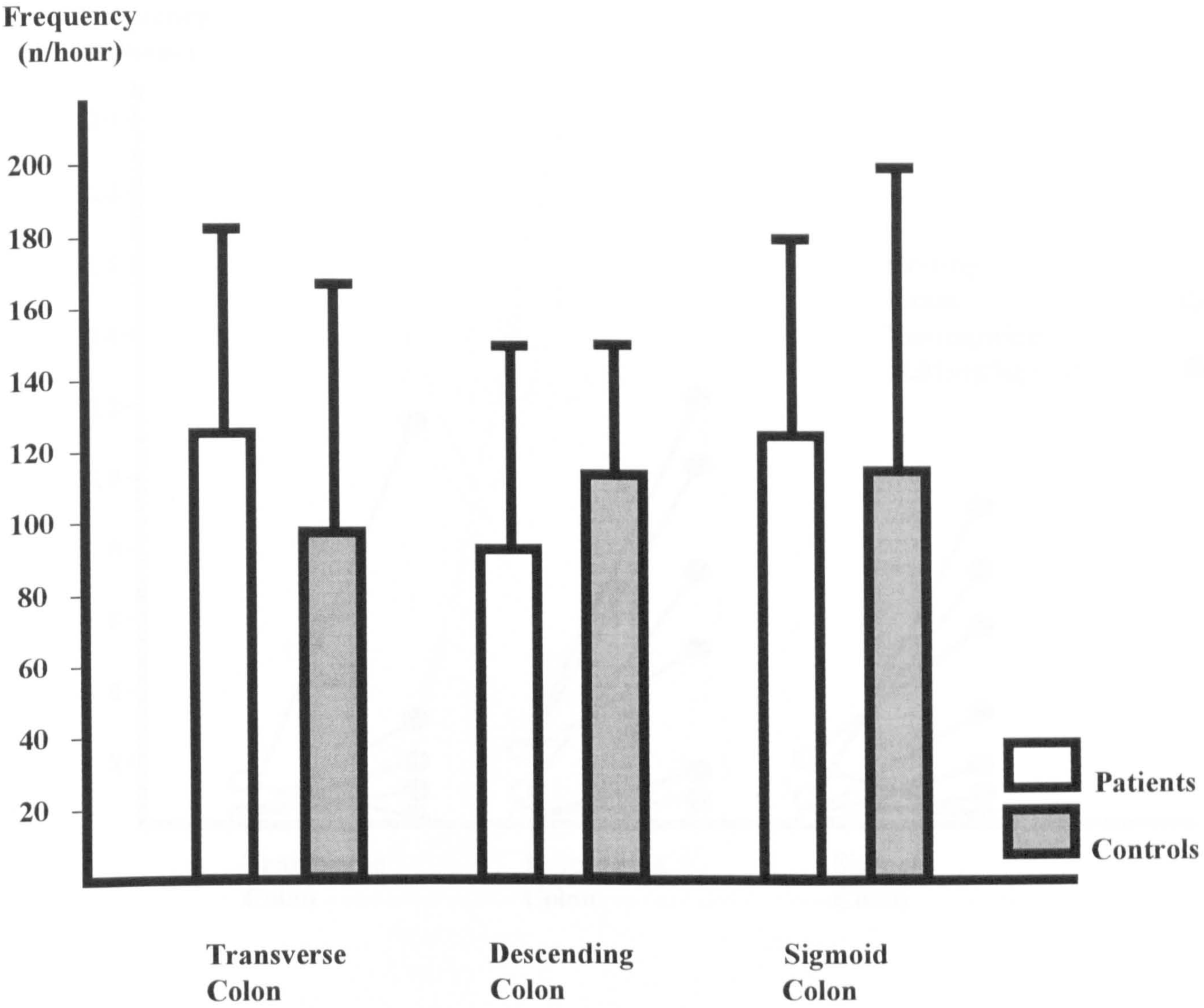


TABLE 7. **>5 CM H_2O CONTRACTIONS DURING THE RESTING PHASE AND FOLLOWING THE ADMINISTRATION OF NEOSTIGMINE IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).**

	Transverse	Descending	Sigmoid
Resting Phase			
Patients	**105(70)**	**83(71)**	**101(58)**
Controls	**64(45)**	**60(51)**	**65(51)**
P <	**0.01**	**0.42**	**0.01**
Neostigmine (0.01mg/kg s.c.)			
Patients	**124(60)**	**93(60)**	**122(50)**
Controls	**96(67)**	**112(32)**	**116(70)**
p <	**0.04**	**0.36**	**0.8**

FIG 19. THE EFFECT OF NEOSTIGMINE ON >50CM H_2O CONTRACTIONS IN CONTROLS.

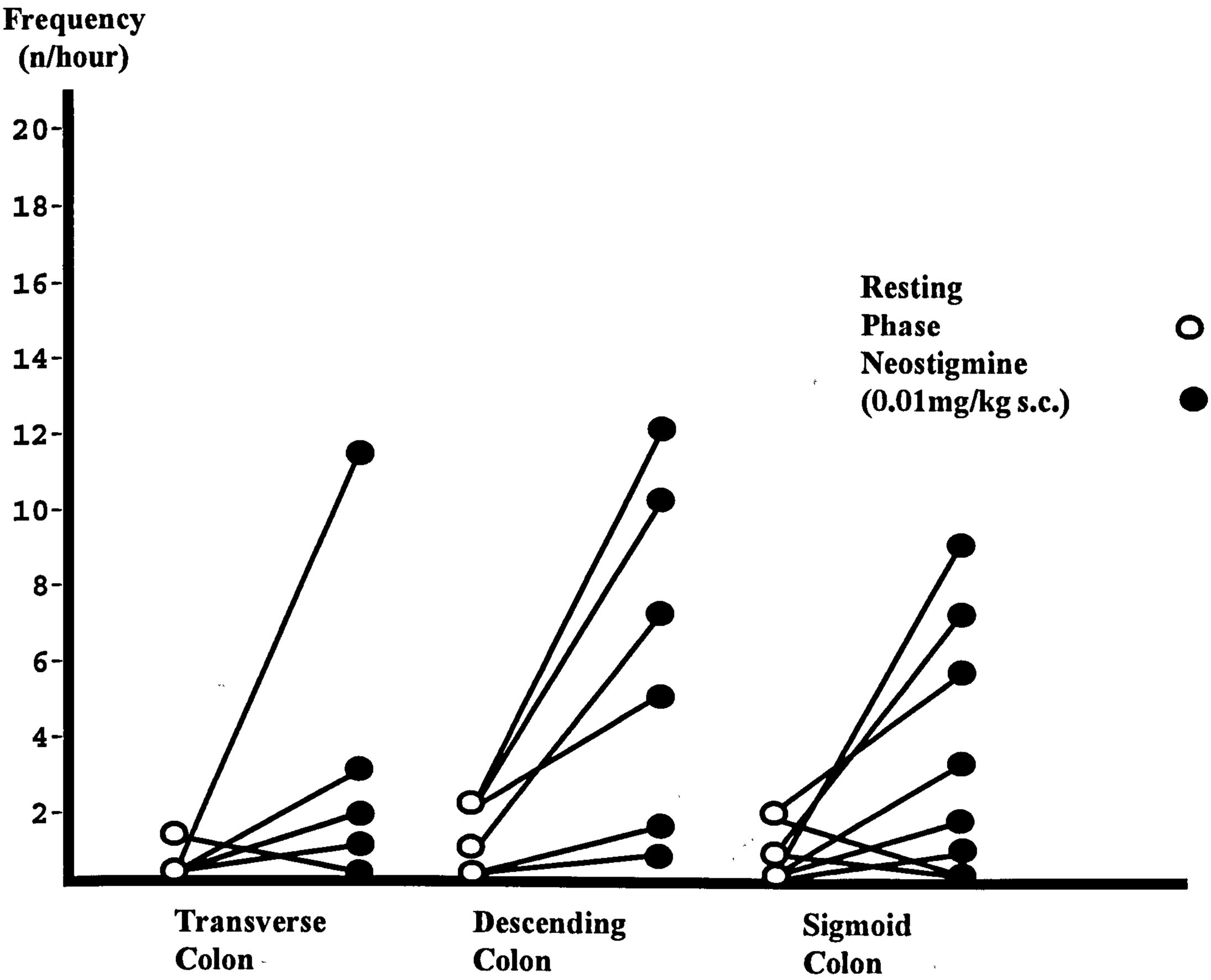


TABLE 8. **>50CM H2O COLONIC CONTRACTIONS DURING THE RESTING PHASE AND FOLLOWING THE ADMINISTRATION OF NEOSTIGMINE IN CONTROLS - MEAN(STDEV).**

	Transverse	Descending	Sigmoid
Resting Phase	0.1(0)	0.6(0.9)	0.5(0.8)
Neostigmine (0.01mg/kg s.c.)	1.5(2.5)	3.6(4.2)	2.2(4.4)
P<	0.02	0.06	0.003

FIG 20. THE EFFECT OF NEOSTIGMINE ON >50CM H_2O CONTRACTIONS IN PATIENTS WITH POST CHILDBIRTH/HYSTERECTOMY CONSTIPATION.

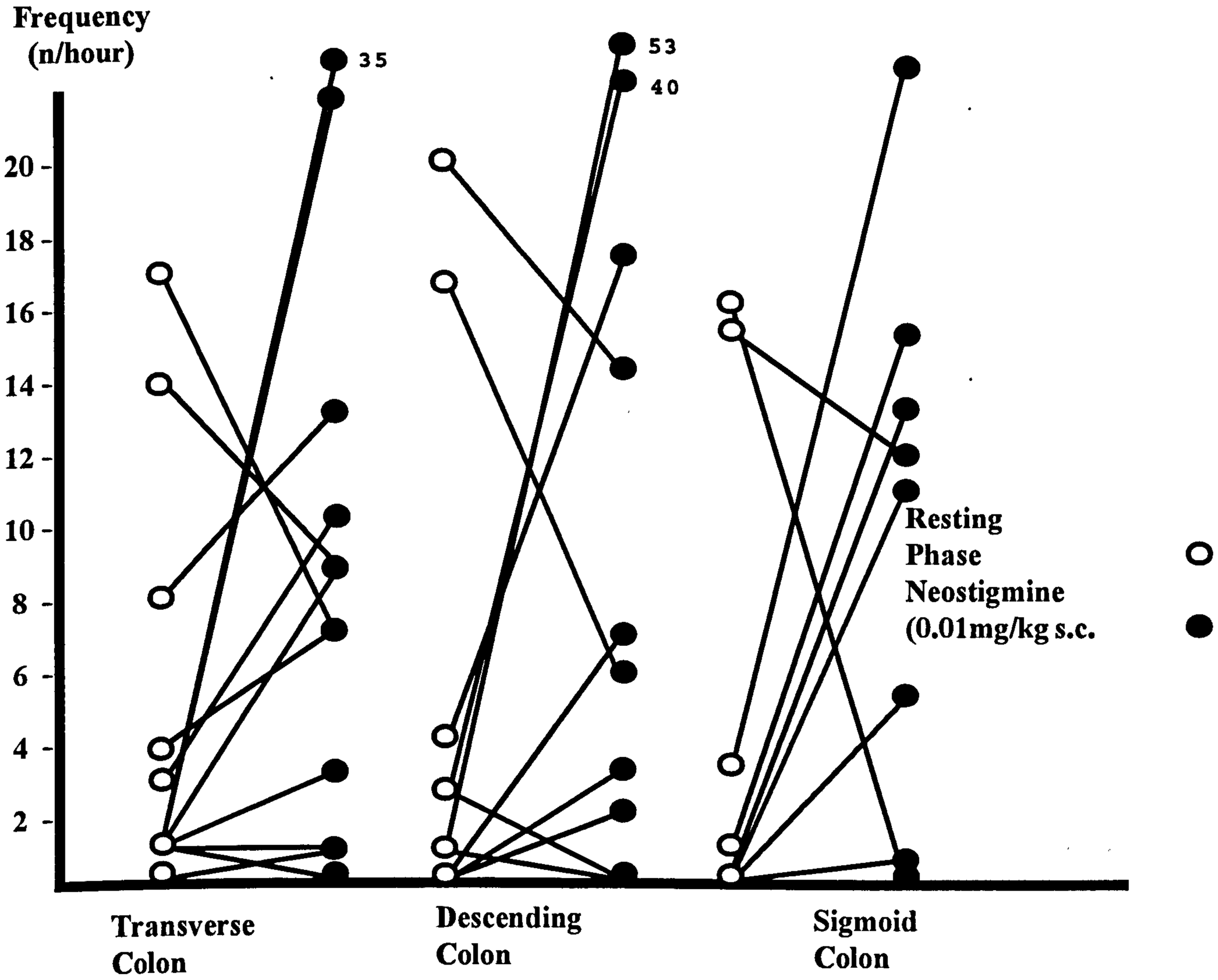


TABLE 9. >50CM H2O COLONIC CONTRACTIONS DURING THE RESTING PHASE AND FOLLOWING THE ADMINISTRATION OF NEOSTIGMINE IN PATIENTS - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	2.3(4.6)	2.5(5.6)	2.3(5.4)
Neostigmine (0.01mg/kg s.c.)	5.3(8.6)	7.1(14.5)	3.7(6.6)
P<	0.15	0.5	0.27

FIG 21. EFFECT OF NEOSTIGMINE ON >50CM H_2O CONTRACTIONS IN PATIENTS WITH POST CHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

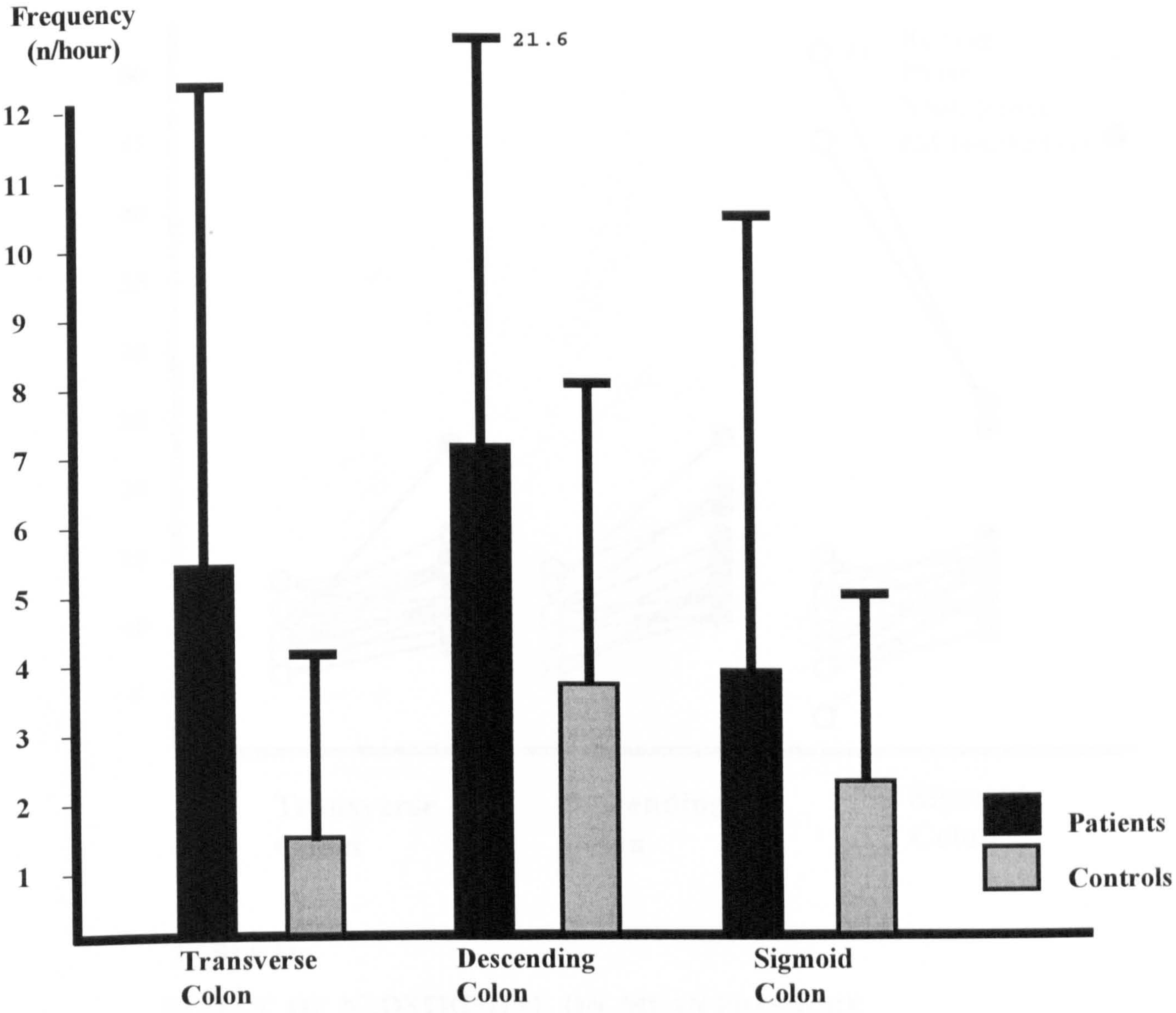


TABLE 10. **>50CM H2O CONTRACTIONS AT REST AND FOLLOWING THE ADMINISTRATION OF NEOSTIGMINE IN PATIENTS AND CONTROLS - MEAN(STDEV)**

	Transverse	Descending	Sigmoid
Resting Phase			
Patients	2.3(4.6)	2.5(5.6)	2.3(5.4)
Controls	0.1(0)	0.6(0.9)	0.5(0.8)
P<	0.01	0.8	0.9
Neostigmine (0.01mg/kg s.c.)			
Patients	5.3(8.6)	7.1(14.5)	3.7(6.6)
Controls	1.5(2.5)	3.6(4.2)	2.2(2.4)
P<	0.5	0.4	0.3

FIG 22. THE EFFECT NEOSTIGMINE ON MEAN COLONIC PRESSURE IN CONTROLS.

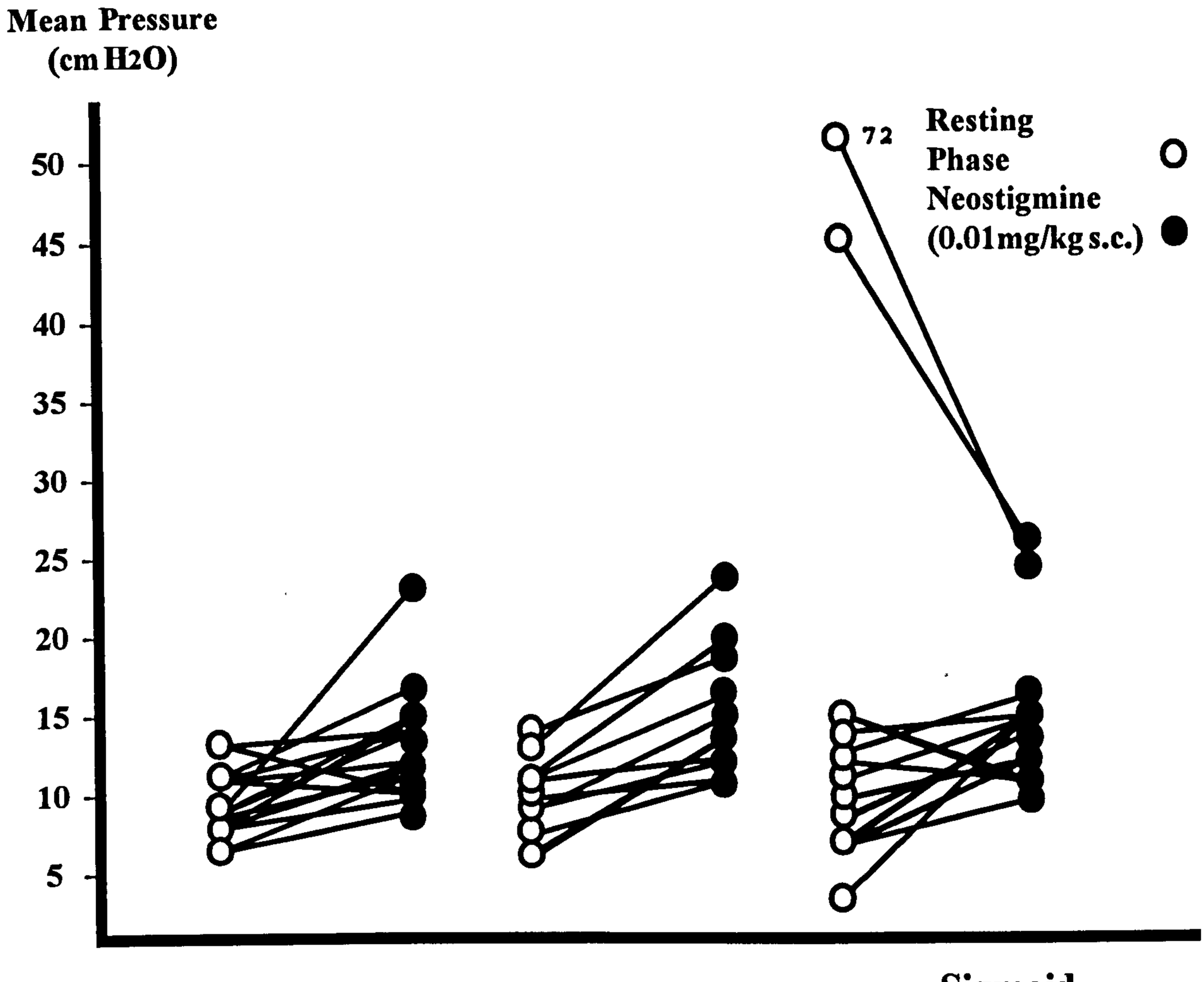


TABLE 11.

EFFECT OF NEOSTIGMINE ON MEAN PRESSURE IN CONTROLS - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	10.1(1.7)	10.0(2.2)	14.5(15.2)
Neostigmine (0.1mmg/kg s.c.)	12.5(3.2)	14.8(4.1)	14.3(4.0)
P<	0.004	0.002	0.004

FIG 23. THE EFFECT OF NEOSTIGMINE ON MEAN COLONIC PRESSURE IN PATIENTS WITH PC/PH CONSTIPATION.

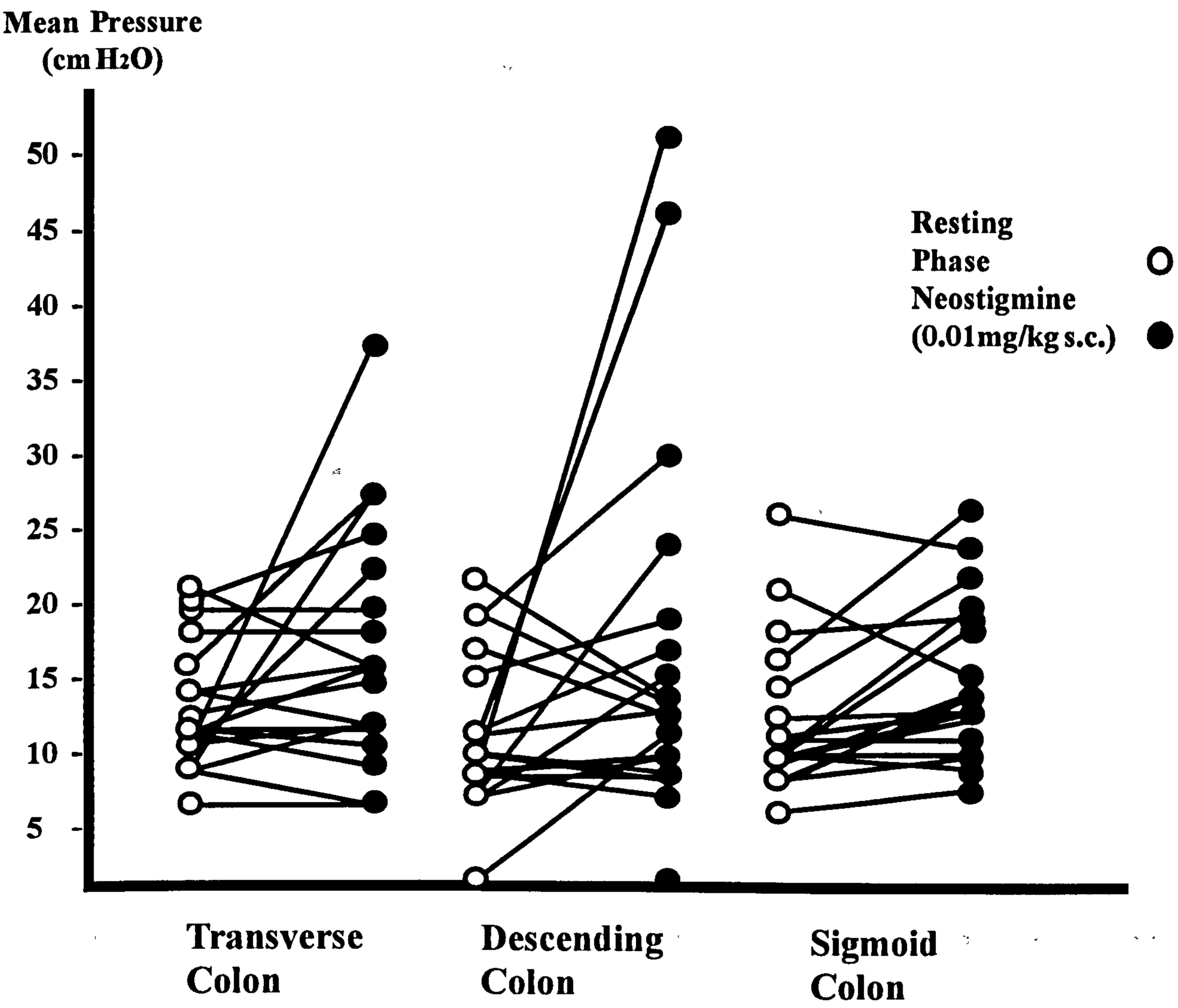


TABLE 12.

THE EFFECT OF NEOSTIGMINE ON MEAN COLONIC PRESSURE IN PATIENTS WITH PC/PH CONSTIPATION - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	12.3(4.0)	10.4(5.7)	11.8(4.6)
Neostigmine (0.1mmg/kg s.c.)	15.2(7.6)	16.2(12.8)	14.5(5.0)
P<	0.25	0.12	0.01

FIG 24. EFFECT OF NEOSTIGMINE ON MEAN COLONIC PRESSURE IN PATIENTS WITH POST CHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

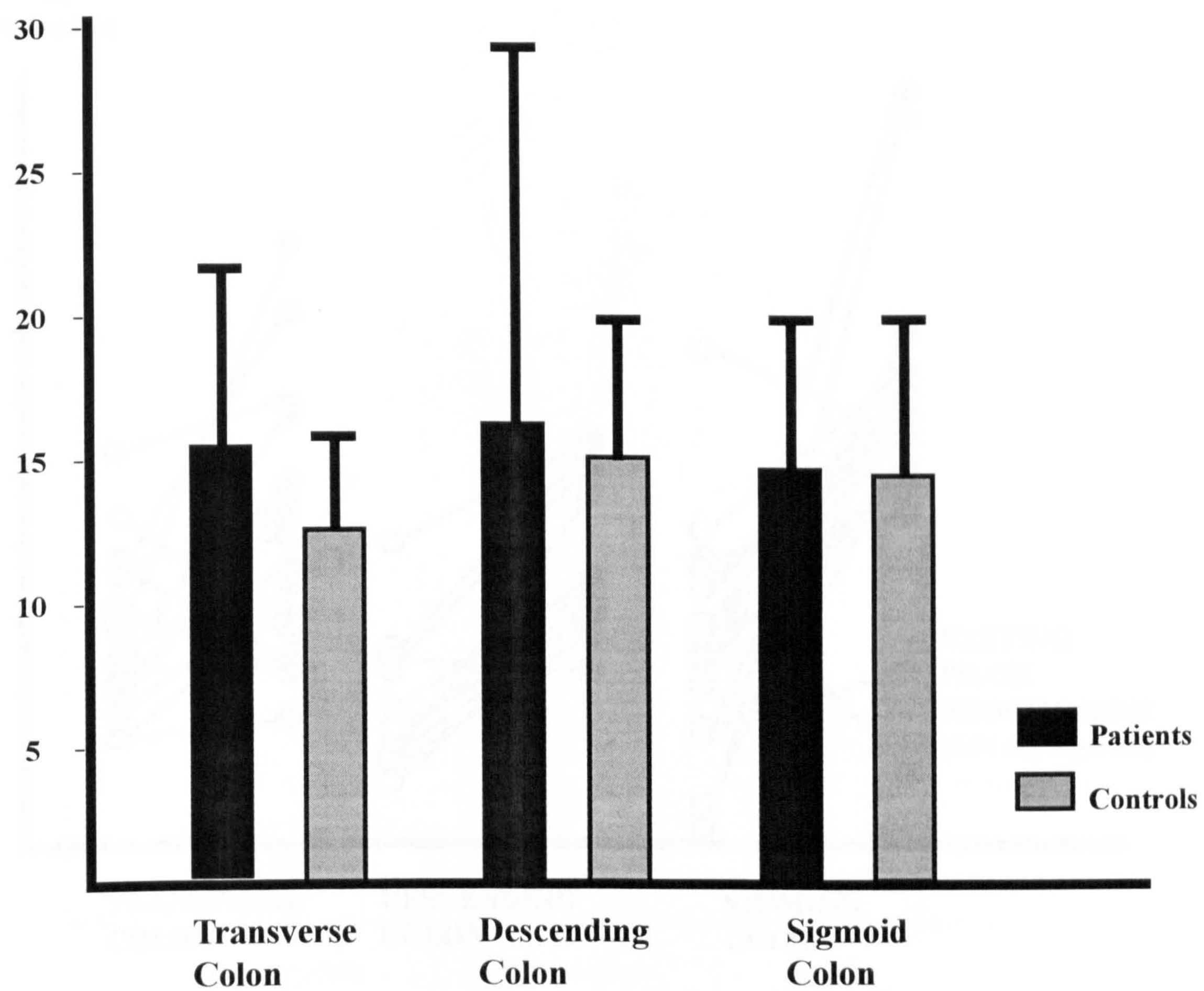


TABLE 13. MEAN COLONIC PRESSURE AT REST AND FOLLOWING THE ADMINISTRATION OF NEOSTIGMINE IN PATIENTS AND CONTROLS - MEAN(STDEV)

	Transverse	Descending	Sigmoid
Resting Phase			
Patients	12.3(4.0)	10.4(5.7)	11.8(4.6)
Controls	10.1(1.7)	10.0(2.2)	14.5(15.2)
P<	0.06	0.9	0.5
Neostigmine (0.01mg/kg s.c.)			
Patients	15.2(7.6)	16.2(12.8)	14.5(5.0)
Controls	12.5(3.2)	14.8(4.1)	14.3(4.0)
P<	0.4	0.3	0.8

FIG 25. EFFECT OF NEOSTIGMINE ON COLONIC MOTILITY IN CONTROLS.

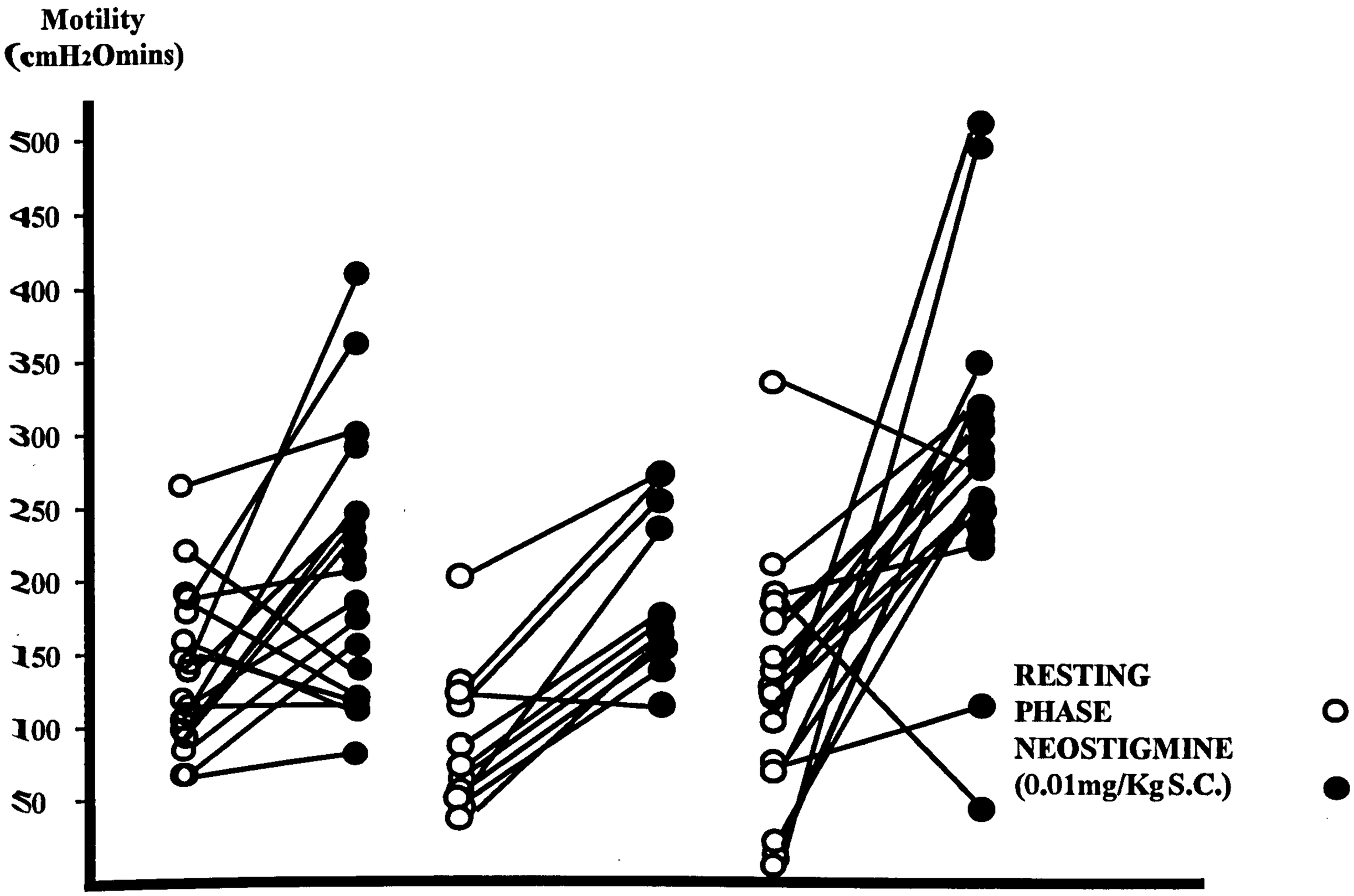


TABLE 14.

EFFECT OF NEOSTIGMINE ON COLONIC MOTILITY IN CONTROLS - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	131(55)	90(48)	116(77)
Neostigmine 0.1mg/kg s.c.	194(94)	178(54)	272(102)
p <	0.03	0.001	0.001

FIG 26. EFFECT OF NEOSTIGMINE ON COLONIC MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION.

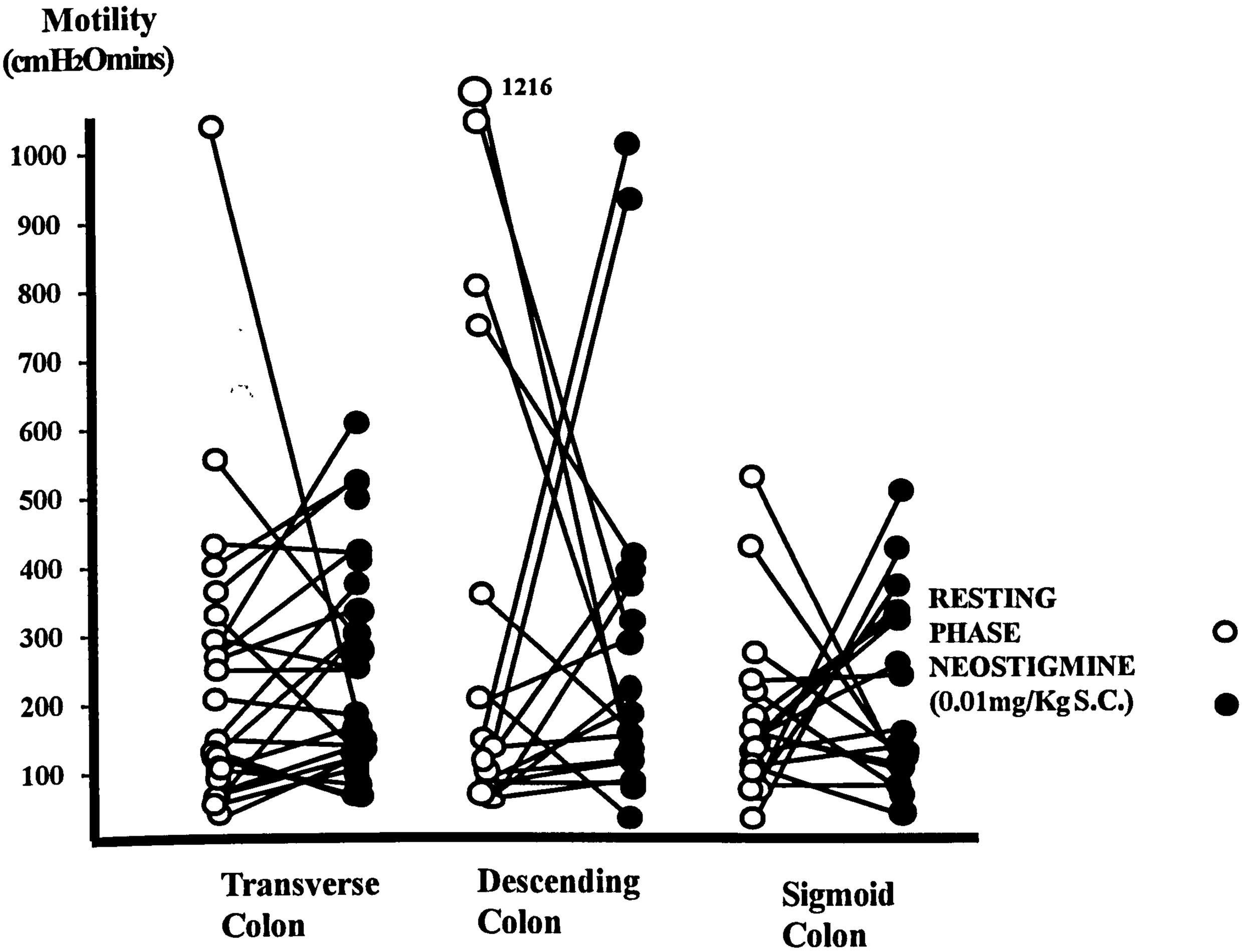


TABLE 15.

EFFECT OF NEOSTIGMINE ON COLONIC MOTILITY IN PATIENTS - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	241(228)	323(383)	183(115)
Neostigmine (0.1mg/kg s.c.)	244(153)	281(272)	211(124)
P<	0.48	0.44	0.53

FIG 27. ABSOLUTE EFFECT OF NEOSTIGMINE ON COLONIC MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

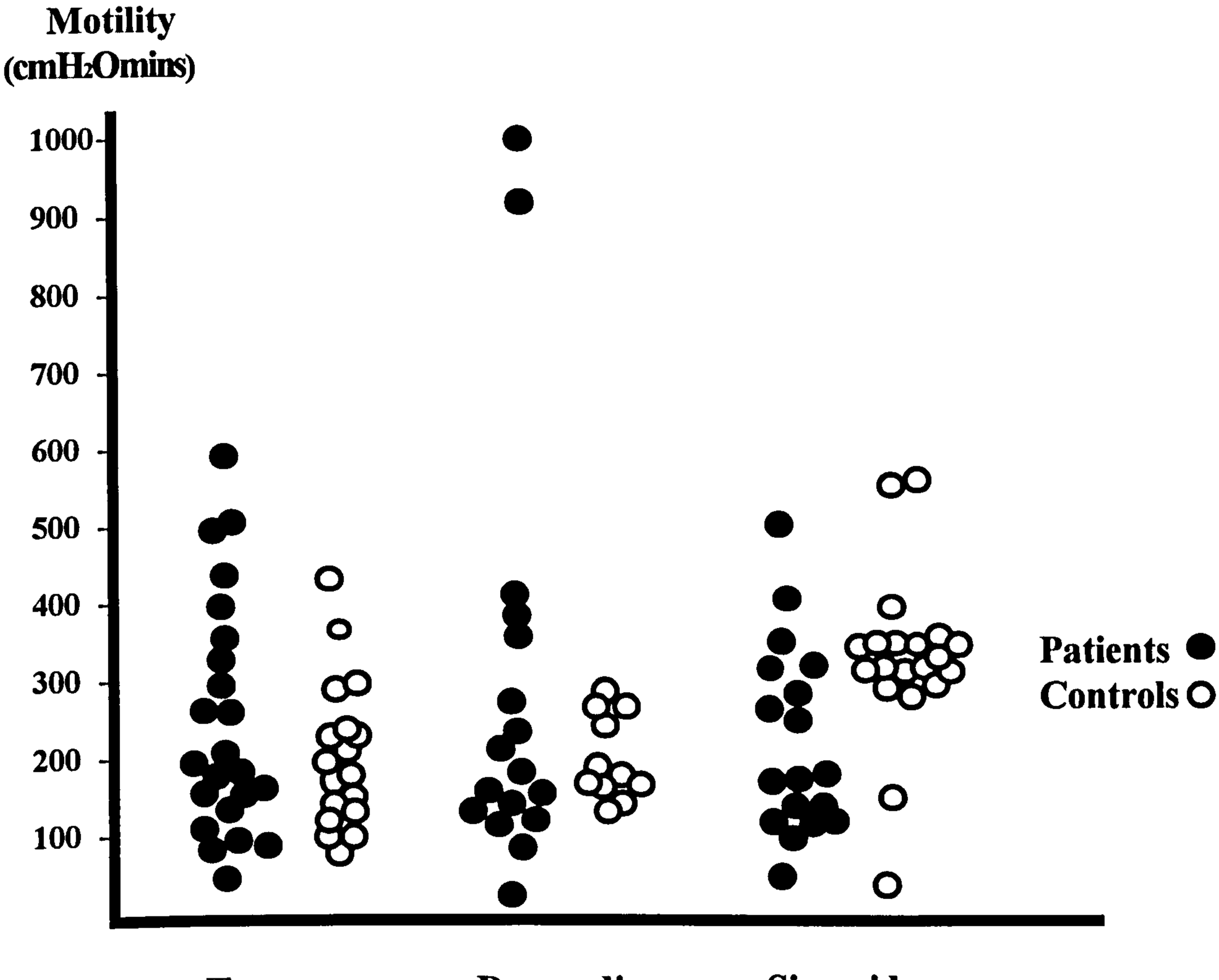


TABLE 16.

COLONIC MOTILITY DURING THE RESTING PHASE AND FOLLOWING NEOSTIGMINE IN PATIENTS AND CONTROLS - MEAN(STDEV).

