

THE ARCHED DORSAL POSTURE
IN OBSTETRICS

The Combined Trendelenburg-Walcher
Posture in Obstetric Operating

The Walcher, the Trendelenburg, and
the Mercurio Postures in Midwifery

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THE COMBINED
TRENDELENBURG-WALCHER POSTURE
IN
OBSTETRIC OPERATING,

WITH NOTES ON OTHER POSTURES.

BY

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(With twenty-three illustrations.)

A COMBINATION of two well-known operating positions, the Walcher and the Trendelenburg, enables one to effect results impossible with either alone. In the absence of an operating table the posture is readily improvised by using a chair without rungs between its back legs for an inclined plane, and preventing the patient from slipping by means of a sheet passing over the patient's shoulders behind the neck, the ends tied to each rear leg of the chair. The buttocks project beyond the back of the seat, the patient's legs are spread wide and dropped backward, free access to the birth canal is secured, level traction with forceps is facilitated, and the uterus is in a partial upside-down position, greatly expediting version, reposition of the prolapsed cord, and other manipulations.

Description of the Position.—In deliveries in maternities the patient is placed on the Trendelenburg incline and slid

upward till she balances on her sacrum, the legs hanging over. In obstetric work in private practice the patient is readily pre-

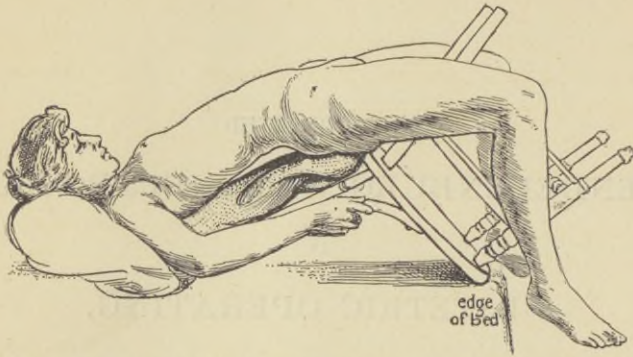


FIG. 1.—The arched dorsal, "Italian," or combined Trendelenburg-Walcher posture on chair turned upside-down.

pared in the following manner: A plain wooden chair which has a flat back and no rungs between the rear legs is selected. Or one steps on the back rung and breaks it out. The chair is then placed on its face across the foot of the bed, the back

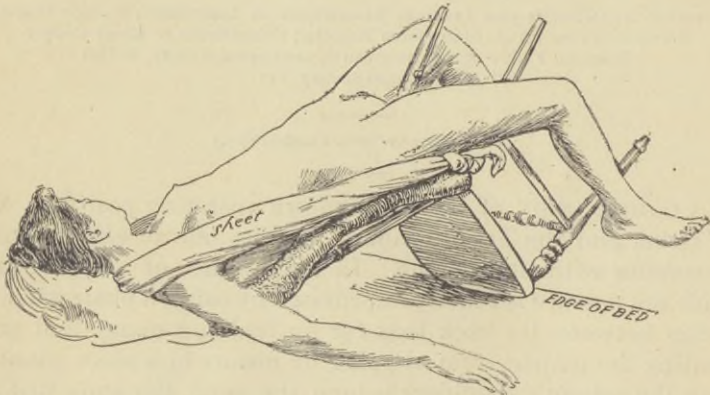


FIG. 2.—Arched dorsal position with sheet in place to prevent slipping. The legs are swung outside the chair.

forming the incline for the Trendelenburg position. A blanket or double sheet is laid along the chair back and may fall over the chair bottom. If it is at hand a Kelly pad may be placed at the angle of the junction of chair back and chair seat, with its apron hanging down toward the floor. A sheet is then

rolled on the bias to form a loose, long rope, and an end of the rope is tied to one upturned rear chair leg at its junction with the chair seat. After anesthesia is complete, the patient is seized by the knees by one assistant and by the shoulders by another and is slid up the inclined plane, as in the ordinary use of a chair for the Trendelenburg posture. Care is taken that the buttocks rest on the upturned back edge of the chair seat, and that they project a little beyond the chair seat toward the operator, so as to give him unimpeded access to the introitus between the rear chair legs. While the operator holds up the patient at this height the assistant slips the loose end of the sheet behind the patient's neck, passing in front of the shoulders; then he draws out all the slack and makes fast this free end to the rear leg of the chair on the opposite side. There is no constriction of the neck by this thick, loosely-rolled sheet. The patient is readily held in place. Now each knee is grasped and the legs swung outward until the thighs hang outside of the upturned chair legs. The weight of the lower limbs causes them to drop toward the floor with the knee lower than the hip. Should the chair be too wide to give the complete Walcher position with marked extension at the hip joint, a rolled sheet or other pad is slid up under the sacrum.

Operation.—The patient is now firmly fixed in a position very advantageous for any operative procedure, especially for such as require a relaxed uterus; the vulva is at a convenient height for the standing operator; the direction of the canal formed by the vagina and the cervix, which leads into the uterine cavity, is more direct and more nearly level than that in any other posture, as will be subsequently shown. The brim of the pelvis is enlarged to its utmost anterior-posterior diameter by the Walcher posture, and instead of being in a location difficult and almost impossible of access, as far as easy manipulative measures go, it is straight in front of the operator. If the patient is exhausted she is in a favorable attitude, which is not true of the ordinary Walcher posture.

In addition to these conveniences the position possesses many of the advantages of the knee-chest posture, while it readily permits anesthesia—an important measure inadmissible in the latter attitude, except on the operating table of a maternity. The posture stands us in stead either for version, prolapse of the cord, high manual rotation of an occipito-posterior to an occipito-anterior position, flexion of a brow presentation, cor-

rection of a face presentation (especially in the cases where the chin is to the rear), or in those laparatomies wherein free access to the vagina is desirable, such as those performed for ruptured uterus or in Cesarean section.

For gynecological work I have planned a table which will embody the principle of a gap, permitting access to the vulva between the knees. Wherever, in laparotomy, the vaginal fornix has to be opened and gauze drawn into the vagina, we have all noted the discomfort and the unsafe contacts on the ordinary Trendelenburg table.

