

opening of a glaucomatous attack Jan. 30, 1894, when the measurement was as follows:

L. E., ax.  $85^{\circ}$ , amount corneal astigmatism  $\frac{1}{2}$  D., corneal radius  $7.5\frac{1}{2}$  m.m.

R. E., ax.  $175^{\circ}$ , amount corneal astigmatism  $\frac{1}{2}$  D., corneal radius 7.5 m.m.

The disease progressed rapidly; an operation was refused and the sight destroyed. The measurement taken March 30, 1894, was as follows:

L. E., ax.  $80^{\circ}$ , amount corneal astigmatism 4 D., corneal radius  $7.4\frac{1}{4}$  m.m.; ax.  $175^{\circ}$ , amount corneal astigmatism 4 D., corneal radius  $7.9\frac{1}{2}$  m.m.

By May 1, 1895, had increased as follows:

L. E.,  $75^{\circ}$ , amount corneal astigmatism 10 D., corneal radius  $7.1\frac{1}{3}$  + m.m.;  $165^{\circ}$ , amount corneal astigmatism 10 D., corneal radius  $8.0\frac{2}{3}$  m.m.

*Case 8.—Illustrating changes in corneal curvature occurring in the course of ophthalmic goitre. Miss M. B., aged 23 years. Examined at the first suggestion of the disease showed the following measurements, Feb. 1, 1893:*

R. E., ax.  $85^{\circ}$ , amount corneal astigmatism  $\frac{3}{4}$ , corneal radius  $7.6\frac{1}{2}$  m.m.; ax.  $175^{\circ}$ , amount corneal astigmatism  $\frac{3}{4}$ , corneal radius  $7.5\frac{3}{4}$  m.m.

L. E., ax.  $95^{\circ}$ , amount corneal astigmatism  $\frac{3}{4}$ , corneal radius  $7.6\frac{1}{4}$  m.m.; ax.  $5^{\circ}$ , amount corneal astigmatism  $\frac{3}{4}$ , corneal radius  $7.5\frac{3}{4}$  m.m.

Reexamined after its rapid development, April 7, 1895:

R. E., ax.  $80^{\circ}$ , amount corneal astigmatism  $\frac{1}{2}$  + D., corneal radius 7.6 — m.m.; ax.  $170^{\circ}$ , amount corneal astigmatism  $\frac{1}{2}$  + D., corneal radius  $7.6\frac{1}{2}$  + m.m.

L. E., ax.  $95^{\circ}$ , amount corneal astigmatism  $\frac{3}{4}$  D., corneal radius  $7.5\frac{3}{4}$  m.m.; ax.  $180^{\circ}$ , amount corneal astigmatism  $\frac{3}{4}$  D., corneal radius  $7.6\frac{3}{4}$  m.m.

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## SPINE BRACE.

