of movement of the knee in all directions. At the foot, the peronei muscles were somewhat shortened, and the toes could touch the outer side of the leg, while flexion of the ankle was very limited. Still, with help, the child could adduct the foot and flex the toes. The left limb was turned outwards, even more completely than the right

Fig. 1.—A. T., aged 6½ months.

one at the hip. At the knee, the tibia was much rotated inwards, and slipped behind the inner condyle. The patella, very small, apparently of the size of a horse-bean, rested on the inner condyle, and was attached to it by a fibrous band, the position of which was indicated by a dimple. The left foot was everted like the right one.

On February 28th, a pelvic band, with outside irons, jointed at the hips, knees, and ankles, was applied. On March 28th, the tendines Achillis were divided. By April 12th the child could turn her thighs in. On July 20th, boots with side-supports were fitted. On September 21st, both feet were in good position; she could extend the knees and flex the feet thoroughly.

Fig. 2.—A. T., 6½ years old.

1879. February 13th. The patient could walk a little without irons if she held the nurse's hand. The left limb still turned outwards; the ligaments of this knee were still very lax, and also those of the left

ankle. When she walked in irons, she did not usually quite straighten the left knee, but she straightened the right knee well.

May 26th. If the condyles of the femora were fixed and the knees straightened, there was still free rotary motion of the left tibia; the right was less free.

September 17th. The child could walk alone without the irons. There was a slight tendency to knock-knee in both limbs. She seldom or never turned the heels forwards, and she could extend both knees thoroughly.

1880. January 23rd. She ran about anywhere on the flat without help; to go upstairs she required the support of a hand. Without the instruments she could run nimbly. She could point her toes forward, flex and extend the ankles, and rotate inwards the femora at the hips.

May 11th. Both patellæ were easily distinguished; the right was almost normal, the left lay close to the external condyle. The left ligamentum patellæ could not be traced.

July 14th. The left patella was as large as half an almond; it slipped outside of the external condyle at every bending of the knee.

August 24th. All instruments were disused. In October the child went home.

1884. April 26th. The photograph, of which the standing figure is a copy, was taken in March of this year, the child being six and a half years old. Her mother writes: "She is very active; hops and runs with a skip and a jump like other children, and has greatly improved from some dancing lessons she has had." (See Fig. 2.)

This case is an unusually good example of deformity, due, partly, to defective structure of the knee-joints, but, in all probability, also to faulty posture of the fetus *in utero*. It also shows what success may be obtained by carefully training the limbs into natural positions, and accustoming the muscles to normal movements before the child is old enough to have practised them in abnormal ones. Probably the short tendines Achillis, which were cut to allow proper flexion of the ankles, had become so simply from the posture of the feet having been long one of extension and eversion. The child was seven months old when treatment was begun; and when she was two years old she could walk fairly well. It is interesting to observe the complete control maintained over the knees by the muscles, in the probable absence of, or only partial development of, the crucial ligaments and of the ligamenta patellæ. In spite of these defects, the child learned in two years to command her limbs in the ordinary manner, and to be able to run and dance at seven years like other children.

THE ELEMENT OF PAIN IN INTESTINAL OBSTRUCTION.

By FREDERICK TREVES, F.R.C.S.,

Assistant-Surgeon to, and Lecturer on Anatomy at, the London Hospital.

In the majority of cases of intestinal obstruction, and in those especially that pursue an acute or subacute course, pain is a grave and prominent symptom. It is commonly the first of the long train of troubles that follows an occlusion of the bowel. Of these, it is usually one of the longest abiding, one of the most grievous for the patient, and one of the most valuable to the surgeon for diagnostic purposes. On the last-named ground, if on no other, the subject is well worthy of some consideration.

The abdominal pain in cases of intestinal obstruction may be due to at least four conditions: 1, direct damage to the peritoneum and bowel, as by strangulation; 2, irregular and disordered peristaltic movements; 3, distension of the bowel above the obstruction; 4, inflammatory changes in the intestine and peritoneum.

1. To the first category belongs the pain that depends upon lesion of the peritoneal and intestinal nerves from sudden compression. The condition is illustrated by a loop of bowel strangulated through a slit in the mesentery, or snared by a solitary band, or involved in an abrupt and severe volvulus.