		Transverse	Descending	Sigmoid
Resting Phase	patients	241(248)	323(383)	183(115)
	controls	131(55)	90(48)	116(77)
	P<	0.1	0.04	0.04
Neostigmine (0.01mg/kg s.c.)	patients	244(153)	281(272)	211(124)
	controls	194(94)	178(54)	272(102)
	P<	0.44	0.71	0.14

FIG 28. EFFECT OF NEOSTIGMINE ON RELATIVE MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

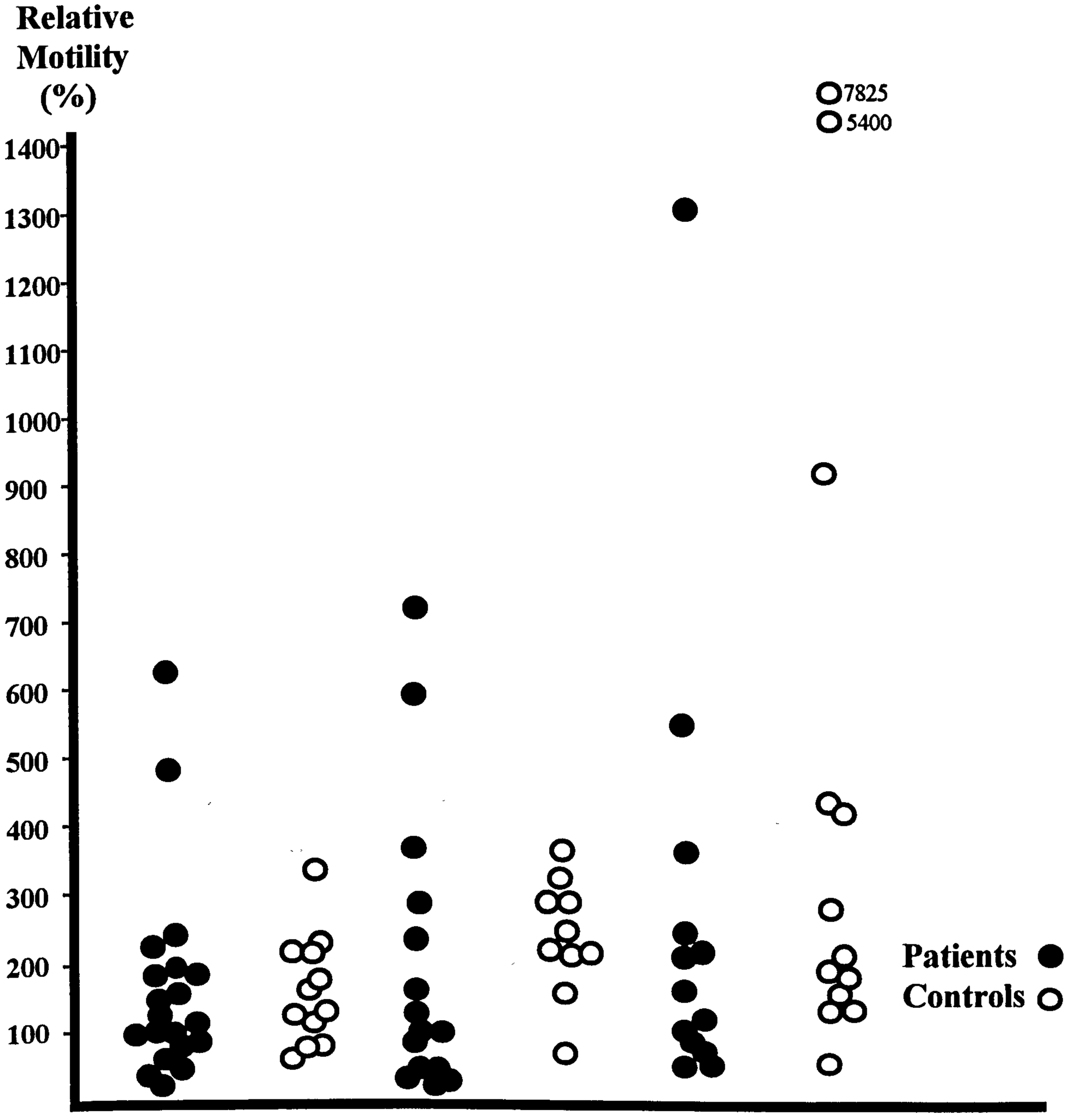


TABLE 17.

EFFECT OF NEOSTIGMINE ON RELATIVE MOTILITY - MEAN(STDEV).

	transverse	descending	sigmoid
patients	157(149)	175(201)	213(309)
controls	149(77)	229(93)	1111(2290)
P<	0.59	0.09	0.02

FIG 28(a). EFFECT OF NEOSTIGMINE ON RELATIVE MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

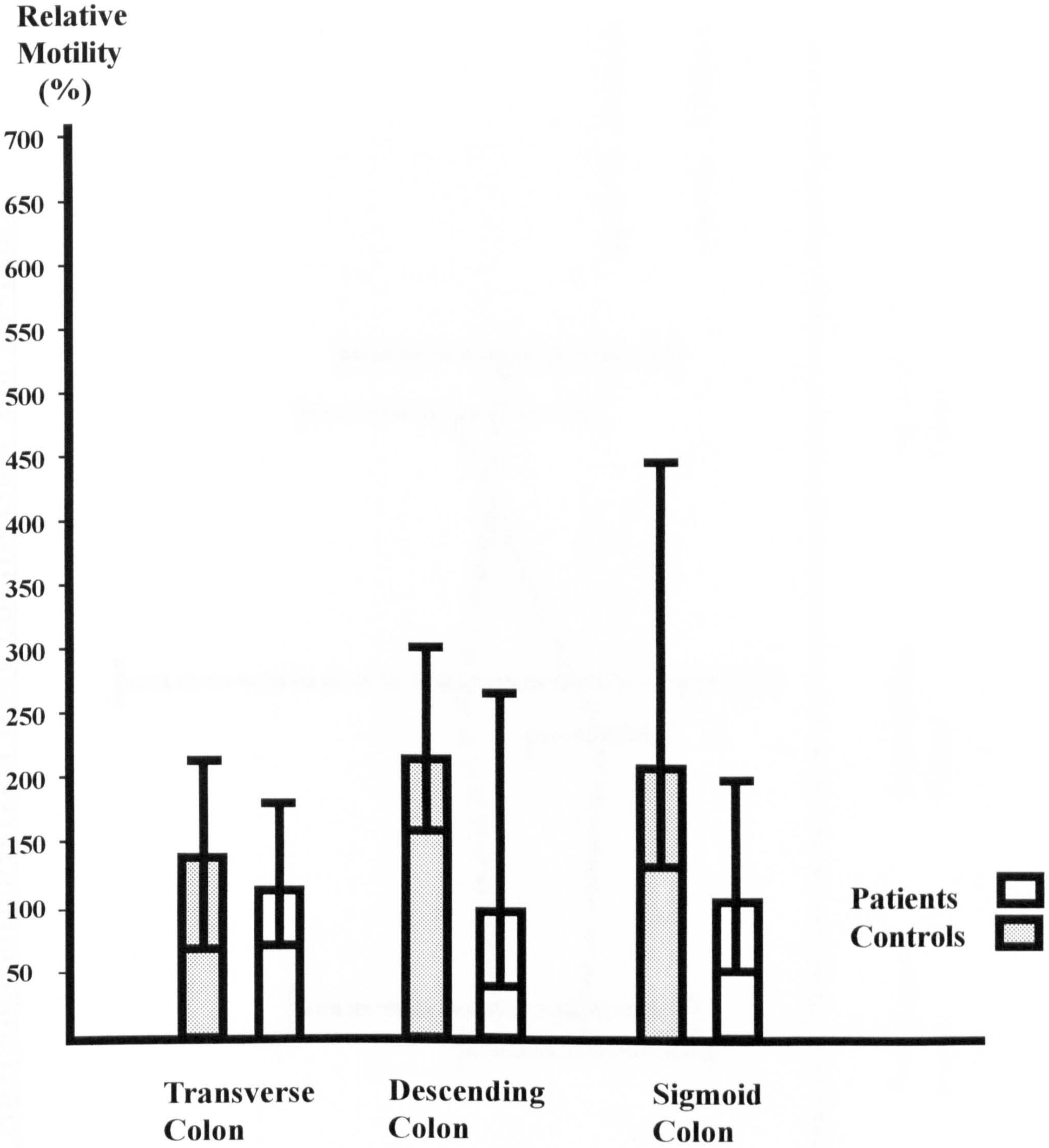
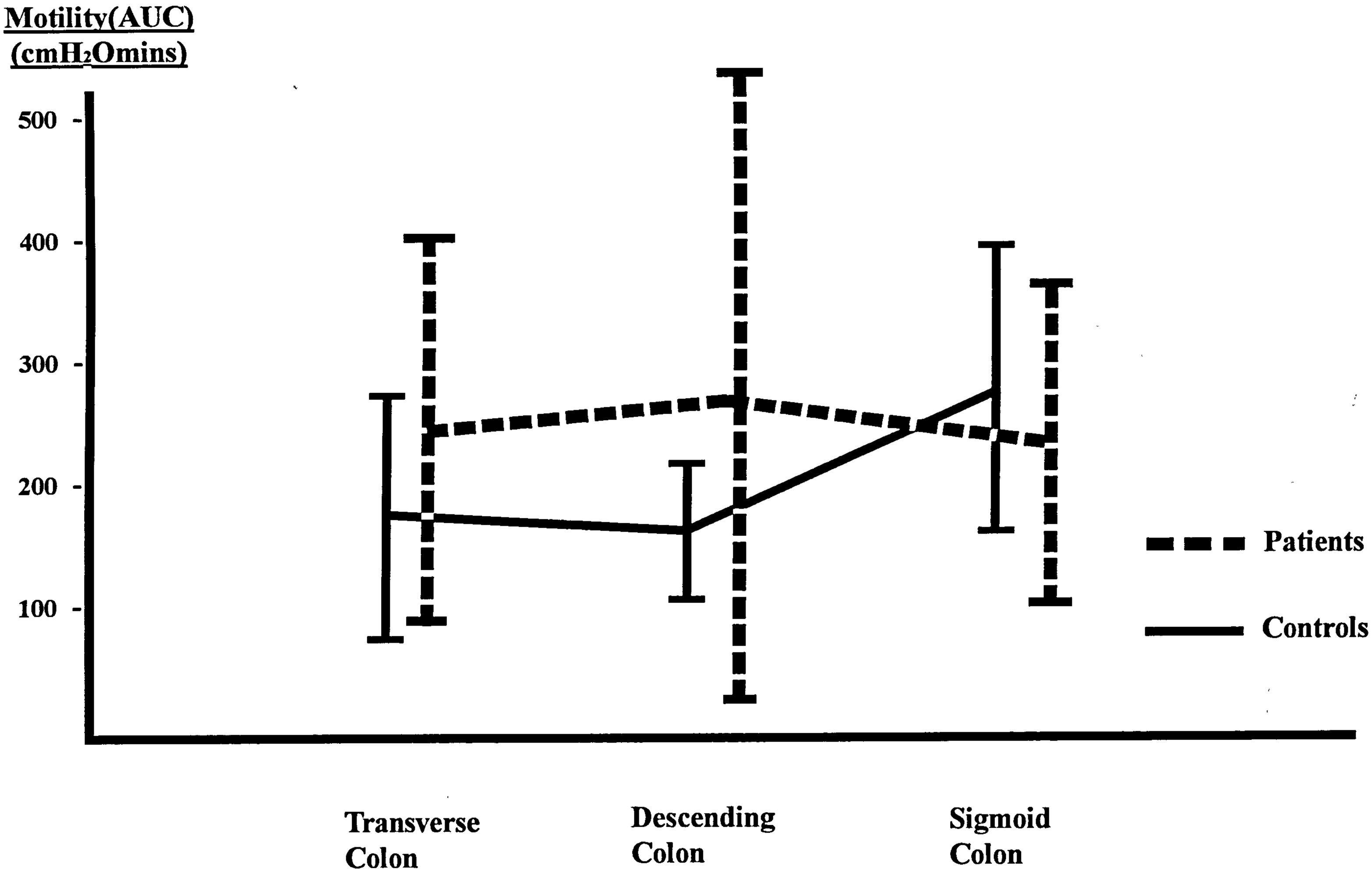


TABLE 17.

EFFECT OF NEOSTIGMINE ON RELATIVE MOTILITY - MEDIAN(INTER-QUARTILE RANGE).

	transverse	descending	sigmoid
patients	138(74-212)	220(160-303)	202(130-425)
controls	110(77-178)	100(29-264)	108(57-205)
P<	0.59	0.09	0.02

FIG 29. THE EFFECT OF NEOSTIGMINE ON THE MOTILITY GRADIENT IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.



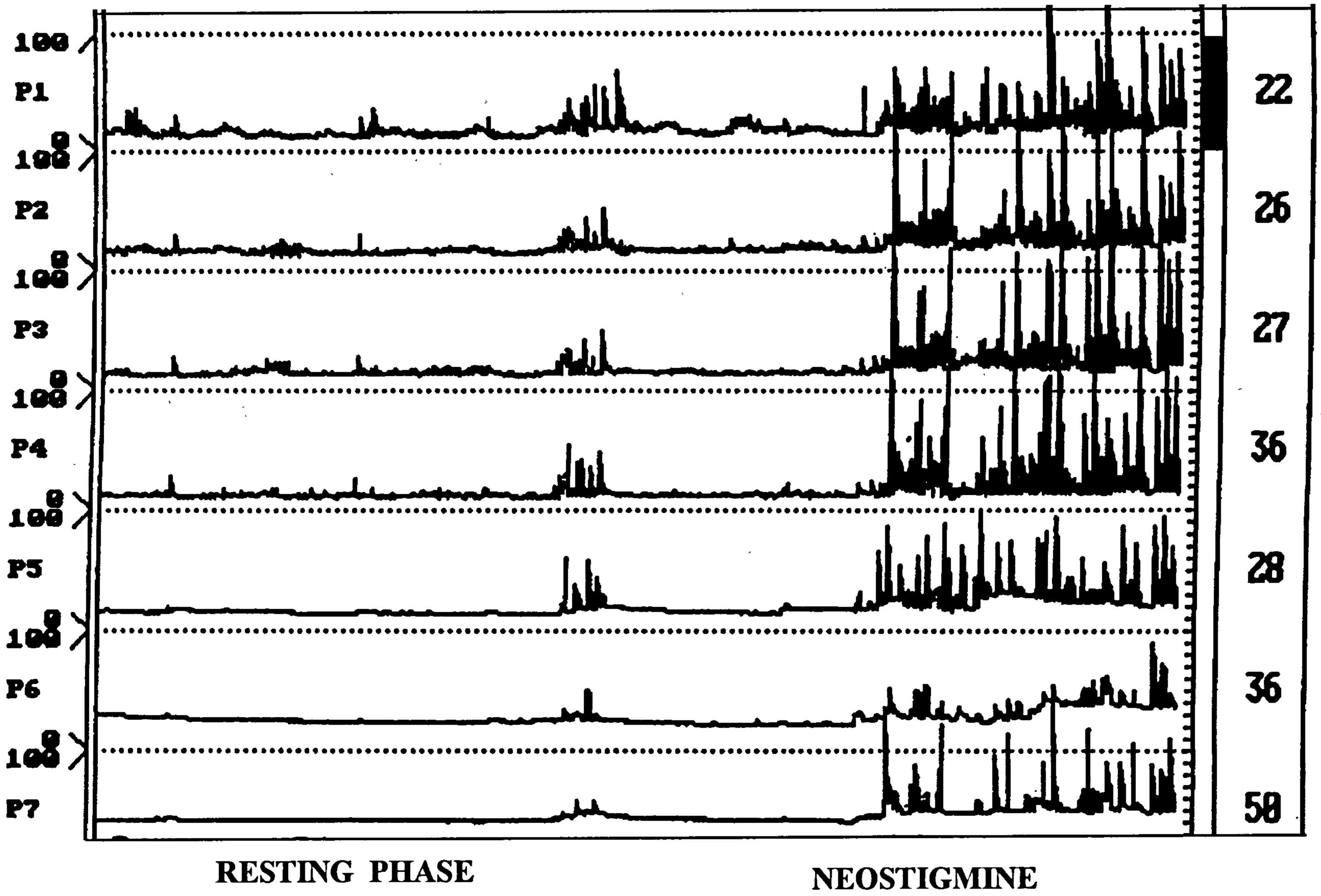


Fig 30. 7-channel recording of colonic pressure in a control. This recording demonstrates the effect of neostigmine (0.01mg/kg s.c.) on colonic motility. Channel 1 lies in the proximal transverse colon and the subsequent channels, placed 12cm apart, lie in series round the colon. Note the reduced moltility in the resting phase which highlights the subsequent response to the drug. Trace represents 2 hours of recording.

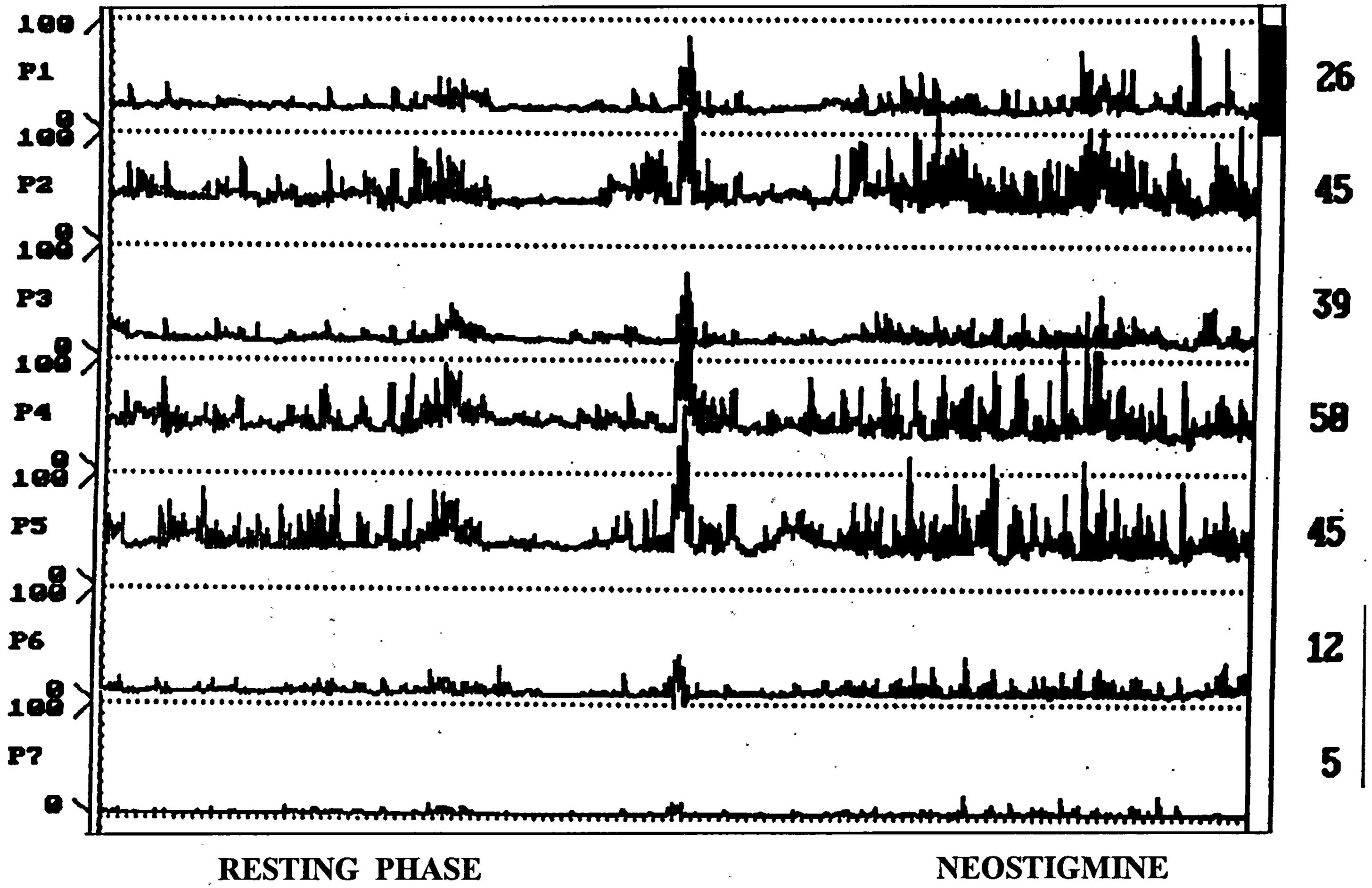


Fig 31. 7-channel recording of colonic pressure in a patient with postchildbirth/hysterectomy constipation. This recording demonstrates the effect of neostigmine (0.01mg/kg s.c.) on colonic motility. Channel 1 lies in the proximal transverse colon and the subsequent channels, placed 12cm apart, lie in series round the colon. Note the elevated moltility in the resting phase which mitigates the response to the drug. Trace represents 2 hours of recording.

FIG 32. THE EFFECT OF A 1000KCAL MEAL ON >5cmH_2O CONTRACTIONS IN CONTROLS.

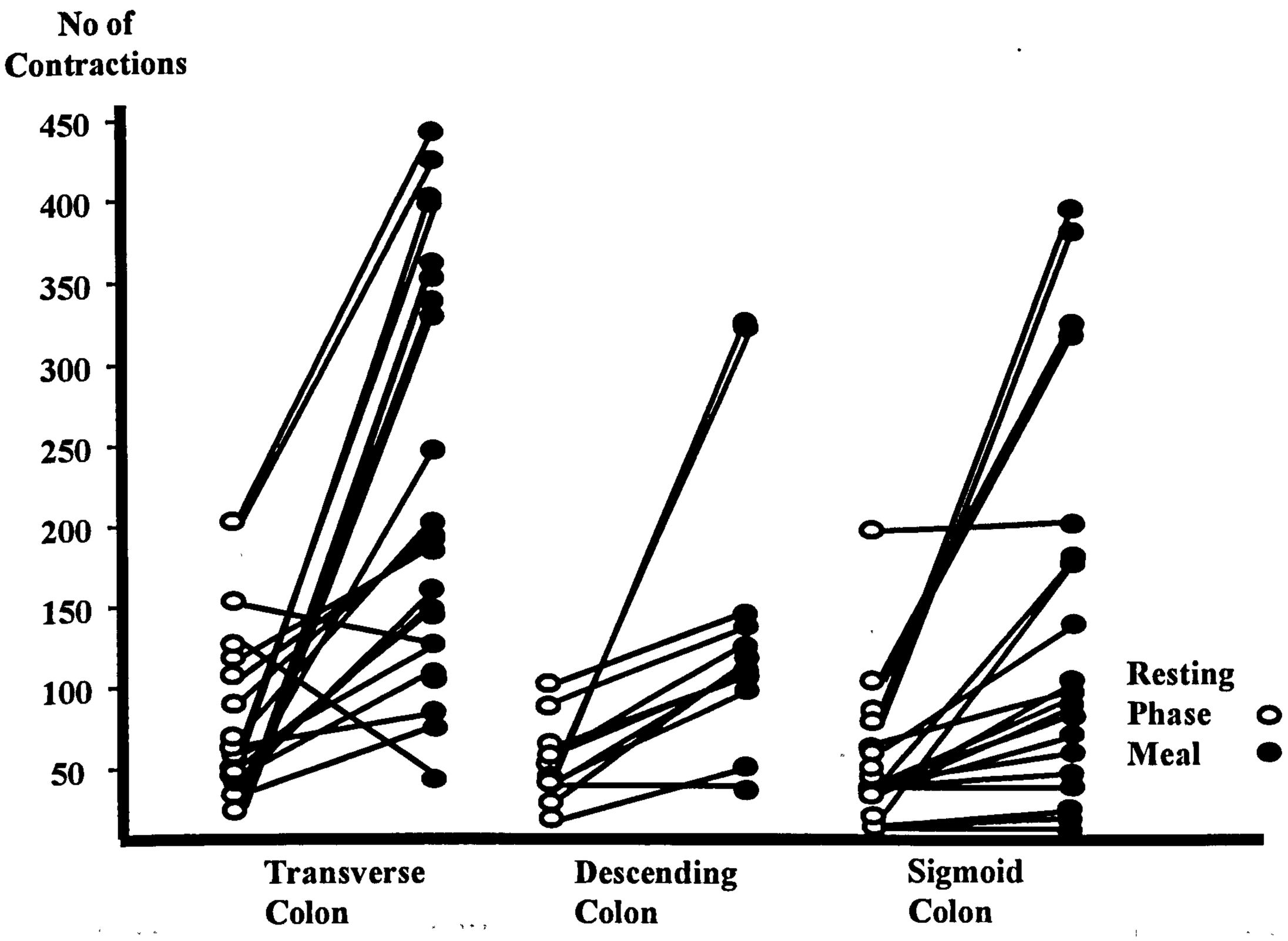


TABLE 18.

THE EFFECT OF A 1000KCAL MEAL ON >5cmH_2O CONTRACTIONS IN CONTROLS - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	67(54)	46(24)	51(45)
1000KCAL Meal	227(129)	136(93)	141(125)
P<	0.001	0.001	0.001

FIG 33. THE EFFECT OF A 1000KCAL MEAL ON > 5 CM H_2O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION.

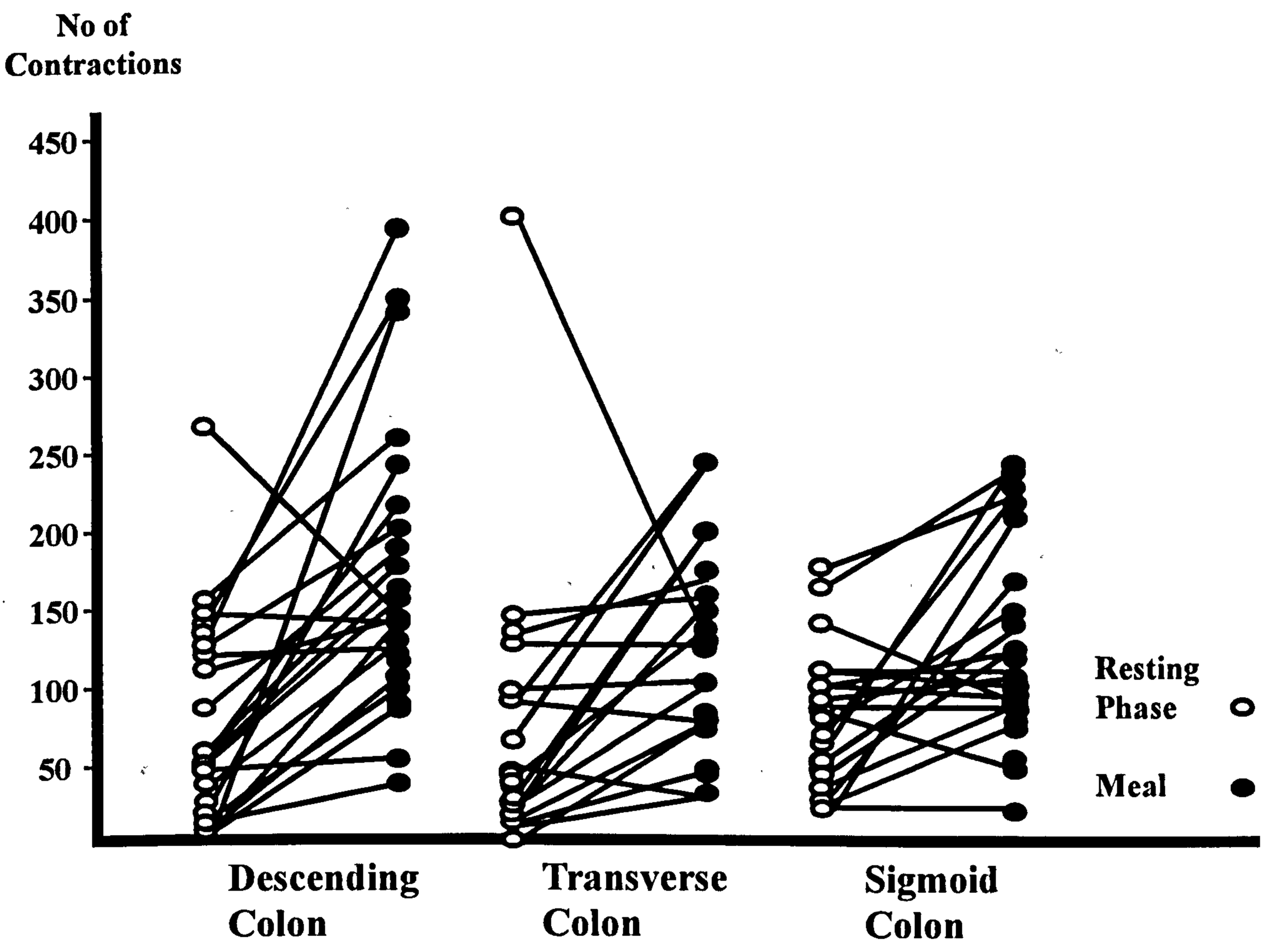


TABLE 19.

THE EFFECT OF A 1000KCAL MEAL ON > 5 CM H_2O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	86(64)	77(90)	84(43)
1000KCAL Meal	170(93)	122(60)	127(63)
P<	0.002	0.01	0.02

FIG 34. THE EFFECT OF A 1000KCAL MEAL ON >5cmH_2O COLONIC CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS.

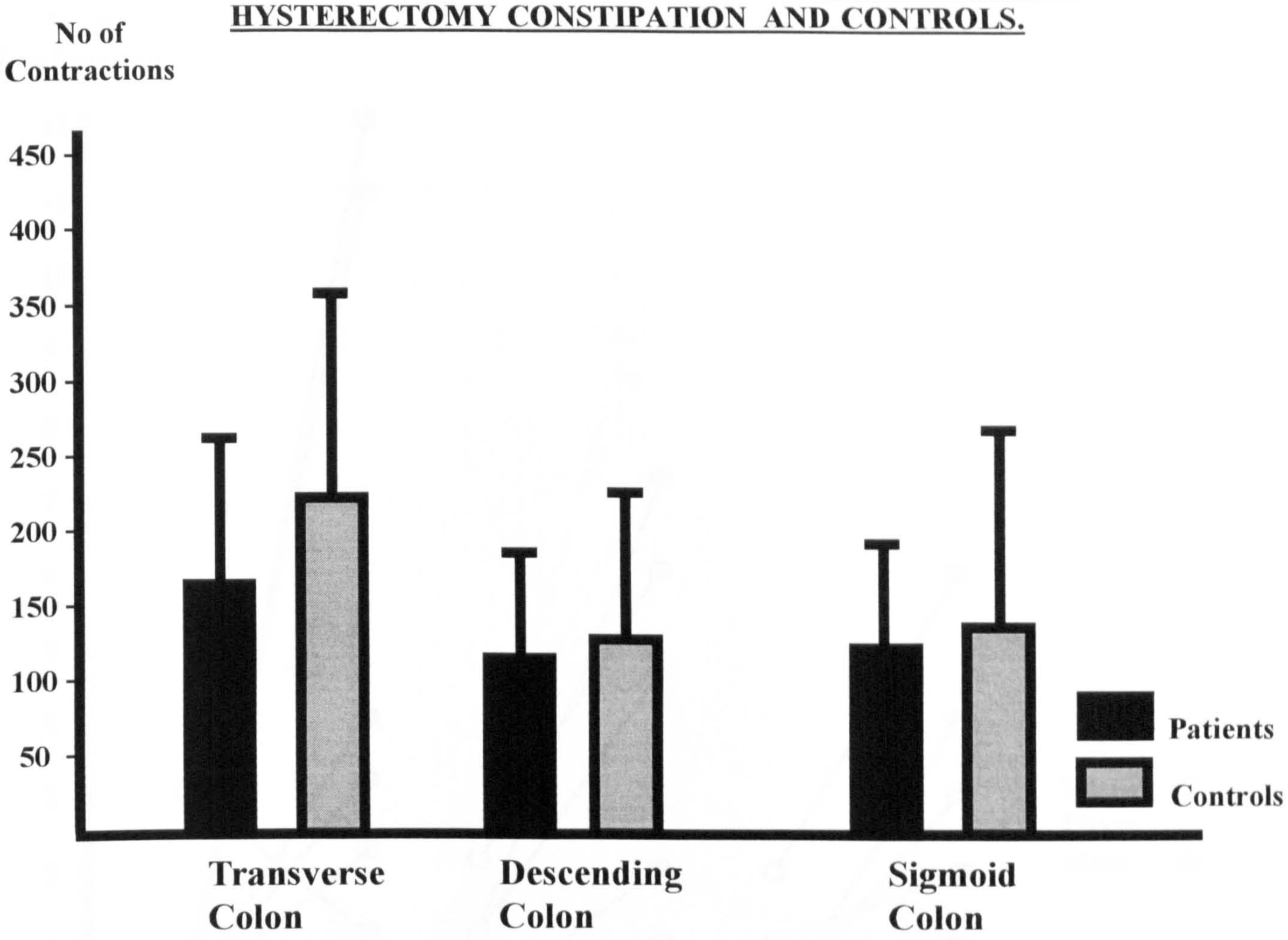


TABLE 20.

THE EFFECT OF A 1000KCAL MEAL ON >5cmH_2O COLONIC CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS-MEAN(STDEV).

Resting Phase	Transverse	Descending	Sigmoid
Patients	86(64)	77(90)	84(43)
Controls	67(54)	46(24)	51(45)
P<	0.41	0.72	0.01
1000KCAL Meal			
Patients	170(93)	122(60)	127(63)
Controls	227(129)	136(93)	141(125)
P<	0.16	0.92	0.5

FIG 35. THE EFFECT OF A 1000KCAL MEAL ON >50cmH_2O CONTRACTIONS IN CONTROLS.

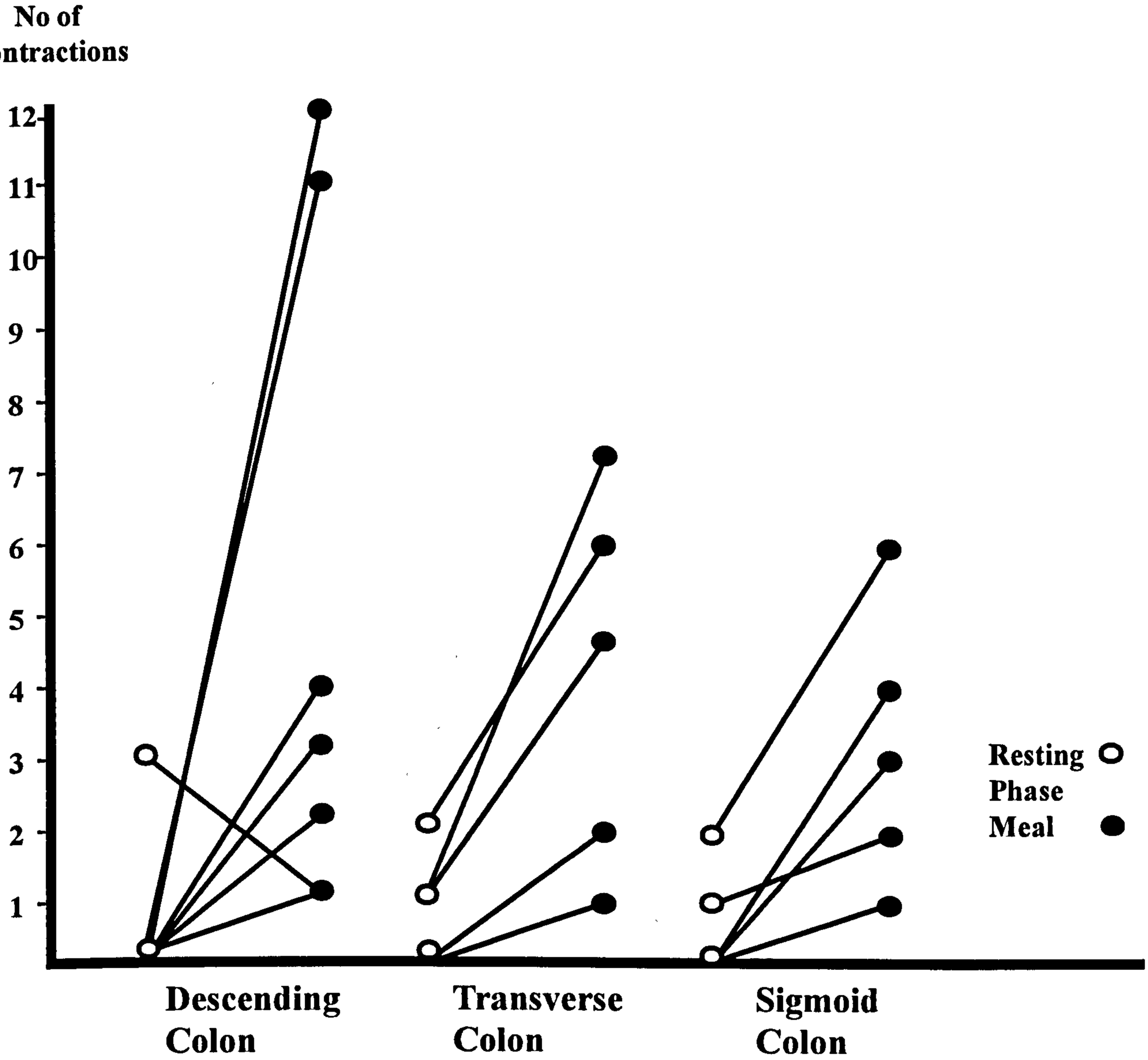


TABLE 21.

THE EFFECT OF A 1000KCAL MEAL ON >50cmH_2O CONTRACTIONS IN CONTROLS.

	Transverse	Descending	Sigmoid
Resting Phase	0.14(0.64)	0.58(0.9)	0.17(0.51)
1000KCAL Meal	2.3(3.2)	2.6(2.8)	1.1(1.6)
P<	0.001	0.07	0.009

FIG 36. THE EFFECT OF A 1000KCAL MEAL ON >50CMH$_2$O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION.

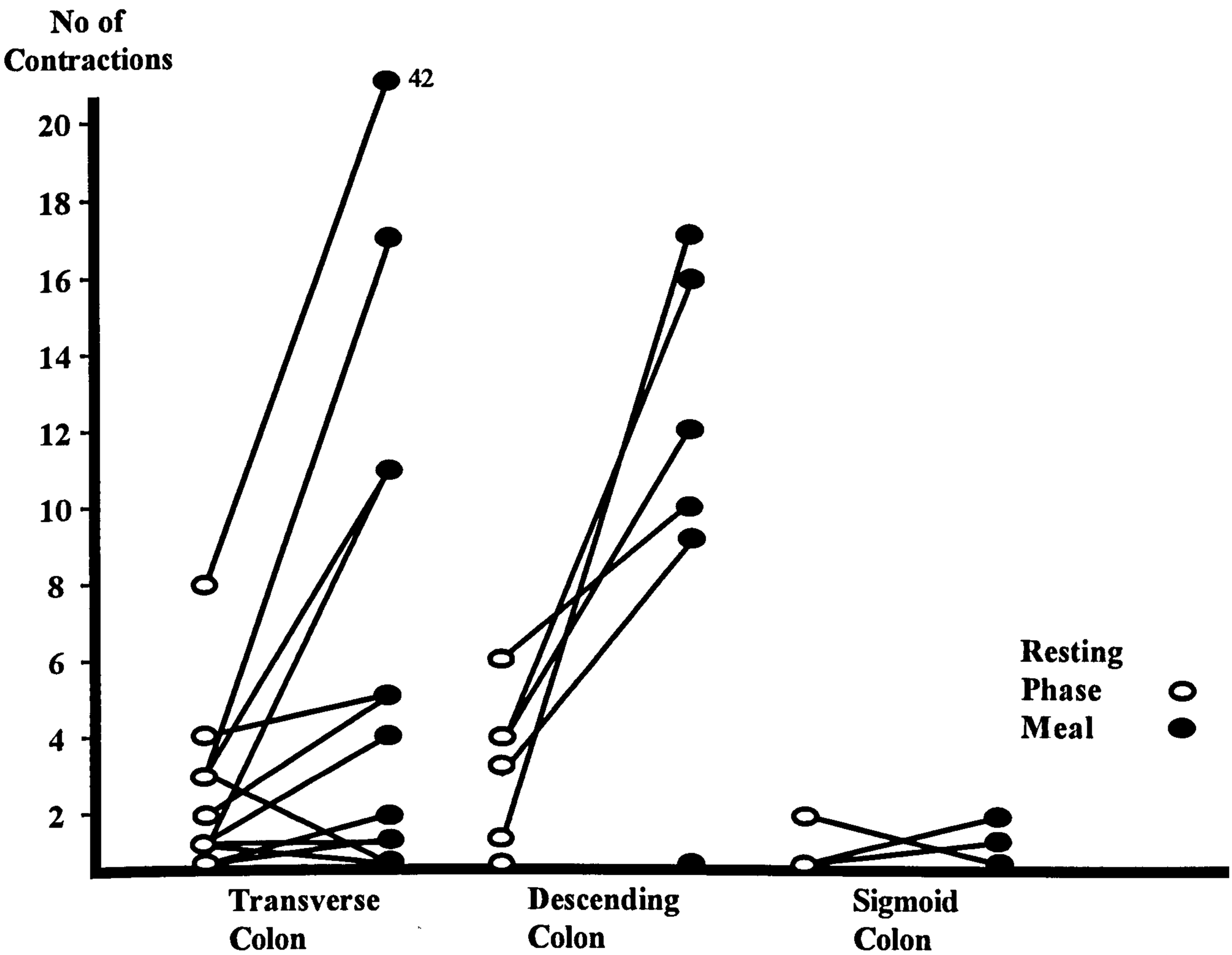


TABLE 22.

THE EFFECT OF A 1000KCAL MEAL ON >50CMH$_2$O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION.

	Transverse	Descending	Sigmoid
Resting Phase	1.2(1.9)	1.1(1.9)	0(0)
1000KCAL Meal	4.4(9.4)	3.8(6.3)	0.2(0.5)
P<	0.42	0.61	0.84

FIG 37. THE EFFECT OF A 1000KCAL MEAL ON >50cmH_2O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

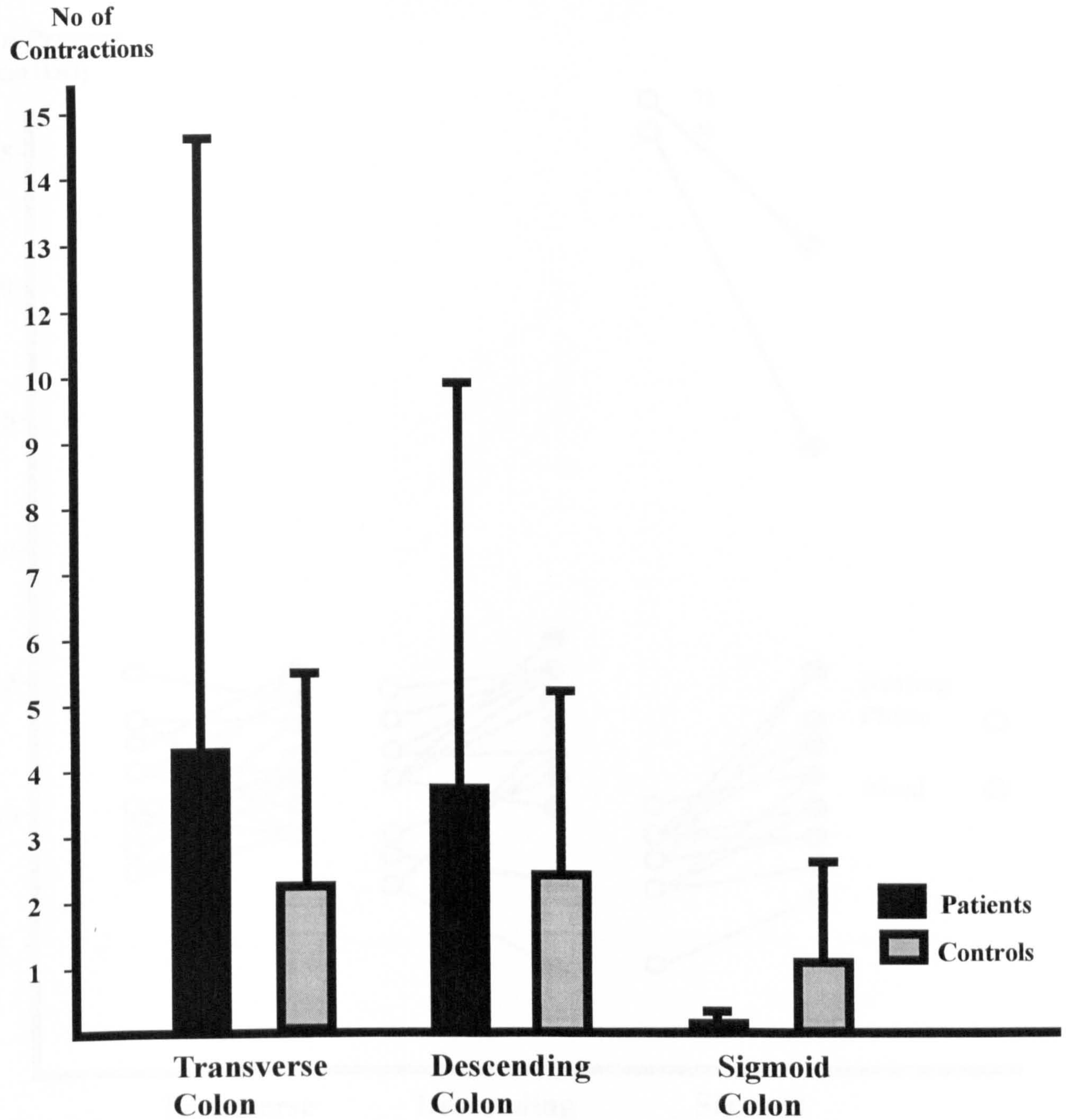


TABLE 23.