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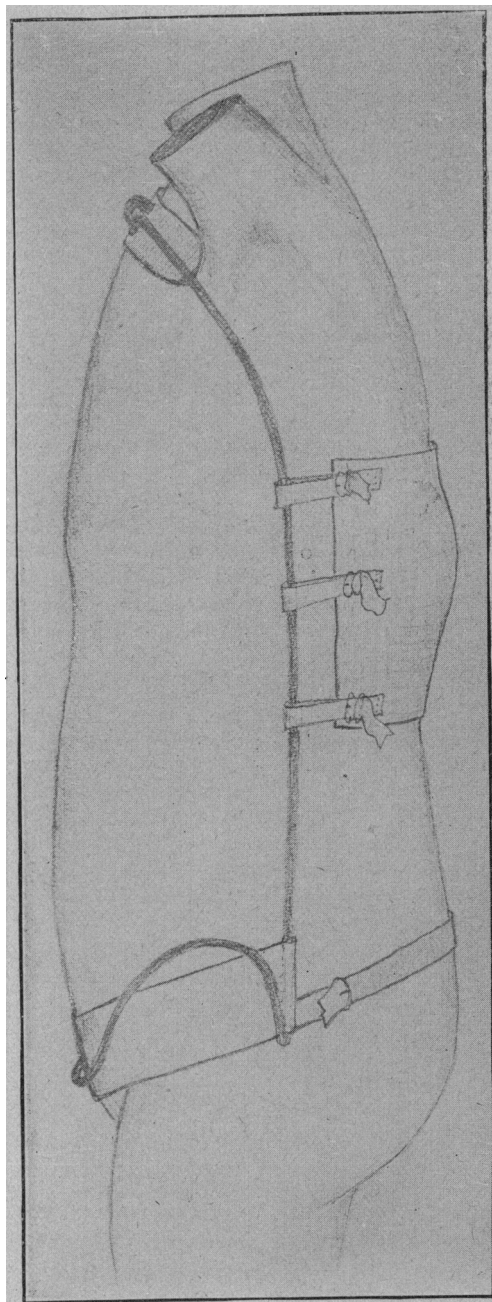
The brace that I wish to describe and exhibit, is one that I have designed and adopted for mechanical support of the middle region of the spine; the range of its greatest utility being the support of the spinal column between the middle of the lumbar and the middle of the dorsal regions, although its usefulness is not strictly confined to these limits. Inasmuch as the greater number of diseases of the spinal column requiring mechanical fixation occur within this region, its usefulness will be comparatively great if found to be an efficient brace.

In its simplest form the brace consists of a steel frame, a rigid chest pad and two aprons. The chest pad is adjusted in contour to fit the upper anterior portion of the chest. The pad should be in length about three times its width and adjusted transversely, resting immediately below the sterno-clavicular articulations. Its real length transversely should be as long as practical without being interfered with by the action of the pectoralis major muscles, in the movement of the shoulder. It should be made of sheet metal hammered to give shape and rigidity, covered and lightly padded.

The frame consists of one piece of light round rod steel, from three-sixteenths to five-sixteenths of an inch in diameter, so shaped that it crosses the body above and below and lies parallel with, and in close proximity to each side on a line with the axilla; the ends are welded or brazed where they meet, making it one continuous piece.

To facilitate the description of the frame we will divide it into four portions—an upper, a lower and two lateral portions. The upper and lower cross in front of the chest and pelvis respectively, and no

portion of the frame passes behind the body. The upper portion of the frame arches upward and forward from a short distance below the axillary space on one side, crosses the chest pad, and then downward and backward to a corresponding point on the opposite side, where it becomes continuous with the lateral portions. There is no fixed point to indicate where the upper and lateral portions come together; a gentle reverse curve marks the place. The lateral



portions are so adjusted as to lie close to the sides, a little nearer the posterior than the anterior aspects, and extend from below the axilla to the space just behind the anterior superior spine of the ilium, below the crest and above the trochanter major. In children, this portion is practically straight, while in adult females they bend in at the waist line and then arch out over the more or less prominent hips, but remain straight in the antero-posterior directions unless some deformity requires a change in this shape.

The lower portion is simply to connect the two lateral portions across the body at their lower ends and hold them rigid relative to each other. In the adjustment of this portion, however, there are some difficulties; for if we extend it straight across from the lower end of one lateral portion to the other, it would prevent the flexion of the thighs, and then again if we arch it up over the thighs it would cross the body above the umbilicus and very materially interfere with the clothing at the waist. And to cross behind the body would be still more objectionable, as the patient would then have to lie upon it and it would be more difficult to put it on and take it off; so it must take a somewhat tortuous course and cross in front, by avoiding those places where its presence would be objectionable. This is accomplished by having the lower portion turn sharply upon the lateral portion which it is to follow a short distance and then arch in over the flexed thigh and then depress to, or very near, the pubis, to some extent, following the fold of the groin in the direction of Poupart's ligament and as close as possible, having in mind that when the finished brace is applied no part of the frame touches the body, but lies very close to it at all points.

The upper portion of the frame rests by its central portion upon the center of the chest pad, to which it is secured by a double acting joint so that the pad may adjust itself to the chest.