The pain due to this condition is, without doubt, the most intense that is met with in intestinal obstruction. It is more severe even than that brought about by sudden perforation of the bowel, since in this latter condition collapse so soon appears, and is so soon profound, that pain ceases to be the most conspicuous symptom. In many acute cases of intestinal strangulation, the initial pain due to the sudden snaring of the bowel is most intense. The patients are described as being in "a state of acute agony," as being "bent double," and in several instances as "rolling upon the floor with pain."

The intensity of the suffering in these cases depends upon many

conditions—upon the age and general state of the patient, upon the condition of the sensorium, and upon the rapid or tardy appearance of collapse. More precisely, however, it may be said to depend mainly upon two things—namely, the abruptness of the strangulation and the extent of peritoneum and intestine involved. The cases in which the most acute suffering appears to have been experienced are those where a large loop, or series of loops, of intestine have suddenly become engaged, and have been subjected to severe compression. It is with special reference to this point that certain distinctions appear in the amount of pain experienced in obstructions of the small intestines, as compared with those of the large. Speaking generally, it is almost needless to say that, in occlusions of the colon, less acute suffering is experienced than is met with in obstruction involving the small intestine. This depends simply upon the fact that cases of acute obstruction are much more common in the lesser bowel, and cases of a chronic form in the large. But, even when the conditions under which the intestine is engaged are as nearly identical as possible, it will still be found that the pain in obstruction of the small intestine is more severe, or at least is capable of being more severe, than it is when the colon is the part involved.

The small intestine has a more active physiological function than the large; its walls are more vascular; its muscle-layers are better developed; its parietal nerve-plexuses are more considerable. It has, moreover, a larger and more constant peritoneal surface than has the colon; its nerves are derived more directly from the great abdominal nerve-centre—the solar plexus—and may on that account be considered to contain more of the spinal nerve-filaments sent to the plexus by the splanchnic trunks. The lower part of the colon is supplied by the inferior mesenteric plexus, which is a comparatively distant offshoot from the solar plexus. The form of obstruction in the large intestine that most closely approaches to an acute strangulation of the lesser bowel, in the matter of the nature and severity of the pain, is a volvulus of the sigmoid flexure. The sigmoid loop is often of considerable length, and has, in any case, as extensive a peritoneal surface as any loop of small intestine of corresponding dimensions. In some forms of volvulus, this loop of colon may become acutely strangulated, and the pain experienced be as abrupt, and for a while as intense, as it is in many cases of snaring of a segment of the small intestine by a band. So far, however, as the recorded cases go, the initial pain in volvulus never attains to the severity that is possible in acute strangulation of the lesser bowel; nor does it appear to me to be quite so severe as it would be if a like extent of small intestine were involved in a like form of twist. The point nevertheless remains, that the acuteness of the pain depends not so much upon the state of the individual, nor the nature or locality of the obstruction, as upon the abruptness and completeness of that obstruction, and the extent of peritoneum that it involves.

One very important point in connection with this initial pain is its position, and the guide it does or does not offer to the situation of the obstruction. Mr. Gay, in speaking of the early symptoms in cases of strangulation by a band, observes that “the localisation of the pain is ever at first due to the constricting agent, and marks its seat” (*On Intestinal Obstruction by the Solitary Band*, London, 1861). This statement, although made by so eminent an authority, I would venture to call in question. I carefully examined the records of fifty cases of acute strangulation of the small intestine, in which the clinical details were fully displayed, and in which the site of the obstruction was subsequently demonstrated either by operation or by necropsy. In some of these examples, I certainly found that the initial pain was referred to a spot that was shown after death to have corresponded to the site of the occlusion, while in others the pain was complained of at a spot more or less remote from the seat of the strangulation. The proportion of these two sets of cases to one another was as 1 to 2. If sensations be localised within the abdominal cavity by the same psychological methods as are presumed to be employed in localising sensations upon the surface, then it must be confessed that the small intestine at least does not offer the best opportunities for such localisation. If a sensation of a painful character be felt upon the surface of the body, it is readily localised by methods that have become automatic, but which were founded upon experience. The method involves the unconscious comparison of constant points; it is very largely aided by, and is at first greatly dependent upon, sight; it is still more assisted by the function of touch, and a child's first gradual knowledge of the topography of its surface depends largely upon frequently repeated and unconscious experiments. It will be obvious that the small intestine can present few of the conditions most essential for the localisation of sensation. The coils of bowel are perpetually changing their position; of these changes, when normally conducted, the mind is not cognisant.