THE EFFECT OF A 1000KCAL MEAL ON >50cmH_2O CONTRACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

Resting Phase	Transverse	Descending	Sigmoid
Patients	1.2(1.9)	1.1(1.9)	0(0)
Controls	0.14(0.64)	0.58(0.9)	0.17(0.51)
P<	0.002	0.91	0.64
1000KCAL Meal			
Patients	4.4(9.4)	3.8(6.3)	0.2(0.5)
Controls	2.3(3.2)	2.6(2.8)	1.1(1.6)
P<	0.42	0.61	0.02

FIG 38. THE EFFECT OF A 1000KCAL MEAL ON MEAN COLONIC PRESSURE IN CONTROLS.

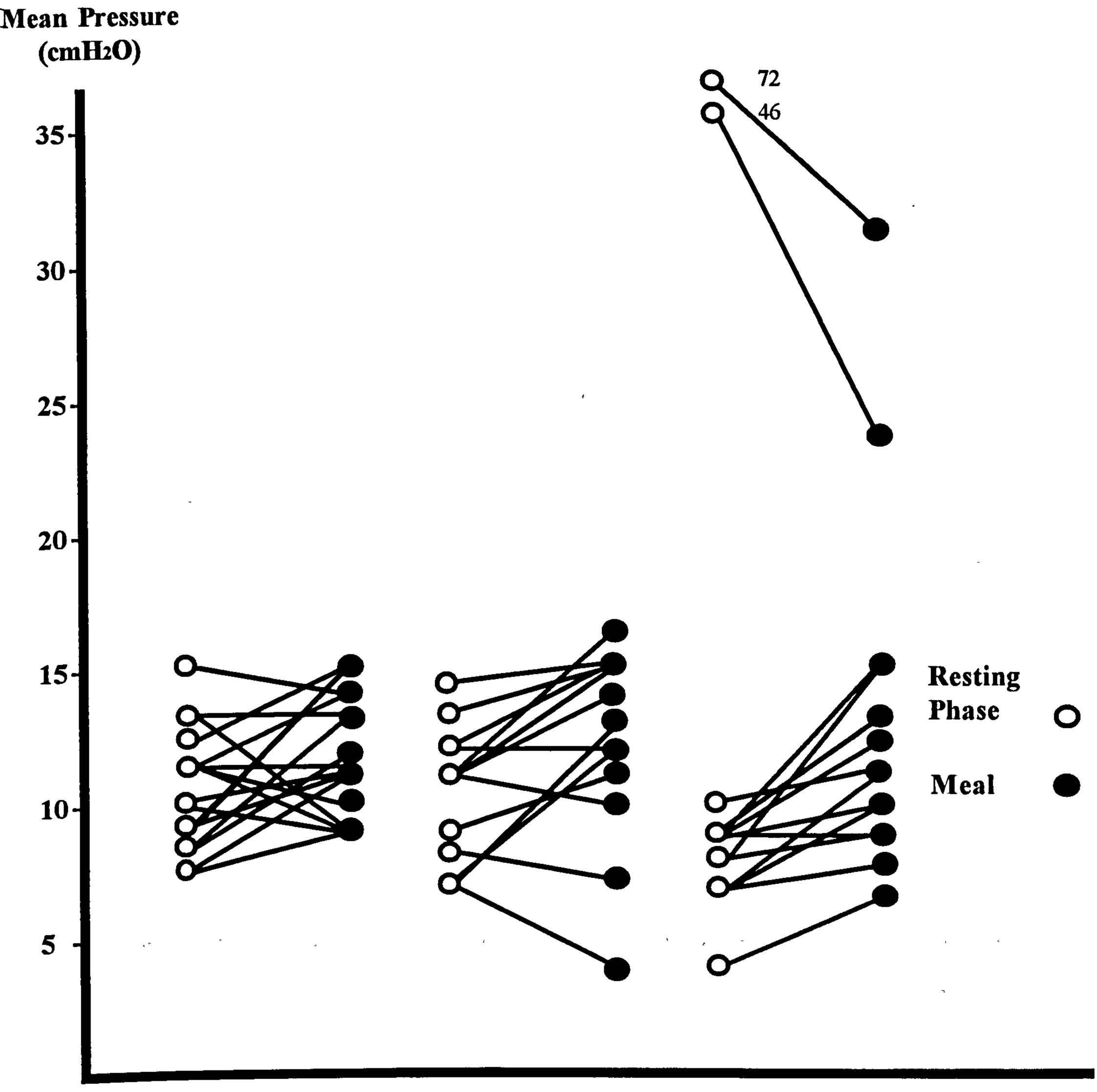


TABLE 24. THE EFFECT OF A 1000KCAL MEAL ON MEAN COLONIC PRESSURE IN CONTROLS - MEAN(STDEV).

	Transverse	Descending	Sigmoid
Resting Phase	10(1.9)	10.1(2.4)	13.6(16.6)
Meal	11.9(2.0)	11.6(3.5)	13.1(5.8)
P<	0.004	0.18	0.004

FIG 39. EFFECT OF A 1000KCAL MEAL ON THE MEAN COLONIC PRESSURE IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION.

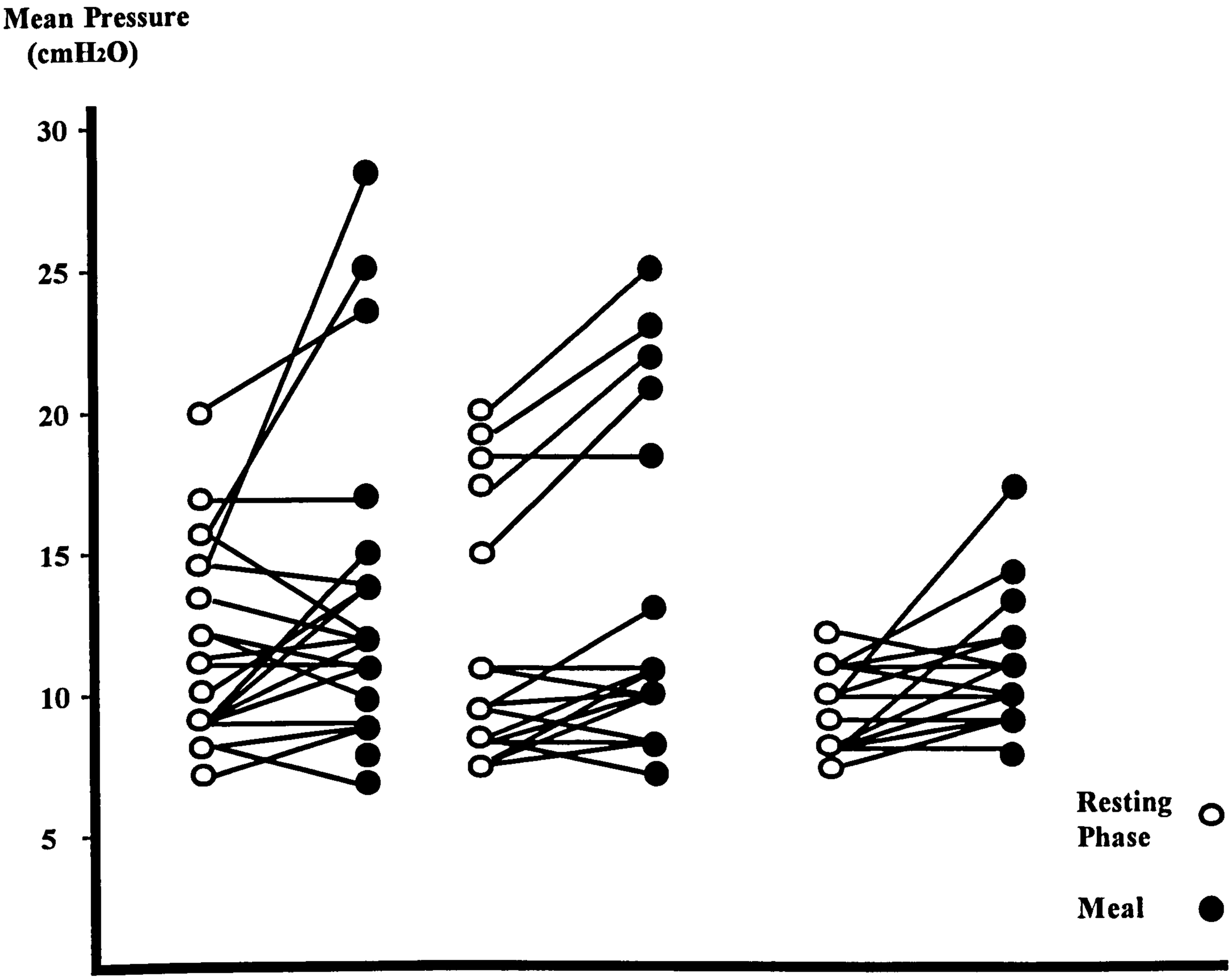


TABLE 25.

EFFECT OF A 1000KCAL MEAL ON THE MEAN COLONIC PRESSURE IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION - MEAN(STDEV).

	Transversre	Descending	Sigmoid
Resting Phase	11.4(3.4)	11.2(4.6)	9.5(1.5)
1000KCAL Meal	13.3(5.4)	13.3(6.0)	10.9(2.2)
P<	0.2	0.18	0.05

FIG 40. THE EFFECT OF A 1000KCAL MEAL ON THE MEAN COLONIC PRESSURE IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

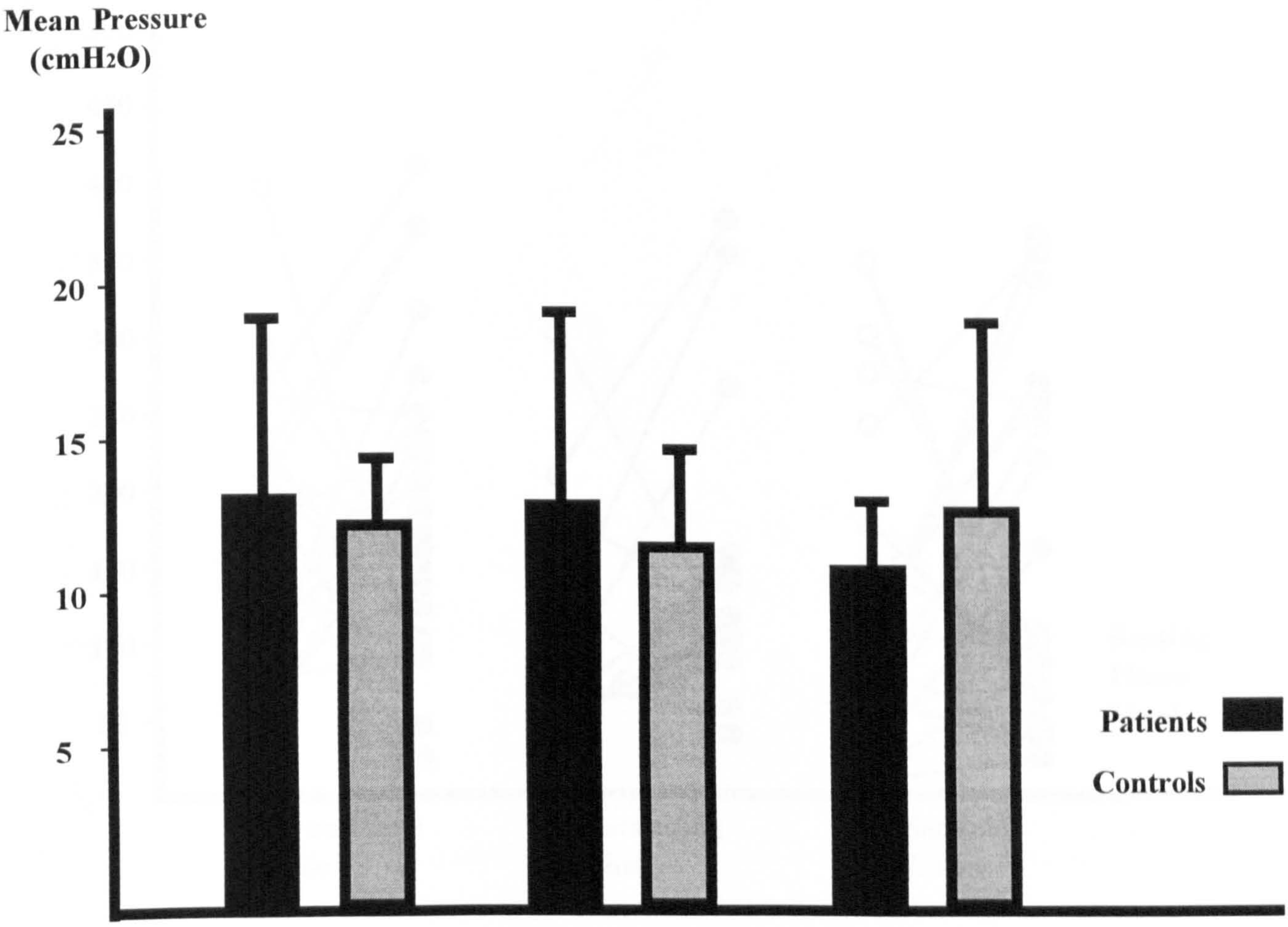


TABLE 26.

THE EFFECT OF A 1000KCAL MEAL ON THE MEAN COLONIC PRESSURE IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

Resting Phase		Transverse	Descending	Sigmoid
	Patients	11.4(3.4)	11.2(4.6)	9.5(1.5)
	Controls	10(1.9)	10.1(2.4)	13.6(16.6)
	P<	0.22	0.88	0.17
Meal				
	Patients	13.3(5.4)	13.3(6.0)	10.9(2.2)
	Controls	11.9(2.0)	11.6(3.5)	13.1(5.8)
	P<	0.73	0.96	0.34

FIG 41. THE EFFECT OF A 1000KCAL MEAL ON COLONIC MOTILITY IN CONTROLS.

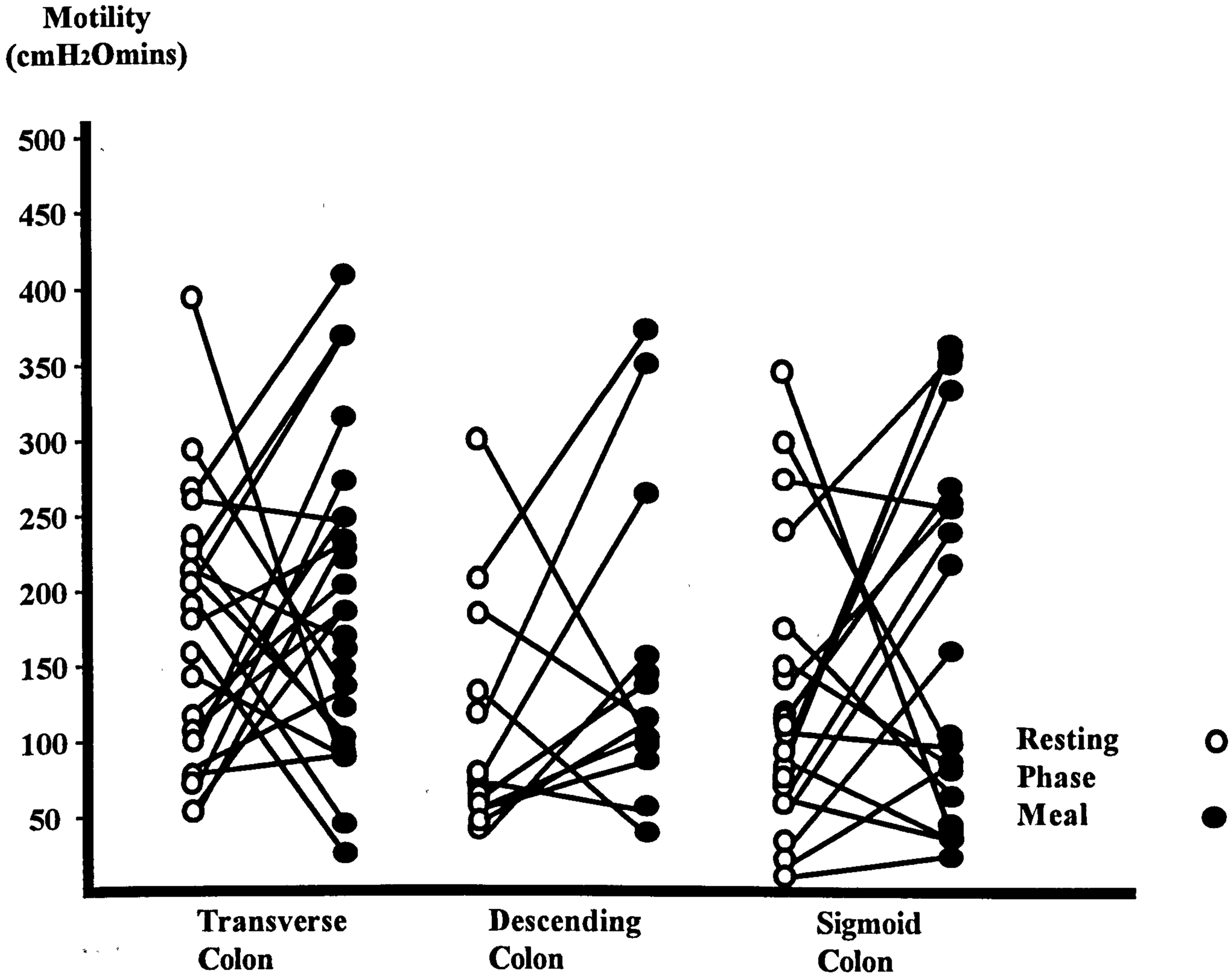


TABLE 27.

THE EFFECT OF A 1000KCAL MEAL ON COLONIC MOTILITY IN CONTROLS - MEAN(STDEV)

	Transverse	Descending	Sigmoid
Resting Phase	172(86)	113(78)	130(94)
1000Kcal Meal	189(105)	148(107)	173(120)
P<	0.59	0.32	0.37

FIG 42. THE EFFECT OF A 1000KCAL MEAL ON COLONIC MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION.

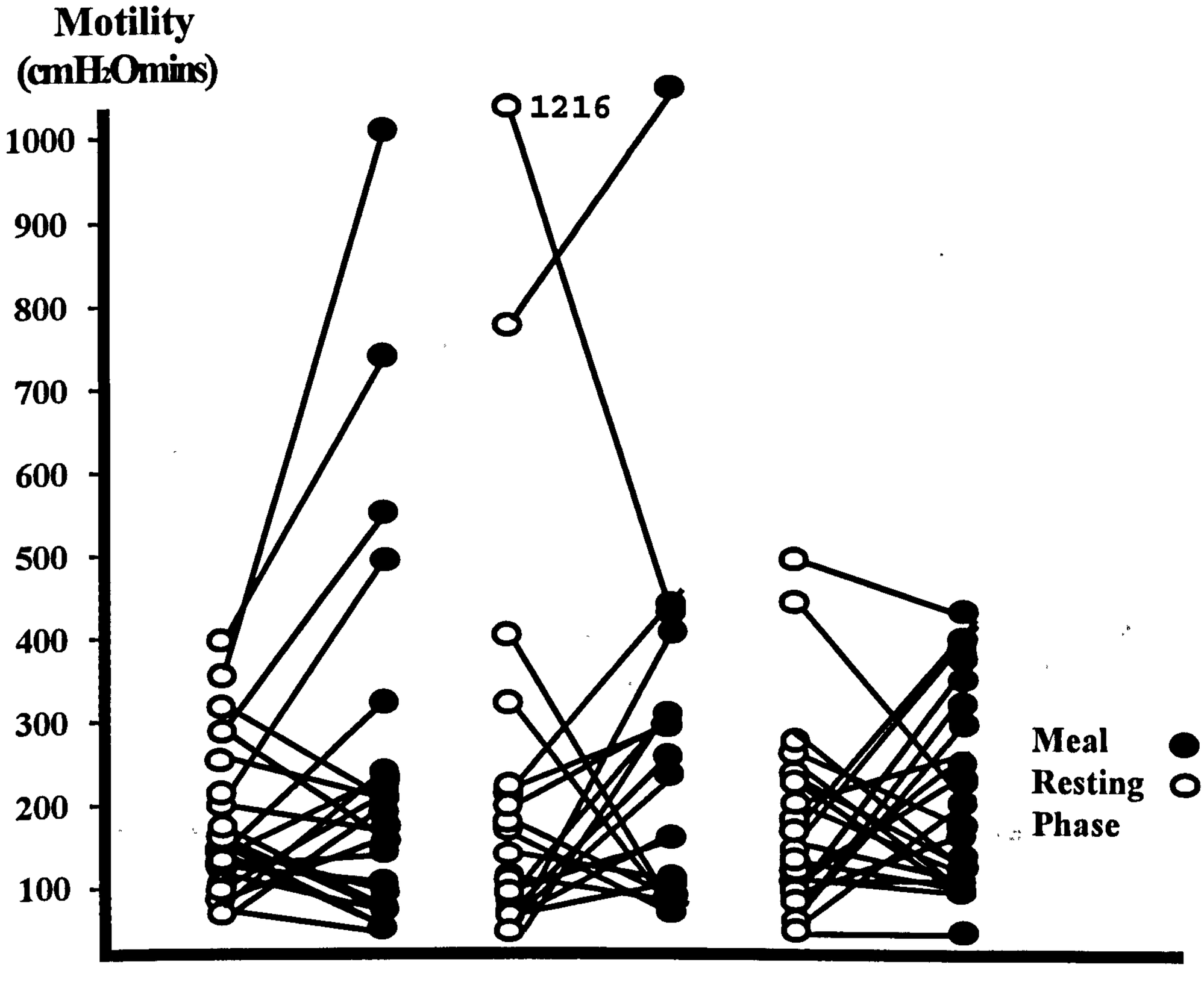


TABLE 28.

THE EFFECT OF A 1000KCAL MEAL ON COLONIC MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION- MEAN(STDEV)

	Transverse	Descending	Sigmoid
Resting Phase	169(97)	222(295)	152(107)
1000Kcal Meal	239(238)	242(234)	191(111)
P<	0.63	0.18	0.19

FIG 43. THE EFFECT OF A 1000KCAL MEAL ON COLONIC MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

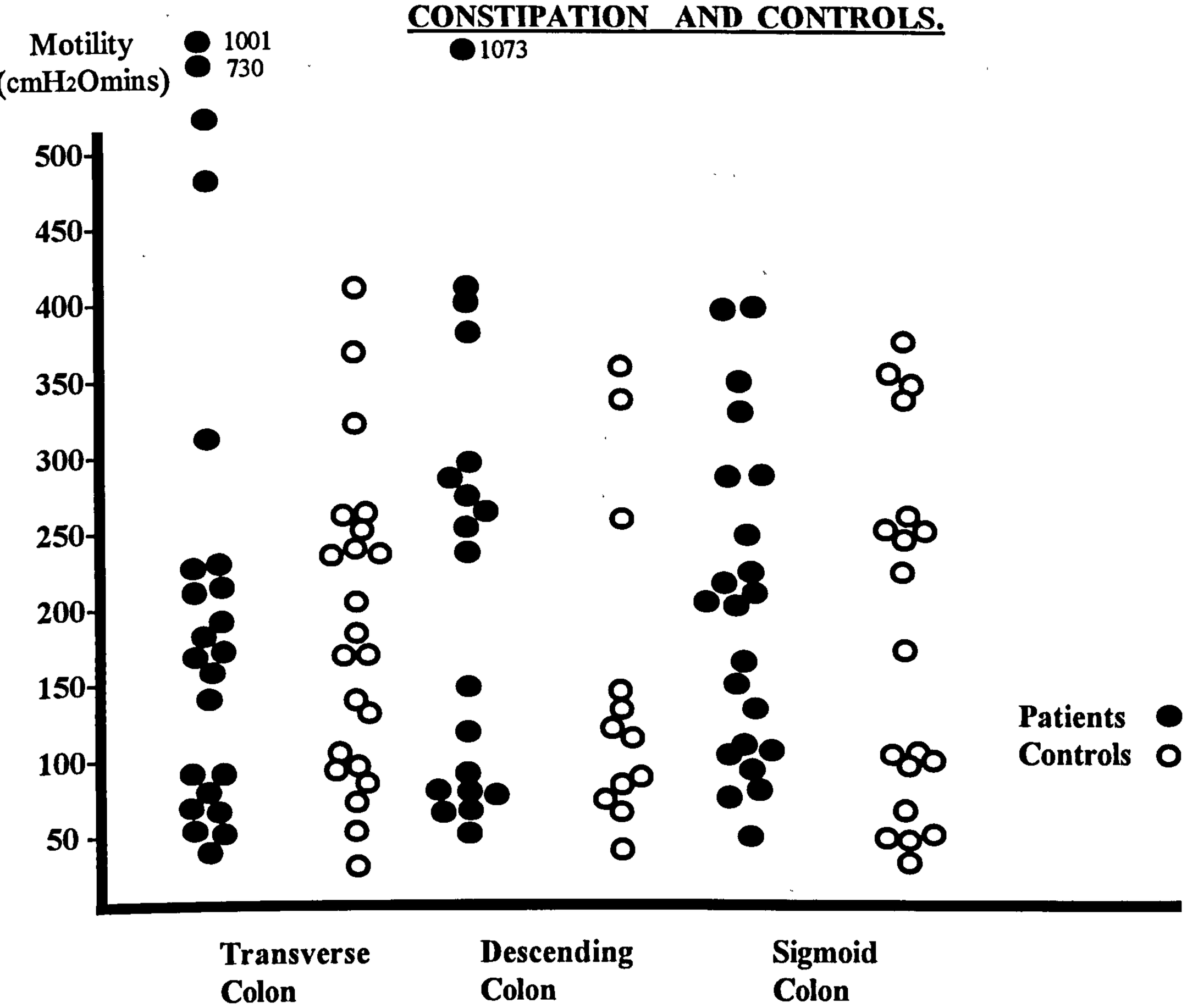


TABLE 29.

THE EFFEFT OF A 1000KCAL MEAL ON COLONIC MOTILITY IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

Resting Phase	Transverse	Descending	Sigmoid
Patients	169(97)	222(295)	152(107)
Controls	172(86)	113(78)	130(94)
P<	0.87	0.54	0.49
1000KCAl Meal			
Patients	239(238)	242(234)	194(111)
Controls	189(105)	148(107)	173(120)
P<	0.90	0.30	0.45

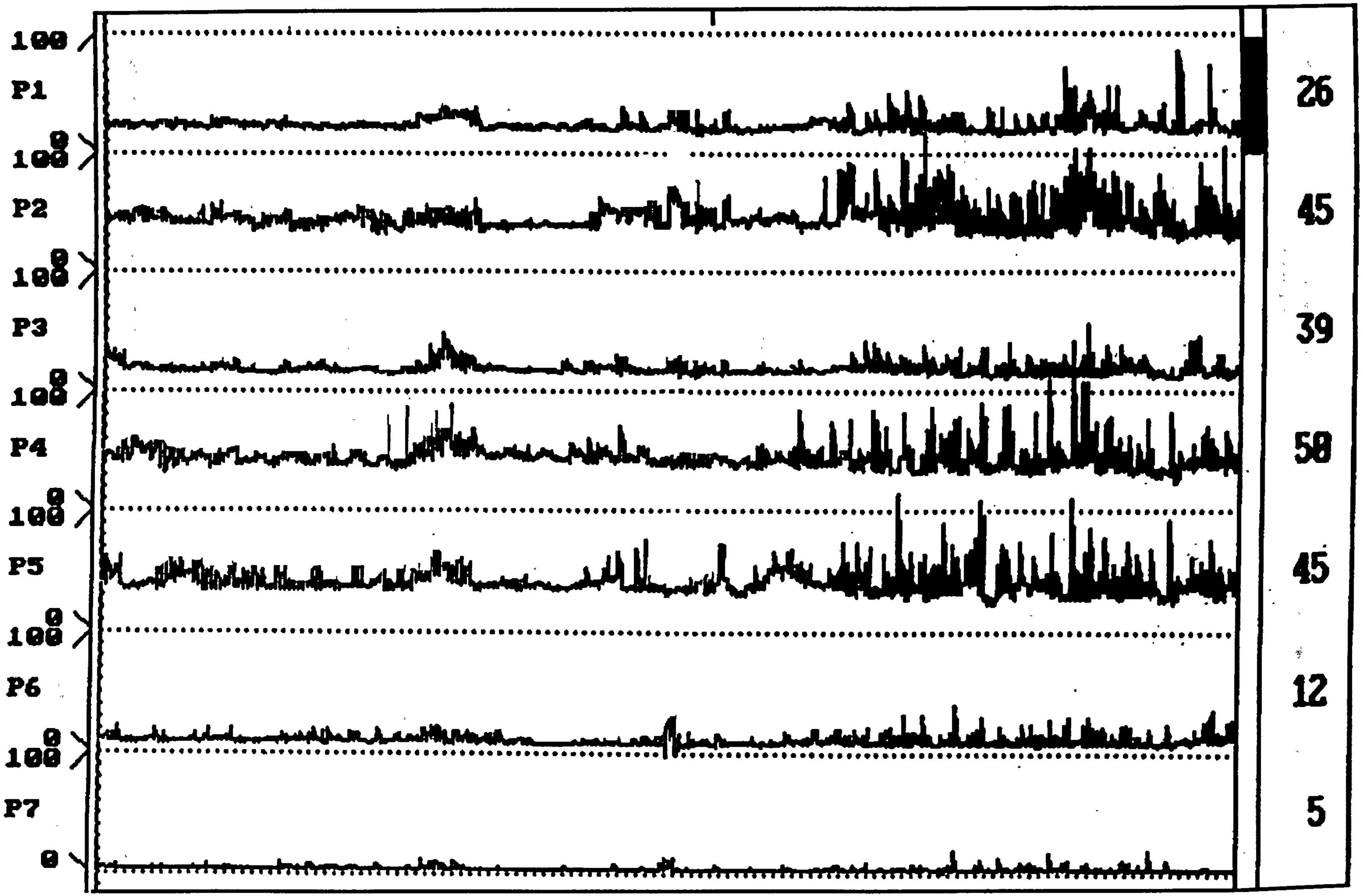


Fig 44. Colonic response to a 1000Kcal meal in a control. The event marker (middle of top line) indicates when the meal was consumed. In this case the major component of the response is in the transverse colon (channels 1, 2, 3).

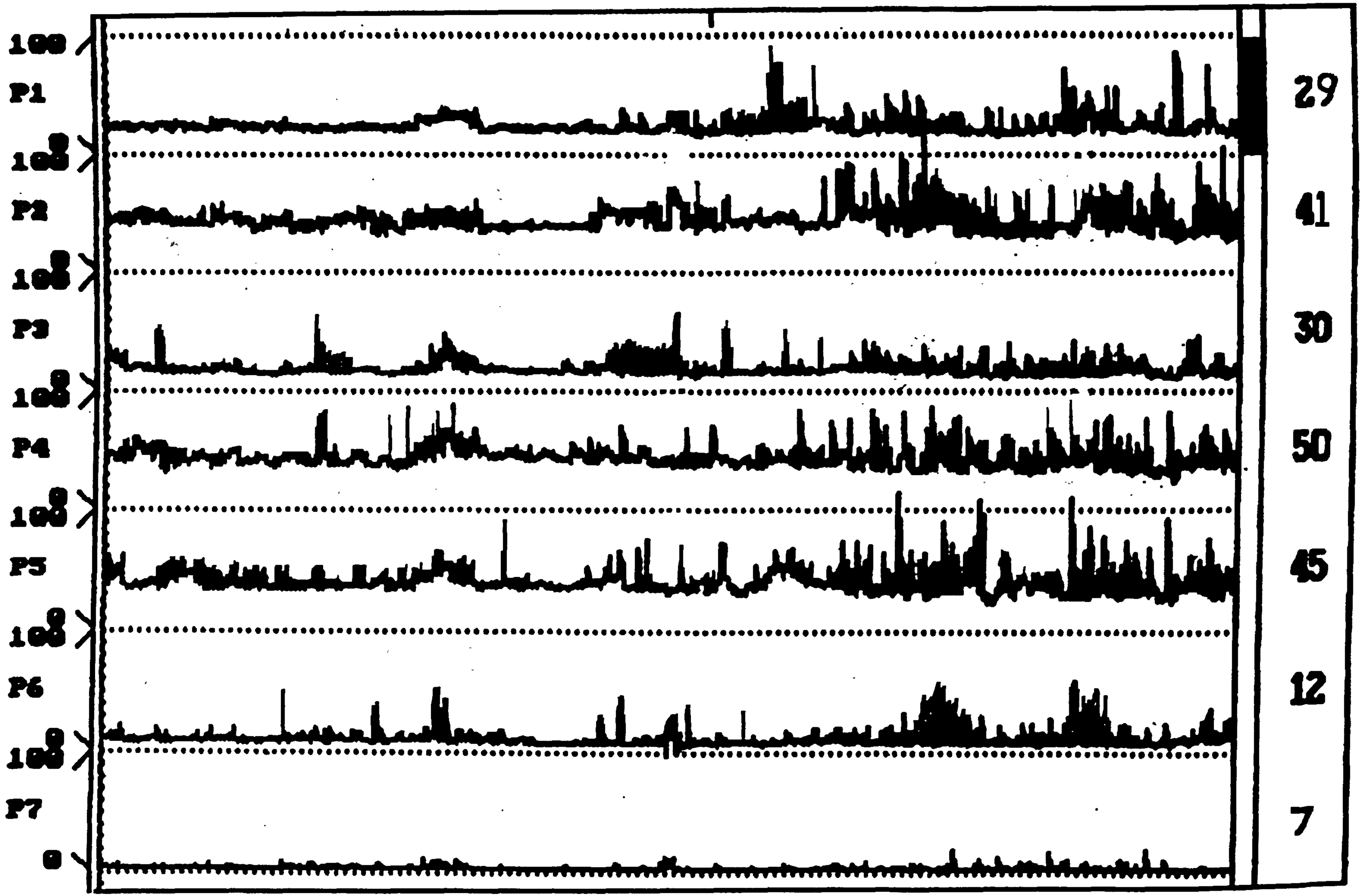


Fig 45. Demonstration of the colonic response to a 1000Kcal meal in a patient with postchildbirth/hysterectomy constipation. The event marker (middle of top line) indicates the beginning of the meal. In this patient the "gastrocolic" reflex appears to be intact. This tracing represents 2 hours of recording.

TABLE 30.

COMPARISON OF THE BASAL MOTILITY PATTERNS FOR THE TWO RESTING PHASES IN CONTROLS (AREA UNDER THE MOTILITY CURVE).

	Transverse	Descending	Sigmoid
1000Kcal Meal	172(86)	113(78)	130(94)
Neostigmine Test	131(55)	90(48)	116(77)
P<	0.46	0.32	0.84

TABLE 31.

COMPARISON OF THE BASAL MOTILITY PATTERNS FOR THE TWO RESTING PHASES IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION (AREA UNDER THE MOTILITY CURVE).

	Transverse	Descending	Sigmoid
1000Kcal Meal	169(97)	222(295)	152(107)
Neostigmine Test	241(248)	323(383)	183(115)
P<	0.35	0.76	0.90

FREQUENCY OF AND DISTANCE PROPAGATED BY COLONIC MASS ACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

FIG 46.

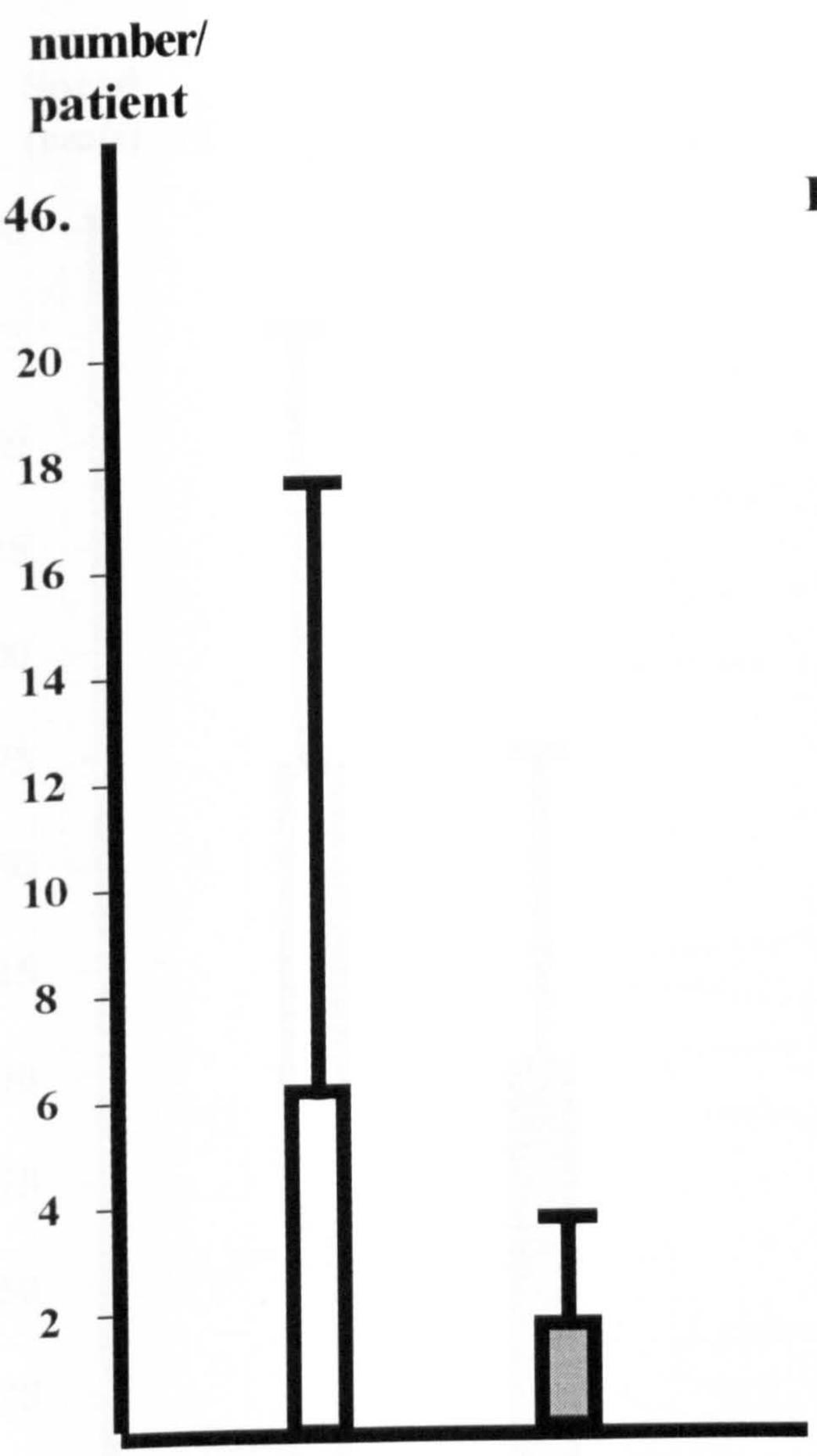


FIG 47.

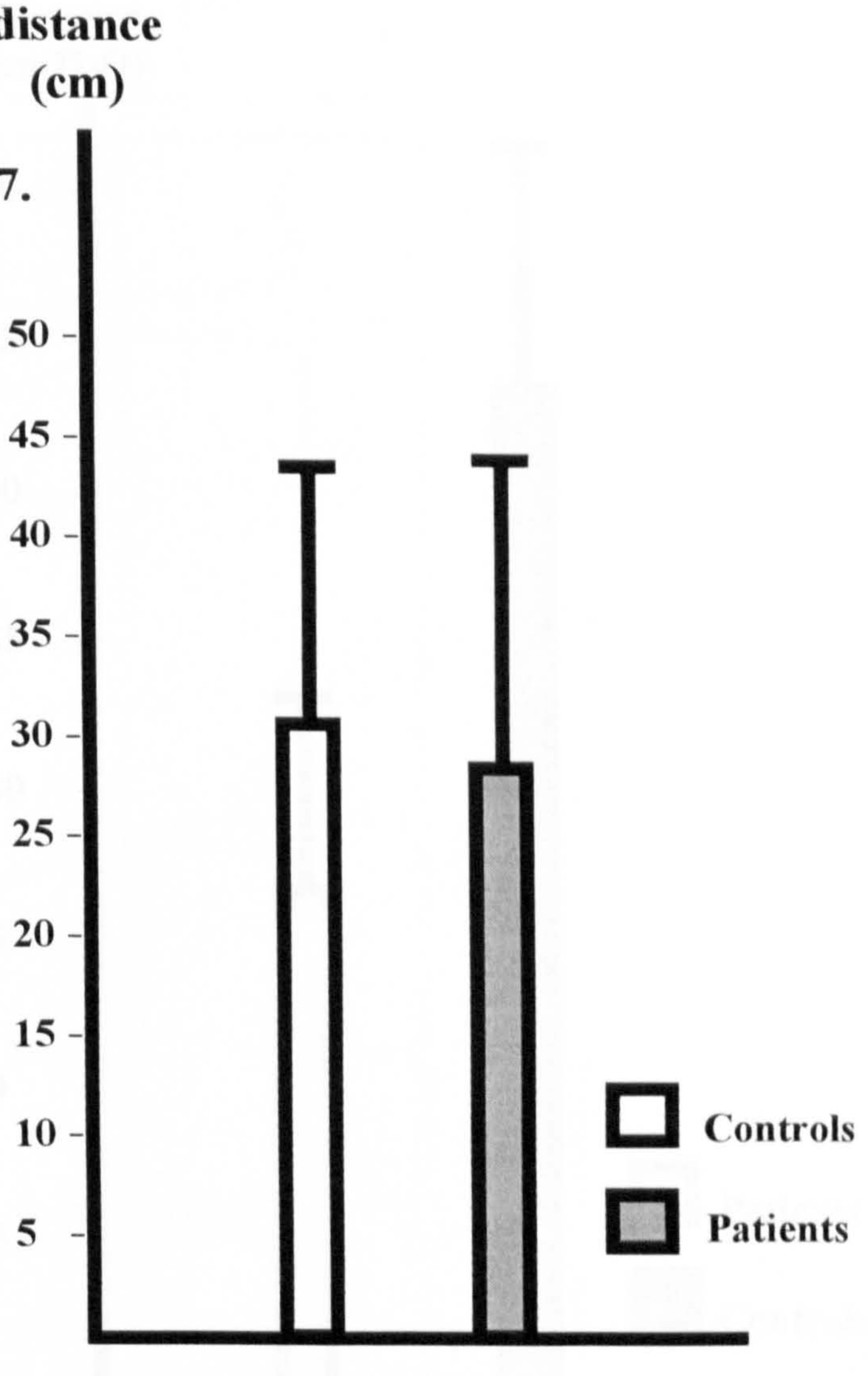


TABLE 32. FREQUENCY OF AND DISTANCE PROPAGATED BY COLONIC MASS ACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

	Frequency	Distance Propagated
Patients	5.8(12)	31(12)
Controls	1.5(1.6)	28(15)
P<	0.8	0.33

SPEED OF PROPAGATION OF AND PEAK PRESSURE GENERATED BY COLONIC MASS ACTIONS IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

FIG 48.