It is possible that for tenement-house symphyseotomy we shall find some advantage in this position as compared with

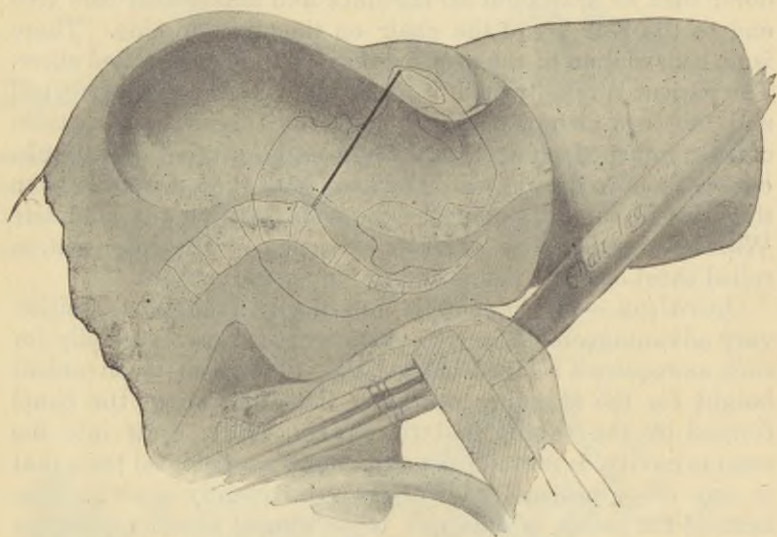


FIG. 3.—The birth canal in the arched dorsal posture. It is more nearly straight and level, and the body of the uterus is more accessible than in any other posture.

the operation on the level table. In such case it would be dangerous, of course, to allow the legs free motion, and it would be necessary to tie them to the chair legs.

Example.—One of the several instances of the utility of this method may be given. I was called to see a vigorous Swede who had been delivered of a six-pound twin at 5 in the morning, the pains being efficient, the vertex presenting, and the process not difficult. The second child, which was larger, was at once driven down into the pelvis by the strongly contracting uterus, in transverse presentation, the left arm presenting, the dorsum in front. At 10 o'clock I found a very firmly im-

pacted shoulder, an excessively thin lower segment, a well-marked retraction ring exactly at the navel, and the child not living. Drs. Hartt and Bennett had faithfully tried to turn, first in the knee-chest position, and then, under complete chloroform relaxation, on the back, but so continuous was the uterine contraction, and so firmly driven down was the child, that it was impossible. The catheter drew a drachm of blood. I placed the patient in the Trendelenburg-Walcher posture, after completely anesthetizing her; I got ready for embryotomy, and

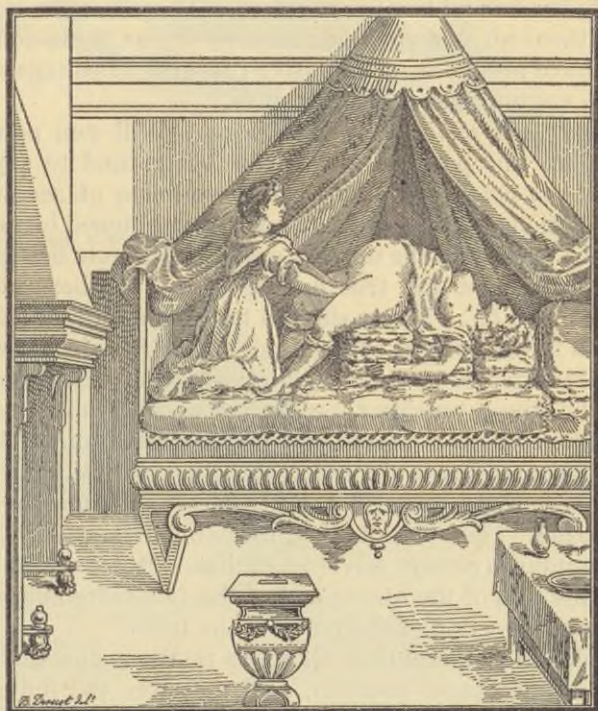


FIG. 4.—The same posture, from a print in Scipio Mercurio's book for midwives, 1595. It is styled the imperial position. Witkowski's copy.

also to operate for rupture, for the thinning of lower uterine segment and vagina was beyond anything I have ever seen, and the child had been impacted for five hours deep in the pelvis. By very gentle manipulation I was able, owing to the relaxation produced by chloroform, plus this position of the uterus, to do a podalic version in ten minutes, operating during the intervals of vigorous contractions. After delivering the seven-pound child I immediately cleaned out the uterus, which

was of an hour-glass shape, not removing my hand from within the uterus until firm contraction had taken place after douching. Between inner and outer hands I was able to clearly demonstrate that not only was the retraction ring at the height of the navel, but that the lower uterine segment was so short that after delivery the space between retraction ring and external os covered less than the length of the body of the third lumbar vertebra and the upper half of the fourth. The vagina, then, was thinned and stretched during those five hours to the second lumbar vertebra. There can be no doubt that without all favoring aids version under these conditions would have produced an extensive rupture. Leakage of urine into the vagina ceased in a few days.

Comparison with Other Positions.—Will you permit me to compare this position with a few others and to say something about pelvic inclinations and readiness of access in the other positions, with a word about a straightened birth canal? With the patient in the upright position, Naegele has given us the angle between the true conjugate and the horizon as between 55° and 60° . Meyer showed that the degree of pelvic inclination in the upright position not only differs in individuals, but is also affected by the relative position of the lower limbs. With the knees touching, or during marked abduction and out-rotation, there is increase of pelvic inclination; it is at its least during moderate abduction and slight in-rotation. "The size of the angle between the conjugate and horizon," says Kaltenbach, "may be of diagnostic importance in drawing our attention to certain pelvic anomalies. Moreover, an alteration in the axis of the uterus and of the fetus often depends on the altered direction of the plane of the inlet."¹

It is also to be noted that all these relations change by very simple alterations of position, and therefore the influence of pelvic inclination on the course of labor is distinctly lessened. It was formerly overestimated. But it is important to the obstetrician to clearly understand how the direction of the plane of the inlet is altered by various positions of the body and by what methods these may be influenced.