The movements of the intestine, moreover, are of a most complicated

character, and the length of the tube is considerable. Even if the anterior abdominal parietes were transparent, and the intestines could be seen, some long experience would be demanded before sensations could be localised in the bowel, without the aid, in every case, of vision. One would have imagined, therefore, that a sudden lesion to some limited parts of the small intestine would have given rise to pain, not only difficult to localise, but impossible to localise with certainty. In fixed viscera, such as the stomach and a large part of the colon, data are afforded for the localisation of painful sensations; but, even in these parts of the alimentary canal, such localisation is not always very precise. In actual fact, it will be found that the position of the initial pain in acute intestinal obstruction is valueless as a guide to the position of the lesion in the bowel. In making careful observation as to the most usual position of this initial pain, I was struck with the frequency with which it is complained of about the umbilicus. It is well known that, in strangulated hernia, the abdominal pain is very frequently, indeed most frequently, felt about the navel. The patient will often point to one especial point near the umbilicus, where the pain is especially concentrated. Observation would appear to show that such pain is due, not to disordered peristaltic movements, but to the lesion of the bowel and peritoneum.

My impression is that this somewhat peculiar localisation indicates a reflection of the pain to the great abdominal nerve-centres. The solar plexus is situated on each side of the middle line, from three to four inches above the umbilicus. The superior mesenteric plexus, through which the small intestine is supplied, is nearer to that cicatrix. I might cite a few cases that are difficult of explanation unless this hypothesis be accepted. In one case, the pain was most severe on the right of the umbilicus, just below the liver; the obstruction was in the ileum, eighteen inches from the cæcum. (*Med. Times and Gaz.*, vol. ii, 1876, page 651.) In another, the pain was just to the left of the navel; the obstruction was due to the strangulation of a loop of the ileum in a rent in the right broad ligament. (*Path. Soc. Trans.*, vol. xii, p. 103.) In a third example, the pain had the same situation as in the last case, while the strangulated loop was found deep in the right iliac fossa. (*Union Med.*, 1860, p. 97.) In another instance, the most acute suffering was over the site of the gall-bladder, the obstruction was found, however, to be low down in the small intestine. (*Brit. Med. Journ.*, vol. i, 1883, p. 999.) In still another example, where the pain was complained of in the epigastrium, the obstruction was due to a snaring of a loop of the lower bowel by a band passing from the urinary bladder to the lumbar spine (*Bull. de la Soc. Anatom.*, Paris, 1843). It is significant also that, in most of the cases where the site of the initial pain has corresponded with the site of the obstruction, the pain has been about the umbilicus, and the frequency with which the strangulated loop is found to be about the navel (as in strangulation by the adherent diverticulum) need not be commented upon.

It may be here well to point out that the present form of abdominal pain, as well as that due to disordered peristalsis and distension, is apt to be diffused and to be referred in part to the surface of the body. In severe colic, the patient, if asked to indicate the seat of the pain, will commonly pass the hands vaguely over the abdomen, and will speak of much pain in the back and between the shoulders. The explanation of such reflection is as follows. The spinal nerve-plexus in the intestinal plexuses is derived almost entirely through the splanchnic nerves. These nerves, in turn, derive their spinal filaments from the lower six or more of the intercostal nerves. These intercostal trunks happen to be the very nerves that supply almost exclusively the integuments of the front of the abdomen, and their posterior branches go to the middle of the back, including the region between the extremities of the scapulæ. In slight colic, the patient sometimes derives relief from friction of the back over the region supplied by these lower intercostal nerves, and the effect of counter-irritation applied to the front of the abdomen in colic depends probably to no small extent upon this nerve-arrangement.

The pain now under consideration is essentially a continuous pain, one that is frequently relieved by pressure, and that after rapidly becoming very intense, is apt to lessen in severity.