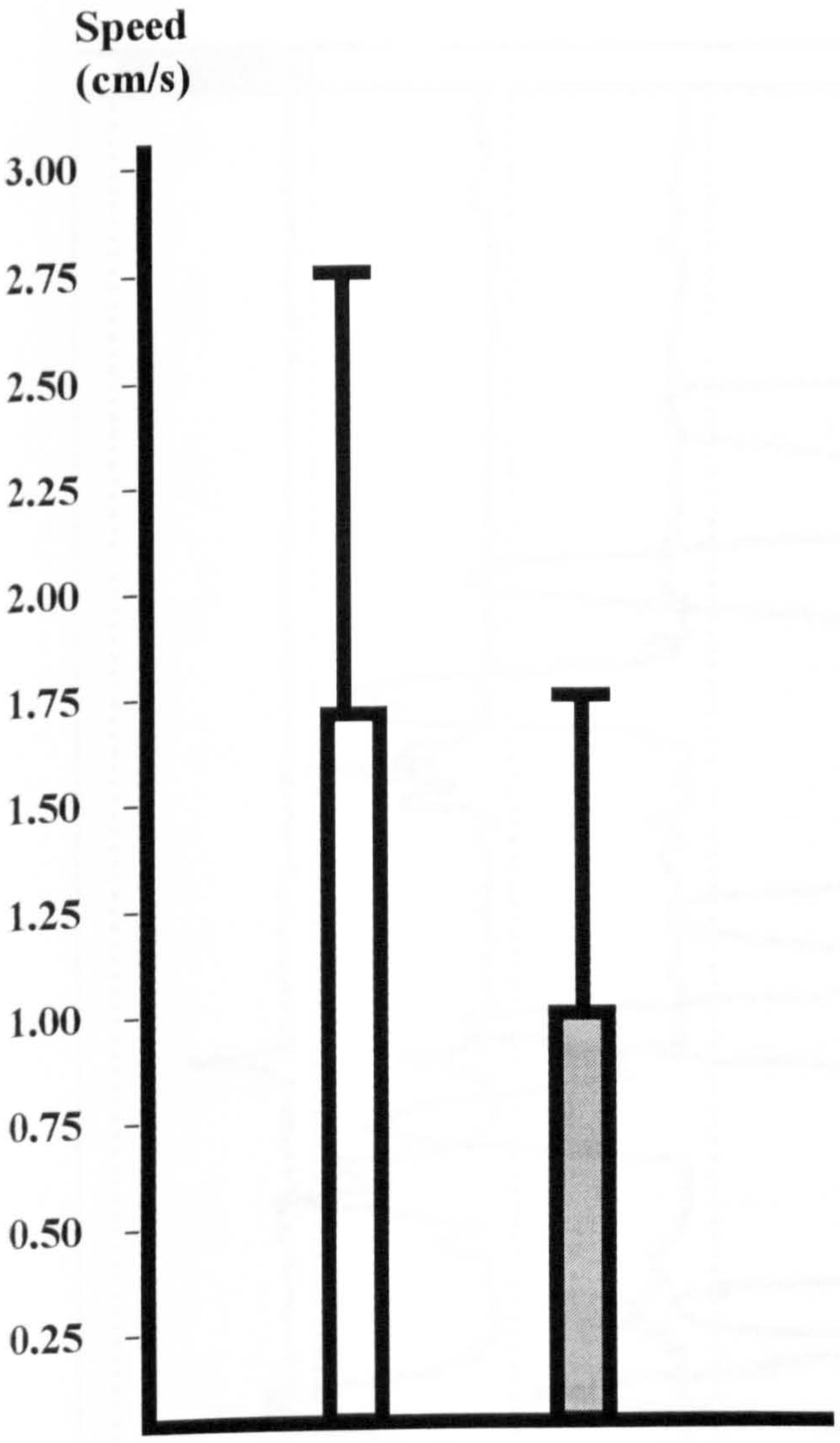


FIG 49.

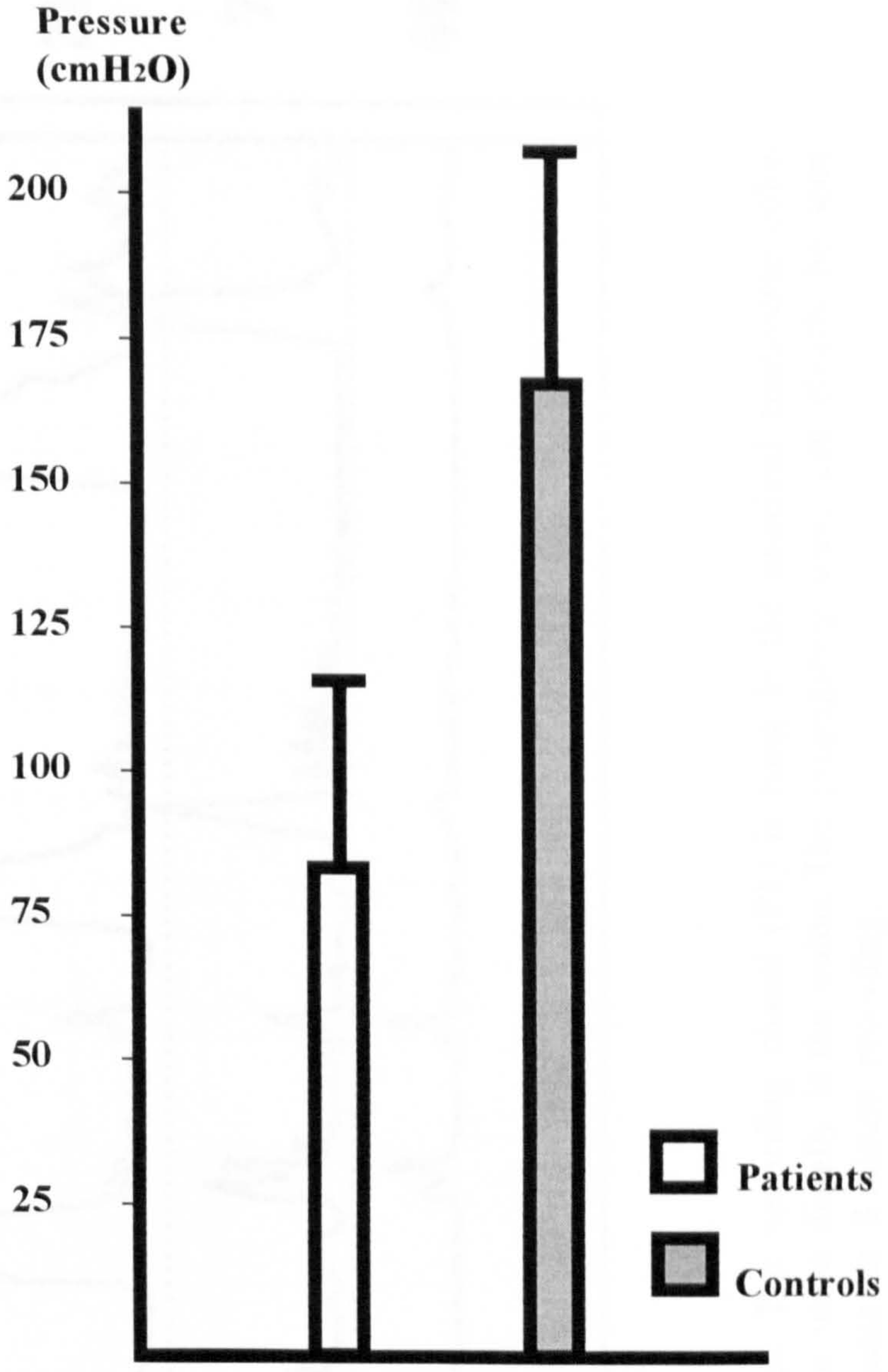


TABLE 33. SPEED OF PROPAGATION OF AND PEAK PRESSURE GENERATED BY COLONIC MASS ACTIONS IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

	Speed of Propagation	Peak Pressure
Patients	1.7(1.0)	81(34)
Controls	1.0(0.8)	160(47)
P<	0.02	0.001

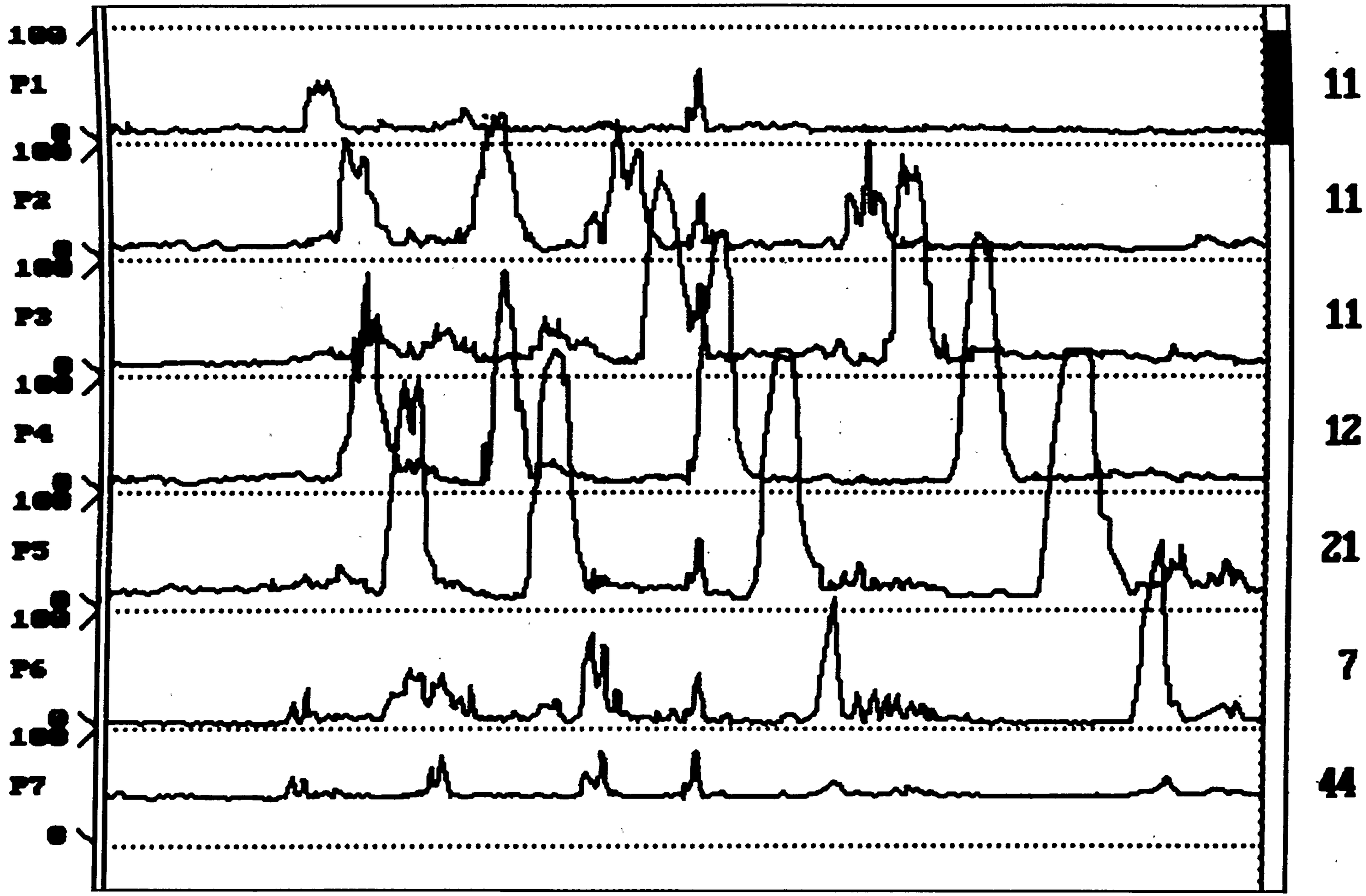


Fig 50. Demonstation of a mass action in a control. The recording chanel (P1) is lying in the proximal transverse colon. Subsequent channels, placed 12cm apart, lie more distally in the colon. The propagating wave can clearly be seen moving in an aboral direction. Trace represents an 8 minute recording.

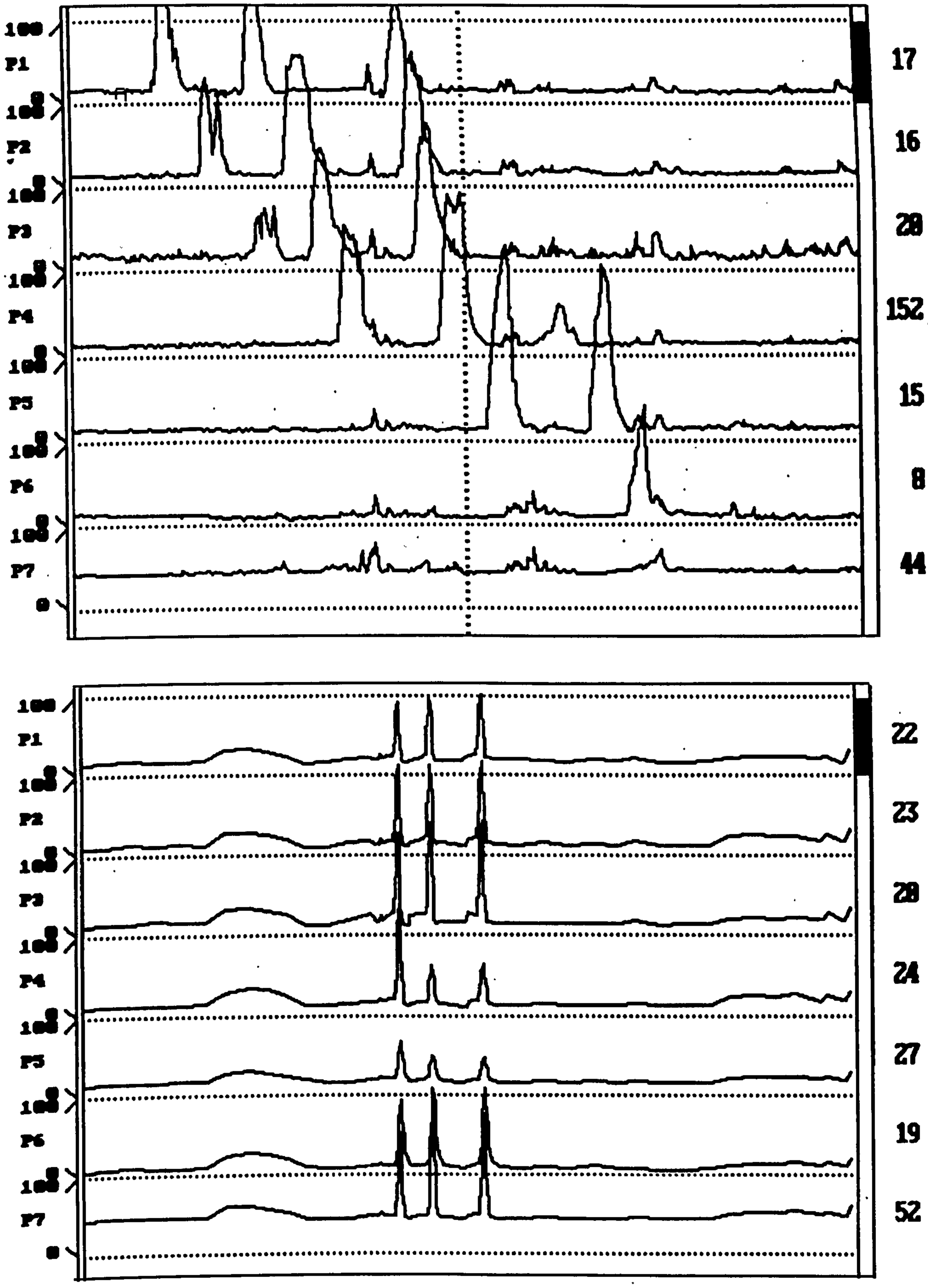


Fig 51. Demonstration of mass actions in controls (upper trace). The contractile waves were seen propagating from proximal to distal in the human colon. In contrast, a cough (lower trace) results in a simultaneous rise in intracolonic (intra-abdominal) pressure. These pressure rises are an artifact.

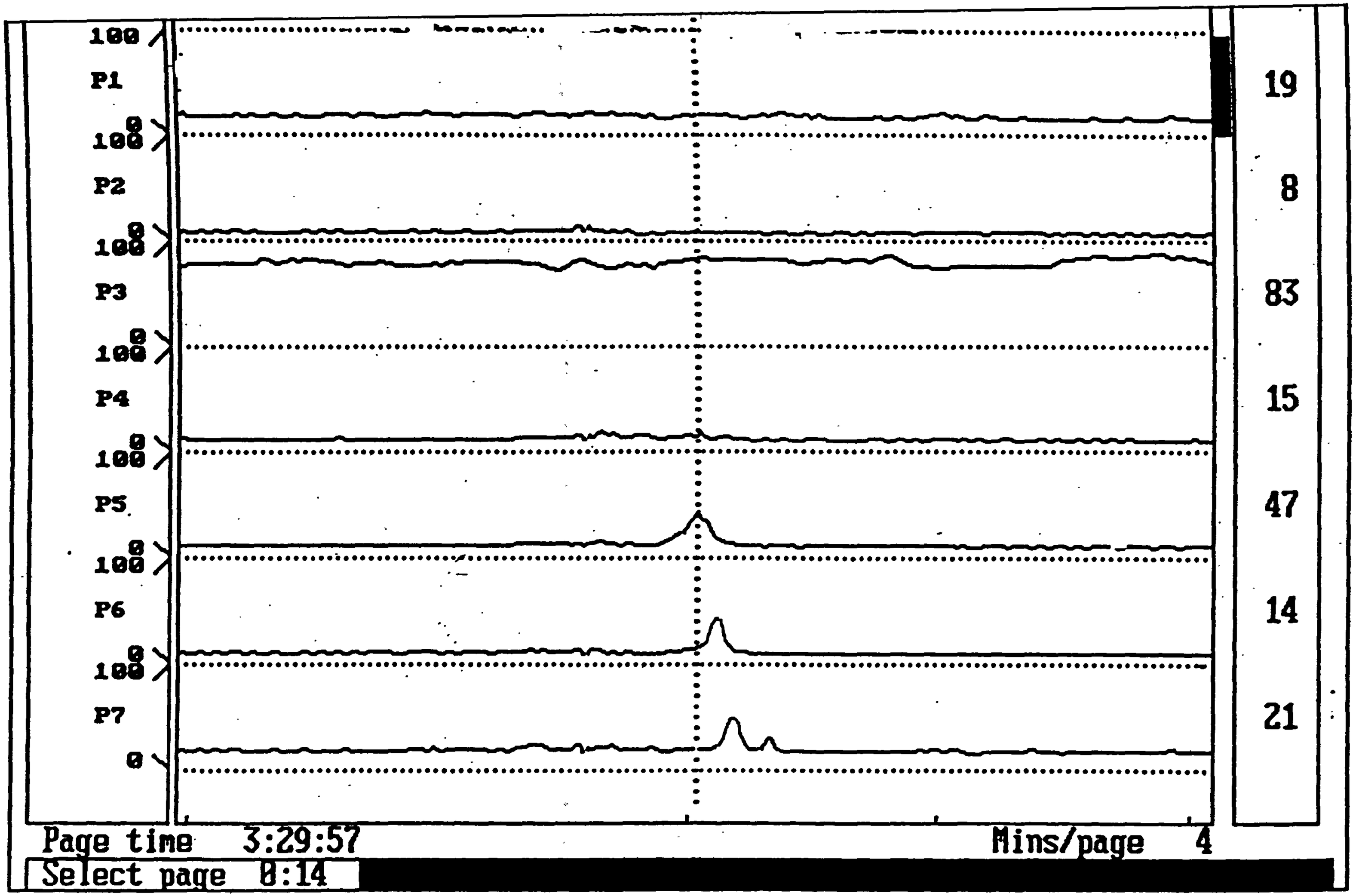


Fig 52. Demonstration of mass actions in patients with postchildbirth/hysterectomy constipation. Note that these propagative waves generate less pressure than in controls. The trace represents 4 minutes of recording time.

FIG 53. RESTING ANAL CANAL PRESSURE AND MAXIMUM ANAL CANAL PRESSURE IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

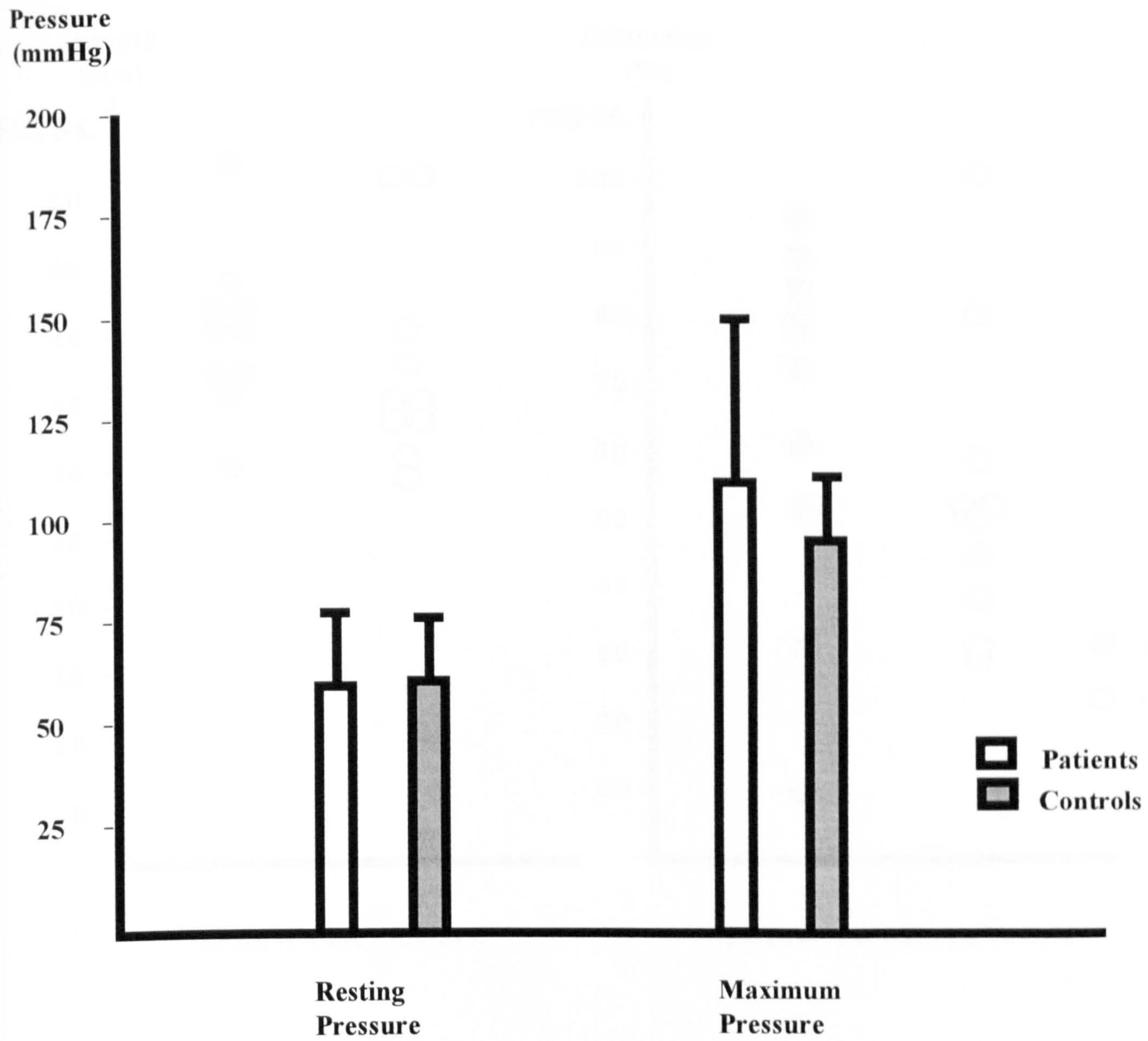
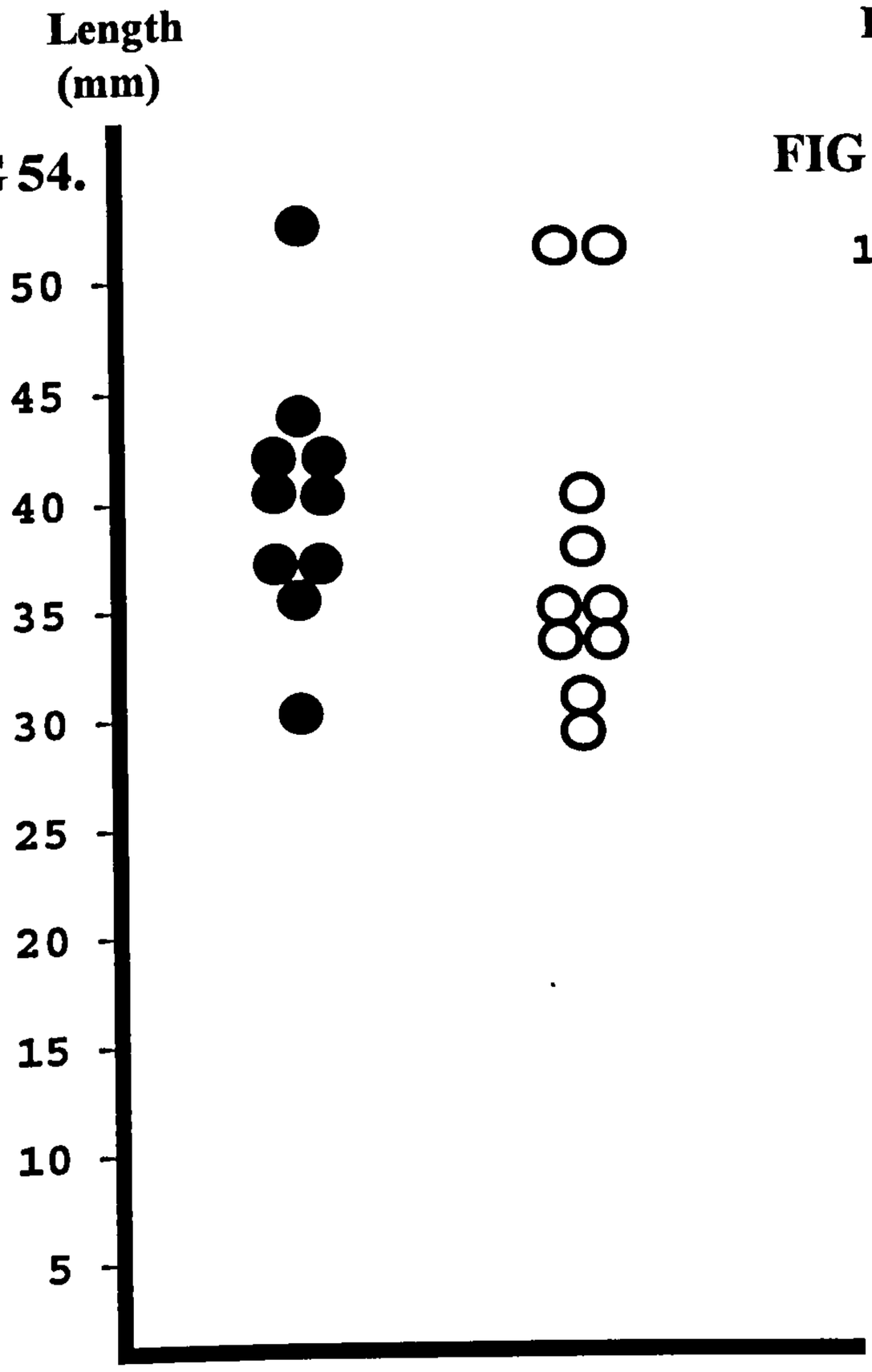


TABLE 34. RESTING ANAL CANAL PRESSURE AND MAXIMUM ANAL CANAL PRESSURE IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

	Resting Pressure	Maximum Pressure
Patients	59.1(16.8)	111.5(38.6)
Controls	56.9(16.4)	89.6(24.7)
P<	0.88	0.19

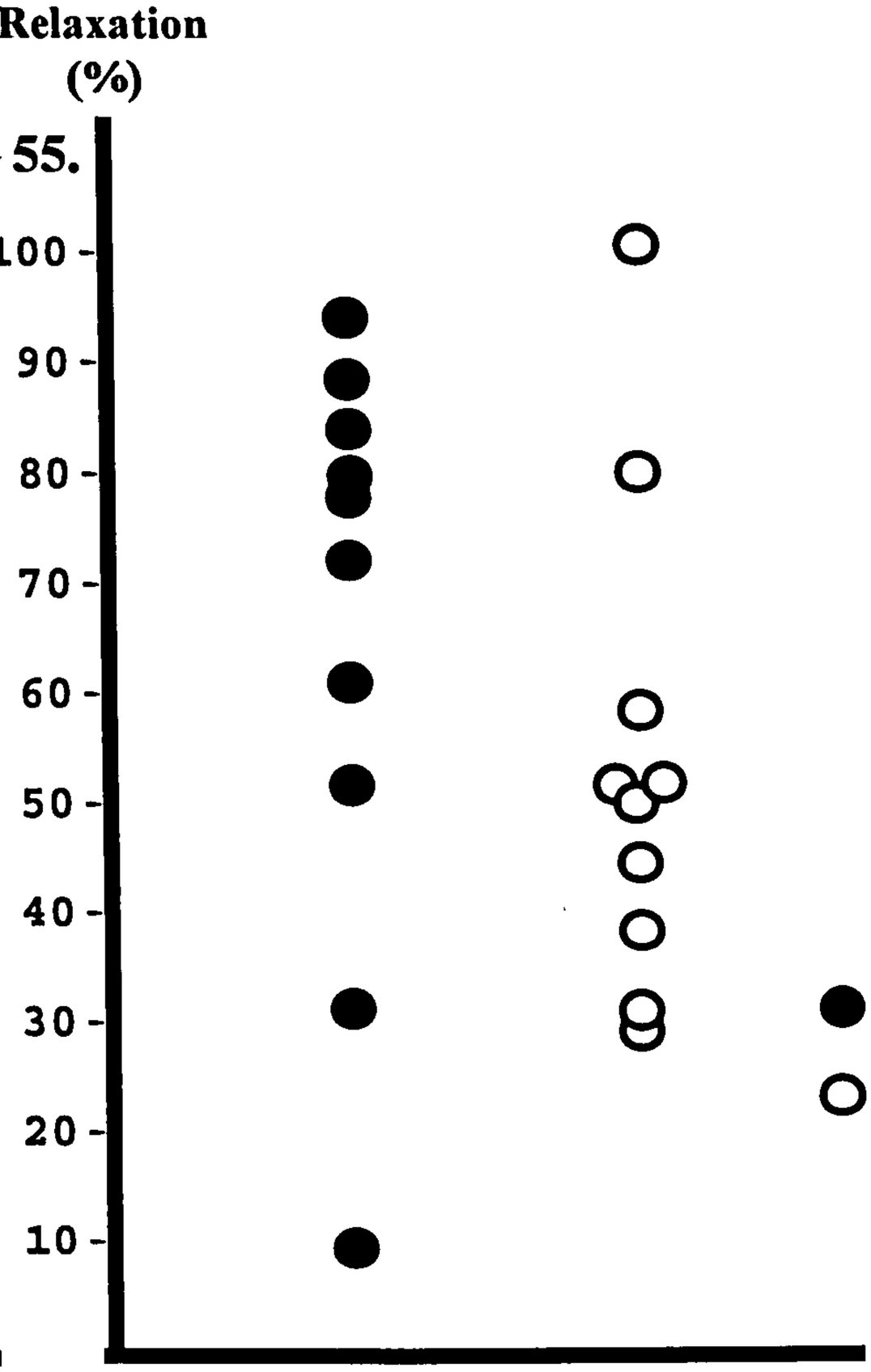
LENGTH OF THE INTERNAL SPHINCTER AND RELAXATION OF THE INTERNAL SPHINCTER IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS.

FIG 54.



SPHINCTER LENGTH

FIG 55.



SPHINCTER RELAXATION

TABLE 35. LENGTH OF THE INTERNAL SPHINCTER AND RELAXATION OF THE INTERNAL SPHINCTER IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS -MEAN(STDEV).

	Sphincter Length	Sphincter Relaxation
Patients	39.8(5.6)	67.5(22.2)
Controls	37.7(7.6)	53.1(22.1)
P<	0.14	0.15

FIG 56. FIRST SENSATION OF RECTAL FILLING AND VOLUME WHICH PRODUCES AN URGE TO DEFAECATE IN PATIENTS WITH POSTCHILDBIRTH/ HYSTERECTOMY CONSTIPATION AND CONTROLS.

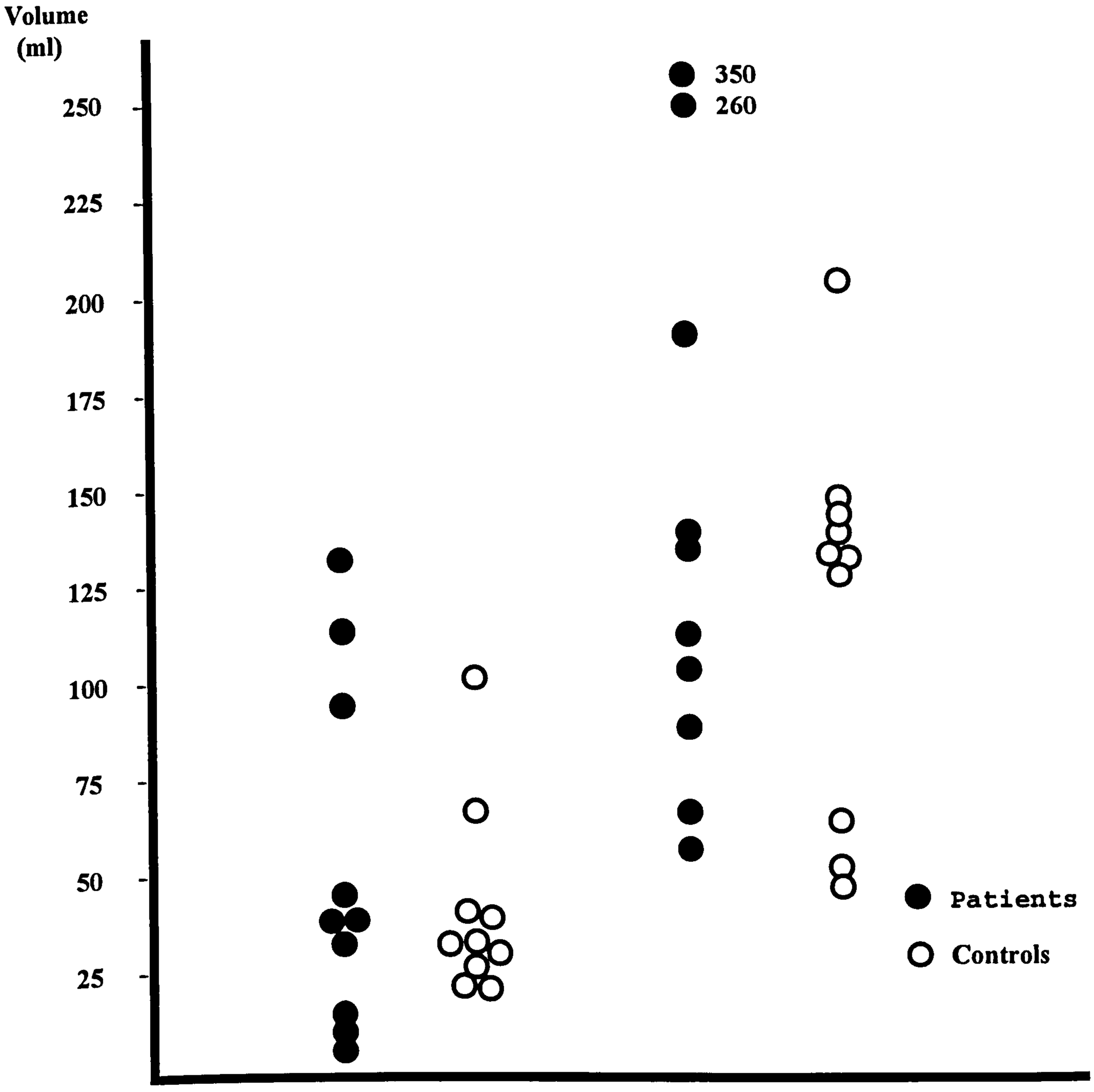
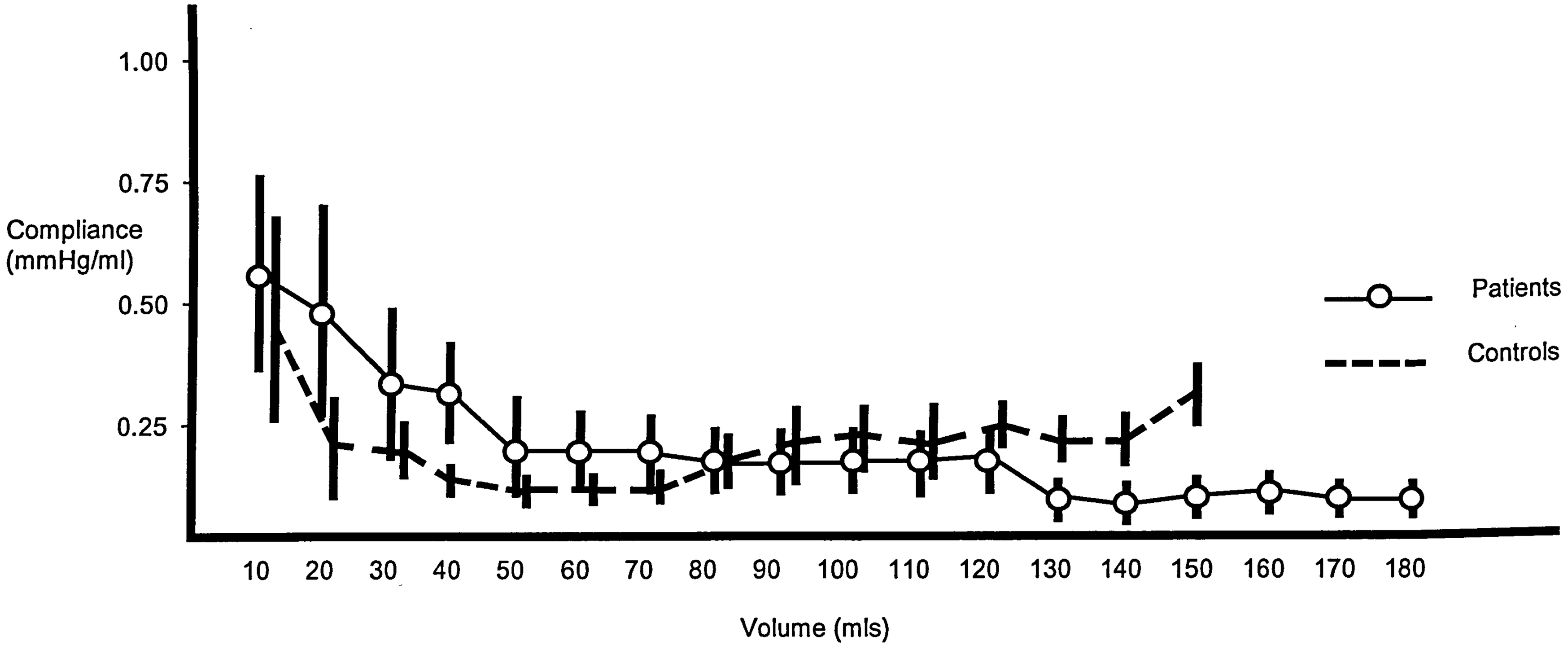


TABLE 36. FIRST SENSATION OF RECTAL FILLING VOLUME REQUIRED TO PRODUCE A CALL TO STOOL IN PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

	Patients	Controls	P<
First Sensation	52.3(43.4)	42.4(26.4)	0.8
Urge to Defaecate	159.2(87.5)	119(51.2)	0.38

Fig 57. Rectal Compliance in Patients with Postchildbirth/Hysterectomy Constipation and Controls.



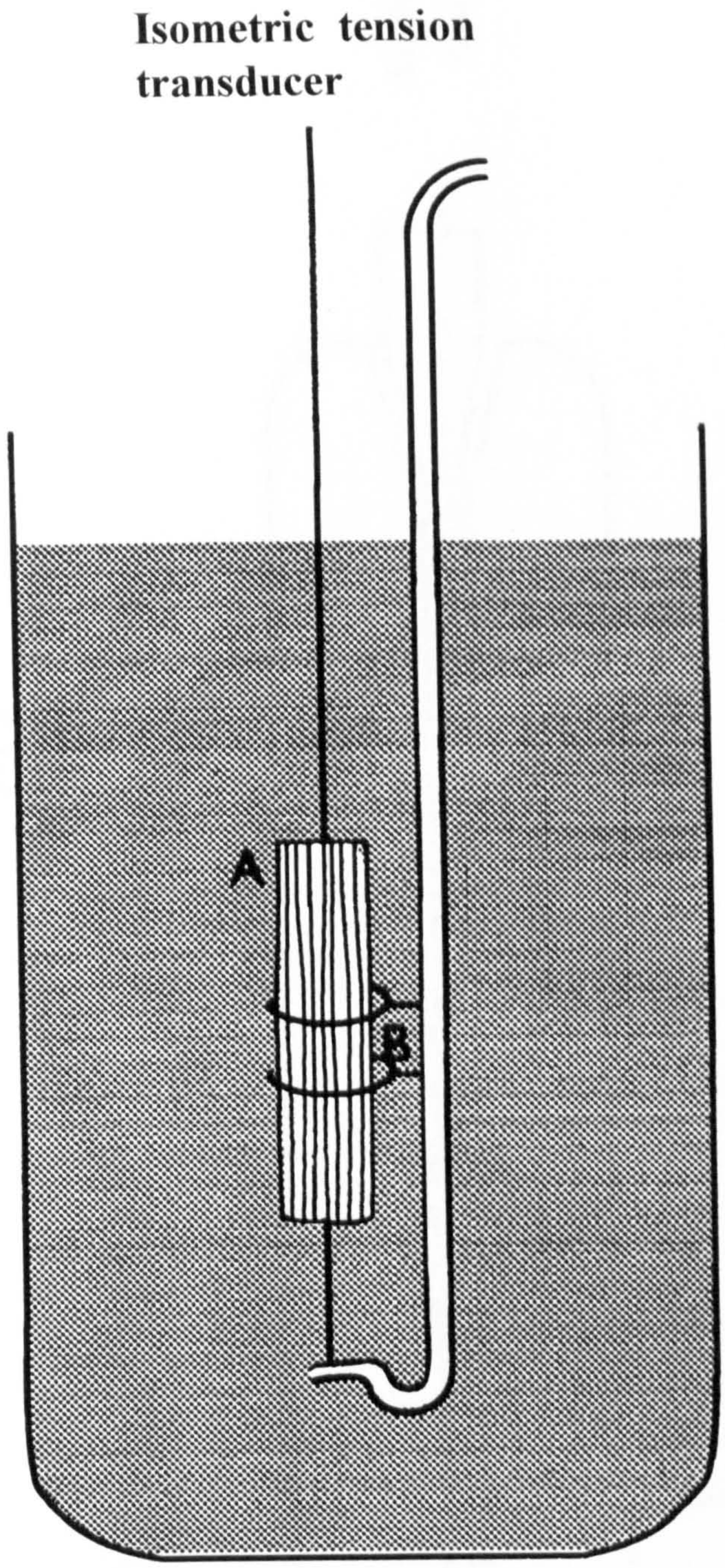


Fig 58. Diagram of organ bath. Strips of sigmoid taenia coli (10 x 2mm) (**A**) were mounted in Krebs solution (37°C, O_2 95%, CO_2 5%) under 1g resting tension, across platinum wire electrodes (**B**) from which electric field stimulation (1-64Hz, 0.1ms, 30V) was applied.