The comparison is most readily made with diagrams, the text being appended.

Dorsal Posture with Horizontal Legs.—In this position the angle of the inlet to the horizon is 30° .

¹ Hegar-Kaltenbach: "Operative Geburtshülfe," Stuttgart, Enke, 1897, pp. 13 to 33. Good summary.

Dorsal Posture, Flexed Thigh and Leg, Feet on Table.—With the knees strongly flexed and the heels close to the buttocks and the knees drawn moderately far apart, the angle



FIG. 5.—Straight dorsal posture—thighs extended. Even here the lumbar arching is increased.

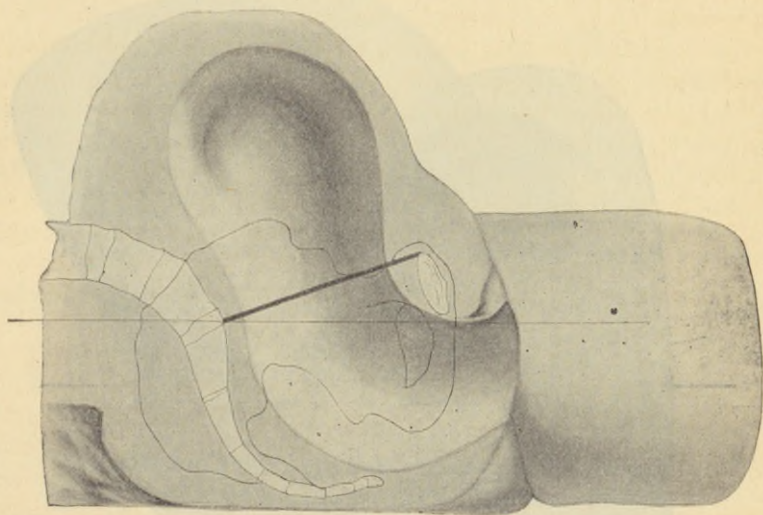


FIG. 6.—Dorsal posture with extended thighs. The black line indicates the conjugate of the inlet.

between the true conjugate and the horizon in front, or beneath, is 40° .

The vagina from hymen to fornix will trend downward, being nearly at right angles with the long axis of the uterus;

but depression of the perineum by the introduction of the hand will give an angle between the lower part of the birth canal

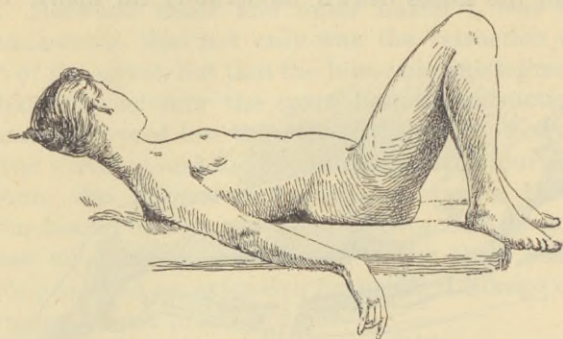


FIG. 7.—Half-flexed dorsal posture—feet on table.

and the upper part of the birth canal of about 120° . The abdominal walls will be relaxed.

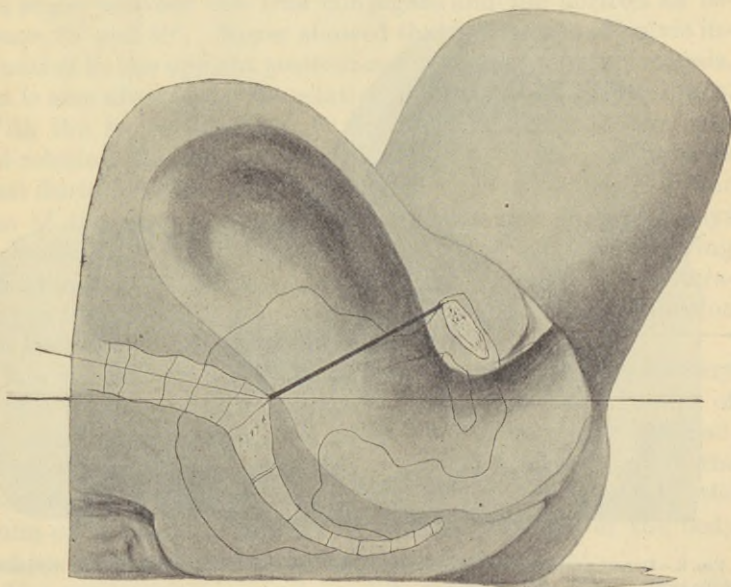


FIG. 8.—Dorsal posture—feet on table. The angle between plane of inlet and horizon is enlarging, and uterine cavity is more accessible.

Dorsal Posture with Thighs Strongly Flexed against the Abdomen.—The knees are carried as near to the shoulders as

possible. The angle between the conjugate and the horizon beneath will be about 60° with the knees wide apart. The symphysis is driven nearer to the promontory, the iliac bones swing on their rear joints, reversing the conditions shown



FIG. 9.—Full-flexed dorsal posture—knees toward shoulders.

in Fig. 13. The depressed posterior vaginal wall will fall more nearly into line with the posterior wall of the upper part of the birth canal, the angle being wider than a right angle. There

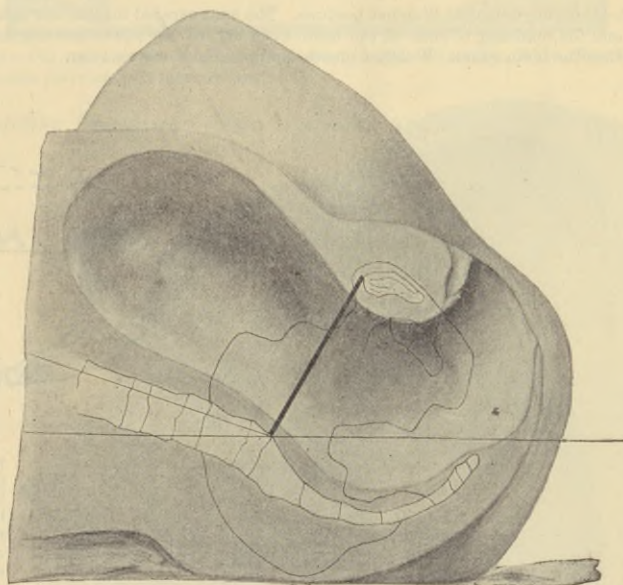


FIG. 10.—Dorsal posture with thighs strongly flexed. Increased angle between inlet and horizon. Accessible birth canal, but conjugate of brim shortened 1 centimetre.