The lower portion of the frame is prevented from touching the body and given a fixed point by an apron made of two thicknesses of canvas from two to four inches wide, according to the size of the brace, between the layers of which a few whalebones have been inserted vertically to prevent rolling. The apron is secured to the lower extremities of the lateral portions of the frame by its ends, and at such an angle that its direction from its attachment toward the center shall be downward, or, in other words, the upper margin of the apron at its attachment shall be the longer one, otherwise the tendency will be for the apron to slide up across the center of the abdomen. This apron should be just long enough to keep the lower part of the frame from touching the body. If properly adjusted it will pass across the lower part of the abdomen very close to the pubis, and upon each side will include, and remain below, the anterior superior iliac spines which constitute the lower fixed point of the frame.

To complete the brace of simple form it is only necessary to attach the second apron or back band. This second apron, which is to extend from one lateral portion of the frame across the back to the other, is to be also of double thickness made in shape to fit any angular deformity. It should be from three to six inches wide without whalebones. One end is to be permanently fastened to one lateral portion of the frame, at a position opposite that portion of the spine to be supported; the other end is to be provided with two or three straps with buckles with which to buckle it to the opposite lateral portion of the frame. Thus completed, we have a spine brace of the simplest possible construction, the smallest amount of material, and at the same time providing for the fixation of the three points relative to each other, in a most positive and efficient manner. The upper front part of the chest, the pelvic bones below and the weaker portion of the spine behind are retained in relative position to each other with positive certainty. Positive, be-

cause these are parts of the framework of the body that have a certain relative stability to each other, and between which all of the deformities in caries of the spine in this region occur. These are the points, and the only points, where definite and reliable resistance to deformity can with certainty be applied and maintained.

In regard to the mechanical adaptability of the different parts to the purpose for which they are designed, I will speak separately.

The frame as just described is identical with the first one that I made three years ago. While I have experimented considerably, I have not in any respect changed the design originally made for the plain brace. All that I can say of it is favorable; there are comparatively no objectionable features, while there are a few that are highly commendatory. It is very light, strong, rigid, simple of construction, easily changed in shape, composed of one piece, and it is as much out of the way as it is possible to have anything that can claim the name, spine brace. It can be readily constructed by any common blacksmith at the cross roads, which is no small consideration from an economical point of view.

The small canvas apron that crosses the pelvis shrinks and molds itself over and around the anterior spines so that a most satisfactory support for the lower end of the brace is secured, capable of resisting any force that may be required either continuous or intermittent, and without producing excoriations or large callosities. The difference between the plump or flat abdomen in the adjustment of the lower fixation is of no importance; even with the very fat there is less to contend with this, than with any other of the forms of lower fixation with which I am acquainted. This small apron, so called, which is little more than a strap, is all that can be required and comparatively speaking it is *multum in parvo*.

It is now about six years since I adopted the chest pad to support the upper part of the column. Why it had not been used, fairly and squarely before, I did not know. I could neither find that it had been used simply and alone, nor any reason why it had not been. To me it seemed perfectly feasible, and from an anatomic standpoint, eminently proper. I therefore determined to try it and, if possible, find out why it was in all corrective and retentive appliances for Pott's disease, that this particular region, the center and upper part of the chest, was universally avoided.

I began by using a small pad to which I secured the upper ends of the parallel uprights that support the back pads of the common form of brace. I found that the small pad was sufficient and comfortable, and as far as I could observe there were no ill effects from its use. Consequently, when I came to design the present brace, the chest pad was no experiment. It had already, in my hands, proved to be efficient and satisfactory. I have now used it on this brace for nearly three years, and in a great variety of cases, old and young, and in no single instance have I been able to observe the slightest deleterious consequences. There is no complaint whatever, and no local changes to be seen. I am, therefore, most emphatically of opinion that the proper place to secure and adjust the upper anterior fixation in spine brace is the upper part of the chest when the disease is low enough to permit. I do not believe that there is any

tendency to flatten or distort the contour of the chest; even the active rachitic patient tolerates this pressure without the slightest local change. Neither is there the slightest impediment to respiration. Relatively, the chest is the proper place, as suitable leverage can be obtained there and anatomically it is rigid and the effect of counter pressure is direct and reliable through the bony framework to the diseased portion and entirely independent of any muscular action whatever; and clinical experience thus far, shows that any required degree of pressure is tolerated with comfort, leaving perfect freedom of movement to the shoulders, a condition of things quite unusual in spine braces.