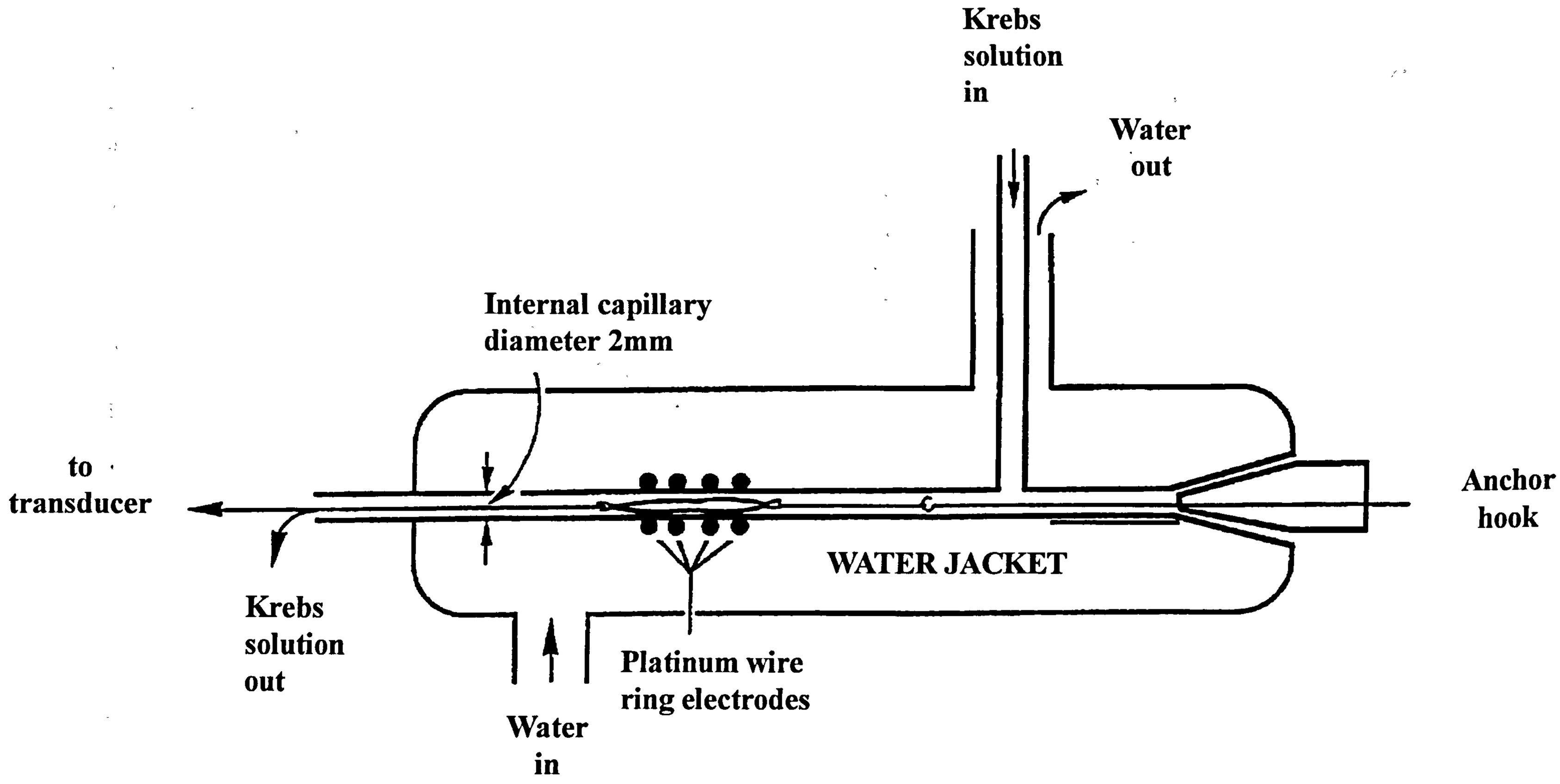


Fig 59. Diagram of Golenhofen/von Low aparatus for the extracellular recording of electrical activity and accompanying mechanical contractions from human sigmoid taenia coli. Strips of taenia coli (20 x 2mm) were mounted on the anchor hook so as to lie across 4 platinum wire electrodes.

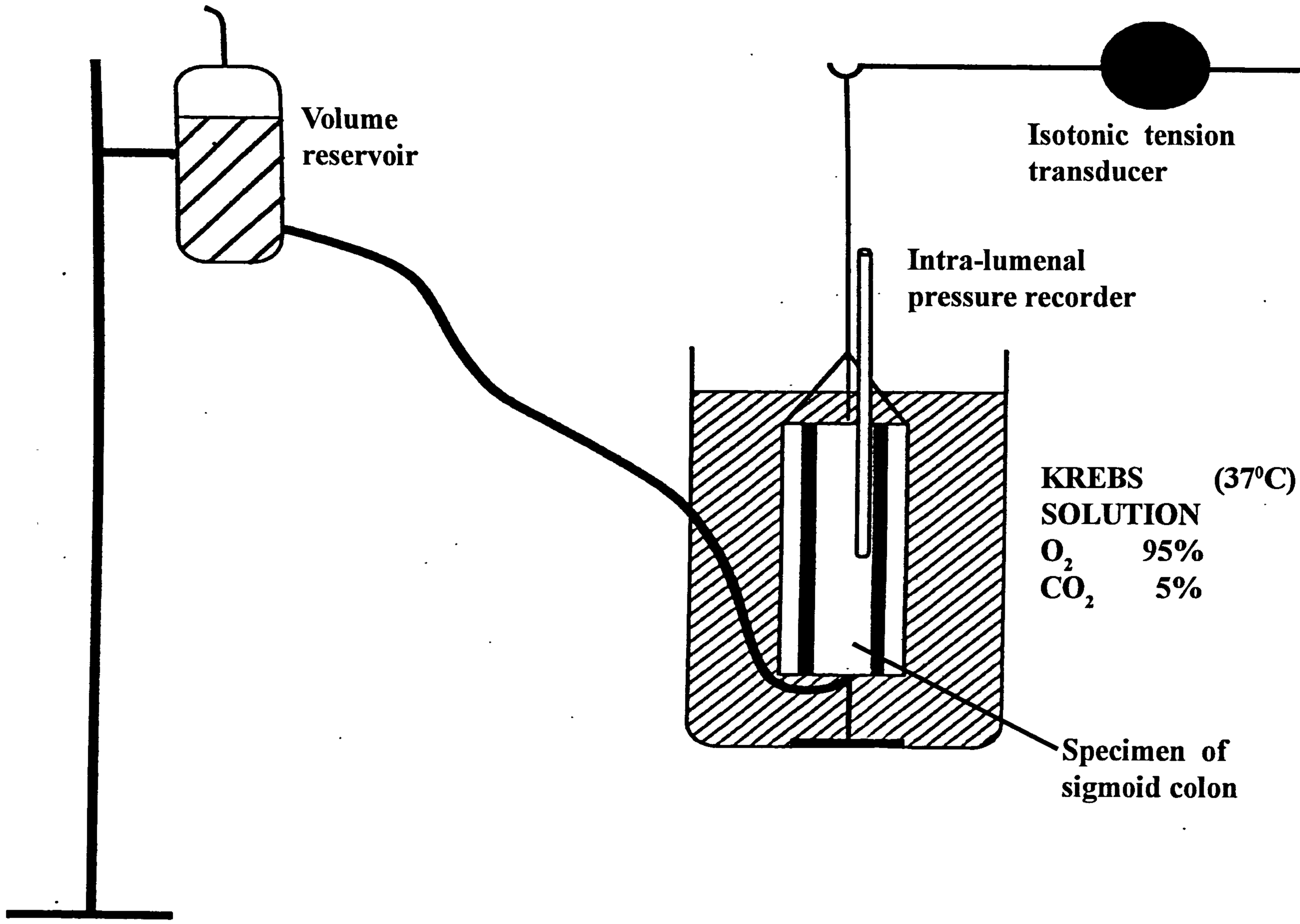


Fig 60. Diagram of Trendelenberg apparatus. Whole segments of sigmoid colon (10cm) were mounted in Krebs solution (37°C, 0_2 95%, CO_2 5%). Peristalsis was induced in control sigmoid colon by raising the fluid reservoir which in turn distended the specimen.

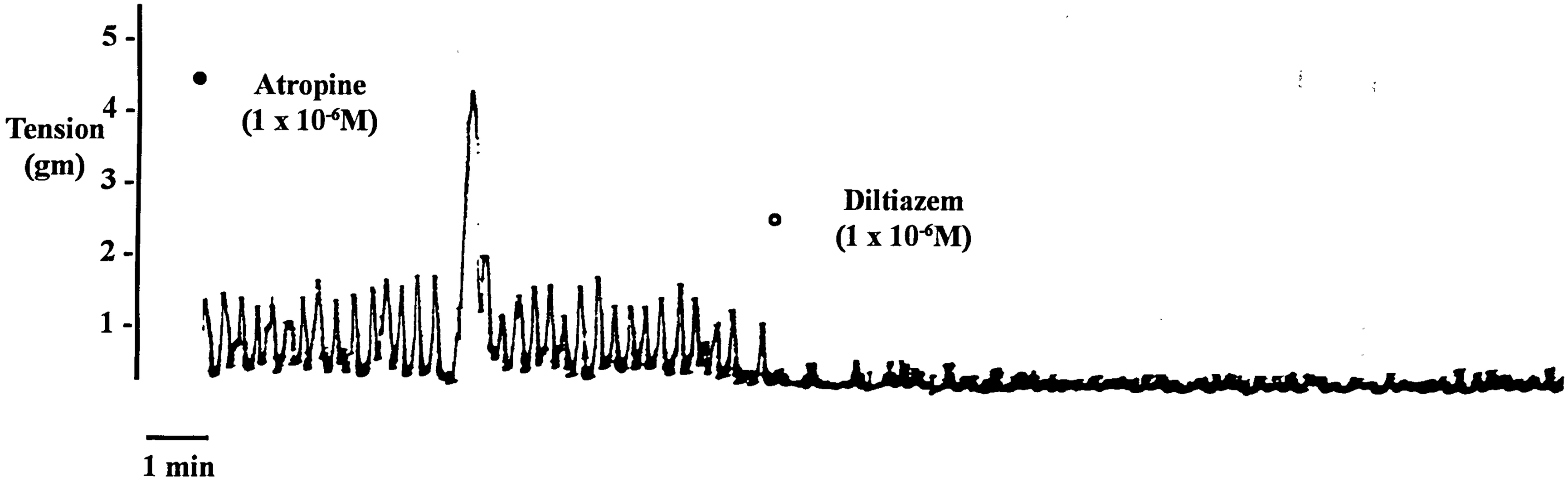


Fig 61. Spontaneous activity in the sigmoid taenia coli which is unaffected by the action of atropine (● - 1 x 10^{-6}M) but is abolished by diltiazem (o - 1 x 10^{-6}M) indicating that it is due to cyclical depolarisation and repolarisation of the cell membrane.

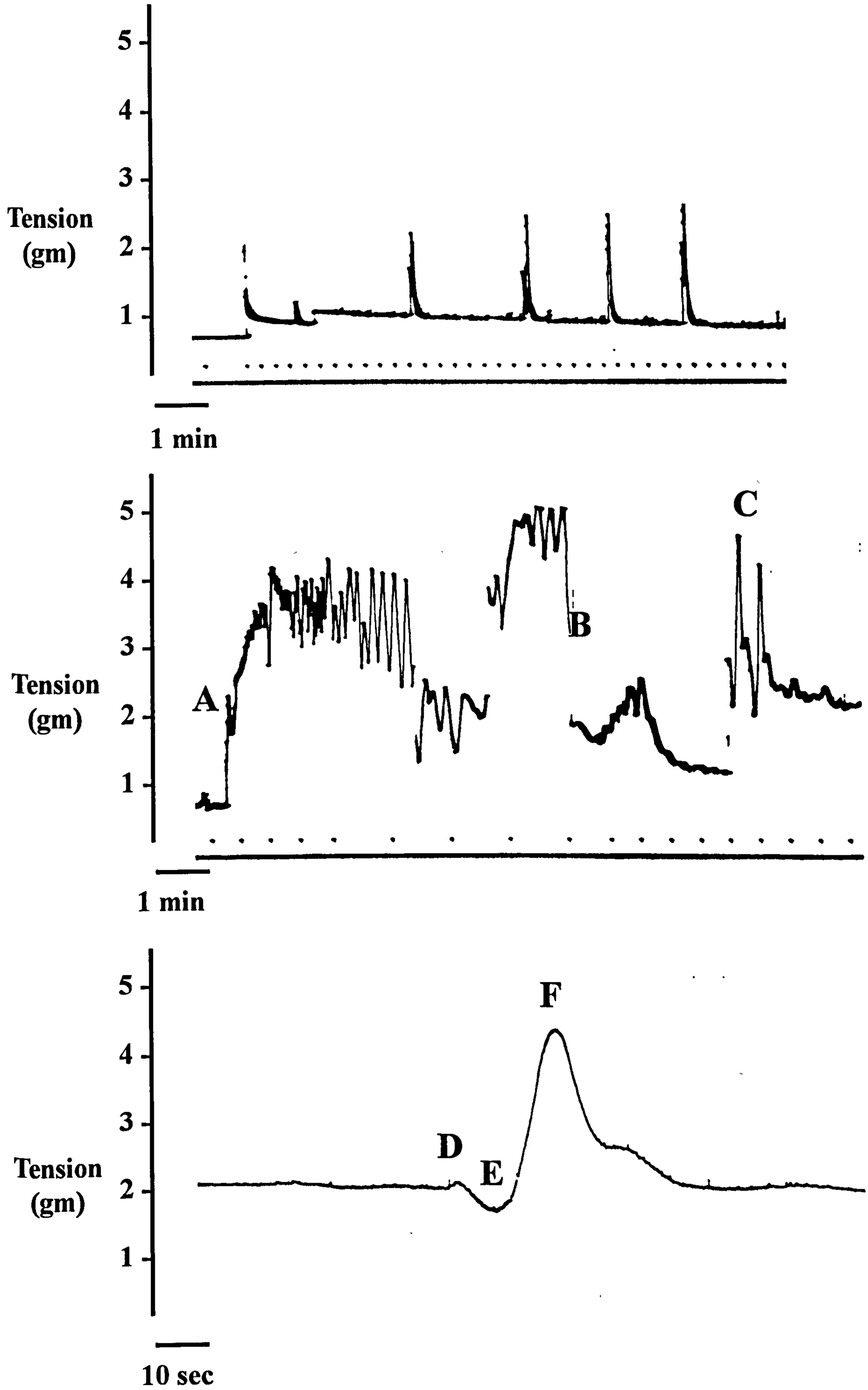
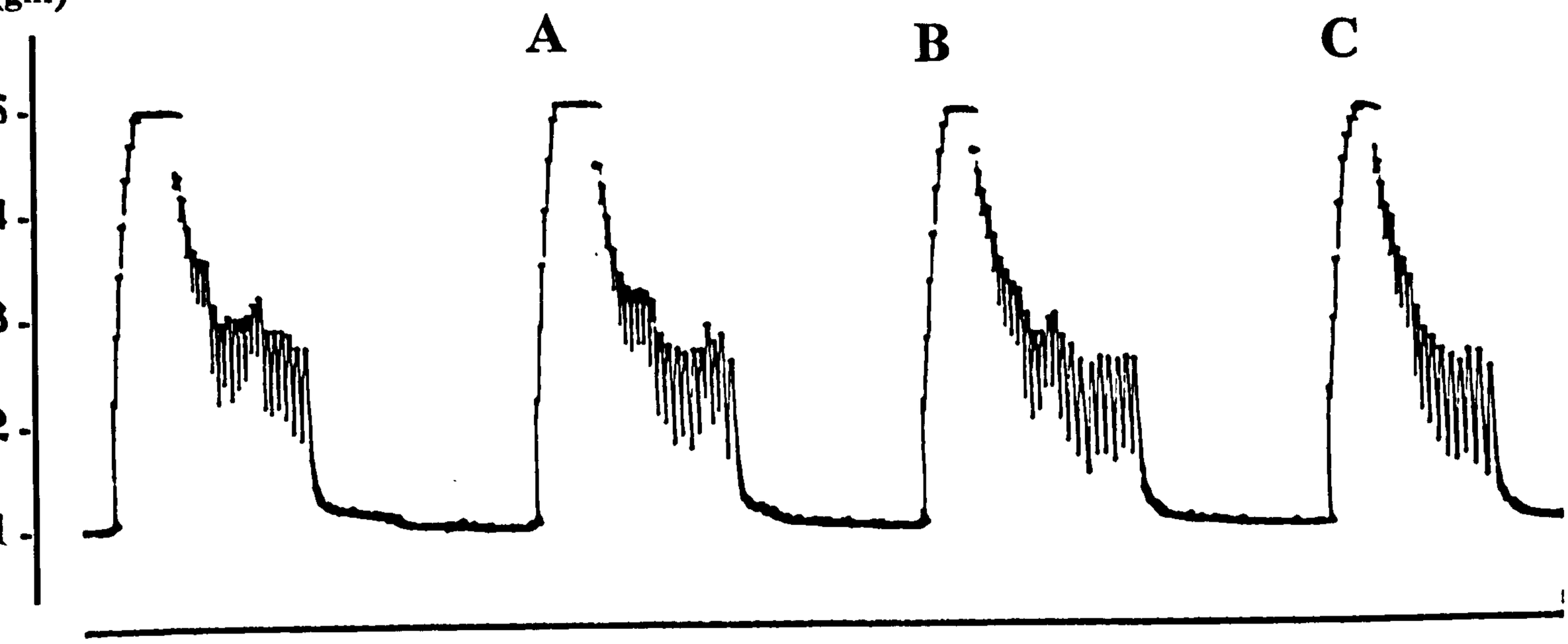


Fig 62. Nerve-induced excitatory responses (1-8Hz, 0.1ms, 30V)iin sigmoid taenia coli in the presence of low basal tone (top trace). At **A** (middle trace), the tone of the tissue spontaneously increased. The offset was adjusted at **B** and nerve stimulation of the same tissue produced relaxation followed by rebound contraction **C**. At higher speed (bottom trace), nerve stimulation at **D** produced relaxation **E** followed by rebound contraction **F**.



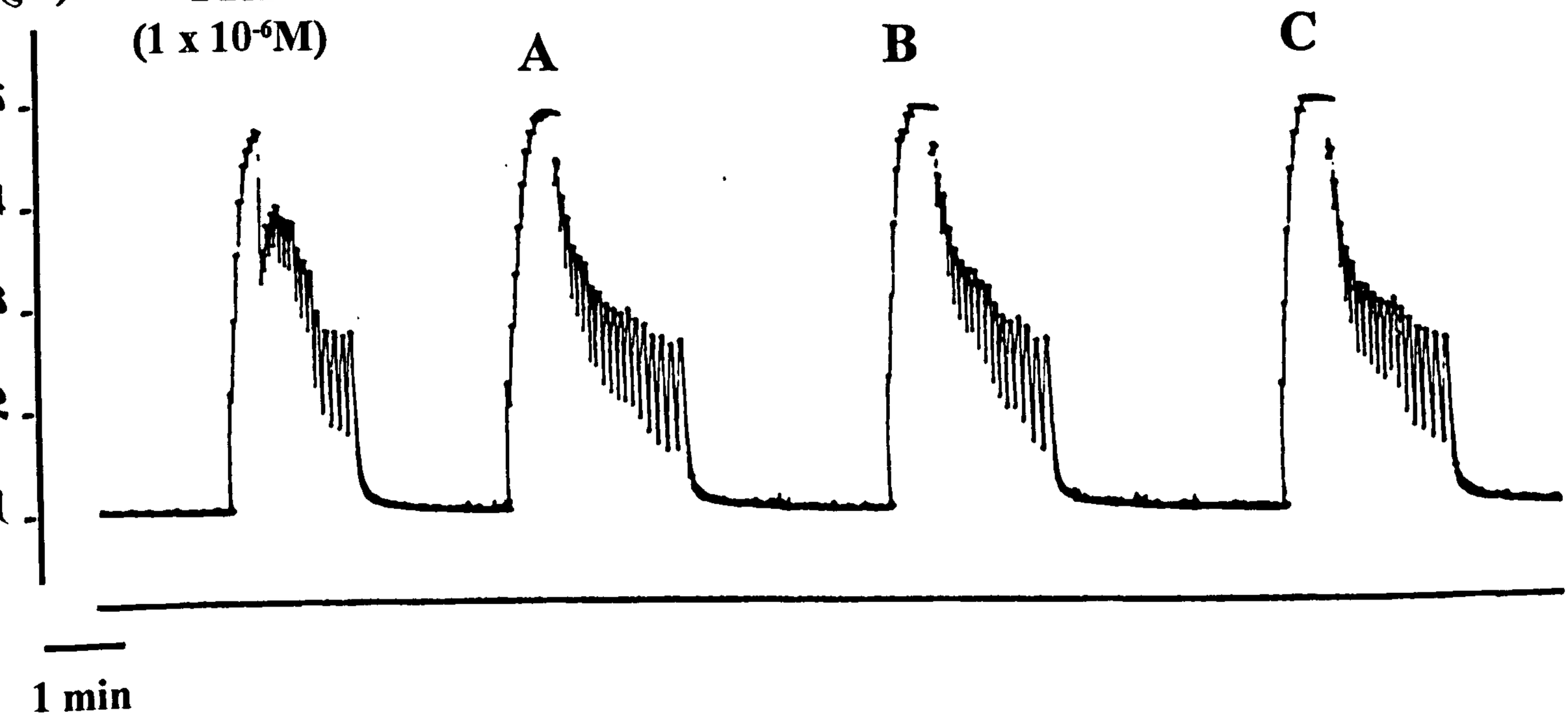


Fig 63. Spontaneous increases in tone in control sigmoid taenia coli. Activity at **A**,**B** and **C** was unaffected by atropine (● - 1 x 10^{-6}M) or TTX (**o** - 1 x 10^{-6}.M) indicating that is was not nerve-mediated. The cyclical nature of this observation suggests that it is due to myogenic pacemaker activity.

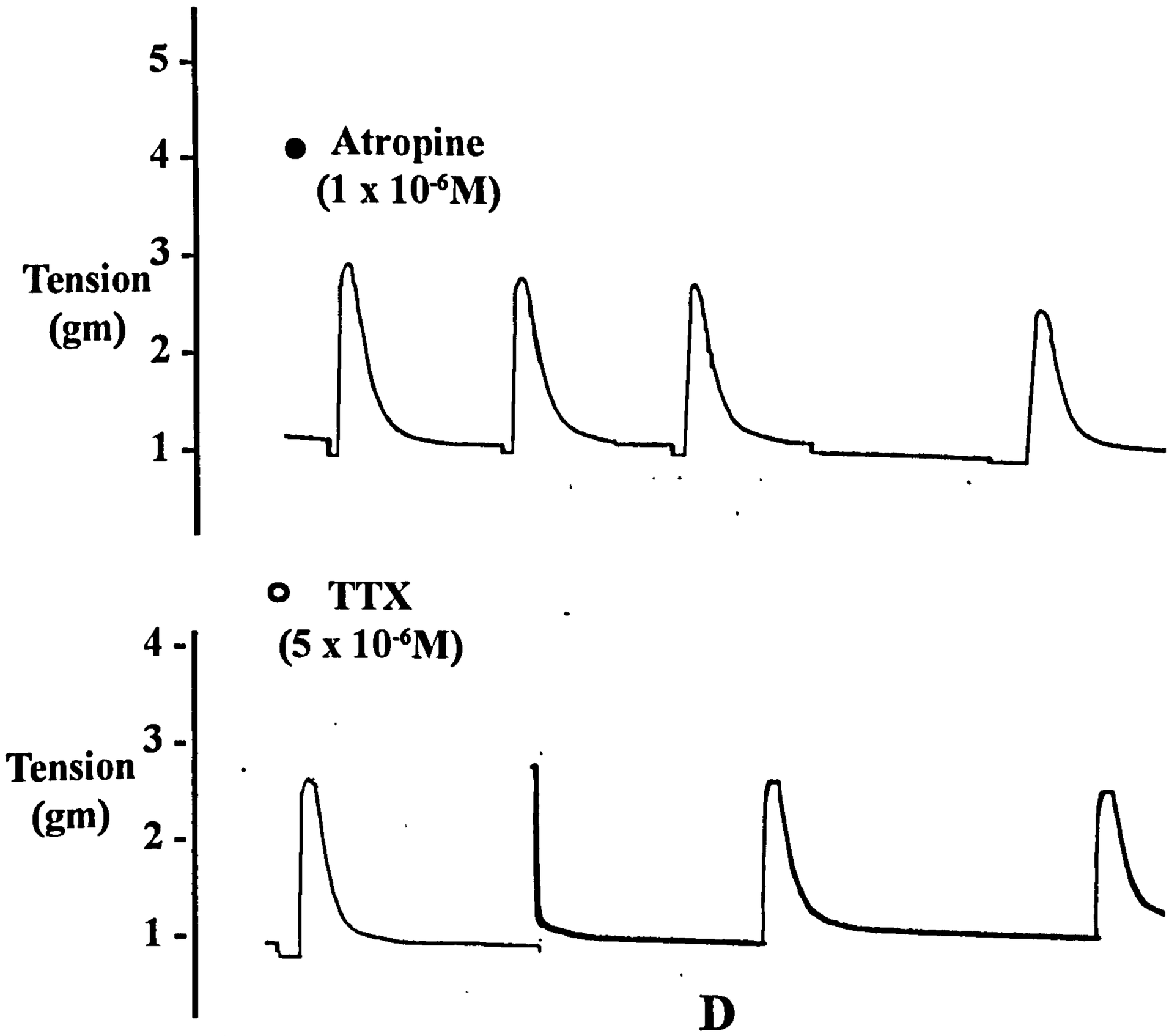


Fig 64. Nerve-mediated contractions (20 pulses, 10Hz, 0.5ms, 40V) in the presence of atropine (● - 1 x 10^{-6}M) (upper trace) and tetrodotoxin (**o** - 5 x 10^{-6}M) (middle trace). Contractions were not abolished indicating that they were myogenic in origin. At **A**, a low pulse width (0.1ms) and voltage (40V) only just break through the effect of tetrodotoxin (lower trace). By increasing the pulse width (0.2 - 0.6ms) at **B**, **C** and **D** and increasing the voltage (40 - 60V) at **E**, **F** and **G**, direct stimulation of the muscle is seen.

FIG 65. NERVE-MEDIATED EXCITATION OF SIGMOID TAENIA COLI FROM PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

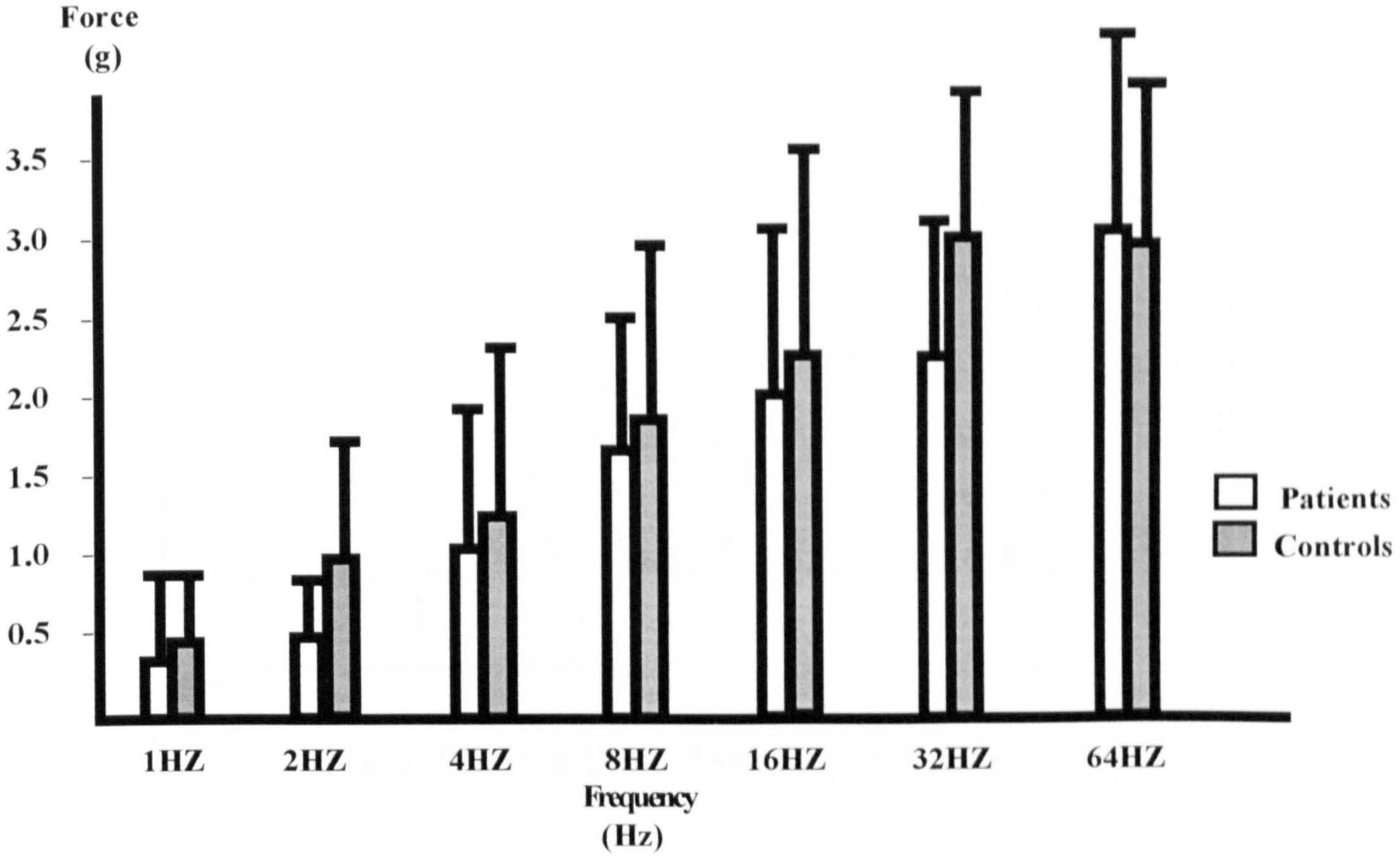


TABLE 35. NERVE-MEDIATED EXCITATION OF SIGMOID TAENIA COLI FROM PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS - MEAN(STDEV).

Frequency	Patients	Controls	P<
1Hz	0.38(0.43)	0.46(0.31)	0.6
2Hz	0.47(0.42)	0.95(0.76)	0.06
4Hz	1.14(0.70)	1.34(0.92)	0.5
8Hz	1.70(0.83)	1.80(0.98)	0.7
16Hz	2.00(1.10)	2.29(1.21)	0.6
32Hz	2.10(1.11)	2.92(1.14)	0.2
64Hz	3.03(1.73)	2.83(1.30)	0.9

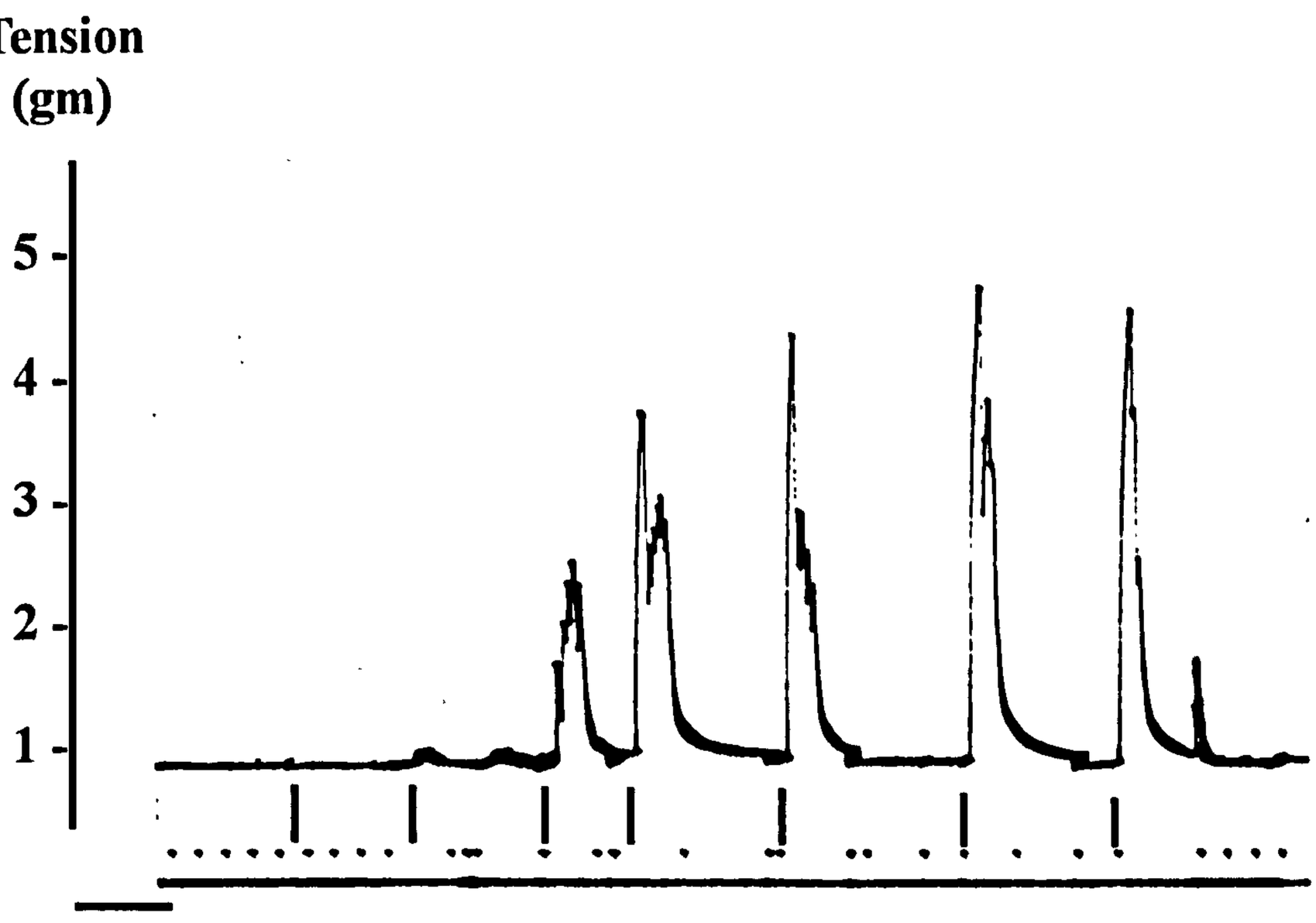


Fig 66. Demonstration of the effect of increasing frequency of nerve stimulation (1-64Hz, 0.1ms, 30V)on the magnitude of contraction in strips (2 x 10mm) of control sigmoid taenia coli. In this tissue the Tmax is at 32Hz.

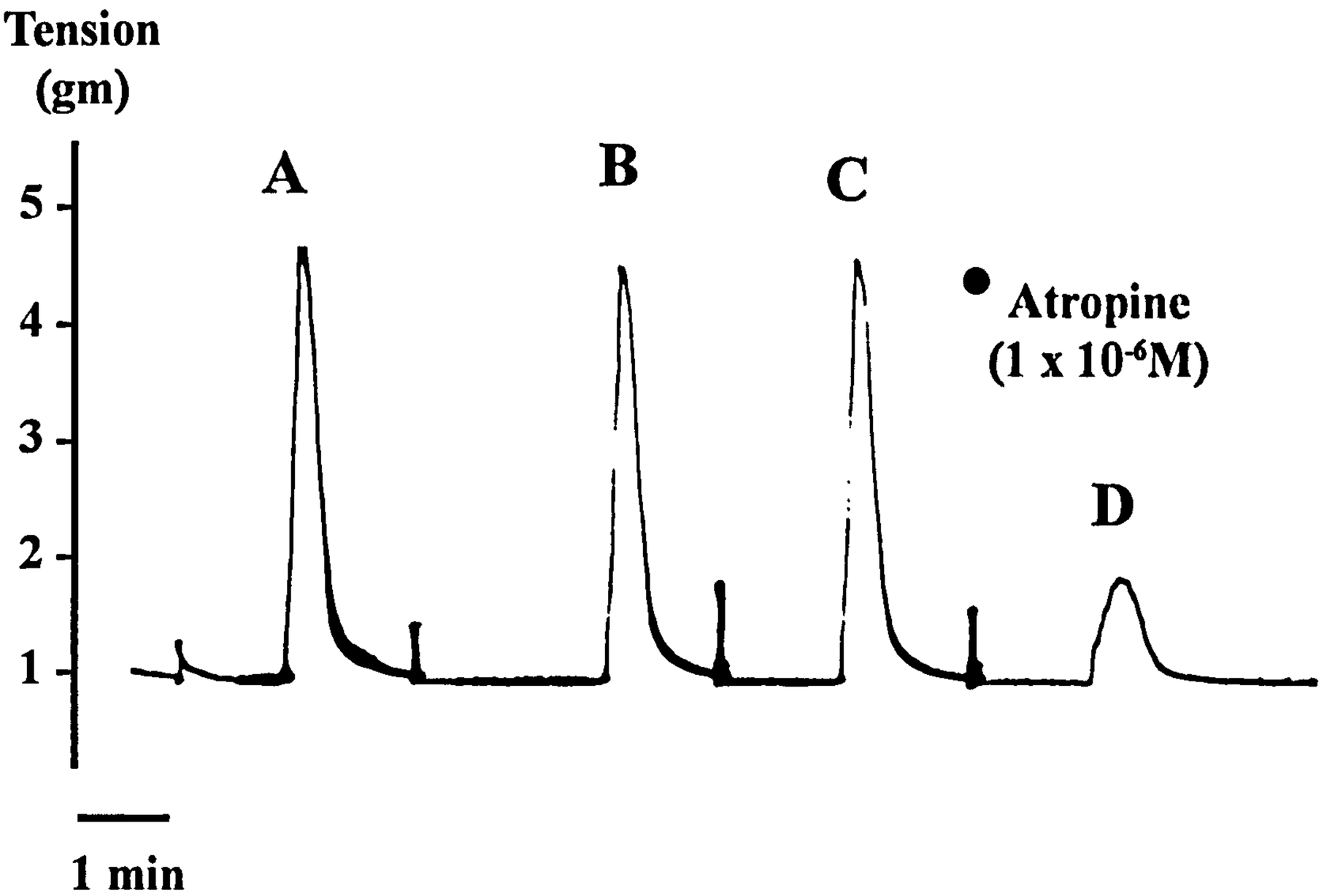


Fig 67. Effect of atropine (● - 1 x 10^{-6}M) on nerve-induced contractions (20 pulses, 8Hz, 0.1ms, 30V) in strips (2 x 10mm) of control sigmoid taenia coli. Excitatory responses at **A, B** and **C** are abolished by atropine, but a rebound contraction is observed at **D**. This rebound contraction is not cholinergic in nature and is mediated through non-adrenergic, non-cholinergic (**NANC**) nerves.

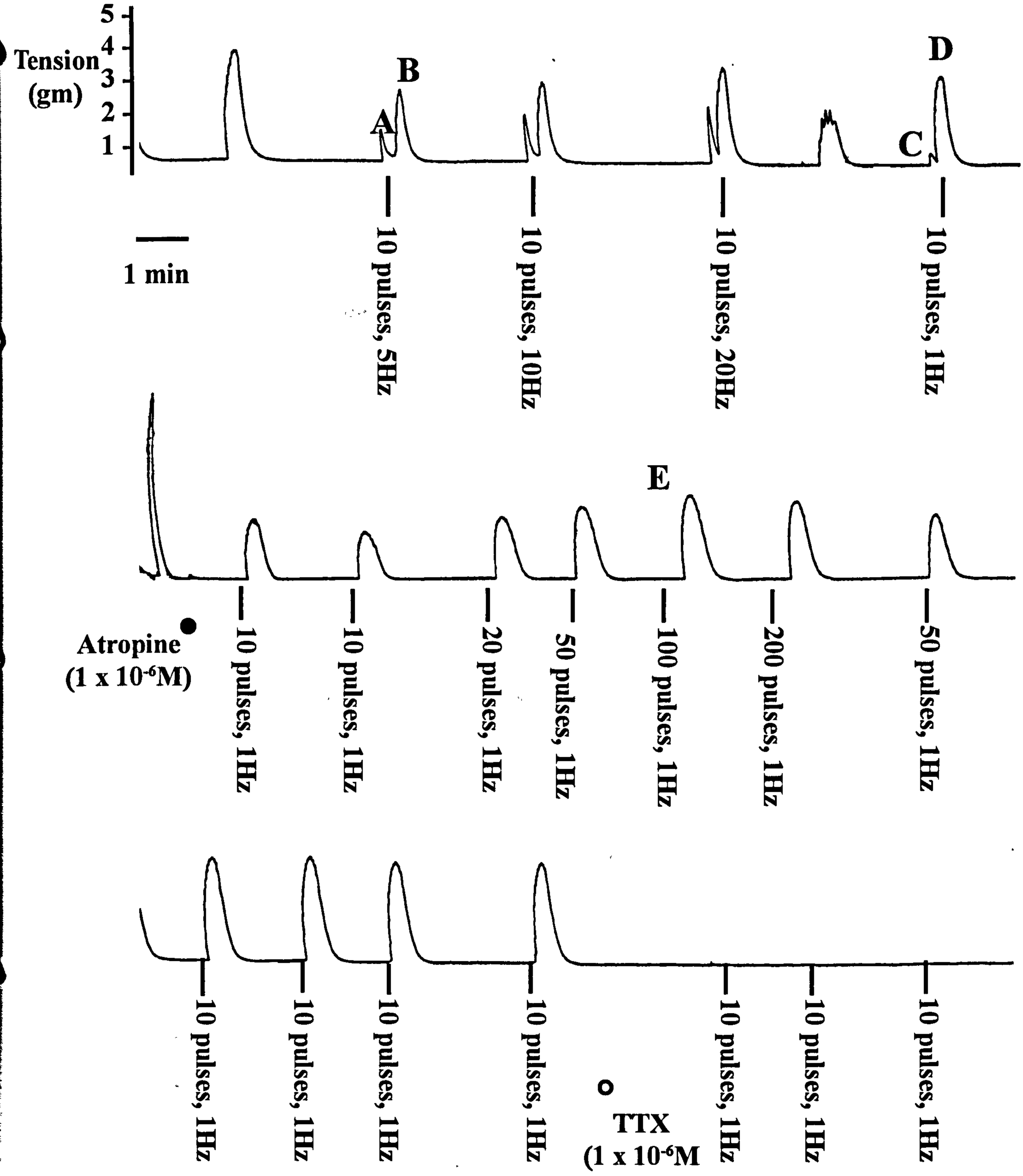


Fig 68. Nerve-mediated excitatory responses (cholinergic) converted to rebound contractions (NANC). At 10Hz, 0.1ms, 30V, 10 pulses produced excitatory contraction **A** which was followed by rebound contraction **B**. Note that at 1Hz, a small excitatory response **C** was produced. The larger rebound contraction **D** was paradoxically produced by a lower frequency of stimulation. Atropine (● - 1×10^{-6}M) abolished the excitatory response but had no effect on the rebound contraction **E** which was abolished by
TTX (**O** - 1×10^{-6}M).

FIG 69. NERVE-MEDIATED RELAXATION OF SIGMOID TAENIA COLI FROM PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS.