will be some lateral pressure on the uterus, but in front the abdominal walls will be fairly relaxed. For ordinary delivery under anesthesia, after the head has passed the brim, this is the most available position and measurably straightens the

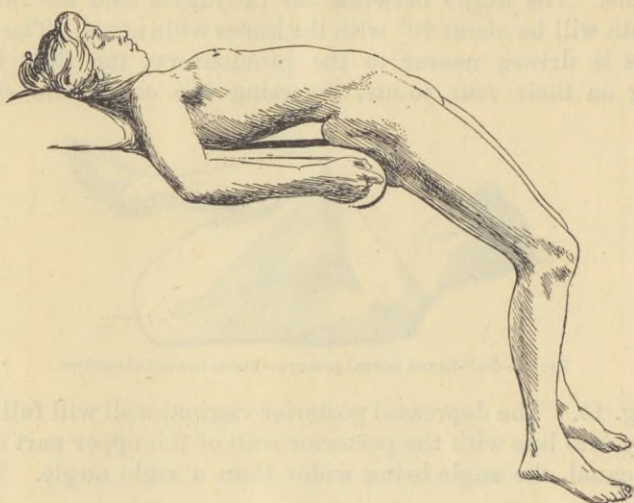


FIG. 11.—Hanging dorsal or Walcher posture. The exaggerated lumbar curve is worthy of note, and the tendency to slide off the table even before any downward traction is exerted within the birth canal. Walcher places a pillow under the sacrum.

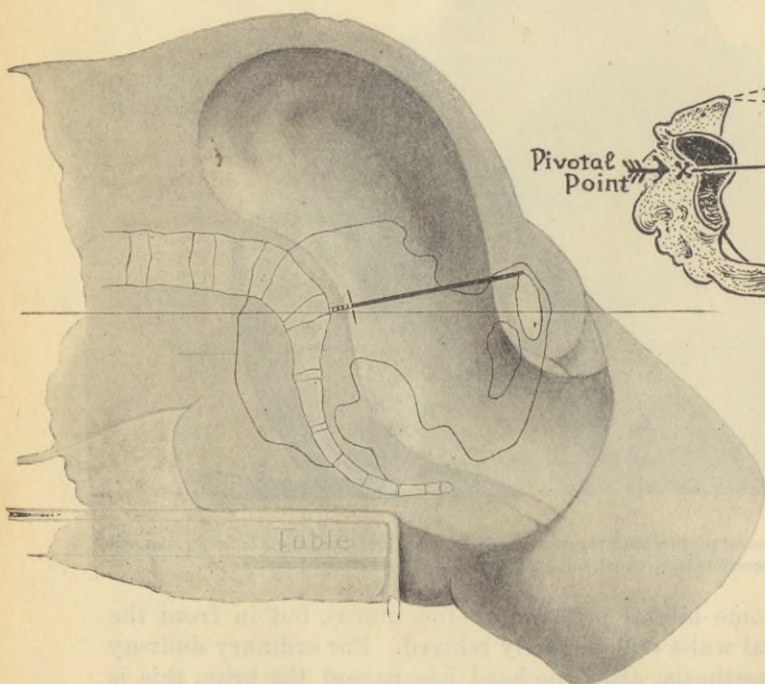


FIG. 12.—Lengthening of the conjugate of the brim by the Walcher posture. The axis of the brim is directed toward the floor.

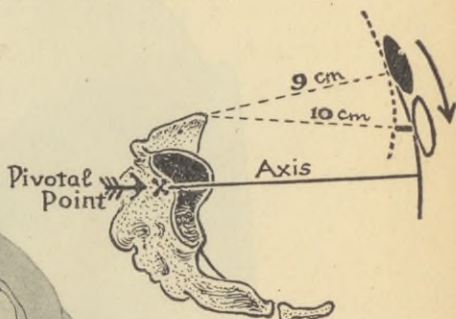


FIG. 13.—Lengthening of the conjugate in the Walcher posture. The sacrum being fixed, the innominate bones are pivoted at the middle of the articulation, and the pubic ends swing downward on the axis shown, dragged down by the weight of the legs. The white symphysis section is 1 centimetre further from the promontory than the black section. (Modified from Klein and Fothergill.)

birth canal. In operations on the perineum and cervix nothing better has been devised.



FIG. 14.—Old print copied by Witkowski from Scipio Mercurio, 1595. Showing that Walcher was reviving a former method.

Walcher Position.—The buttocks are brought to the edge

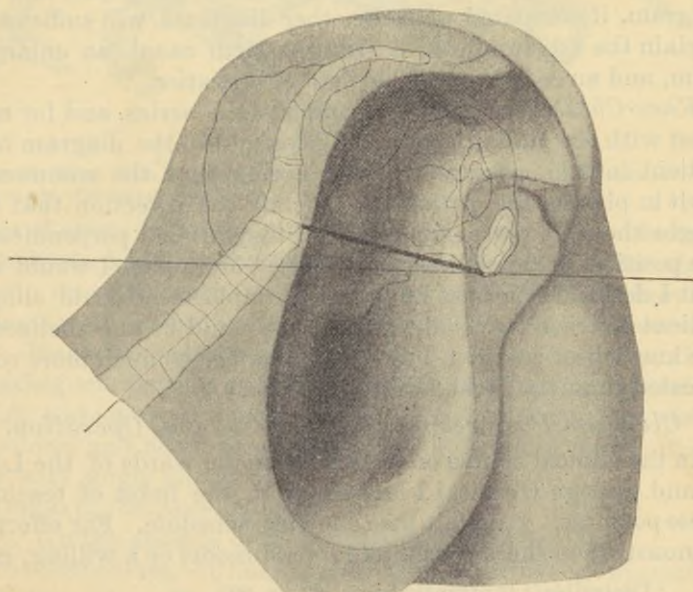


FIG. 15.—Knee-chest posture.