The back band that crosses the back at the seat of the disease, from one lateral portion of the frame to the other, furnishes, in my opinion, the best possible retentive force. The distribution of pressure over a large surface is an advantage. It is tolerated with perfect comfort. It does not induce pressure atrophy or excoriate. Pressing as it does, firmly upon the angles of the ribs as well as upon the spines, its influence to prevent or correct rotation or lateral deviation is far more than would at first sight be appreciated and when combined with some of the accessories which are to be described, this particular resistance to rotation and lateral curve or deviation becomes most effectual. The firm unyielding character of the support and the great degree of force in the direction of correction that can with comfort be tolerated is surprising. With a firm adjustment of this brace, bringing proper tension upon the gently curving chest pad, and bringing the pelvic strap or apron securely against the iliac spines and with the firm application of the back band to the full width of the back, exerting pressure upon the ribs as well as the spines, there is no tendency whatever, in the average cases, for any body movements to take place, such as the rotation of the upper part upon the lower, deviating to one side or the other. The support is practically perfect, maintaining equal poise and suspending all voluntary effort to sustain equilibrium and the erect attitude.

The foregoing description of the brace, together with the description of its applicability, refers only to the brace in its simplest form and to diseased conditions of average severity with but moderate deformity.

The brace, however, is susceptible of many modifications and the addition of many accessories to meet the requirements of varying diseases and deformities, without losing the original principles of construction.

The most simple modification which changes the shape of the frame is the substitution of a pad over the pubis and lower end of the rectus muscle, similar in construction to the chest pad, to take the place of the canvas apron at that point. The frame is then changed so that the side portions, just above the crest of the ilium, turn forward and inward, to follow nearly the fold of the groin, and to meet in the center over the pubic pad, and to which it is attached by means of a joint that will permit of a racking motion only; two staples, an inch or two apart, answer very well. This modification of the frame does away with that portion that passes down to the space above the great trochanter. This simple form is all that can be desired as a convalescent brace. It is light, easy, inexpensive and very efficient, and the pubis and tissues immediately above it tolerate the pad pressure remarkably well.

When it is desirable to fit this brace to a patient who has a tendency to a lateral inclination it should be provided with three pads, one above and one below on the concave side and the other in the middle of the convex side. The one below should be round and hung loosely on the lower end of the frame, so as to rest in and adjust itself to the space described above the great trochanter. The upper pad should rest just as close to the axilla as practical, the frame to be modified so as to support it. It may be arranged transversely or vertically. I usually use at this point, long or oblong pads. The middle pad should be long and attached, with its long axis vertical to the lateral portion of the frame at the place where the pressure is to be exerted.

As much retentive and corrective force may be applied in this way as the patient can tolerate. Where great need exists for lateral retentive force, it is advisable to add crutches to the brace. The crutches can be made a part of the frame, and adjusted from below by raising or lowering the entire frame, which can be done within short limits, or, what is better, have the crutches supported by a separate piece made adjustable upon the lateral portion of the frame. Where this lateral method is adopted it is necessary to have the back band secured by straps and buckles upon each side. Where the crutches are added it is also necessary to attach a supporting band at the lower end of the frame to carry the crutches and their superimposed weight. A strong webbing strap, buckled across the lower part of the back or sacrum from the lower extremity of one lateral portion of the frame to the other, answers this purpose exceedingly well.

Any required degree of support is easy to bear and is unyielding. It is by far the best crutch support with which I am acquainted. Taken together with the little pelvic apron that crosses in front it embodies the principle which is in the support adopted by the color bearer, in carrying the heavy pole and flag. Pads at the lower extremities of the lateral portions of the frame are advisable where the supporting strap is applied, although not strictly necessary where the frame is well made and rigid.