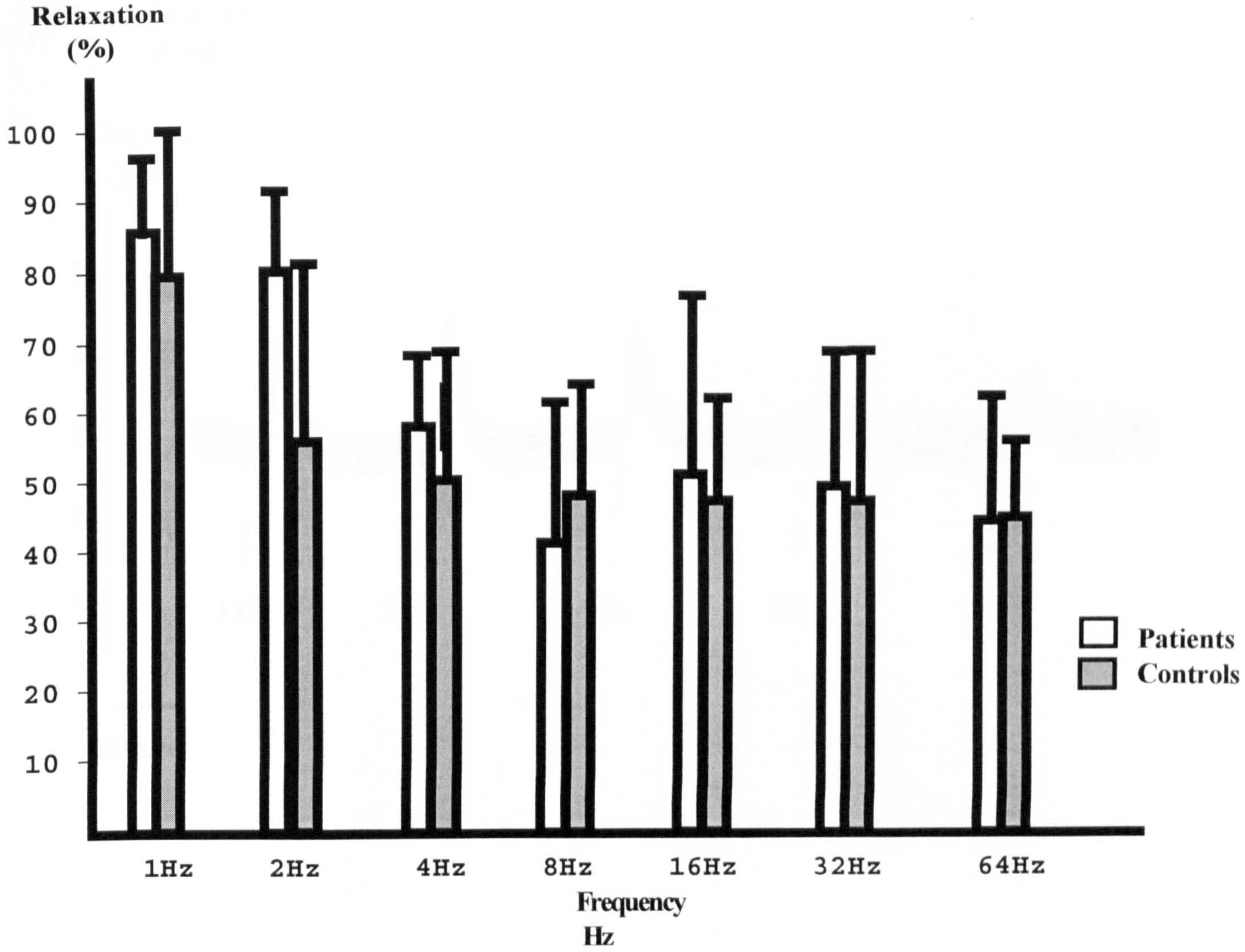


TABLE 36. NERVE-MEDIATED RELAXATION OF SIGMOID TAENIA COLI FROM PATIENTS WITH POSTCHILDBIRTH/HYSTERECTOMY CONSTIPATION AND CONTROLS-MEAN(STDEV).

Frequency	Patients	Controls	P<
1Hz	86(9.7)	79.6(21.6)	0.36
2Hz	80.8(10.4)	56.5(24.0)	0.03*
4Hz	58.8(10.0)	50.9(19.1)	0.31
8HZ	42.7(21.8)	48.7(15.4)	0.46
16HZ	52.5(24.7)	48.0(14.5)	0.71
32HZ	50.8(17.7)	48.7(20.6)	0.86
64HZ	45.6(17.3)	46.8(10.3)	0.90

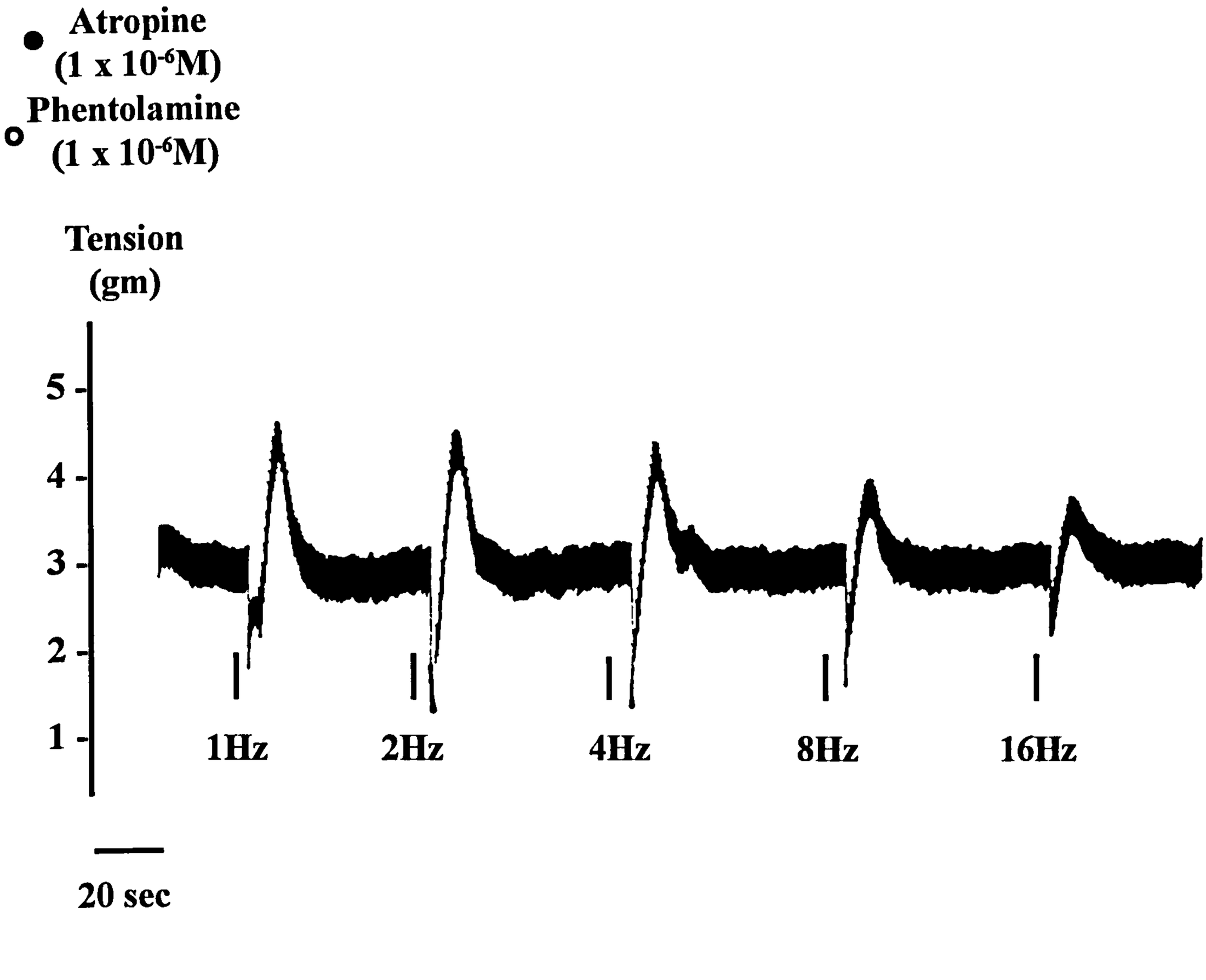


Fig 70. Nerve-mediated inhibitory responses in constipated sigmoid taenia coli. Increasing frequency of stimulation (1- 16Hz, 0.1ms, 30V) produces a paradoxical decrease in the degree of relaxation. Responses were elicited in the presence of atropine (● - 1 x 10^{-6}M) and phentolamine (o - 1 x 10^{-6}M), indicating that they are non-adrenergic, non-cholinergic in nature.

Fig 71. Effect of tetrodotoxin (● - 1 x 10^{-6M}M) on nerve mediated relaxations in the sigmoid taenia coli of constipated patients. Following the administration of TTX, the tone of both tissues (upper and lower traces) rose (A) indicating that the balance of nerve supply to the human sigmoid taenia coli is inhibitory in nature. Nerve stimulation (| - 8Hz, 0.1ms, 30V, 40 pulses) at B and C failed to induce relaxation confirming their nerve-mediated nature.

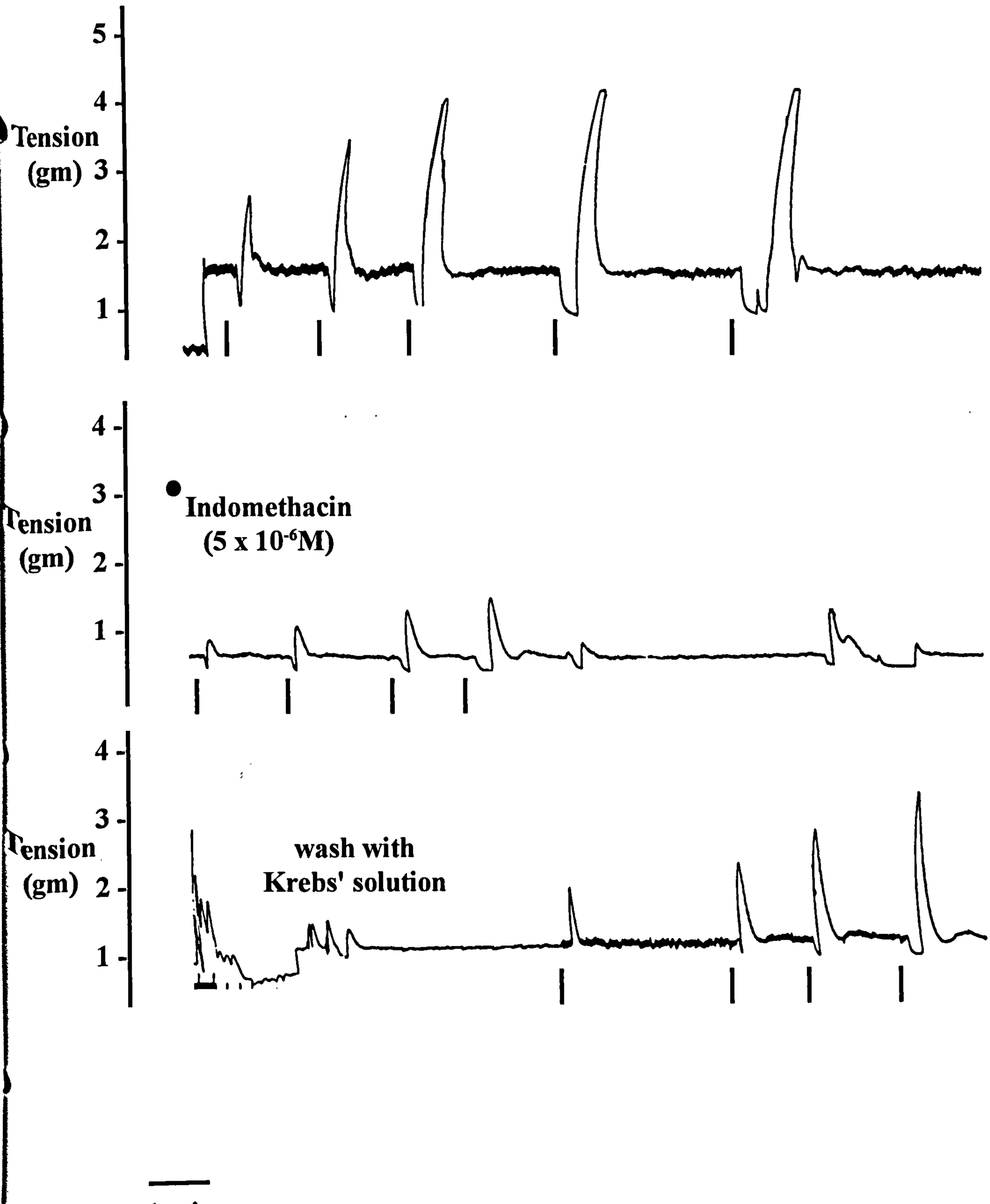


Fig 72. The effect of indomethacin (● - 5 x 10^{-6}M) on nerve mediated (| - 5Hz, 0.1ms, 30V, 20 - 320 pulses) in sigmoid taenia coli. Increasing stimulation (20 - 320pulses) produced progressively greater relaxations and rebound contractions (upper trace). Indomethacin reduced the magnitude of the rebound responce (middle trace). Washing with Krebs' solution restored the rebound contractions (lower trace). This observation suggested a possible role for prostaglandins in the rebound response.

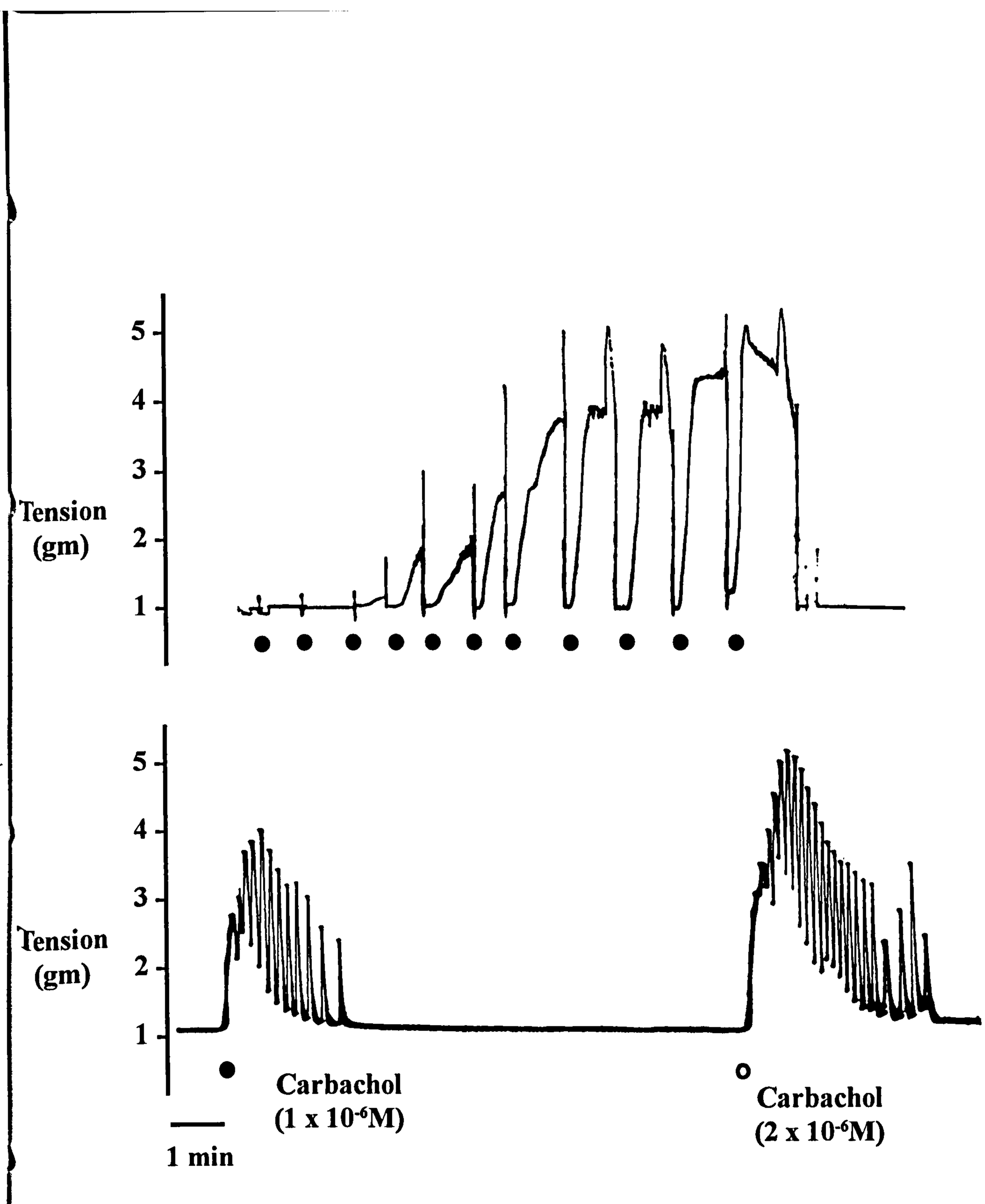


Fig 73. The effect of increasing concentrations of carbachol (● - 5 x 10^{-8}M - 1 x 10^{-5}M) on contractions in strips (2 x 10mm) of control sigmoid taenia coli (upper trace) In a second experiment (lower trace), carbachol (● - 1 x 10^{-6}M and o - 2 x 10^{-6}M) induces spontaneous activity in the tissue. This may be due to the nicotinic effect of carbachol stimulating the ganglia, thus producing cyclical contraction and relaxation of the muscle strip.

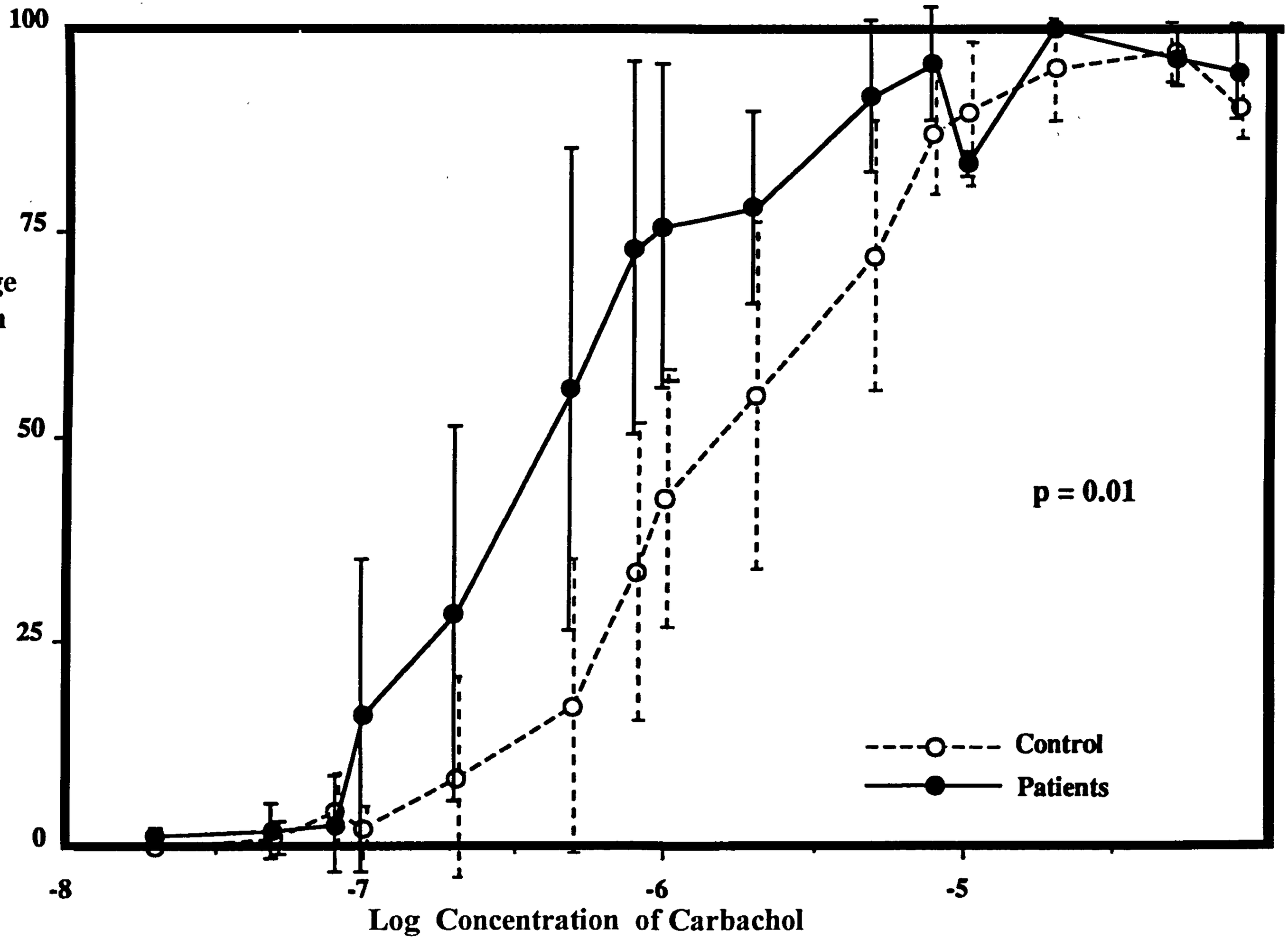
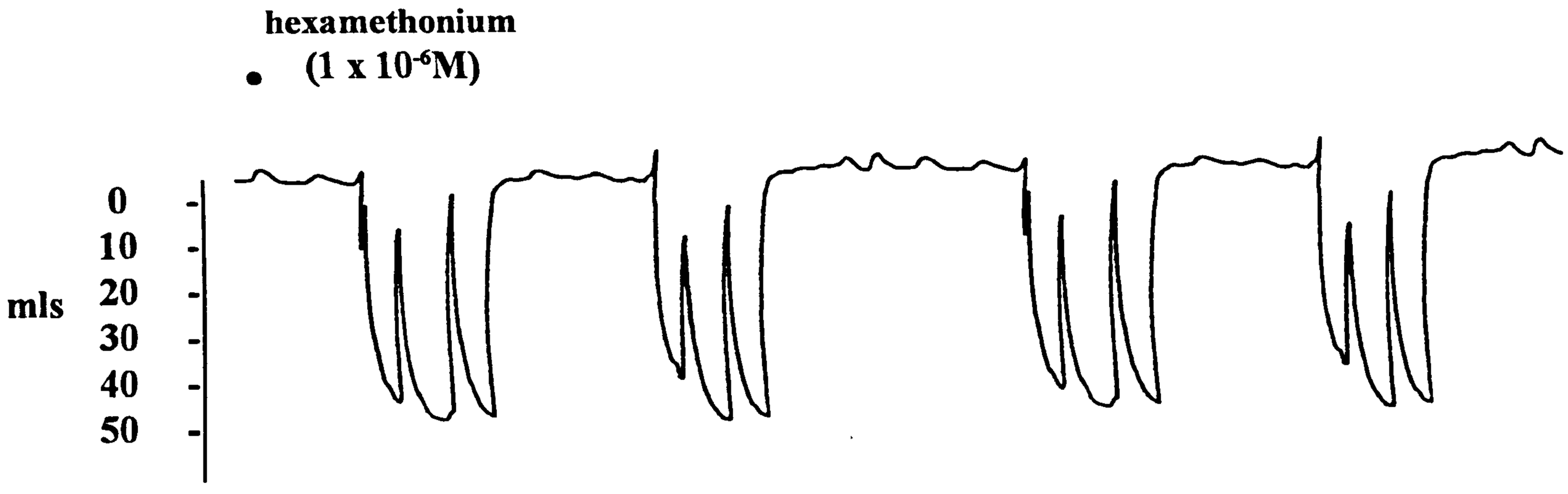


Fig 74. Demonstration of the Log dose response curves (Carbachol) in patients with postchildbirth/hysterectomy constipation and controls. This demonstrates that strips of taenia coli from constipated patients are more sensitive to cholinergic agonists than control tissue.



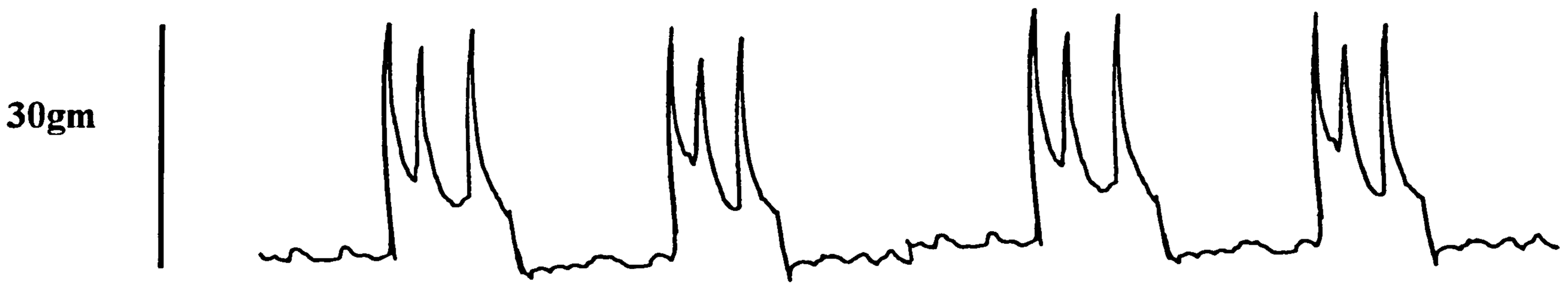
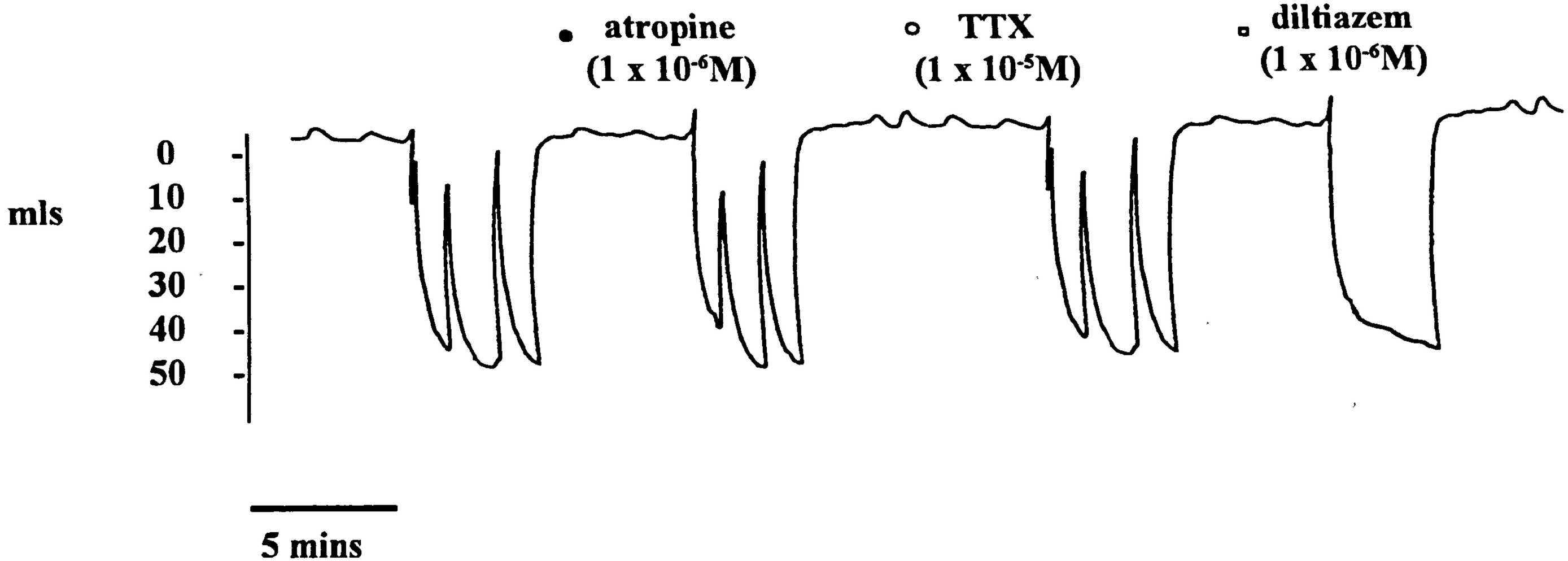


Fig 75. In vitro demonstration of segmentation contractions in control sigmoid colon. These contractions persist in the presence of hexamethonium (• - 1 x 10^{-6}M), indicating that they are not mediated through the myenteric plexus.



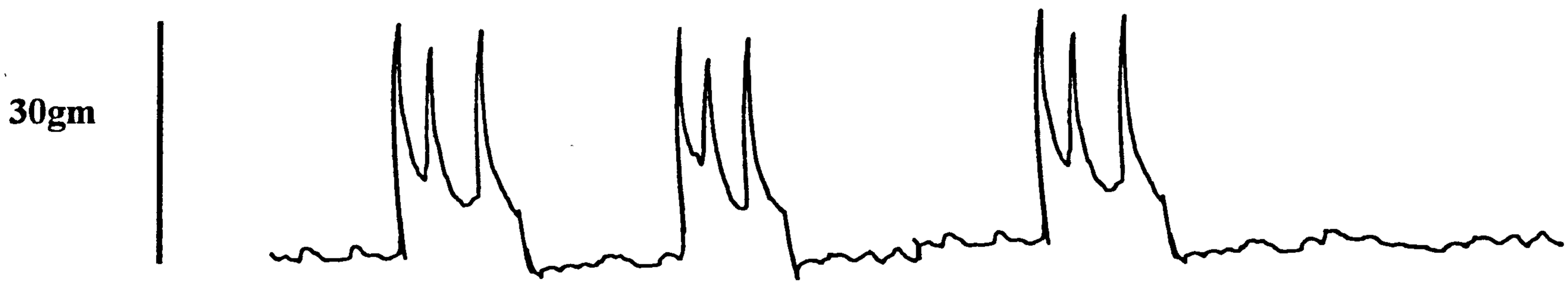


Fig 76. Effect of atropine (• - 1 x 10^{-6}M), TTX (○ - 1 x 10^{-6}M) and diltiazem (▫ - 1 x 10^{-6}M) on segmentation contractions in control sigmoid colon. This demonstrates that these contractions are myogenic in origin.

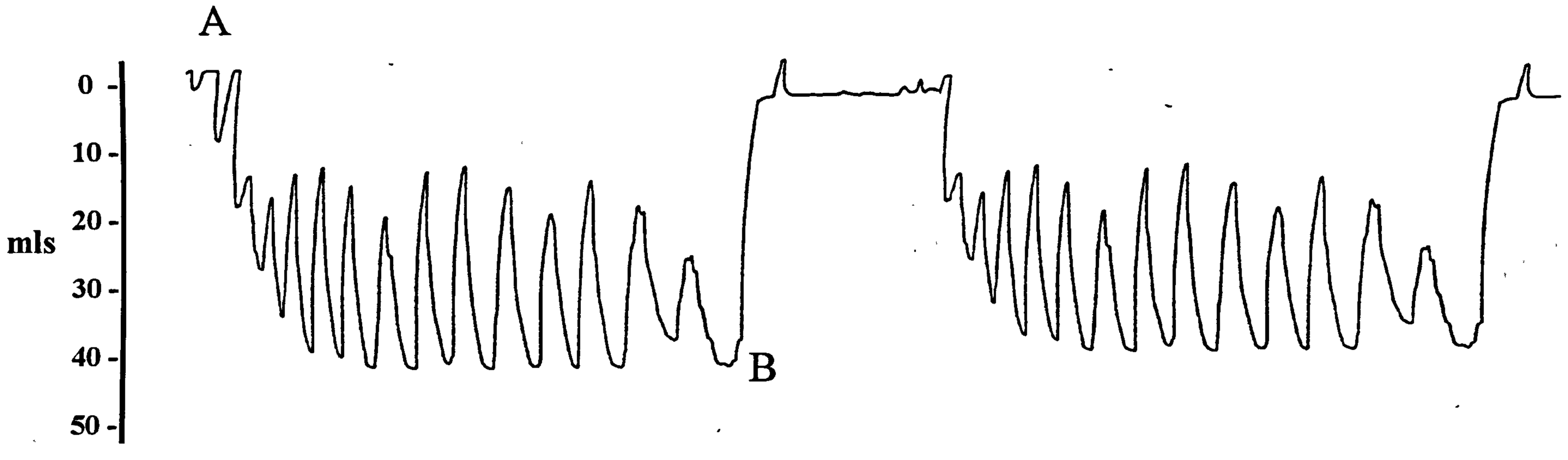


Fig 77. *In vitro* demonstration of peristalsis in control sigmoid colon. When the reservoir was raised (**A**), the intraluminal volume increased until the threshold was reached (upper trace). At this point, peristalsis was induced and continued until the reservoir was lowered (**B**). The accompanying longitudinal muscle contractions can also be seen (lower trace).

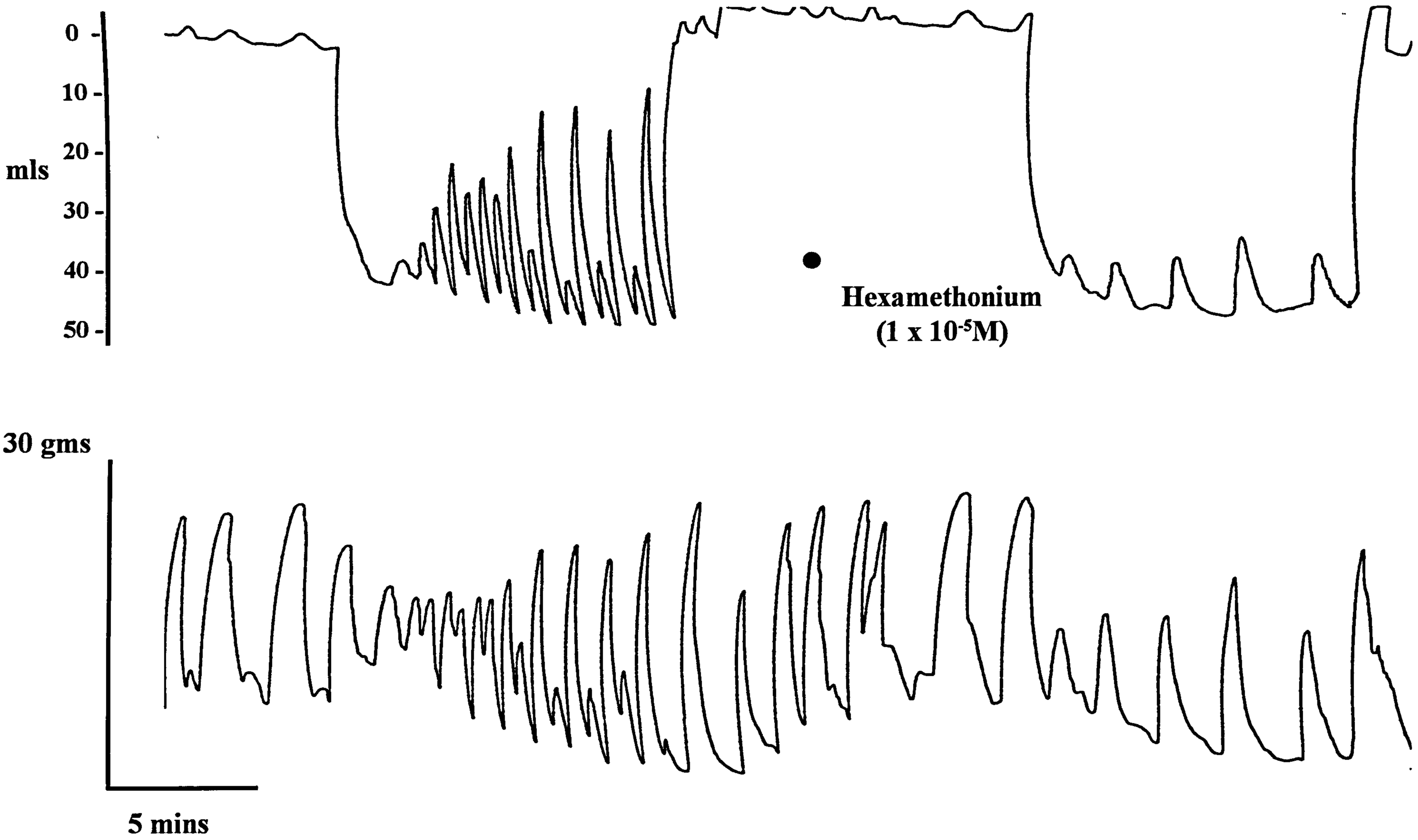


Fig 78. The effect of hexamethonium (● - 5 x 10^{-5}M) on peristalsis (upper trace) in control human sigmoid colon. Hexamethonium abolished peristalsis. The upper trace represents intraluminal volume (peristalsis) and the lower trace, accompanying isotonic contractions.

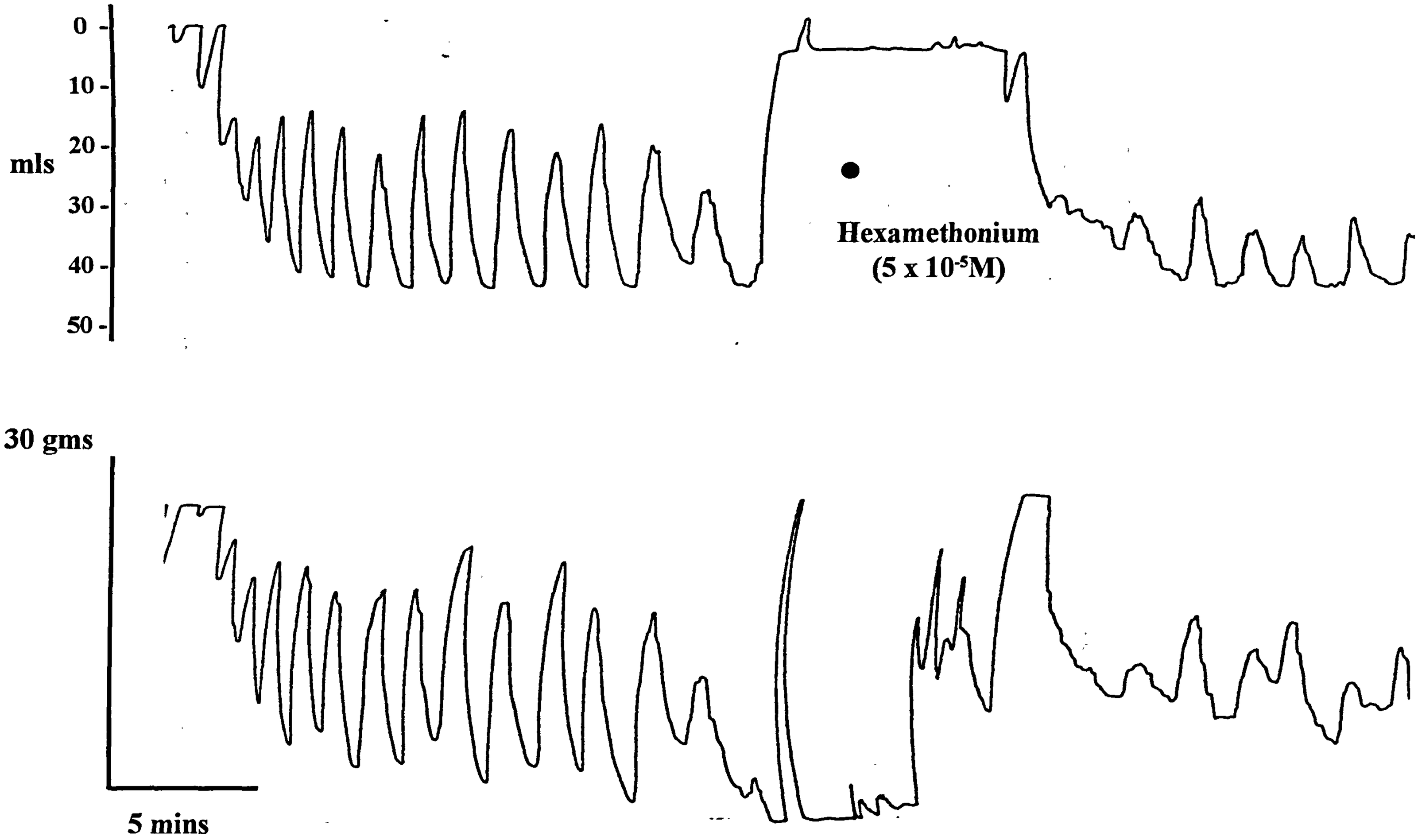


Fig 79. Peristalsis in control sigmoid colon. Hexamethonium inhibits regular peristalsis (upper trace). Hexamethonium (● - 5×10^{-5}M) acts by binding to a receptor and blocking the associated channel. The block is most effective when the channel is open and therefore is progressive rather than immediate. The associated isotonic contractions (lower trace) are also reduced.

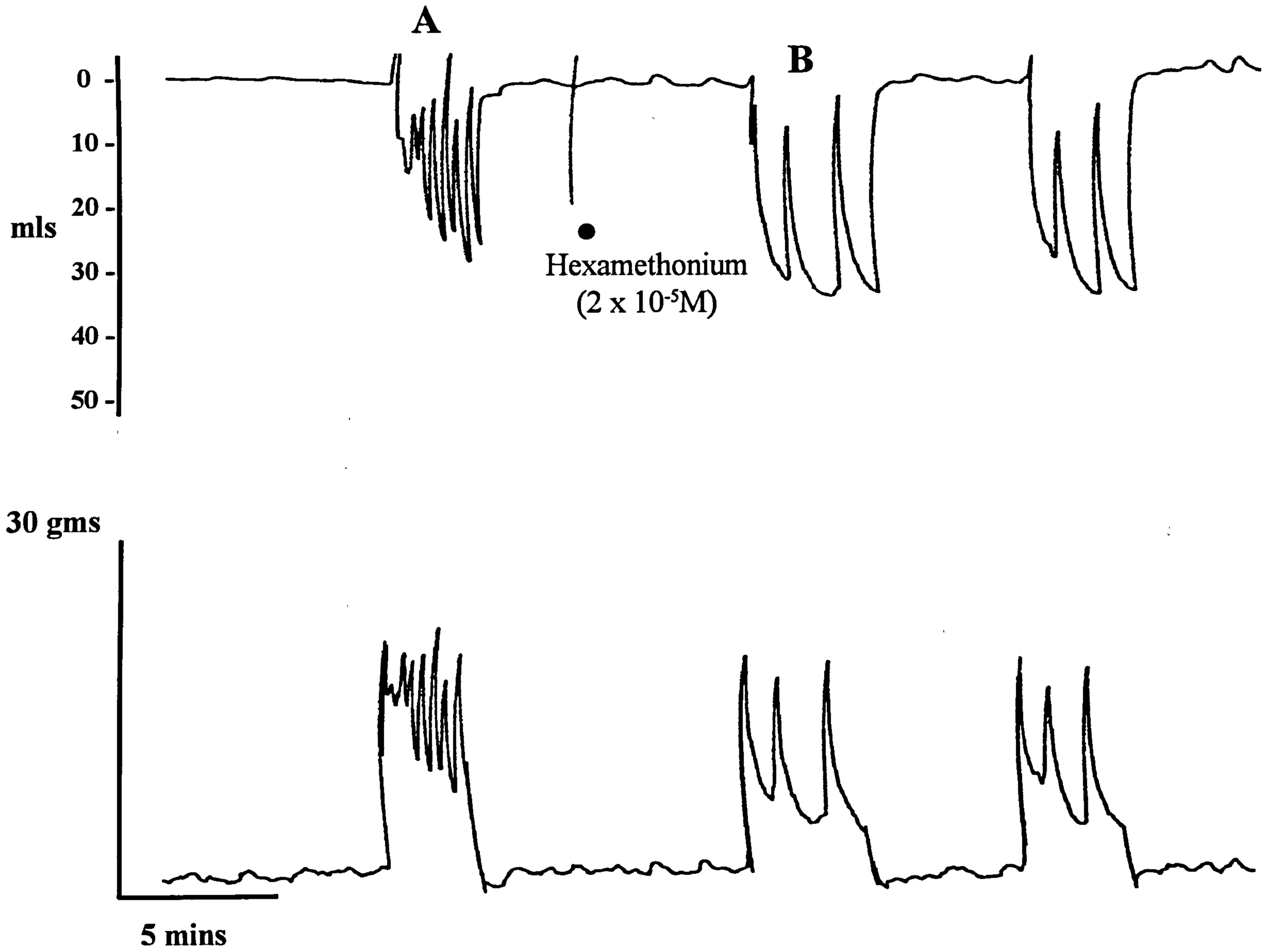


Fig 80. The effect of hexamethonium (● - 2 x 10^{-5}M) on peristalsis in control sigmoid colon, converting peristalsis at **A** to segmentation contraction at **B**. The upper trace is intraluminal volume and the lower trace is isotonic contractions.