of the table or bed, the legs allowed to hang over, bending backward at the hip joint as far as possible. The lower end of

the sacrum must be at the table's edge. In this position the plane of the pelvic inlet comes quite close to the horizon, with an average angle of 10° to 15° . The depressed posterior vaginal wall comes nearly in line with the posterior uterine wall, and we have a birth canal which is as straight a cylinder as it ever can be, while at the same time the conjugate of the brim is lengthened on an average 0.9 centimetre (three-eighths of an inch), as shown by Walcher,¹ Klein,² Jewett,³ and Fothergill.⁴ There will be some tension on the abdominal walls, so that manipulation through them is not as easy as in other positions.

The objection to this posture is that the direction of traction is straight toward the floor in pulling a head through the inlet to the axis of the latter. This embarrasses any manoeuvre greatly, and calls for muscle on the part of the assistant who holds back the patient on the precarious edge over which the operator's traction is pulling her. I have therefore proposed to put the patient, in difficult labors, into the same posture, but to level the birth canal and do away with the necessity of the operator sitting on the floor or working from beneath in a most uncomfortable predicament.

Trendelenburg-Walcher Posture.—The details of this posture have been given in the early part of the paper, and the diagram, if compared with the other diagrams, will sufficiently explain the advantage of a straight birth canal, an enlarged brim, and an easily accessible field of operation.

Knee-Chest Posture.—To complete the series, and for contrast with the Italian posture, I have added the diagram of a patient in this posture, merely noting that the commonest fault in placing the patient is to omit the direction that the thighs should be perpendicular. If they are not perpendicular the position is much less endurable. Moreover, I would say that I devised a harness by which a simple sheet could sling a patient between two chairs so that she could be anesthetized in the knee-chest position, but that the device is much more complicated than the arched dorsal posture.

Clinic on Postures for Examination and Operation.

In the clinical course on obstetrics in the wards of the Long Island College Hospital I have been in the habit of teaching these postures. I submit the following schedule. For effective demonstration there is required a paid model or a willing, con-

¹ Centralblatt für Gynäkologie, 1889, p. 892.

² Zeitschrift für Geburtshülfe und Gynäkologie, xxi., p. 74.

³ Brooklyn Medical Journal, November, 1894, p. 652.

⁴ Edinburgh Medical Journal, July, 1895.

valescent ward patient who may be glad of a fee. She is dressed in a union suit; the gap between the legs is sewed up; she wears stockings and a veil.

DORSAL, for bimanual examination.

Preliminaries.—Patient to loosen all waistbands, buttons of bodice, and corset. Patient empties her bladder. Table or couch with three pillows or inclined plane. Lubricant, towels, sheet, basin with warm water and soap.

Steps.—1. Hold sheet up between yourself and patient as a screen; ask her to step up on a stool; ask her to go through the form of partly raising the back part of the skirts as she sits down; as she sits down throw sheet over her; head on pillow, feet on table.

2. Step to foot of table, seize lower edge of sheet and lower

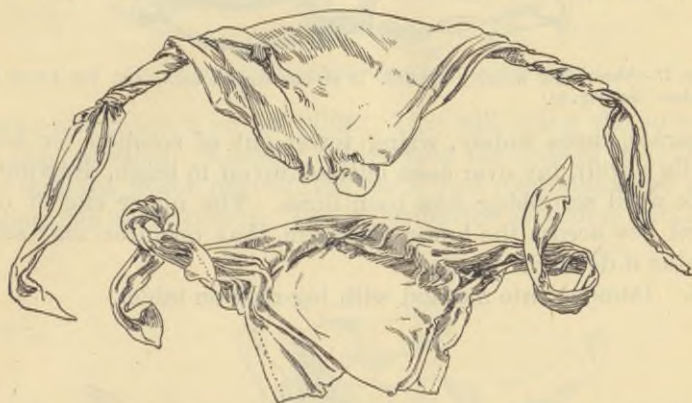


FIG. 16.—Sheet sling, its shawl shape, its bearing on shoulders rather than on neck. Before and after using. See Fig. 20.

edge of skirts in same hold, and push both upward toward symphysis, keeping lower legs covered (or reach under sheet to slip up skirts, then press back sheet between knees, keeping patient well covered and being careful to give that impression).

3. Place feet near together, push knees wide apart, thus relaxing and putting at a disadvantage the abdominal muscles, thigh adductors, and levator ani. Some gynecologists prefer shoulders and head somewhat raised on inclined plane, others low with single pillow.

DORSAL, for operation.

A. (In the absence of table with leg supports.)

Preliminaries.—Underclothes, with stockings or operating drawers, only. The rest as before.

Steps.—1. On back as before, head low, knee joints and hip joints as sharply bent as possible.

2. Place sheet sling. Sheet is seized by diagonally opposite corners and ends loosely rolled, like a shawl. The shawl-shaped triangle caps the shoulders, the straight upper edge against neck. Each end ties below a knee.

3. To cover patient, take a second sheet by diagonal corners, corners hanging over patient's feet; tie corners about feet.



FIG. 17.—Sheet sling wrongly applied. It strains on the neck, and the knees are together. (See Fig. 20.)

Separate knees widely, wring towel out of solution (or take sterile towel), lay over each buttock up on to thigh, drawing it back until scrubbing has been done. The upper end of one towel lies across the lower abdomen, that operator may seize fundus if desired.

B. Demonstrate method with leg-rod on table.



FIG. 18.—Defective method of applying sheet sling, as patient can slip knees together by extending the legs.

LATERO-PRONE or SIMS' POSTURE, for operation.

Preliminaries, as before.

Steps.—1. Patient sits on side of table, then lies down on left side, the left arm beneath her; she either lies across her forearm or it is placed against her back or hanging over table edge.