Where there is much compensatory lordosis, protrusion of the lower ribs, or a very prominent abdomen, an apron of proper dimensions should be strapped across the front of the abdomen at the place required and with the required tension. Occasionally it is desirable to include the whole front of the body in such an apron. In some cases where the body is thin and the spines prominent at the seat of the disease and deformity, it is advisable to provide the back band with two pads, to rest one upon each side of the spine. These pads should be secured to the back band, made wide enough to extend from the spines of the vertebrae to the angle of the ribs and as long as the band is wide. They should be made as hard and as smooth as practical by stuffing them with cotton or wool, or make them primarily of folded blanket.

To make the frame for any given case it is always advisable to first make a frame of soft iron, or copper wire, of a size that can be readily bent with the fingers, should be selected. The patient should be placed lying on the back, with the body in the position in which it is to be retained, and the wire bent to fit the body just as the finished frame should fit. It is best to adjust the wire across the lower part of the body first, and the ends will lap across the top of the chest.

where the lapped ends are to be secured by winding them around each other, or winding with a string; the former is the best plan. This wire frame which can be made exact in shape, furnishes the artisan perfect lines for the construction of the finished steel brace.

## WHEN SHALL HYSTERECTOMY BE PERFORMED IN PUERPERAL SEPSIS?

Read at the Mississippi Valley Medical Association at Detroit, Sept. 3, 1895.

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It must be admitted by all observers that too many women die of puerperal fever, even in these antiseptic and aseptic times. Curetting and irrigation with all their modifications are not always effective. Infection gets beyond the reach of the curette. The interior of the uterus becomes clean and relatively well, but the sepsis goes on. In the treatment of infected wounds, one of the first indications is the removal of the infected tissues. Hysterectomy alone in certain cases of puerperal sepsis meets this indication. It is the purpose of this paper to show when hysterectomy should be undertaken for this disease. Incidentally the frequency of the disease and some points in its pathology are treated.

### I.—FOUR CASES OF PUERPERAL SEPSIS TREATED BY THE AUTHOR BY FOUR DIFFERENT METHODS.

*Case 1.—Curetting and Irrigation only—Death.*—The patient was a multipara 26 years old. She came from an Irish family and had had tubercular disease when a child. She was confined in a barn by a competent physician with no other person about to help him. There was violent post-partum hemorrhage which yielded to nothing, except the introduction of the hand into the uterus and slow removal of the placenta. This operation was done without help and without chloroform. Sepsis appeared almost at once. The uterus was carefully curetted several times and irrigated at frequent intervals. In spite of everything the sepsis continued for seven weeks and the patient died of pulmonary infarction at the end of that time.

*Case 2.—Septic Peritonitis—Double Salpingectomy—Death.*—This patient had a history of gonorrhea after the birth of her first child. She was 35 years old and had suffered frequent attacks of "pelvic inflammation." She had a second child three years ago, the birth of which was followed by sepsis. She was confined to her bed three months. She had an abortion performed on a three months fetus four weeks ago. This had been followed by a pronounced sepsis. The uterus had been curetted carefully by a competent physician and twice packed with iodoform gauze for six hours each time. On examination, March 10, 1895, I found her temperature 104.5. The pulse was 140. The respirations were rapid and constrained. The abdomen was tympanitic. Vomiting had been almost constant for three hours. The bowels had resisted all attempts to move them. A large area of dullness could be made out in the right inguinal region. The uterus was tipped over to the left. The right pelvis was filled with a doughy mass. The extremities were cold. Under these circumstances not much could be expected from operation, yet nothing could be gained by other treatment. The abdomen was therefore opened. The right pelvis was found to be a great abscess, in which the greatly distended and infiltrated tube was found. The left tube was also full of fluid (old pyosalpinx) and was removed. The uterus was almost exactly the normal size. It was not edematous and was left in the pelvis. Both sides of the pelvis were drained with gauze tampons through the abdominal wound. The patient rallied well after the operation and did well for five days. She gradually grew worse then, had several attacks of phlebitis and died of pulmonary embolism nine days after the operation. There were no symptoms of peritonitis after the operation.