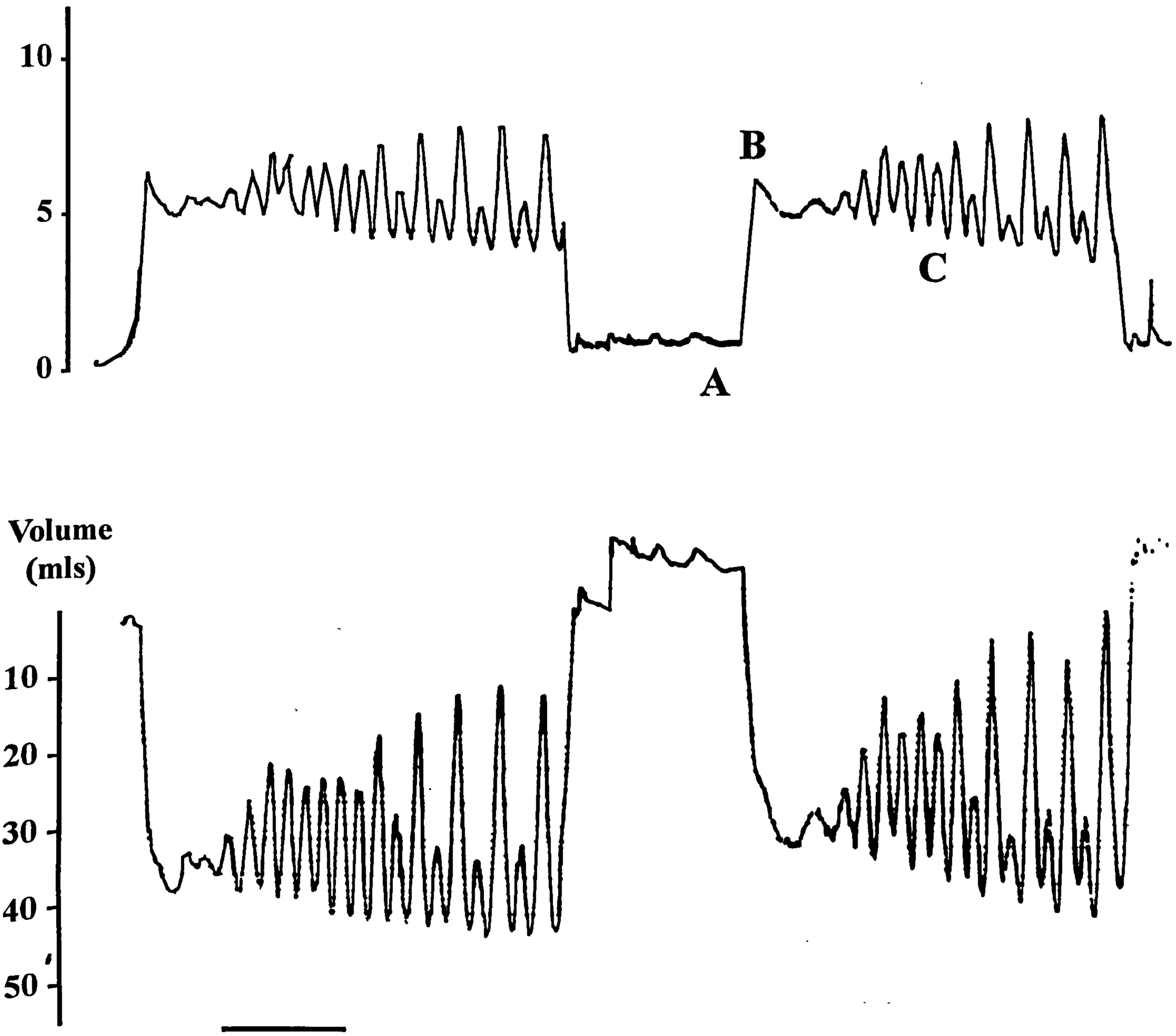
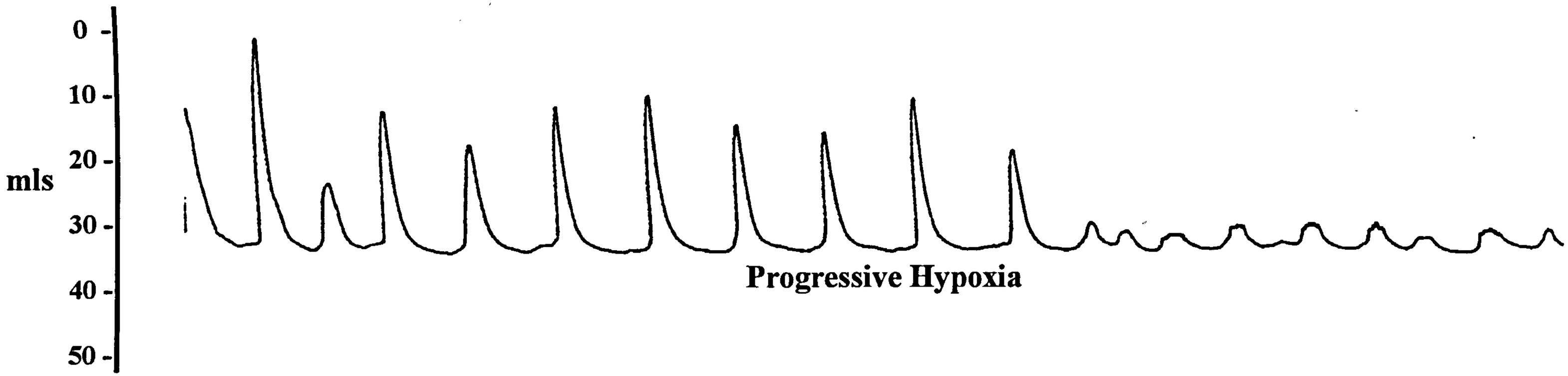


Fig 81. The effect of intraluminal pressure (upper trace) on the peristaltic reflex. At **A**, the reservoir has been raised and there is an immediate increase in pressure. There follows a period of receptive relaxation (**B**) during which the intraluminal pressure falls. At **C**, the peristaltic reflex is initiated suggesting that it is intraluminal volume (lower trace) and not pressure which is important in initiating peristalsis.



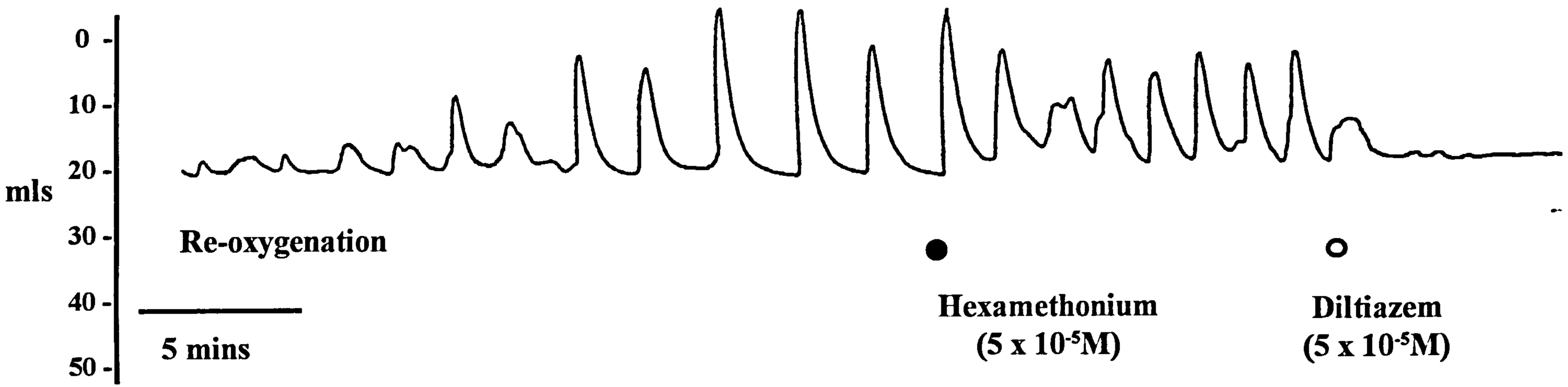


Fig 82. The inhibitory effect of hypoxia on segmentation contractions in control sigmoid colon; re-oxygenation restored activity which was undiminished by hexamethonium (● - 5 x 10^{-5}M, but is abolished by diltiazem (O - 5 x 10^{-5}M).

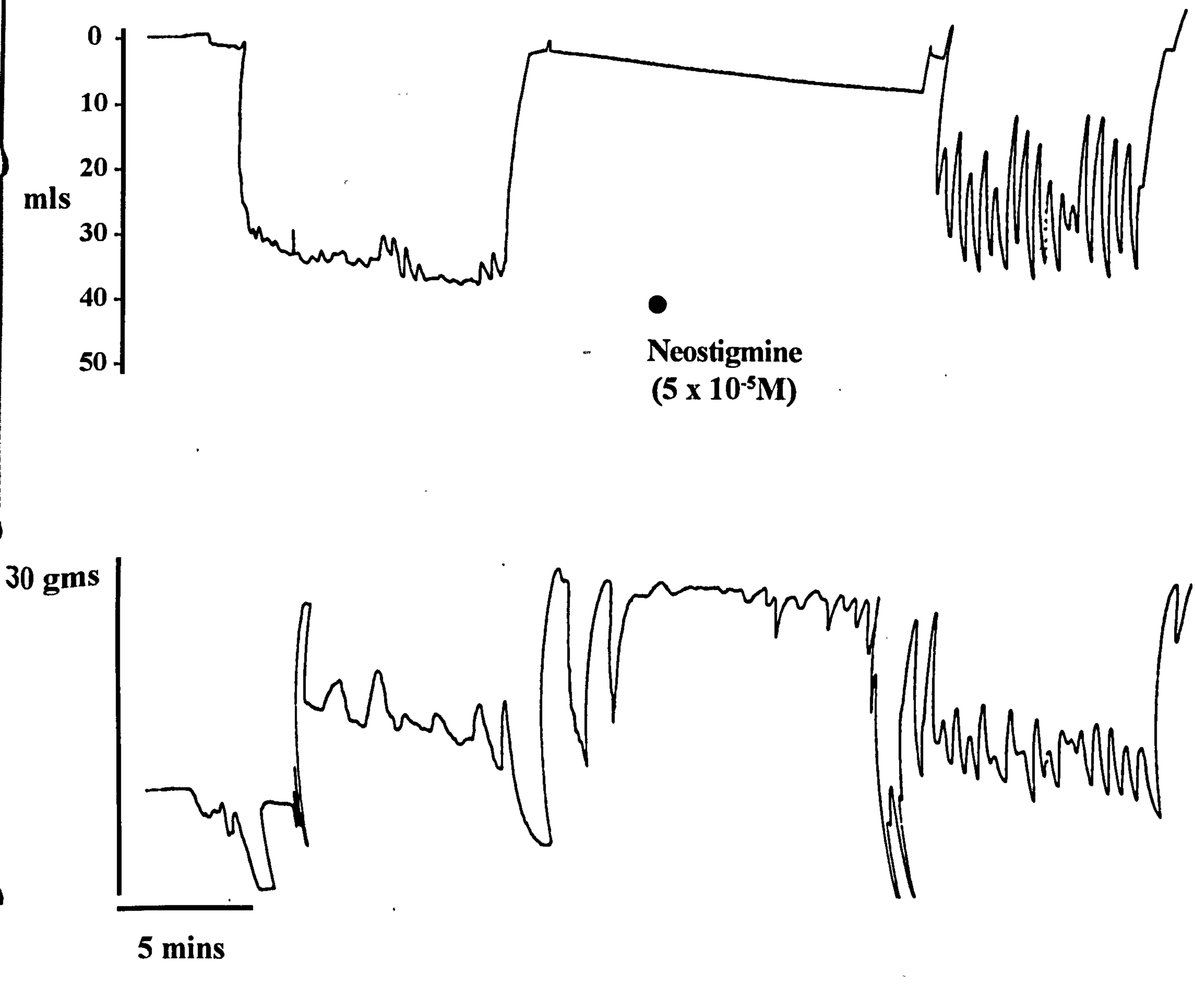


Fig 83. Effect of neostigmine (● - 5 x 10^{-5}M) on peristalsis (upper trace) in control sigmoid colon. Neostigmine enhansed peristalsis and accompanying isotonic contractions (lower trace).

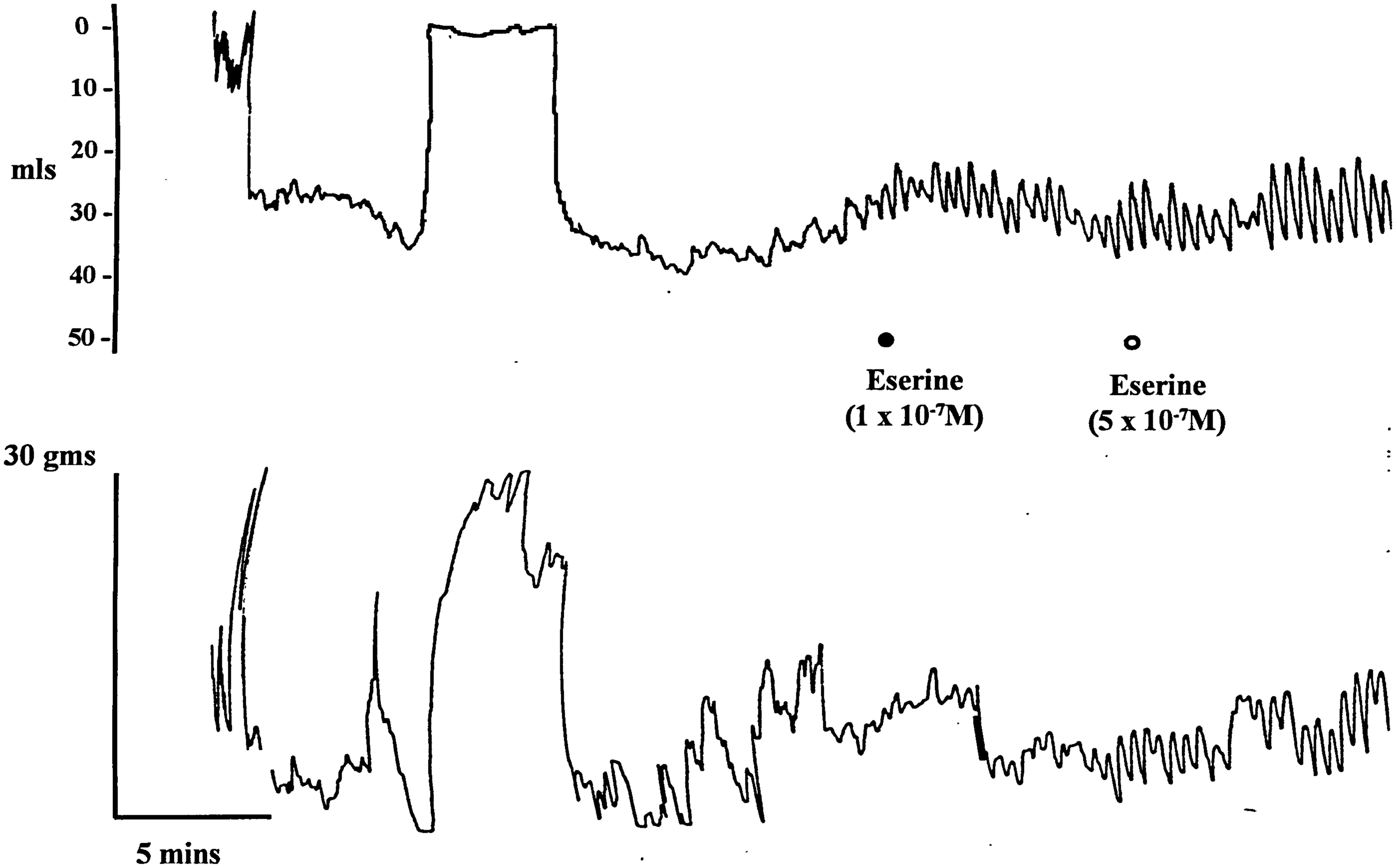


Fig 84. The effect of eserine (● - 1 x 10^{-7}M and ○ - 5 x 10^{-7}M) on peristalsis (upper trace) in control sigmoid colon. Eserine enhanses peristalsis and accompanying isotonic contractions (lower trace). This effect is mediated through the anicholinesterase properties of the drug.

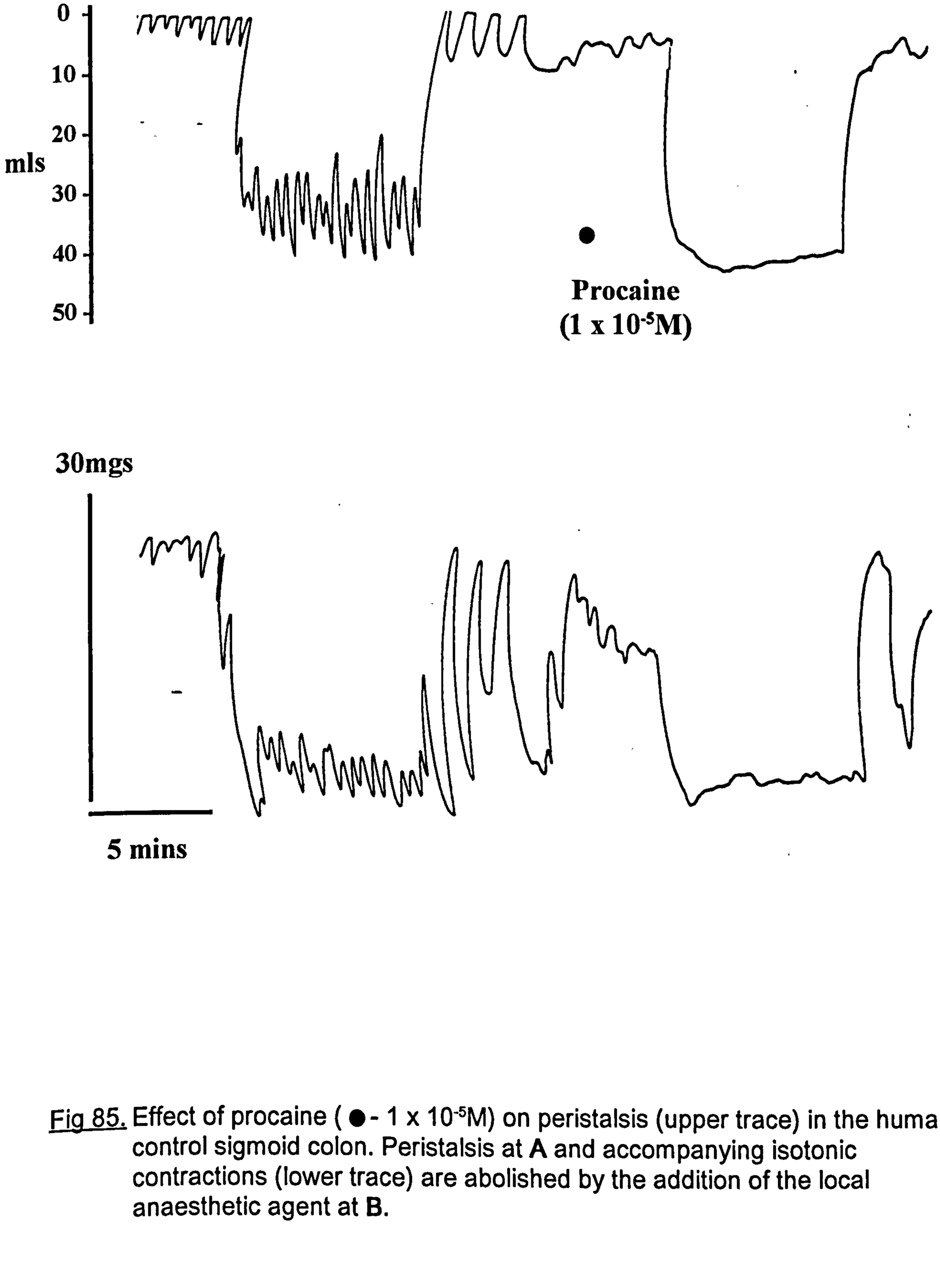


Fig 85. Effect of procaine (● - 1 x 10^{-5}M) on peristalsis (upper trace) in the human control sigmoid colon. Peristalsis at **A** and accompanying isotonic contractions (lower trace) are abolished by the addition of the local anaesthetic agent at **B**.

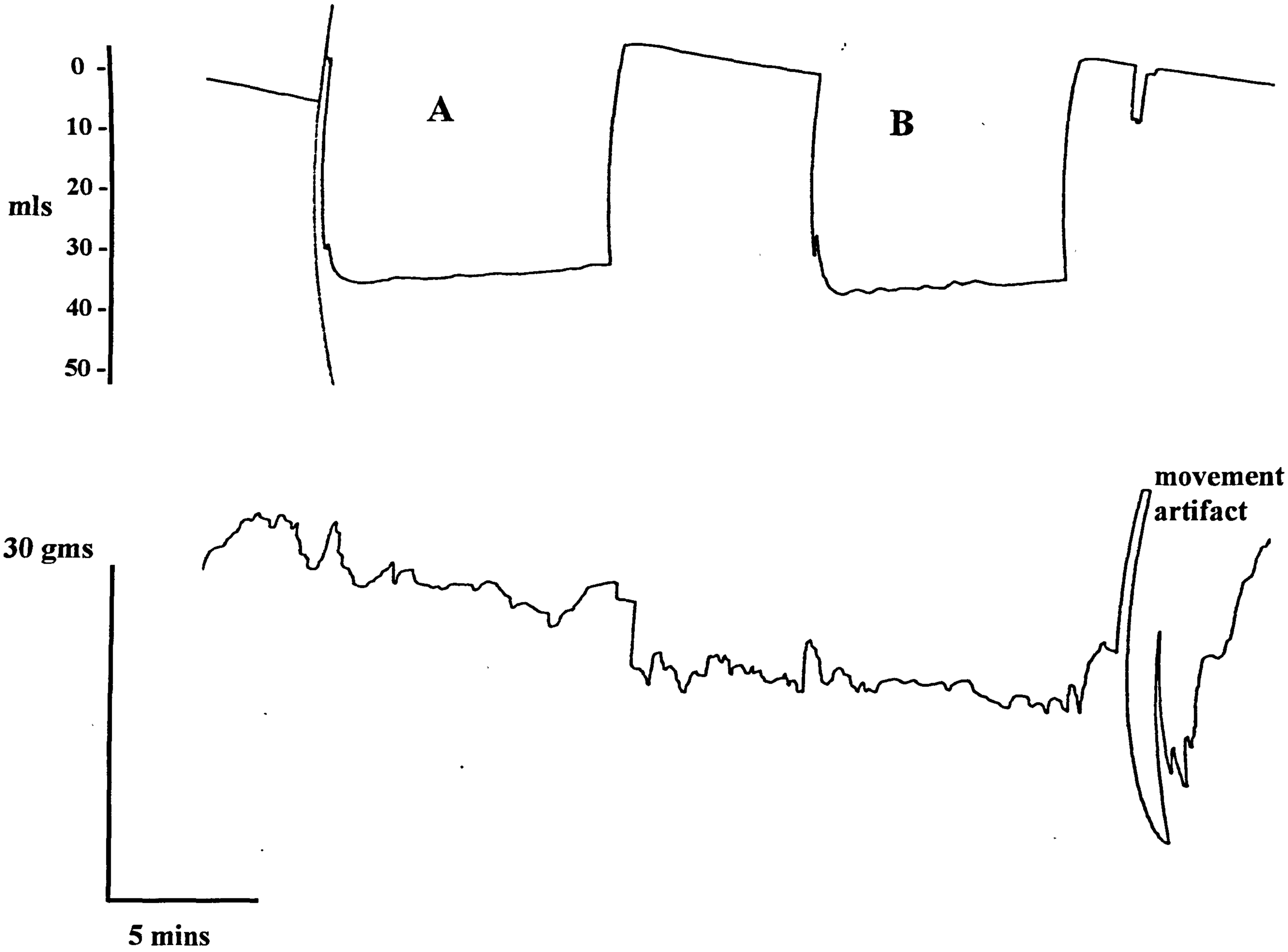


Fig 86. The effect of increasing intraluminal volume (upper trace) on sigmoid colon from constipated patients. Note the absence of peristalsis and accompanying isotonic contractions (lower trace) at **A** and **B**.

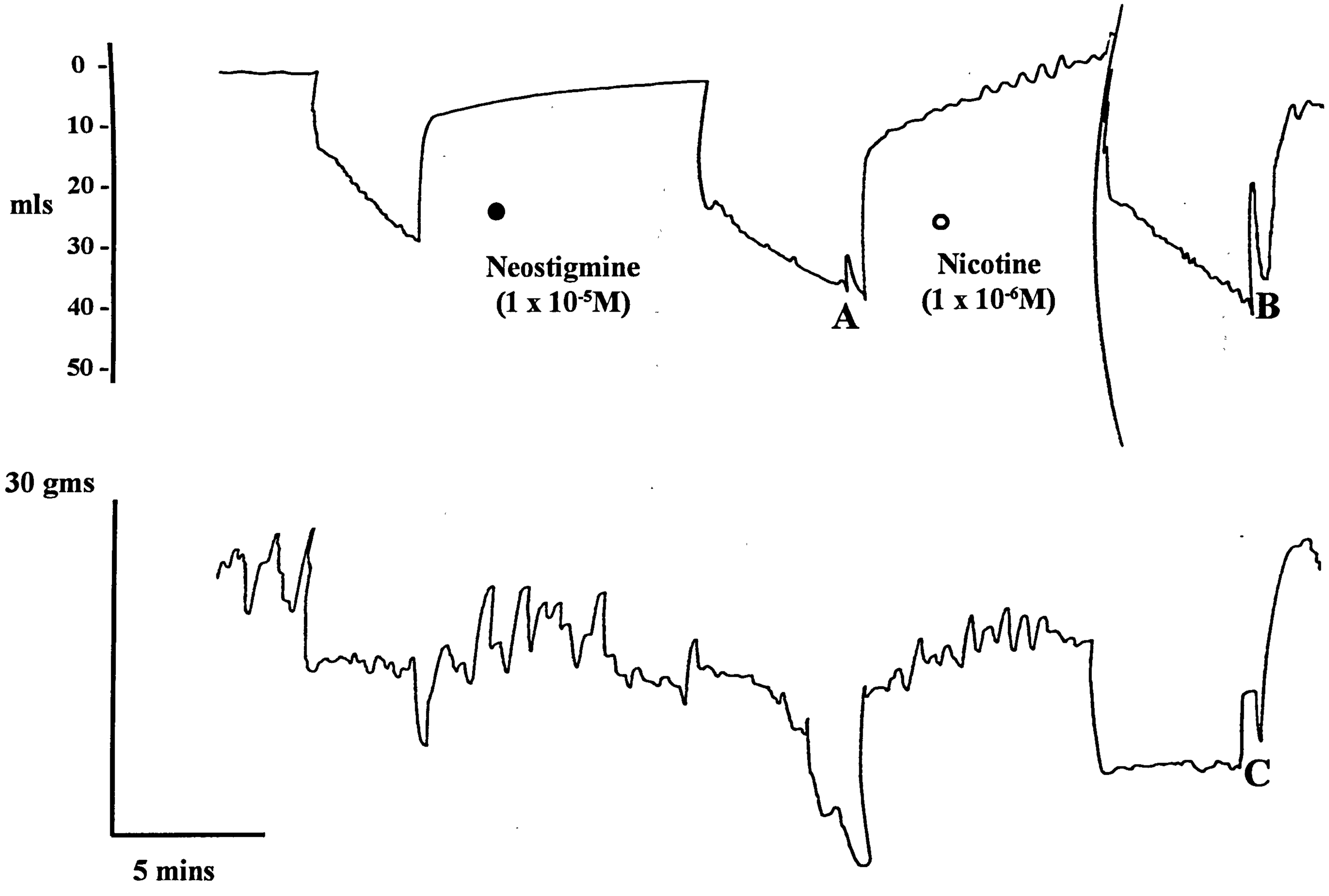


Fig 87. Failure to induce regular peristalsis (upper trace) in postchildbirth/hysterectomy sigmoid colon. Despite the addition of neostigmine (● - 1 x 10^{-5}M) and the ganglion stimulating agent nicotine (o - 1 x 10^{-6}M), regular peristalsis was not induced. However, the low amplitude contraction, (**A**) produced by the effect of neostigmine is further enhanced by nicotine (**B**). The accompanying isotonic contraction (lower trace) is seen at **C**.This suggests that sigmoid colon from constipated patients will contract if there is sufficient stimulus.

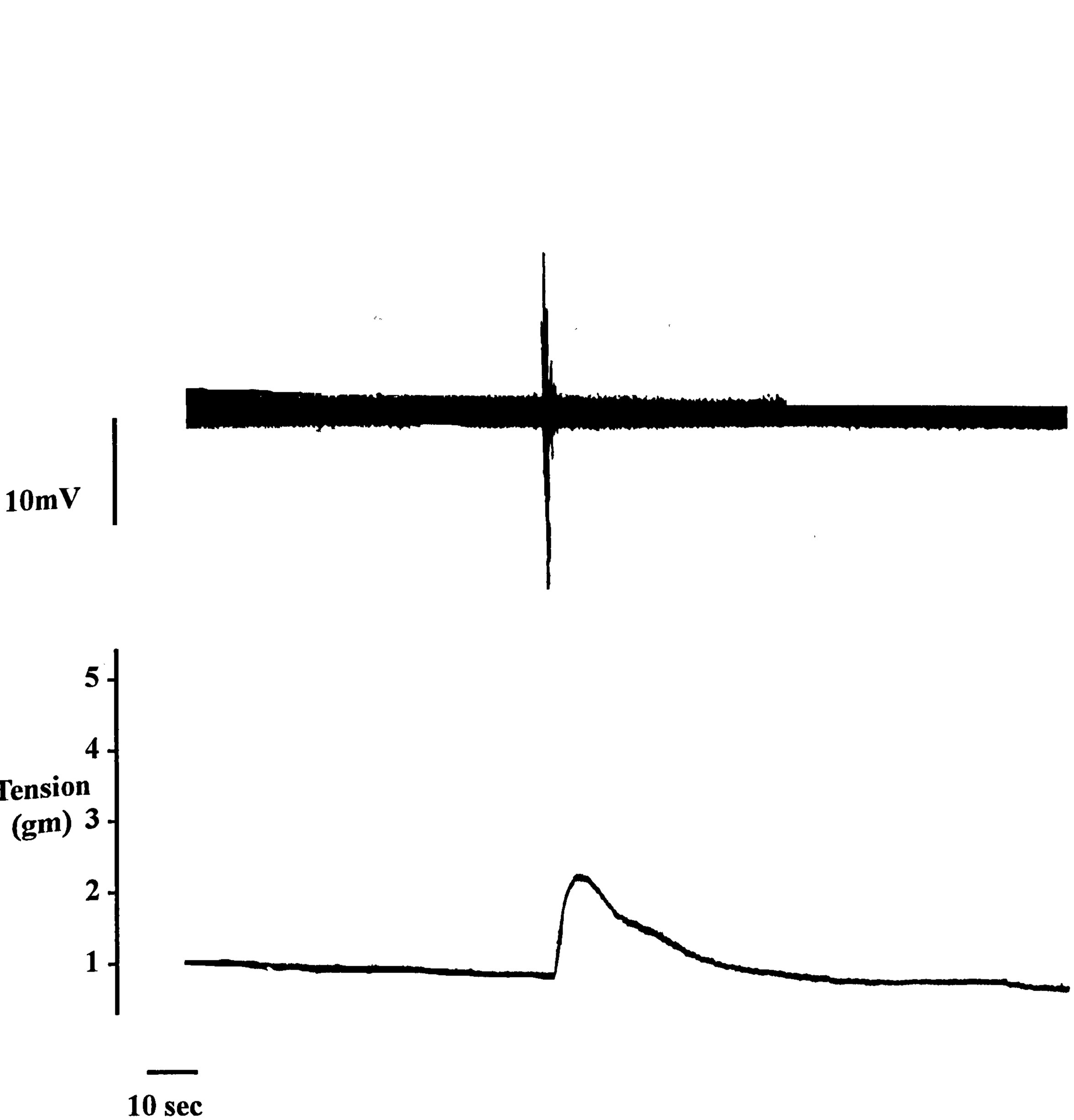


Fig 88. Spontaneous electrical (upper trace) activity recorded extracellularly from control sigmoid taenia coli. The associated mechanical response (lower trace) is also shown. Recording made on an ultraviolet oscillograph (EMI,SE6150MkII).

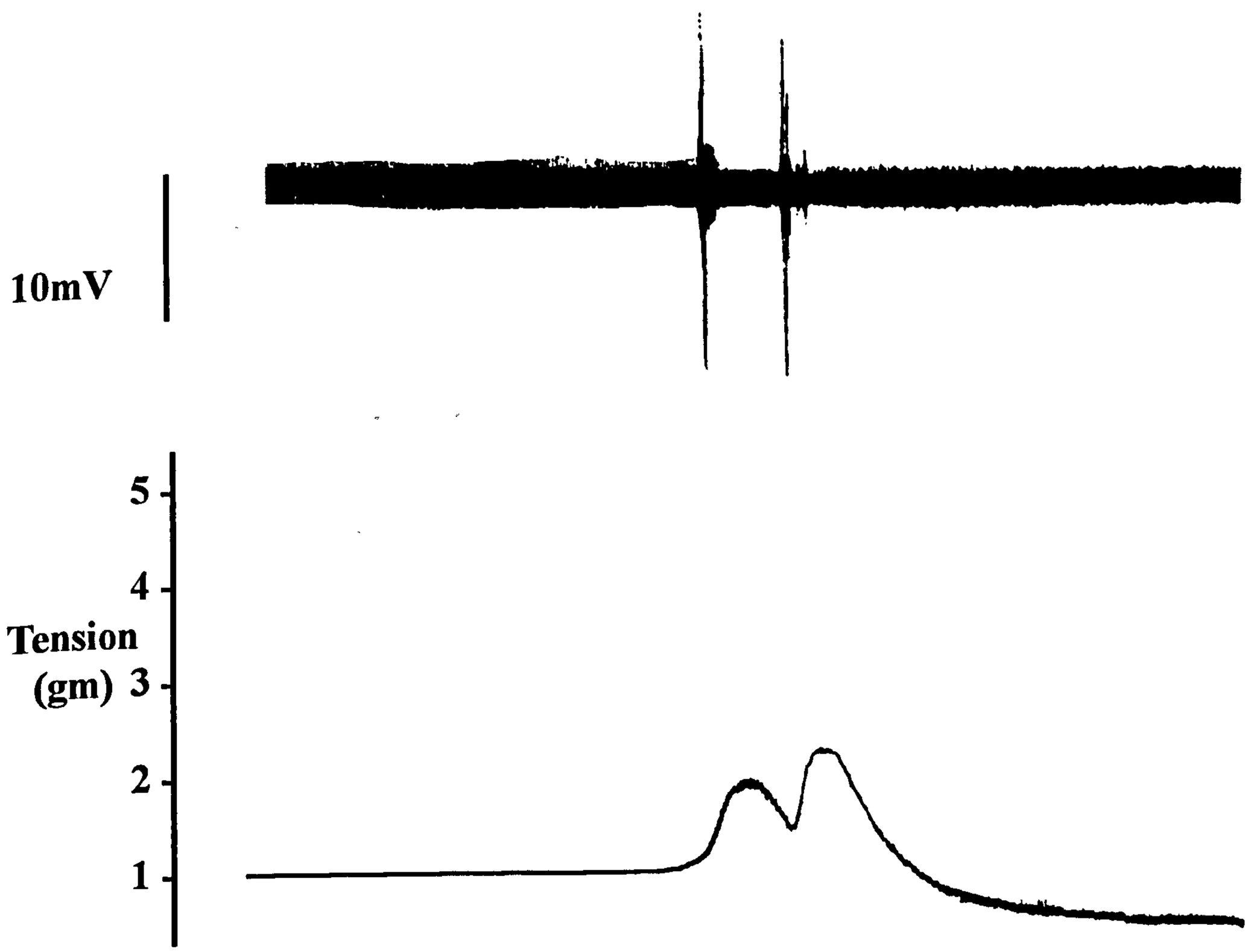


Fig 89. Spontaneous electrical (upper trace) activity recorded extracellularly from control sigmoid taenia coli. Two consecutive depolarisations gave rise to associated mechanical contractions (lower trace). The rapid depolarisations resulted in summation of the contractions leading to an increase in tone. Recordings made on an ultraviolet oscillograph (EMI,SE6150MkII).

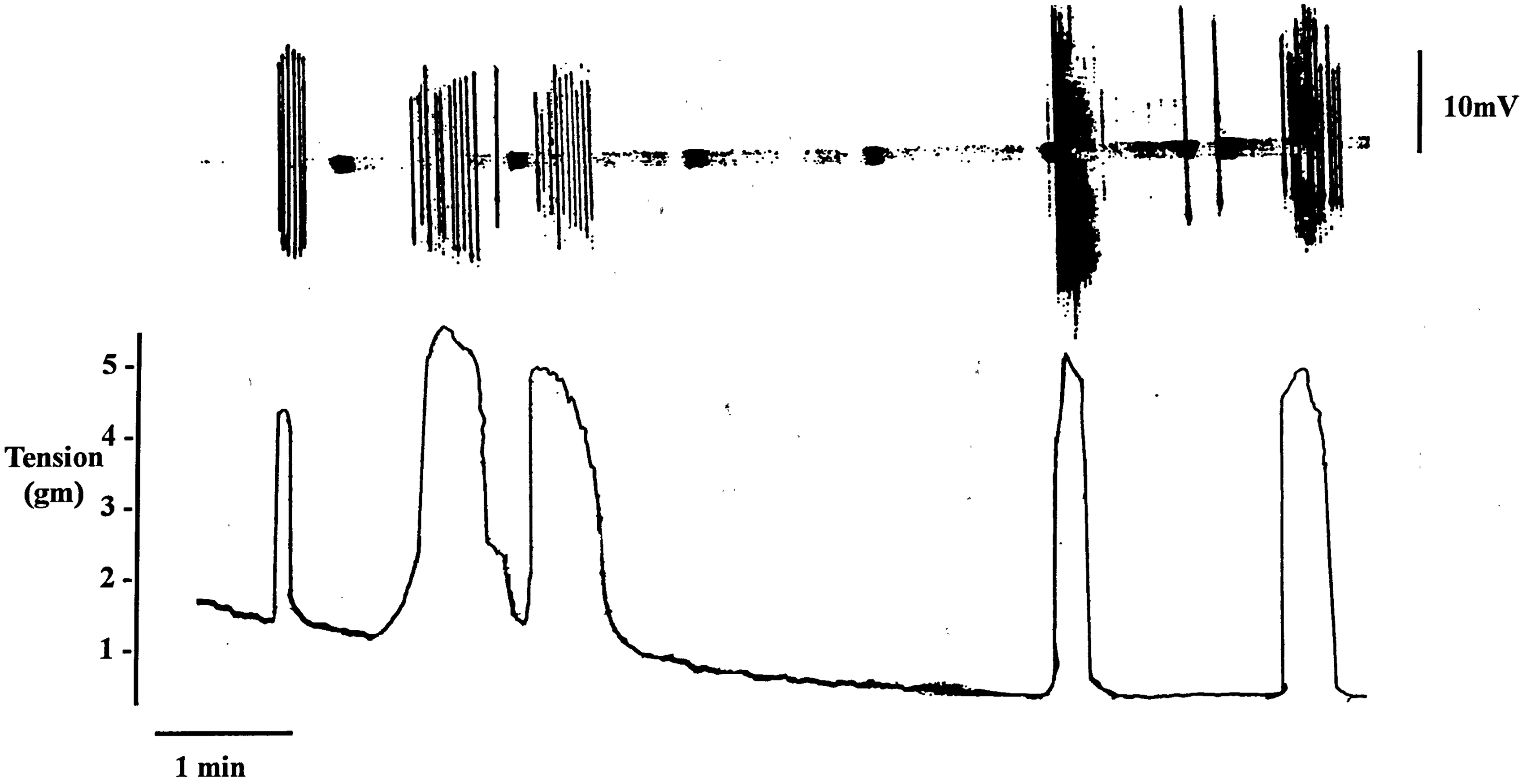


Fig 90. Spontaneous bursts of electrical activity (upper trace) recorded extracellularly from control sigmoid taenia coli. The associated mechanical response (lower trace) is also shown. Note how varying lengths of electrical bursts produced varying degrees of mechanical response. Recordings made on an ultraviolet oscillograph (EMI,SE6150MkII).

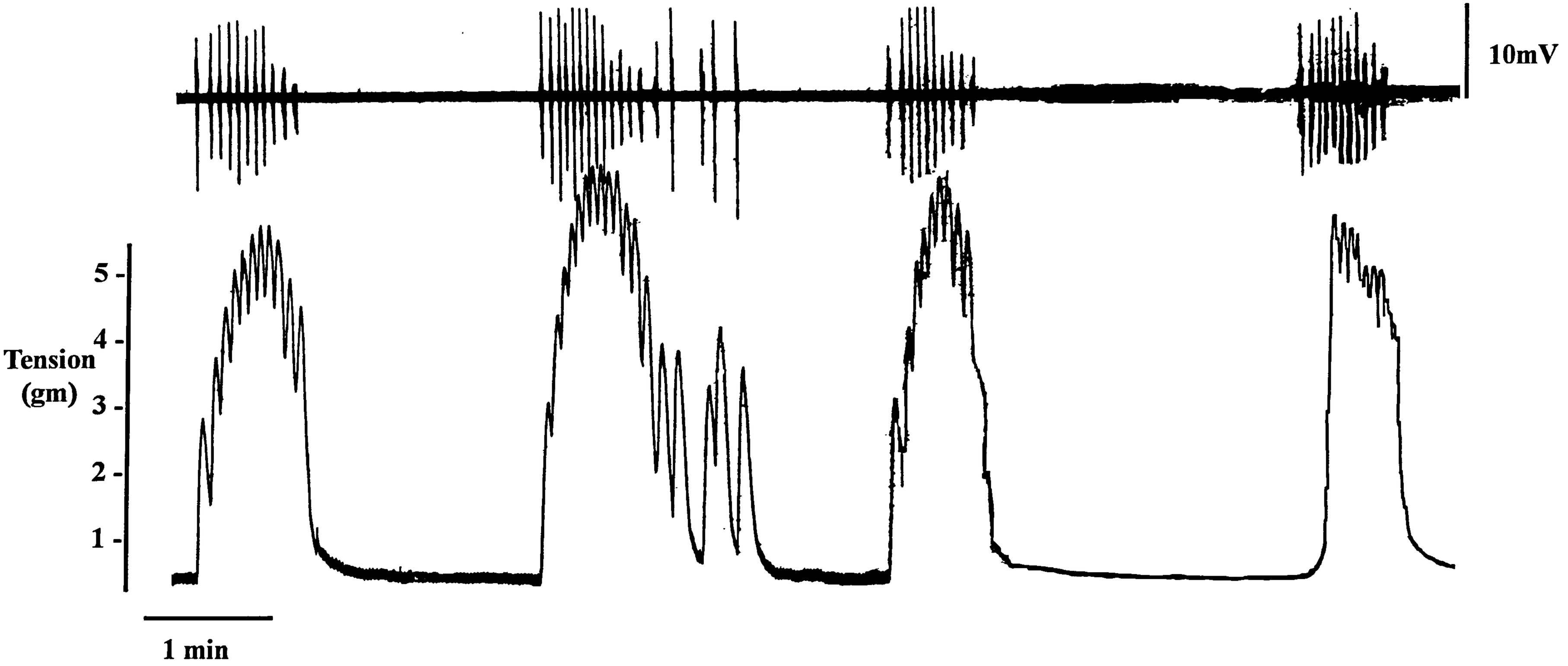


Fig 91. Bursts of extracellularly recorded electrical activity (upper trace) producing regular elevations in tone in constipated sigmoid taenia coli. Note how the associated spontaneous activity (lower trace) is superimposed on top of increases in basal tone. Recordings made on an ultraviolet oscillograph (EMI,6150MkII).