The total cessation of the pain, noted in some instances, usually indicates profound collapse, or a state of narcotism or gangrene of the bowel.

2. The suffering in intestinal obstruction that is due to disordered peristaltic movements is usually a conspicuous clinical feature. On the one hand, the obstruction offers an obstacle to the passage of the peristaltic wave; on the other, the lesion to the bowel is a starting point for disordered movements that are the outcome of reflex action. If the obstruction be chronic, the bowel above it is hypertrophied, and vigorous movements in this over-developed segment hurl themselves against the obstruction.

If an extensive loop of small intestine be involved in a strangulation, there is no doubt that that loop is itself the seat of violent movements, which may almost be viewed in the light of a frantic struggle in the bowel to be free. Experiment has shown that a diminution in the oxygen of the blood going to the intestine, and an increase in its carbonic acid, induce inordinate peristaltic movements, and that such movements are also induced by mechanical irritation of the serous coat of the bowel. In strangulation, these conditions are present; and much of the severe colicky pain noted early in strangulation of a large loop of small intestine is probably due to movements in the involved coil itself rather in the bowel above it.

The pain depending upon disordered peristalsis is more severe in cases in which the small intestine is involved, owing to the greater muscular development of that part of the bowel as compared with the colon, and on account also of the greater activity of the small intestine and its superior nerve-supply. Other things being equal, it is perhaps on the whole more severe in examples of chronic obstruction than in those of an acute character. In the chronic forms, the gut above the stenosis has become greatly hypertrophied, its walls are probably congested, possibly inflamed, and ulceration of its mucous membrane is more often present than absent. This is the form of pain that is induced by the taking of food, and often by the administration of enemata. I have met with some recorded cases of obstruction in the small intestine, where severe colic was brought on by a digital examination of the rectum. In such examples, one has to deal merely with peristalsis due to reflex action.

Pain due to disordered peristaltic movements, as met with in a case of simple colic, is essentially of an intermittent or paroxysmal character. In examples of obstruction, this feature may not be so marked. There are other causes producing pain, and the actual suffering experienced by the patient is to be regarded as the resultant of several forms of painful sensation.

In the diagnosis, however, of intestinal obstruction, I would point out that a very important distinction may be observed with reference to the character of the pain. When the obstruction in the bowel is complete, the pain experienced is constant, with periodic exacerbations. When the obstruction is incomplete, the pain is intermittent, and there are intervals of freedom from pain, of varying duration. Thus, in acute strangulation of the intestine, the suffering is continuous, the patient is never free from pain, although he has from time to time an increase in that pain. In stricture, on the other hand—taking as an example stricture of the small intestine—the pain is intermittent. At the commencement of the case, the patient has only an occasional attack of pain. He may be entirely free from suffering for days, and even weeks. Now, as the obstruction advances, the painful attacks are of longer duration, while the intervals of freedom diminish. Finally, if the occlusion become complete, the pain becomes continuous, with periodic exacerbations. In intussusception, again, the suffering complained of has at first an intermittent character, for the lumen of the bowel is only partly occluded. When, however, that occlusion is complete, the pain becomes continuous, with exacerbations. Out of fifty examples of strangulation by bands in which the occlusion was presumed to be complete, I find only eight instances of intermittent pain. In several of these exceptions, however—which are fully detailed in my Jacksonian prize essay—there were peculiar circumstances that may have modified the nature of the pain.

With the pain that depends upon disordered peristalsis, there is associated at times some tenderness. This tenderness may depend upon changes in the intestine, or may be of the same kind as that experienced after cramp in the superficial muscles. The pain itself is essentially a cramp in the intestinal muscle.