*Case 3.—Curetting—Removal of Right Tube and Ovary—Vaginal and Abdominal Drainage—Death without Peritonitis.*—This

patient was 30 years old. She had been confined five weeks before examination. Symptoms of sepsis appeared on the fourth day and continued of a low grade. There was a renewal of septic symptoms on the tenth day after sitting up and walking a little. When I examined her, April 20, 1895, she was slightly tympanitic, the pulse was 112 and the temperature 101. She had no appetite and had vomited a little once or twice. The bowels were easily moved with enemas and mild laxatives. The vagina was edematous but the uterus was well contracted. The right side of the pelvis, as felt through vagina, was firm and hard, the left side somewhat less so. The patient was carefully watched for three days while the uterus was almost constantly irrigated and twice curetted, and packed with iodoform gauze. All the symptoms grew steadily worse, chills occurred twice a day with a slow rise of temperature and tympanitis. This led me to make abdominal section. The right tube was found as large as the thumb, red and infiltrated. It was removed with the right ovary. The uterus was firm, hard, small and not at all edematous. I did not remove it. The left tube was normal and was not disturbed. The right pelvis was drained by means of a tube from the abdominal wound above into the right side of the vagina and packed about with iodoform gauze. After a few days of improvement the patient grew gradually worse and died of septic phlebitis without peritonitis eight days after the operation.

*Case 4.—Septic Peritonitis—Removal of both Tubes and Ovaries and the Uterus.*—The patient was a multipara 32 years old. The labor occurred six weeks ago and was uncomplicated. A midwife, noted for her train of puerperal fever, was in attendance at the time. On examination, May 14, 1895, I found a temperature of 104 degrees and a pulse of 124. The abdomen was tympanitic and greatly distended, vomiting was almost constant. There was great tenderness over the whole abdomen. When the patient was on her back, both flanks were dull; when turned on her side, the left flank became tympanitic. In making a vaginal and bimanual examination, extensive infiltration of the right side of the pelvis could be made out. The uterus was about the size of a uterus when four months pregnant. Operation was undertaken for the removal of the septic material twelve hours later. After the proper preparation of the patient, she was chloroformed and placed in the Trendelenburg position, and the abdomen opened. On the first incision, about a pint of sero-purulent fluid slowly poured out. As the right tube was grasped, another gush of pus came out. This broad ligament was large and edematous. It was separated from its adhesions to the pelvic wall and tied off. The uterine artery was ligated and the uterus was then amputated from before backward, and from right to left with a dull knife. After ligating the other uterine artery and the left ovarian artery, the cervix was closed upon itself by two rows of catgut sutures; one buried in the cervical tissues and one superficial in the peritoneum. All hemorrhage was stopped, the abdomen carefully washed out with several pitchers of sterilized hot water and the pelvis drained with a large iodoform gauze drain coming out at the lower part of the abdominal wound. The rest of the abdominal wound was closed with two rows of sutures. In spite of the fact that this operation was done in a hovel, and in spite of the additional fact that a factory next door burned down three days after the operation, making it necessary to lay the patient for an hour on the sidewalk in front of the house, she made a most excellent and rapid recovery and was out of bed in five weeks.

The pathology of this case is extremely interesting. The section of the uterus measured 4.5 centimeters in anterior posterior diameter after hardening in formalin. The transverse diameter just below the opening of the tubes, was 7.75 centimeters. The diameter of a section of the ovarian ligament was 2.5 centimeters on the right side and a little less on the left side. There was an abscess in the right ovarian ligament with partial necrosis of its posterior wall. This abscess was about a centimeter in diameter. There were two other abscesses about the same size in other parts of the ligament. On inspection of a thin transverse section the interior of the uterus was found lined with a black necrotic mass. Pigmentation extended outward from the mucosa about a centimeter in all directions. The whole of the right broad ligament was of this same dark color. On microscopic