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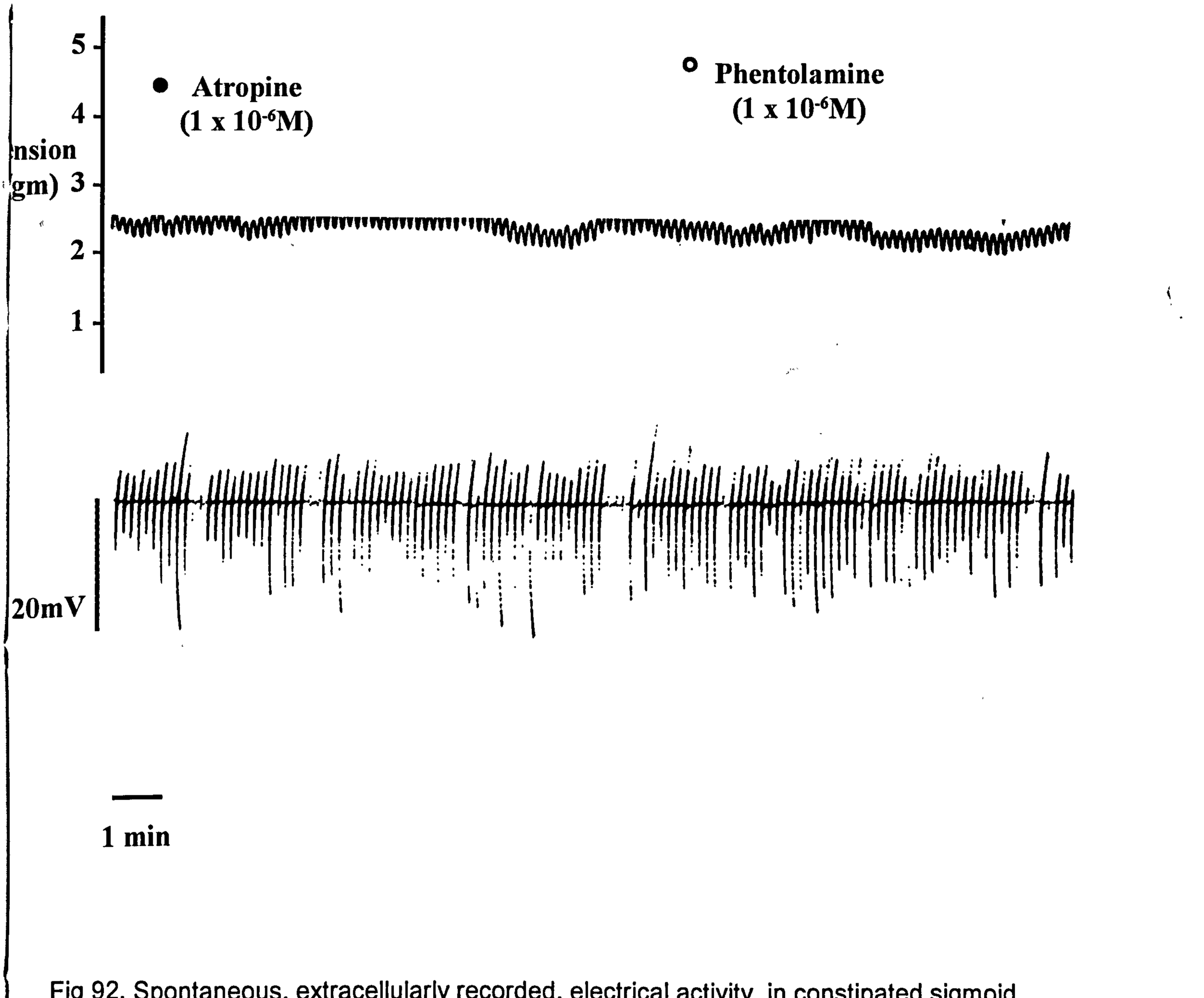

Fig 92. Spontaneous, extracellularly recorded, electrical activity in constipated sigmoid taenia coli (lower trace). This activity is unaffected by either atropine (● - 1 x 10^{-6}M) or phentolamine (o - 1 x 10^{-6}M), indicating that it is not mediated through the sympathetic or the parasympathetic system The associated mechanical contractions are shown in the upper trace. Recording made on polygraph (Grass 7D).

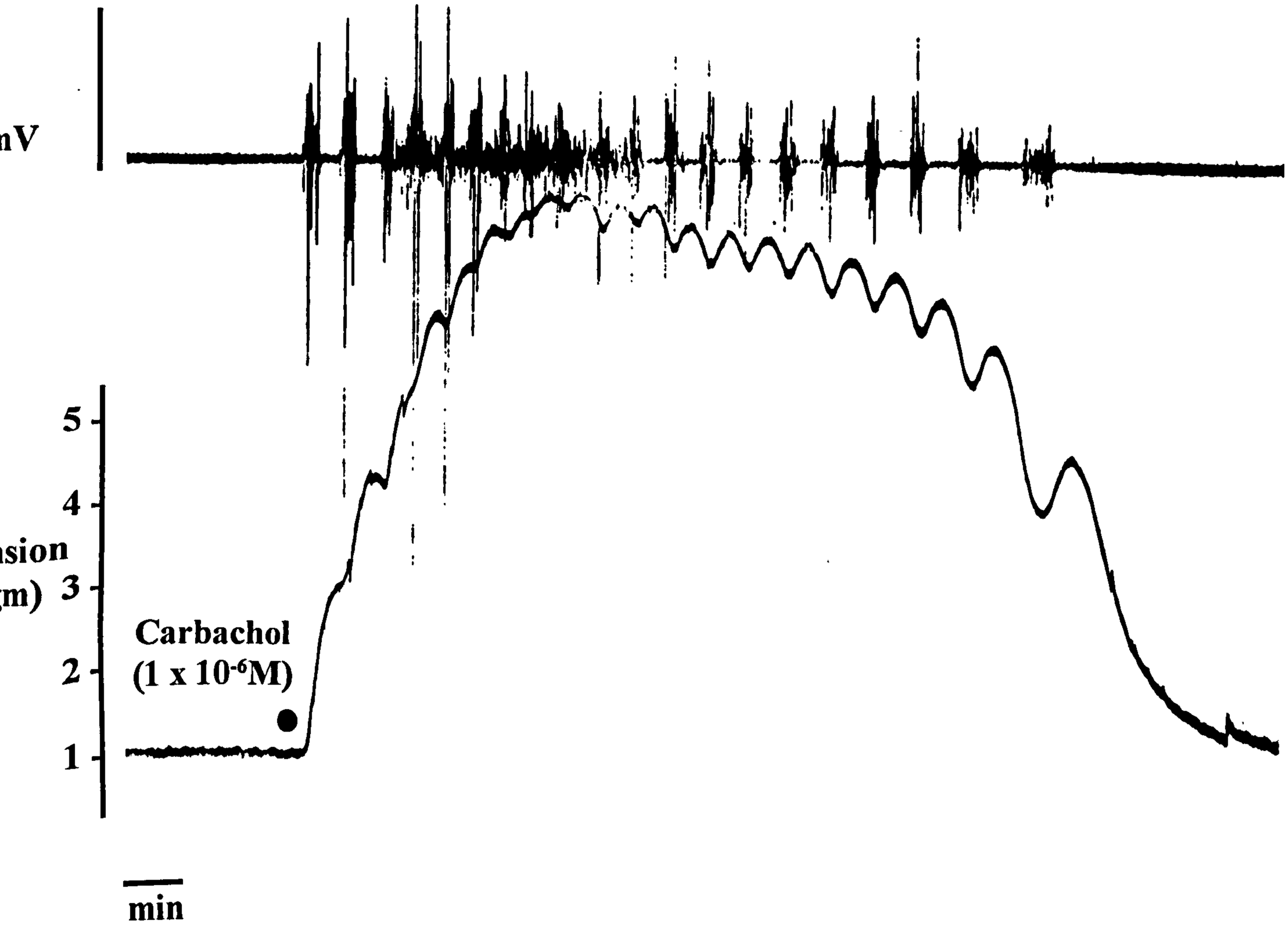

Fig 93. Demonstration of the effect of carbachol (● - 1 x 10^{-6}M) on extracellularly recorded electrical activity (upper trace) and associated mechanical contractions (lower trace) in constipated sigmoid taenia coli. Recordings made on an ultraviolet oscillograph (EMI,SE6150MkII).

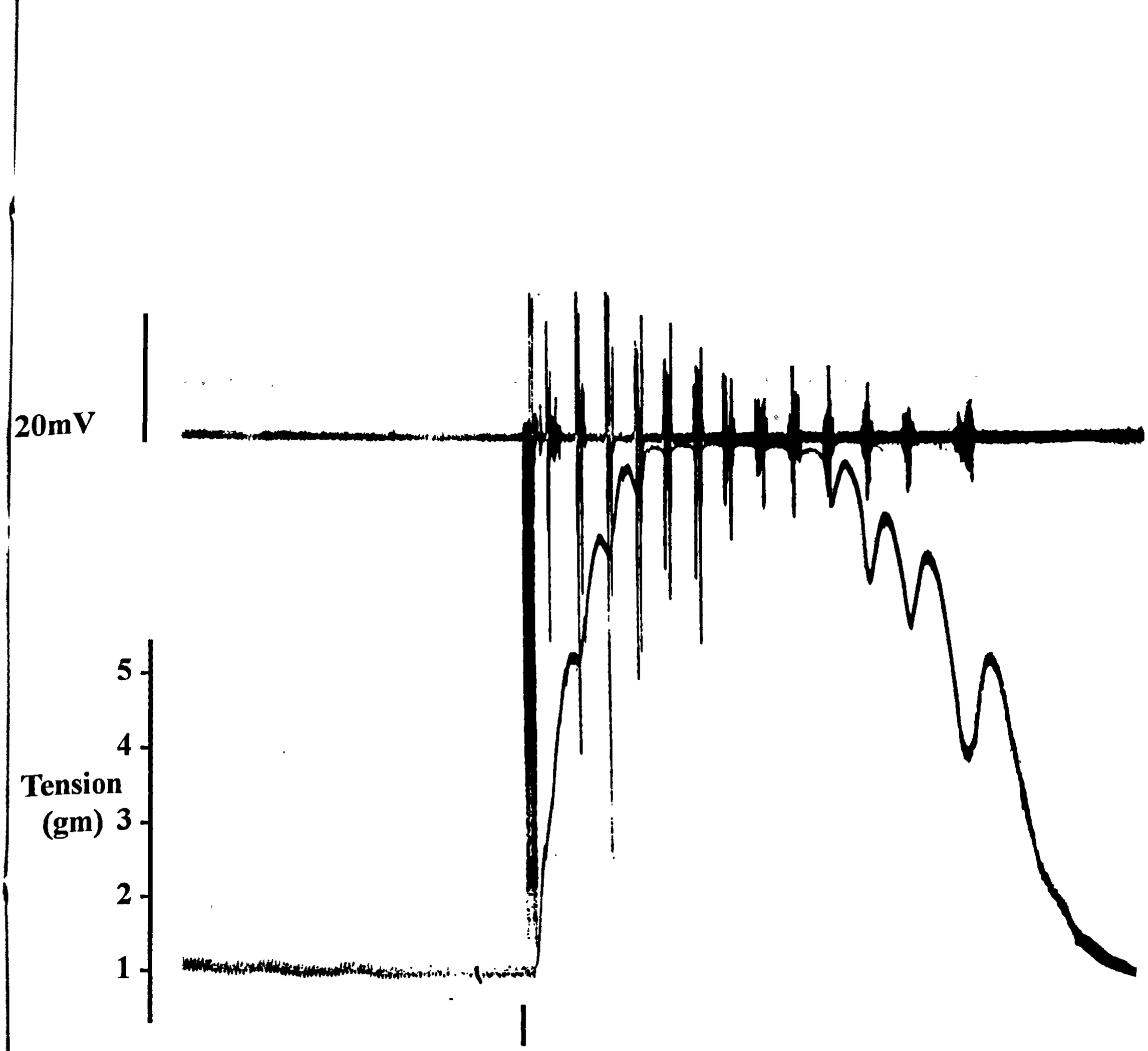

Fig 94. The effect of nerve stimulation (| - 10Hz, 0.1ms, 30V, 10 pulses) on extracellularly recorded electrical activity (upper trace) and associated mechanical contractions (lower trace) in control sigmoid taenia coli. Recordings made on an ultraviolet oscillograph (EMI,SE6150MkII).

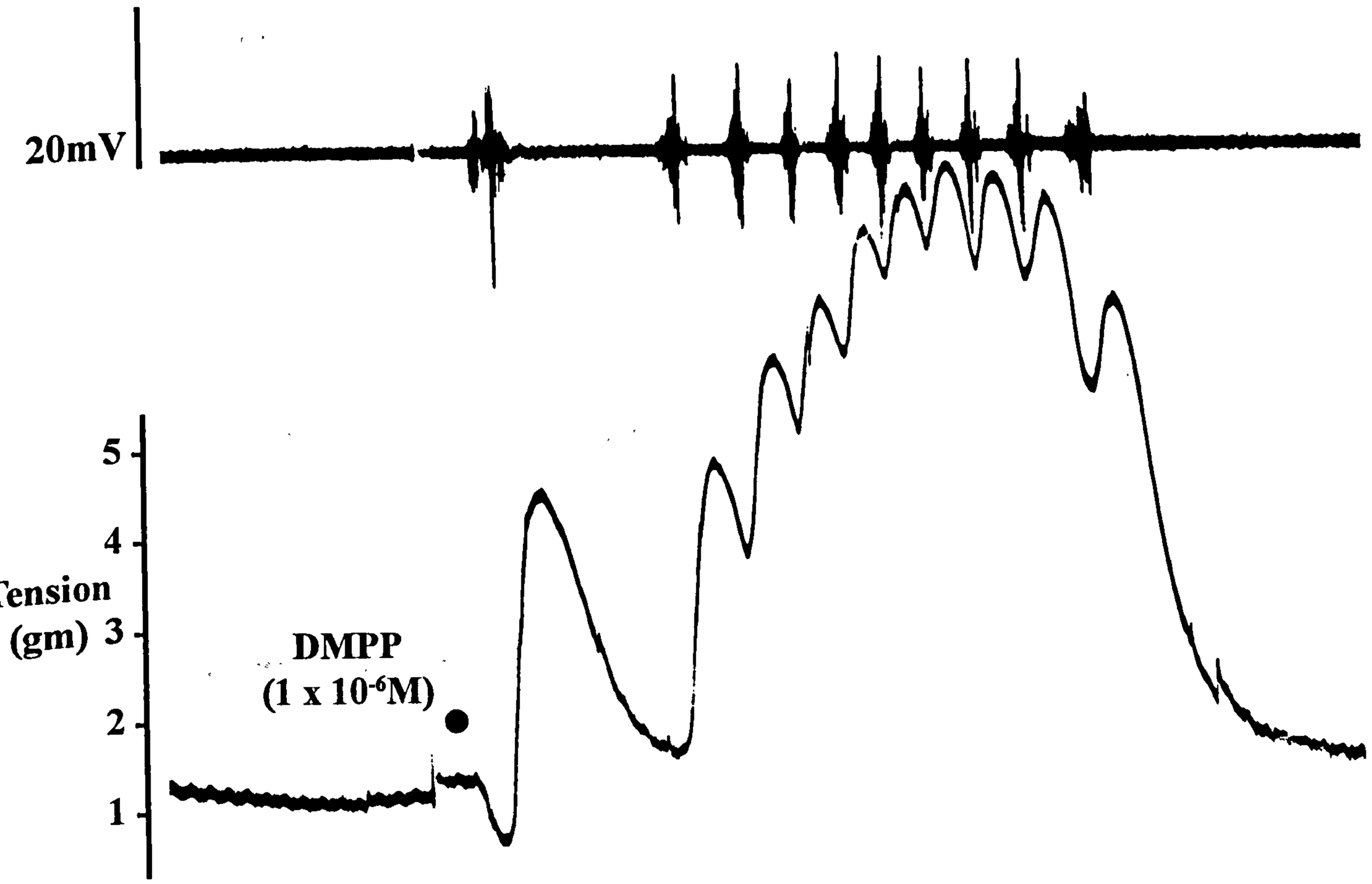

Fig 95. The effect of **DMPP** (● - 1 x 10 $^{-6}$M) on extracellularly recorded electrical activity (upper trace) and accompanying mechanical response (lower trace) in control sigmoid taenia coli in the presence of low basal tone. Recordings made on an ultraviolet oscillograph (EMI,SE6150MkII).

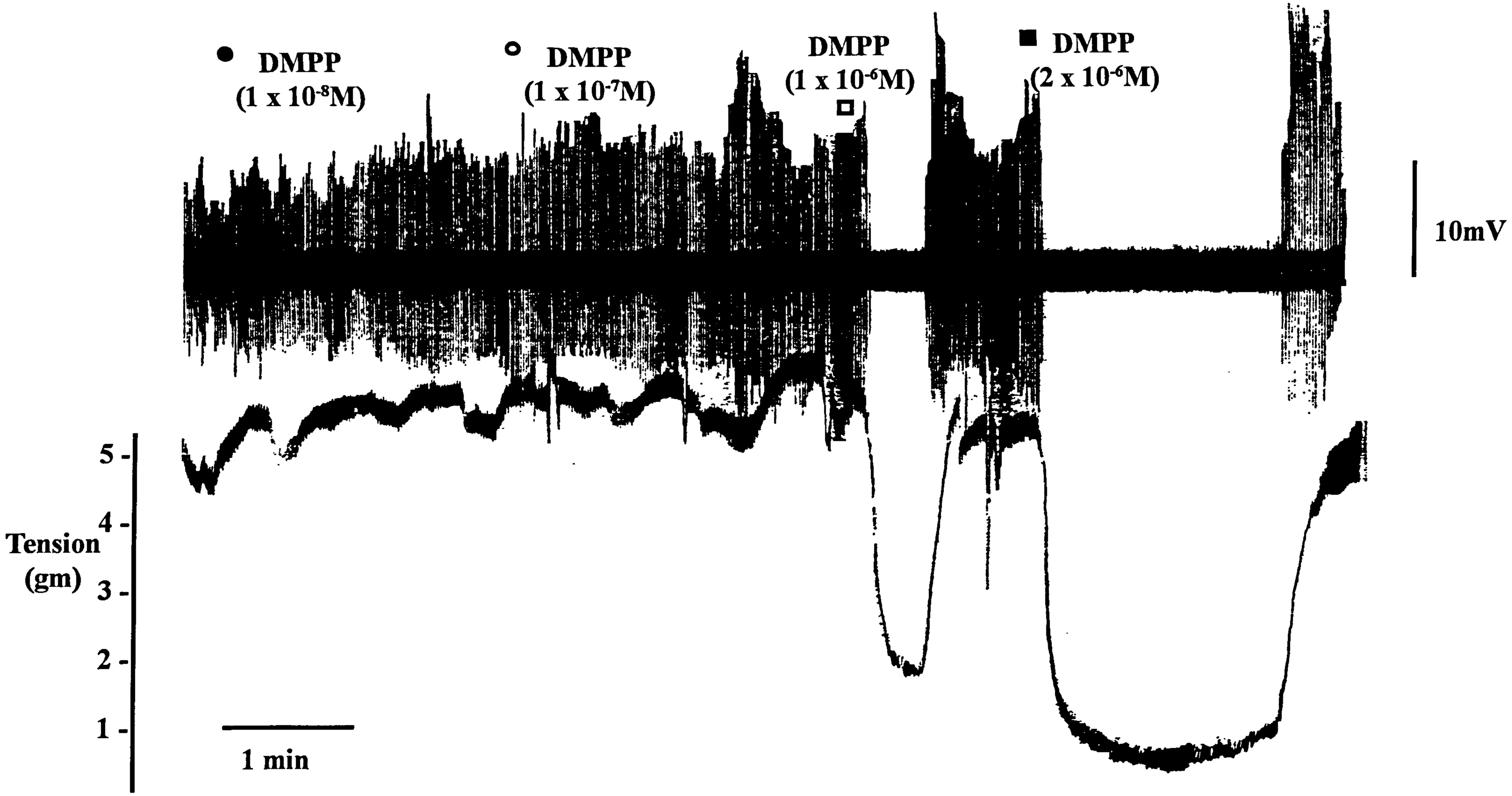

Fig 96. The effect of increasing concentrations of DMPP (● - 1×10^{-8}M, ○ - 1×10^{-7}M, □ - 1×10^{-6}M, ■ - 2×10^{-6}M) on extracellularly recorded electrical (upper trace) and accompanying mechanical contractions (lower trace) in control sigmoid taenia coli. When the concentration of DMPP reached threshold (□), spontaneous electrical activity was abolished and tone reduced. These effects, which were dose-related (■) are likely to arise from the stimulant effect of the drug on enteric ganglia releasing an inhibitory substance. The anticipated accompanying hyperpolarisation could not be recorded using this technique but spontaneous activity ceased. Recording made on an ultraviolet oscillograph (EMI, SE 6150 Mk II).

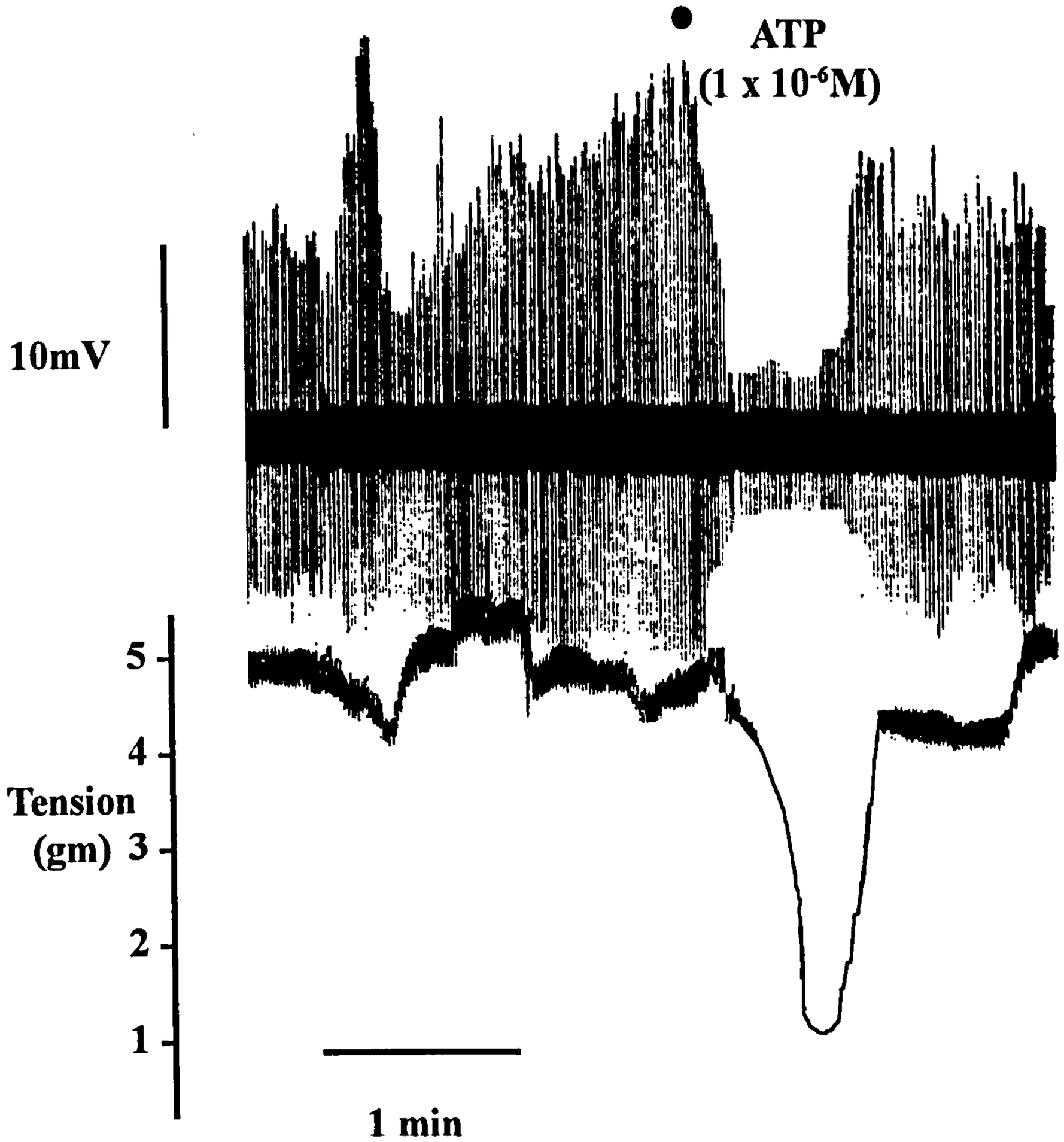

Fig 97. The effect of **ATP** (● - 1 x 10^{-6}M) on extracellularly recorded electrical (upper trace) and acompanying mechanical contractions (lower trace) in control sigmoid colon. ATP inhibited spontaneous activity and relaxed the colon, presumably by interacting with purinoceptors on the colonic smooth muscle. Recording made on an ultraviolet oscillograph (EMI, SE 6150 Mk II).

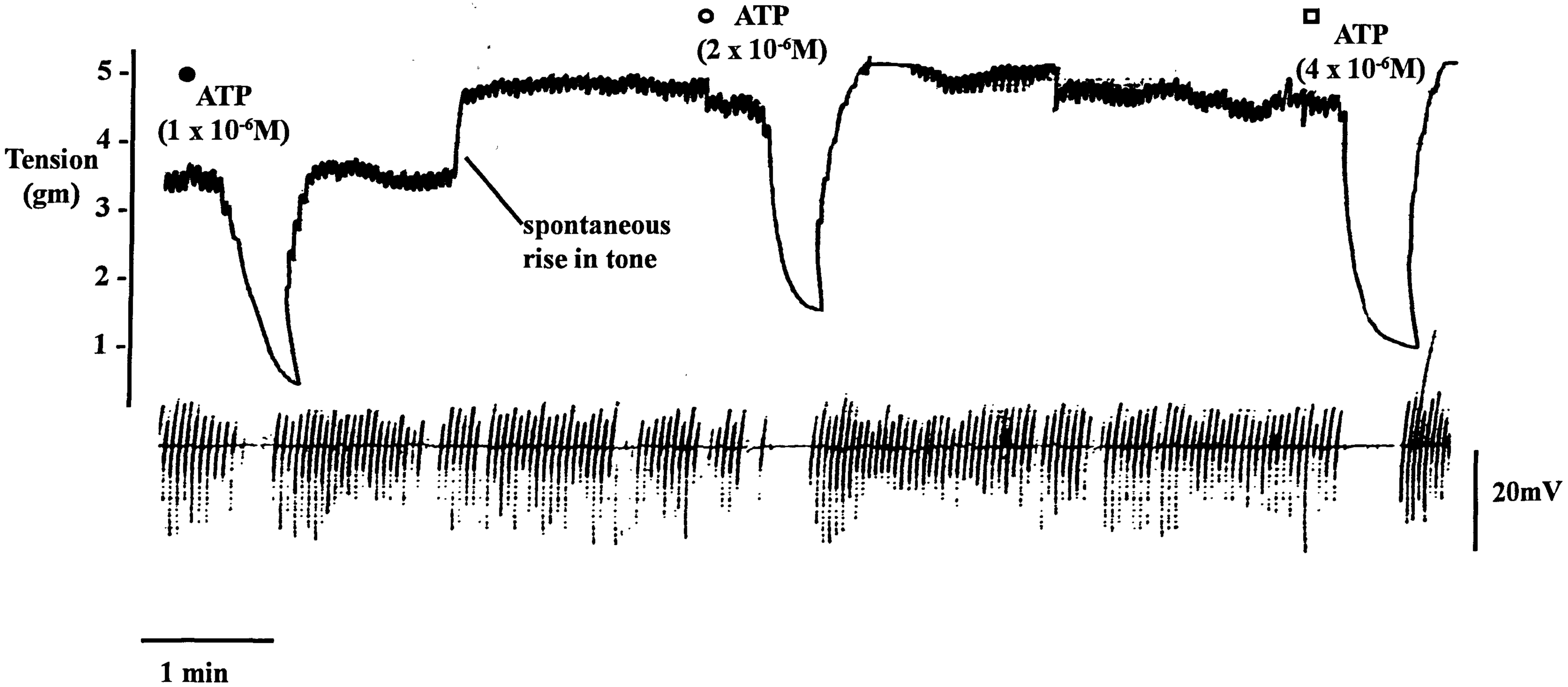

Fig 98. The effect of increasing concentrations of **ATP** (● - 1 x 10^{-6}M, o - 2 x 10^{-6}M, □- 4 x 10^{-6}M) on extracellularly recorded electrical (lower trace) and accompanying mechanical contractions (upper trace) in constipated sigmoid taenia coli. ATP inhibited spontaneous electrical activity and lowered tone in a dose dependent fashion. Recordings made on a polygraph (Grass 7D).

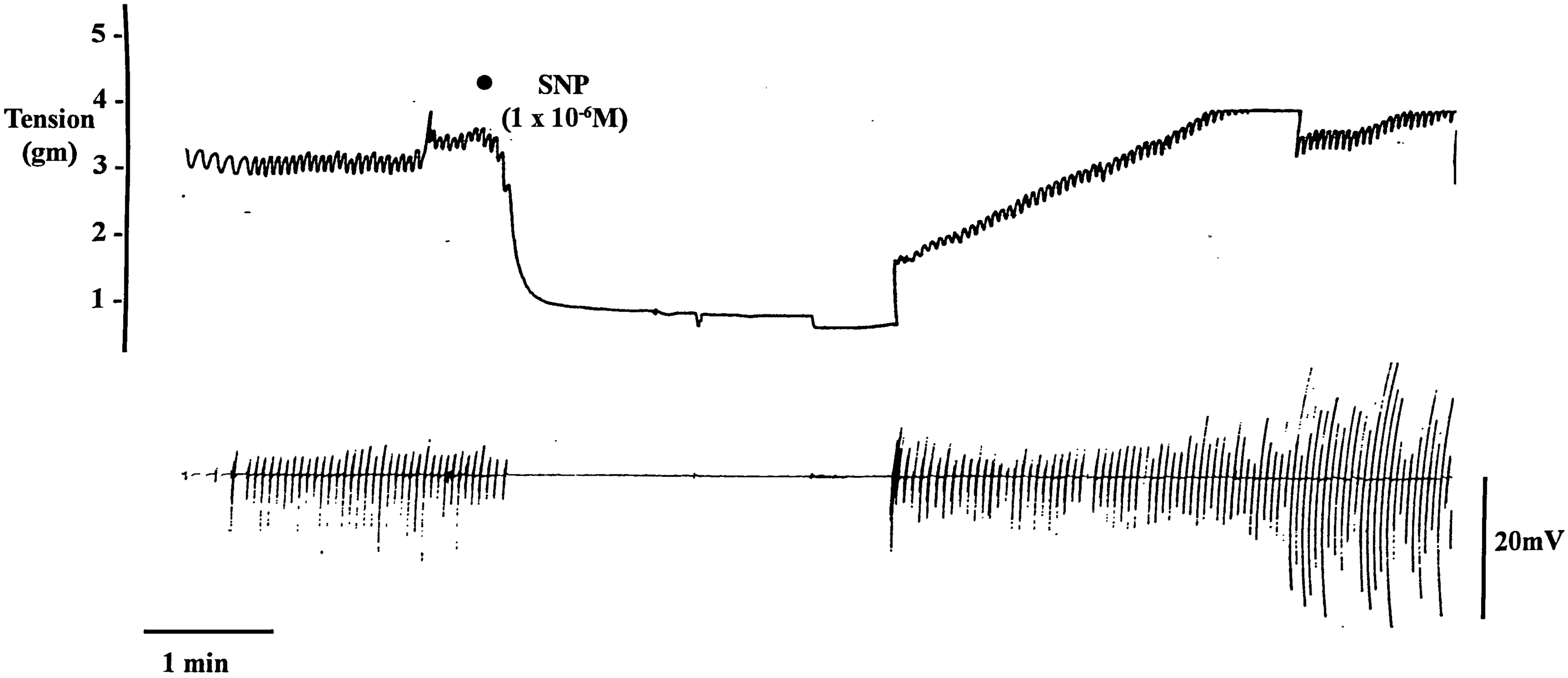

Fig 99. The reversible, inhibitory effect of **SNP** (● - 1 x 10^{-6}M) on extracellularly recorded electrical (lower trace) and accompanying mechanical contractions (upper trace) in control sigmoid taenia coli. Note the relaxation of smooth muscle at **A** and the corresponding abolition of electrical activity at **B**. Recordings made on a polpolygraph (Grass 7D).

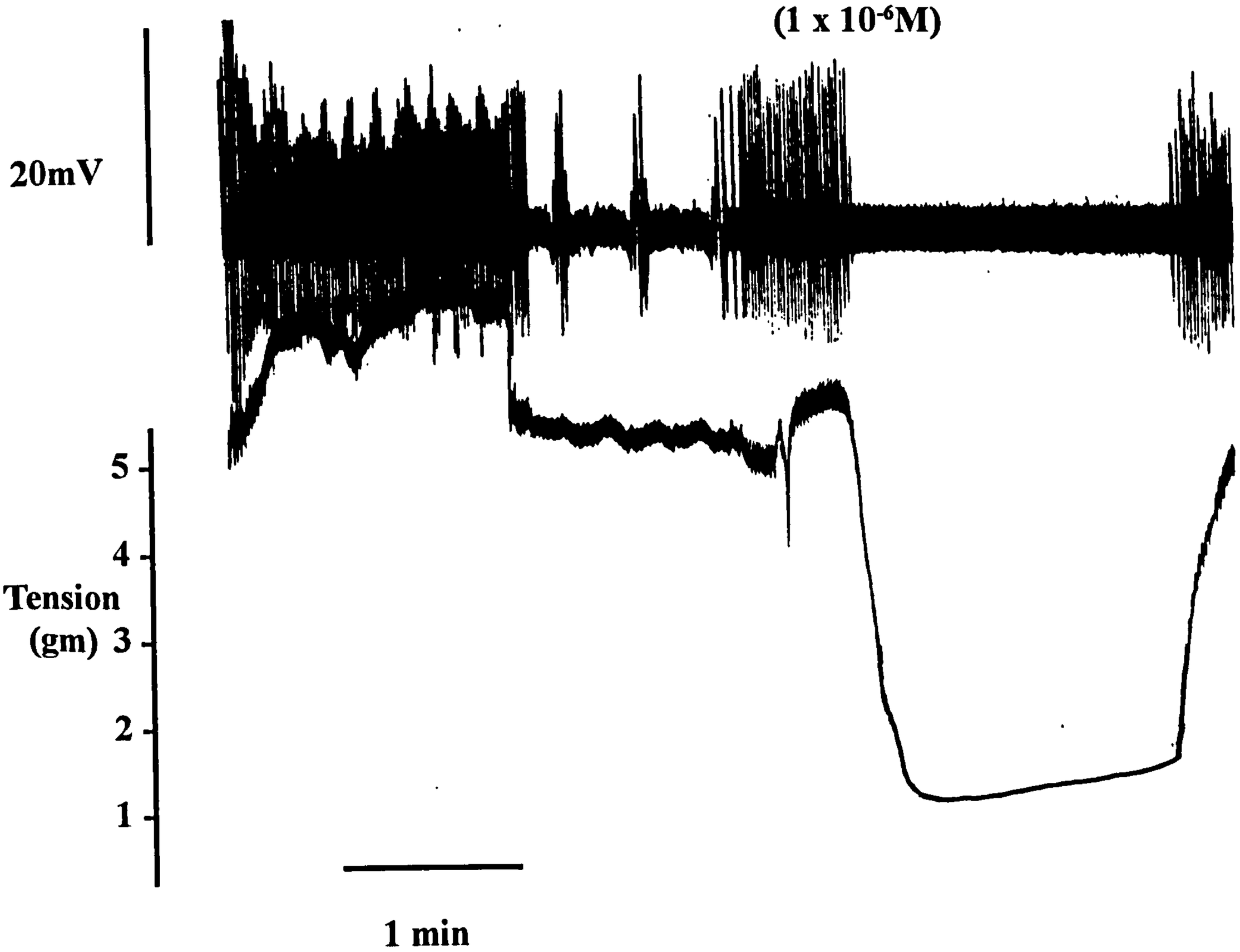

Fig 100. Effect of **SNP** (● - 1 x 10^{-6}M) on extracellularly recorded electrical (upper trace) and accompanying mechanical contractions (lower trace) in constipated sigmoid taenia coli. SNP presumably acted through guanylate cyclase releasing nitric oxide. Recordings made on an ultraviolet oscillograph (EMI,SE6150MkII).

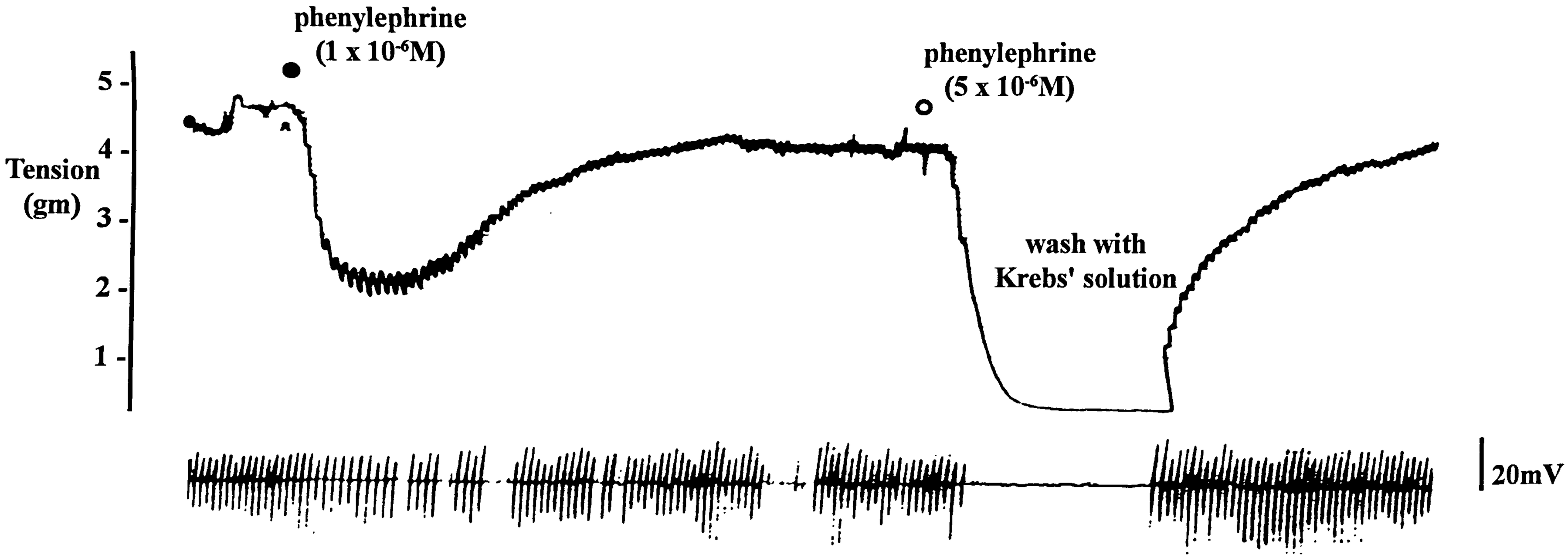

Fig 101. Effect of phenylephrine (● - 1 x 10^{-6}M) and (o - 5 x 10^{-6}M) on extracellularly recorded electrical activity (lower trace) and accompanying mechanical contractions in control sigmoid taenia coli. Incremental doses of the sympathomimetic first reduced and then abolished electrical activity. The accompanying spontaneous contractions were also reduced and then abolished producing complete relaxation of the tissue. Washing with Krebs' solution restored both the myoelectrical and mechanical activity. Recordings made on a polygraph (Grass 7D).

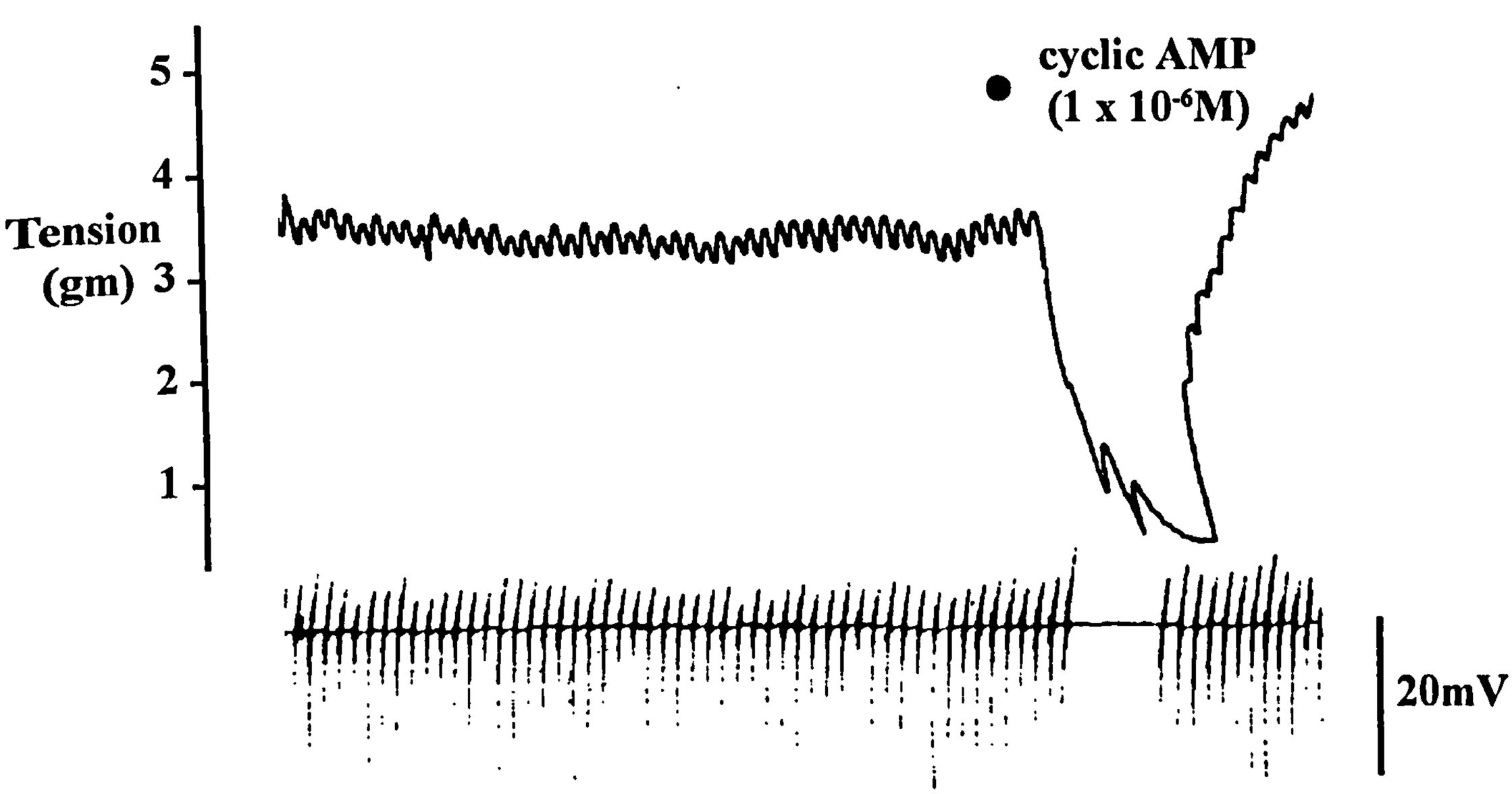

Fig 102. Reversible, inhibitory effect of cyclic **AMP** (● - 1 x 10^{-6}M) on extracellularly recorded electrical (lower trace) and accompanying mechanical contractions (upper trace) in control sigmoid taenia coli. Note the relaxation of the smooth muscle which accompanied the abolition of electrical activity. Recordings made on a polygraph (Grass 7D).