2. To adjust patient, stand at foot of table, place left hand under the hip, pushing it up until it comfortably seizes the iliac crest; the right hand seizes the upper right knee; pull toward you with your left hand; with your right push the knee



FIG. 19.—Defective method of applying the sheet sling.

away and place it on the table. This will bring the buttocks in good position. Keeping hold, swing the body of the patient so that the lower part of the back just overhangs the edge where the nurse stands. Lastly, bring the shoulders and head

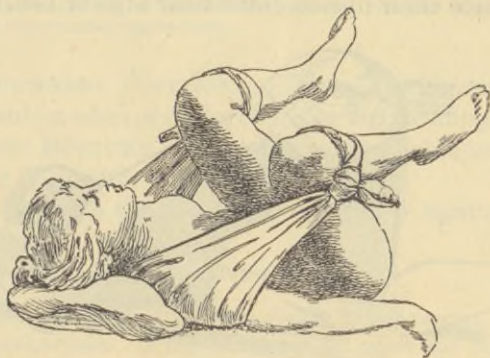


FIG. 20.—Sheet sling applied broadly and properly to shoulders and tied below the knees; thus the knees are held apart and the patient can elevate the feet very little.

to the other edge of the table, if it is narrow. Buttocks are a foot from lower end of table when there is no footpiece on it.

Place sling to hold patient from becoming displaced under ether. It passes beneath the two knees, under and about neck of patient and behind the upper shoulders. Cover her.

KNEE-CHEST POSTURE. (Reposition of prolapsus funis, retroversion, version, tamponing.)

Let patient turn on knees and elbows; make her spread elbows out until chest touches bed, the face turned sidewise; now see that thighs are perpendicular, knees somewhat apart.

HANGING DORSAL or WALCHER POSTURE. (Passage of large head through brim.)

Patient, on back, is drawn down and over foot of table until lower end of sacrum rests at edge; thighs are then gently dropped back as far as they will go.

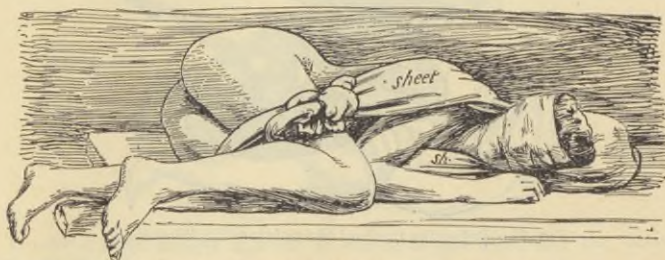


FIG. 21.—The sheet sling applied to latero-prone or Sims' posture.

INCLINED DORSAL or TRENDELENBURG POSTURE. (Laparotomy for rupture of uterus, tubal pregnancy, etc.)

Preliminaries.—Get ready wooden chair, quilt, sheet sling, pillow. Place chair upside down near edge of bed, quilt folded



FIG. 22.¹—Knee-chest posture.

over it, sheet tied to one leg of chair at its junction with the seat. Place patient on inclined plane, slip sheet under head and like a shawl over the shoulders. Draw out the slack and tie the loose end to the other hind leg of chair, feet to rest on front rung.

¹ From Skene's "Diseases of Women," by permission of Messrs. D. Appleton & Co.

ARCHED DORSAL, or TRENDELENBURG-WALCHER. (High forceps, version, high manual internal rotation for occipito-posterior position, reposition of cord.)

Patient as just described. See that buttocks project clear of upturned rear edge of seat of chair and that there is no rung between the back legs of chair. Lift knees from between the rear legs of chair and drop them outside of those legs, their weight unsupported. Standing between patient's feet, explain ready access to birth canal, line of traction, etc., etc.

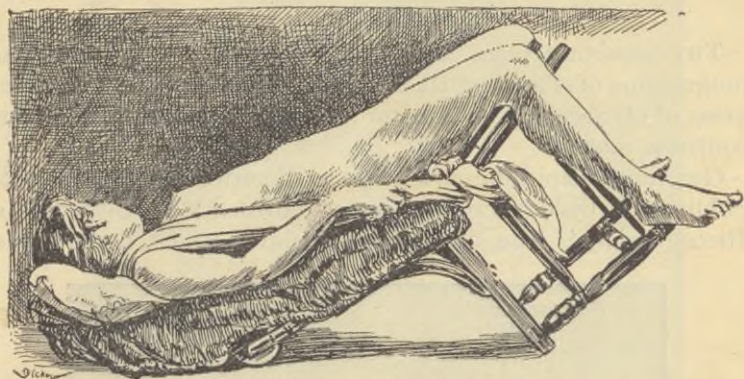


FIG. 23.—The inclined dorsal or Trendelenburg posture with the sheet sling applied. Improved on a chair turned upside-down.

SEMI-RECUMBENT POSITION. (Vaginal ballottement.)

Seat patient on edge of table, chair, or bed, leaning backward.

SQUATTING POSTURE. (Transverse and oblique presentations during dilatation stage.)

Attitude in which the thighs press strongly against the sides of the abdomen.

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NOTE.—A few minor alterations are found in this reprint, as compared with the original article. In Fig. 13 the pivotal point was moved back to agree with Klein's researches. In Fig. 4, "imperial" is substituted for "Italian."

THE WALCHER, THE TRENDELENBURG, AND THE MERCURIO
POSTURES IN MIDWIFERY:

BIBLIOGRAPHICAL NOTES.

BY

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Surgeon, Brooklyn Hospital.

(With nine illustrations.)

THE important place accorded to posture in delivery by the programme of the August meeting of the International Congress of Gynecology in Amsterdam justifies a review of this confused matter.