3 and 4. With regard to the pain due to distension and to inflammatory changes, space will not permit me to deal save in the briefest manner. The pain from distension is continuous, and is very diffused. It is associated with tenderness on pressure, which may, however, be quite insignificant. It is more marked in cases of obstruction of the colon than in like cases in the small intestine. The most severe degree of distension, and that most rapidly developed, is met with in acute volvulus of the sigmoid flexure. In several of the reported cases of this variety of occlusion, the diaphragm has been pushed up by the distended intestine, the heart has been much displaced, the functions of the thoracic viscera have been seriously interfered with, and the involved loop of bowel has become rapidly gangrenous as a result of the distension. It is needless to point out that the degree of the distension depends upon many conditions—upon the site and completeness of the obstruction, upon the extent of the vomiting, upon the nature of the intestinal contents, and upon the association with peritonitis. In the pain due to inflammatory changes in the bowel or peritoneum, there

is, as a feature almost more conspicuous than the pain, a marked degree of tenderness. When the morbid changes are still limited in extent, this tenderness is localised, and the symptom has considerable diagnostic value. In connection with this point, it must be borne in mind that the only peritonitis found in a case of fatal obstruction may be at some distance from the occlusion itself. For example, in a case of stricture of the sigmoid flexure, the distension of the colon above the stenosis will probably be most felt at the caput coli. The mucous membrane of the cæcum may become ulcerated, the walls of the bowel may inflame, and a local peritonitis be induced, that is separated from the seat of actual disease by the length of the large intestine. In all cases, the pain and the tenderness tend in time to become diffused over the whole of the abdomen.

PROLAPSE OF THE PELVIC FLOOR WITHOUT RELATIVE DISPLACEMENT OF THE UTERUS.¹

By G. ERNEST HERMAN, M.B. Lond.,
Obstetric Physician to the London Hospital, etc.

In the systematic description of the alterations in the mechanical relations of the pelvic viscera in women, the chief place is usually given to the flexions and versions of the uterus. Both those who think uterine flexions and versions in themselves important, and those who do not, agree in the observation that these so-called displacements, when met with in patients who seek for treatment, are generally accompanied with more or less prolapse, and admit also that prolapse of the pelvic viscera causes some amount of discomfort to the subject of it.

The chief difference between those who accept what is called "the mechanical system of uterine pathology," and those who reject it, is, that the former regard the amount of bending of the uterus, or the kind and degree of its inclination, as the essential elements of the case, the conditions which cause the symptoms, and the rectification of which must be the chief aim of treatment. The latter, with whom I am in agreement, consider the shape and position of the uterus as only a part, and generally an unimportant part, of the clinical phenomena.

It is so obvious as not to need demonstration, that descent of the uterus cannot take place by itself. There must also be change in the parts which support the uterus, and in those with which it is connected. The uterus rests upon the structures which form the floor of the pelvis, and have been called, when regarded as a whole, the "pelvic diaphragm." No excuse is needed for clinically speaking of the pelvic floor as a whole, for we cannot during life dissect it, split it up into its component parts, and ascertain which is the one most effective in maintaining its proper mechanical relations. Prolapse of the uterus cannot take place without some alteration in the pelvic "diaphragm." But we may have yielding of the pelvic floor without any relative alteration in the position of the uterus; and this is what I wish to point out in the present communication. Cases of the kind, although they may be practically familiar to many, have as yet, so far as I can find, never been described in such a manner as that they can be clinically identified.

These patients come either saying that "the womb is coming down," or that "something is coming down," or complaining more vaguely of "bearing-down" pain. On digital examination, we find the uterus in its normal position—that is, in, or nearly in, the axis of the pelvic inlet. Its body cannot be felt through the anterior vaginal wall, nor through the posterior. It is neither retroflexed nor anteverted. It is movable, and its cavity is of normal length. The vagina is not unusually relaxed, nor does its orifice appear unduly large. On inspection, when the patient is lying quietly on her side, we see the perineum as usual, forming the bottom of a groove between the two convex eminences of the buttocks; ascending slightly during inspiration, and descending to an equal extent during expiration. If, now, the patient be told to strain, to bear down, as strongly as she can, we see the perineum bulge downwards, forming, instead of the bottom of a groove, a third convex swelling between the two lateral ones of the buttocks. The position of the uterus during this effort is, relatively to the pelvic floor, unaltered. It descends, of course, with the pelvic floor, but neither uterus nor vagina undergo any other appreciable change in their relative position. The morbid condition present is simply abnormal yielding of the pelvic floor, without relative alteration of its parts.

¹ Read before the East London and South Essex District of the Metropolitan Counties Branch.