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**Influence of Obstruction of the Bowel upon its Strength
(Bursting Strength).***

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Changes in the bowel wall in intestinal obstruction due to increased intraenteric pressure have been emphasized by many investigators. Perforations of the bowel wall due to gangrene are sometimes terminal complications of simple obstruction.

This study was made to compare the bursting pressure of the bowel wall in simple intestinal obstruction with the normal. Cutting¹ reports the breaking point of normal bowel to be between 1000 and 1500 mm. of mercury. Morton² reports a pressure of over 500 mm. of mercury as the breaking point. Burt³ determined the pressure required to rupture the bowel at various levels by the introduction of air. He found that, experimentally, the rectum supports the greatest pressure, and the sigmoid, *ileum*, esophagus, *jejunum*, transverse colon, caecum, and stomach decrease in strength in the order in which they are mentioned.

Loops of ileum and jejunum 6 to 8 inches long were obtained immediately after death from normal dogs (used for other experiments). One end of the loop was connected to a specially constructed mercury manometer (measuring to 1800 mm. of mercury) and the other to an airline source of pressure. The ends of the loop were tied over rubber nipples to prevent as much as possible blowing out of the connections. The pressure (intraenteric) was then gradually increased until the bursting point (explosion) of the bowel was passed.

Similar loops were obtained from 11 dogs with simple low ileal obstruction of 4 to 7 days duration. The loops were obtained as in the normal cases immediately after death (sacrifice of animal for another experiment), and subjected to distension with air in the same manner as the normal loops. The pressure level at which the serosa split, the site of the tearing (mesenteric or antimesenteric border), and the level of pressure at which the bowel finally burst were noted.

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¹ Cutting, R. A., *Arch. Surg.*, 1928, **17**, 658.

² Morton, J. J., *Arch. Surg.*, 1930, **21**, 531.

³ Burt, C. A. V., *Arch. Surg.*, 1931, **22**, 875.

The normal ileum in most cases was able to withstand greater degrees of pressure than the jejunum. The ileum resisted pressures from 300 to over 1,000 mm. of mercury. The bursting pressures for the jejunum fell within the same limits, but, with some exceptions, were lower than those of the ileum in the same dog.

In the obstructed series, however, the reverse was found to be true. The jejunum, *i. e.*, that portion of the bowel farthest away and least affected by the obstruction, was the more resistant. The values for the jejunum approached the normal, whereas those of the obstructed segment of bowel (ileum) were far below normal values. In the obstructed specimens (ileum) the serosa split usually at the antimesenteric border at about 100 to 300 millimeters of mercury, and soon burst, whereas in the normal cases the serosa was able to resist usually above 400 mm. of mercury pressure.

TABLE I.
Bursting Pressures for Normal Bowel.

Dog	Press. mm. Hg at which serosa split		Press. mm. Hg at which bowel burst	
	Ileum	Jejunum	Ileum	Jejunum
1	360a	210a	620	400
2	300a	660a	560	660
3	540	400p	540	400
4	480a	440	480	440
5	660a	600a	Ends blew out	
6	540a	610a	“ “ “	
7	700a	540a	700	540
8	1060a	820a	1060	820
9	560p	640p	560	640
10	700p	780a	700	780
11	300m	220m	660m	500a
12	1080m	400a	1080	820

aAntimesenteric border.
pParamesenteric border.
mMesenteric border.

TABLE II.
Bursting Pressures for Obstructed Bowel.

Dog	Days Obst.	Press. mm. Hg. at which serosa split		Press. mm. Hg. at which bowel burst	
		Ileum	Jejunum	Ileum	Jejunum
1	6	195a		200—	End blew out
2	6	220a	240	230	540
3	7	200	200	280	225
4	7	90a	190a	180a	260a
5	7	200	200	200	200
6	7	200a	500a	280	760
7	5	210a	420a	250m	620m
8	5	360a	560p	480m	560p
9	5	260a	360a	360a	400a
10	6	400m	500	460m	520a

a, p, m, as in Table I.

Conclusions: 1. The bowel wall in simple intestinal obstruction cannot withstand marked increase of intra enteric pressure as well as the normal bowel wall. 2. This is especially true of that portion of the bowel just above the site of obstruction. 3. The most frequent site of tearing of the serosa and rupture is the antimesenteric border of the bowel.

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Experiments with Poliomyelitis Virus.*

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In my series of experiments on poliomyelitis the average length of time elapsing between the intracerebral injection of the virus in the *M. rhesus* monkey and the onset of paralysis was from 5 to 10 days. The clinical effects of motor cell destruction were not noticed for some time, irrespective of the quantity (from 0.25 cc. to 2.0 cc.) and the concentration (from 1% to 10%) of the virus administered. When the motor areas of 2 monkeys were exposed at operation and from 0.25 cc. to 0.5 cc. of a 2% suspension of virus injected directly into their centers no paralysis developed immediately. When larger amounts (from 2.0 cc. to 2.5 cc. of a 2% suspension) were injected in 2 monkeys in the same area, some partial hemiparesis occurred following the recovery of the animals from the anesthetic. The hemiparesis that occurred was fleeting since the animals recovered within 24 hours. It was not due to the virus, but probably to local mechanical effects, since the same amount of homologous blood serum injected in the exact cortical motor area produced a similar slight immediate hemiparesis from which 2 monkeys recovered just as quickly. The quadriplegia which develops after the injection of the virus occurred only after the usual lag interval, *i. e.*, days after the injection.

The cortical areas are very resistant or perhaps less susceptible than other areas of the central nervous system to the virus. The virus is considered to have a predilection for the motor cells of the lumbar enlargement.

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