Geronimo Scipio Mercurio, who lived between 1550 and 1595, published a little volume of essays entitled "La Commare o Riccoglitrice." The first edition is dated 1595. There was a

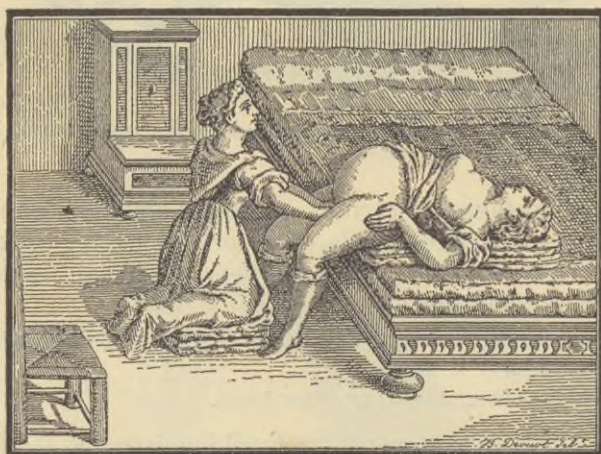


FIG. 1.—Hanging dorsal posture, 1595. (Mercurio.)

German edition of this book for midwives issued in Leipzig in 1652. Among the crude woodcuts occur those here given as Figs. 1, 2, and 4. Witkowski, in his "Histoire des Accouchements chez tous les Peuples,"¹ from whom I have borrowed the

¹ The nomenclature proposed by the author in his illustrated paper in the December JOURNAL was: Walcher, the hanging dorsal posture; Trendelenburg, the inclined dorsal; Mercurio, the arched dorsal; the posture of ordinary examinations, the half-flexed dorsal; and that used in operations on the back, the full-flexed dorsal posture.

cuts, has had them redrawn, but without modifying any material detail. The Walcher, or hanging dorsal, posture picture occurs in the edition of 1595, according to Witkowski, and the edition of 1601, the earliest to which I have access, contains the cut of the arched dorsal posture.²

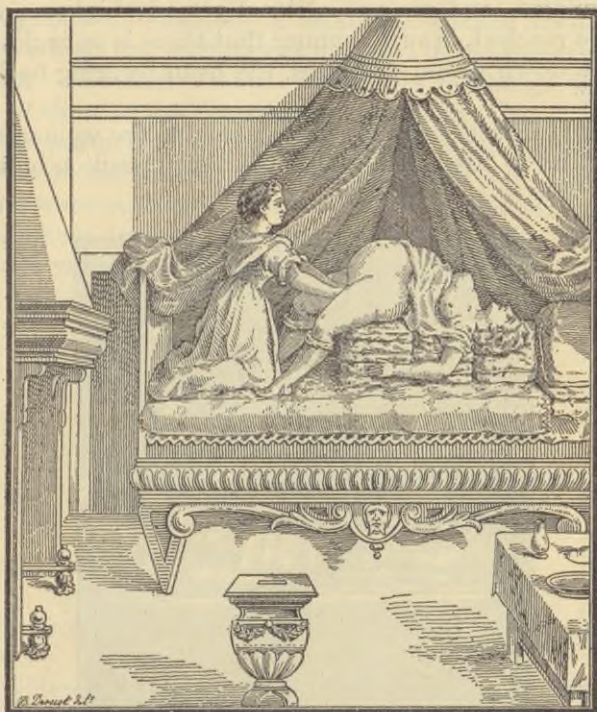


FIG. 2.

EXPLANATION OF WOODCUT OF ARCHED DORSAL POSTURE IN MERCURIO'S "COMMARE."

Sito necessarissimo in ogni parto vitioso nel quale si debbono collocare tutti le gravide, che difficilmente partoriscono per quale si voglia causa.

(The position most necessary in every faulty birth, in which all parturients ought to be placed when for any reason whatever the labor is difficult.)

I am inclined to say with Mercurio that there are obstetric emergencies in which the latter posture is "necessarissimo."

In his first chapter on abnormal labor, Mercurio³ says:

¹ 714 pages, 8vo, Paris, Steinheil, 1877.

² See also Engelmann: "Labor among Primitive Peoples," Chambers, St. Louis, 1884. Ploss: "Das Weib in der Natur- und Völkerkunde," Leipzig, Fernau, 1891.

³ "La Commare o Riccogliatrice." Del Ecc. G. Scipion, Mercurii. Pp. 407. Gio. Bai. Ciotti, Venetia, 1601. Reference to description of position on page 140 et seq. Woodcut on page 143.

“The following appropriate position will be necessitated under these conditions and moreover in every other variety of faulty birth. This position is illustrated by a cut, but for the sake of greater lucidity it is hereby described.” “The parturient is placed upon her back in bed. Cushions are arranged beneath her shoulders, and are proportionally made higher until the nates are reached, in such manner that there is an incline from the nates down to the shoulders, the head hanging back upon the bed.”

Mercurio directs the midwife to examine the woman in this position and to attempt to reduce the faulty position by manipulation. He then continues:



FIG. 3.—Arched dorsal posture as shown in the German edition of Mercurio, by Welsch.

“There is an error not only of midwives but of certain physicians whom I have seen operate in such cases. In attempting to reduce the head to the normal position they place the parturient in an armchair, not perceiving that this position is most opposed to the mechanism of labor. When this is done the weight of the child plus the downward pressure of the intestines forces the said child into a faulty position which neither diligence nor force may correct, and I have seen both mother and child perish on several occasions under these circumstances.

“I arrange the parturient in the supine position, head

hanging and all the trunk elevated in the manner already described, so that the midwife is enabled to bestride the abdomen of the mother and thus expel the fetus from the straits within, for this procedure appears to cause the fetus to assume a position natural to labor."

Throughout the chapters on faulty labor there are allusions to this position, but nothing not included in the foregoing.

Corradi¹ says that "Scipio Mercurio's teachings were the reverse of those of the Greeks and Arabians. He did not require the parturient to lie prone or get upon all-fours, but placed her on her knees, with thighs spread apart and body bent backward so that the head touched the ground, etc."

Corradi here describes the "fat woman's position," and does not in this connection mention the "hanging incline," reserv-



Fig. 4.—"Fat woman's" posture. (Mercurio.)

ing it for another passage. He says further of the fat woman's position:

"He (Mercurio) affected to believe that this position was recommended by Avicenna. But what the latter really prescribed was for a fat woman to lie prone with head on ground and thighs flexed beneath abdomen."

After describing the obstetric chair, Corradi says: "But a substantial improvement in the obstetrical chair was not made for a century after the time of Gottfried Welsch. The latter translated Scipio Mercurio's 'Commare' into German. Our obstetrician (Mercurio) had severely reprov'd the midwives and physicians who made use of the obstetrical chair when the child was in a bad position. He thought the chair would make a bad position worse, and counselled that the parturient be placed supine in bed with the head lower than the rest of the body, which was supported by cushions so raised that the shoulders were lower than the nates. He advised this position

¹ "Dell' Ostetricia in Italia." Alfonso Corradi. Bologna, 1874. Pp. 1,640. Gamberini e Parmeggiani. Extracts are on pages 436 and 440.

for all puerperæ when labor from any cause was difficult, with the one exception of corpulence."

This hanging incline (*sdrucchiolo pendente*), as Mercurio called it, did not prove useful enough to deserve a special apparatus, according to Corradi, nor did it merit the term "*lectus imperialis*" (imperial bed) given it by Kilian.¹

Mercurio had no idea of enlarging the pelvic diameters. Everything shows that he was in complete ignorance of any rationale for his position; therefore it is hardly just for Klein² and La Torre³ to seek to take away credit from Walcher, who says himself that Mercurio used the position, but empirically.

Siebold, in his valuable "*Geschichte der Geburtslehre*,"⁴ takes the passage subjoined from a foot-note in Corradi's history explanatory of the term "imperial bed." The original is in Latin, translation as follows:

"A bed, otherwise known as imperial bed, a peculiar arrangement of pillows for obstetrical purposes, represented in a wood-cut in Scipio's '*Commare*.'"

(Corradi adds that a bed with canopy and curtains has nothing to do with the arrangement of pillows, which could take place as well on the floor of the lying-in room.)

Siebold dubs the posture "backbreaking." Osiander⁵ mentions the position only to condemn it.

Fothergill⁶ makes the point that the old picture of the hanging posture shows the feet supported by the floor, and that, therefore, traction by the legs on the innominate bones would not pull the symphysis away from the promontory. The same criticism must be made concerning the arched dorsal position in this three-century-old picture, as the feet rest upon the bed. The objection is unimportant, because the posture alone, even

¹ "*Die operative Geburtshülfe*." Von Dr. Herman Friedrich Kilian. Bonn, 1849. Pp. 860. Eduard Weber. Reference, p. 125.

The passage in Latin about *lectus imperialis*, the term used by Kilian, was found by him in this book.

"*Commentatio de cubilibus sedilibusque usui obstetricio inservientibus.*" Georg Christoph von Siebold. Göttinge, 1790. J. C. Dieterich. Pp. 88. Reference, p. 68 (Corradi, p. 441, note).

² *Zeitsch. f. Geb. u. Gyn.*, Bd. xxi., S. 74.

³ Proceedings International Congress at Moscow.

⁴ "*Versuch einer Geschichte der Geburtshülfe*." E. C. J. von Siebold. Berlin, 1839-1845. T. C. F. Enslin. In vol. i., p. 374, is a reference to the *lectus imperialis* (Corradi, p. 441, note). Siebold's "*History of Obstetrics*" has recently been translated into French and brought up to date by Hergott. Paris, 1893. Three vols.

⁵ *Lehrbuch der Entbindungskunst*, Göttingen, 1799.

⁶ *Edin. Med. Jour.*, 1895-96, vol. i., p. 42.

without traction by means of the full weight of the leg, would probably do nearly all that posture plus the full weight of the leg could effect.

Sebastiano Melli republished the two cuts, in "La Comare Levatrice," Venezia, 1766. He says that Mercurio's position has relapsed into oblivion and that he attempted its revival.

Walcher, in the *Centralblatt für Gyn.*, 1889, Seite 892, has a short communication describing the use of the hanging dorsal posture in flattened pelves, and claims an increase of the true conjugate from eight to thirteen millimetres under certain circumstances. This difference is between the true conjugate in the fully-flexed dorsal and the hanging dorsal, *not* between the straight dorsal and the hanging dorsal. It is, however, legitimate to speak of the gain as averaging one centimetre, because the ordinary posture for forceps delivery had been a half-flexed or fully-flexed dorsal posture. He also draws attention to the shortening of the antero-posterior diameter of the outlet in his posture, due to the swinging forward of the tip of the sacrum.¹

Walcher also says² that after the head has been pulled through the inlet by his procedure, the pelvic floor is most efficiently relaxed by changing the patient to the fully-flexed posture. His experiments were made on a few women in labor.

Matthews Duncan³ had already demonstrated rotation at the sacro-iliac joints and showed the elongation due to such motions. He speaks of four to six millimetres alteration. Hermann Meyer⁴ reached the same conclusion. Crouzat⁵ found that by extension and flexion on the cadaver the true conjugate varied eight millimetres. Farabœuf is quoted by Currier⁶ as agreeing with this.

Klein⁷ reports a large number of experiments on cadavers. In an excellent paper, which, next to Küttner's, is the most thoroughgoing and scientific study of the postures I pictured,⁸ he draws attention to the fact that the pivotal point of the axis of the swing of the symphysis is behind the joint, one centimetre to the rear of the middle of the second sacral vertebra. He

¹ Verh. d. Deut. Gesell. f. Gyn., 1892, S. 448.

² Med. Cor. Blatt d. Würtemb. Aerz. Verein, Bd. lx., Heft 5.

³ Dublin Quart. Med. Jour. for Med. Sci., 1854, xviii., p. 60.

⁴ Arch. f. Anat. u. Entwicklungsgeschichte, 1878, S. 1.

⁵ "De la Menstruation du Diametre Suboccipito-pubienne," Paris, 1881, p. 312.

⁶ Med. News, 1896, p. 265.

⁷ Zeitsch. f. Geburt. u. Gyn., Bd. xxi., S. 74.

⁸ AMERICAN JOURNAL OF OBSTETRICS Dec., 1898.

calls the pelvis in the hanging dorsal posture *das gedehnte Becken*; in the straight dorsal posture, *das ruhende Becken*; between the flexed and fully-flexed dorsal, *das gedrückte Becken*; in the fully-flexed dorsal, *das gepresste Becken*. None of the forty-seven cadavers were from the postpartum weeks.

Klein found that he could more easily shorten than lengthen a

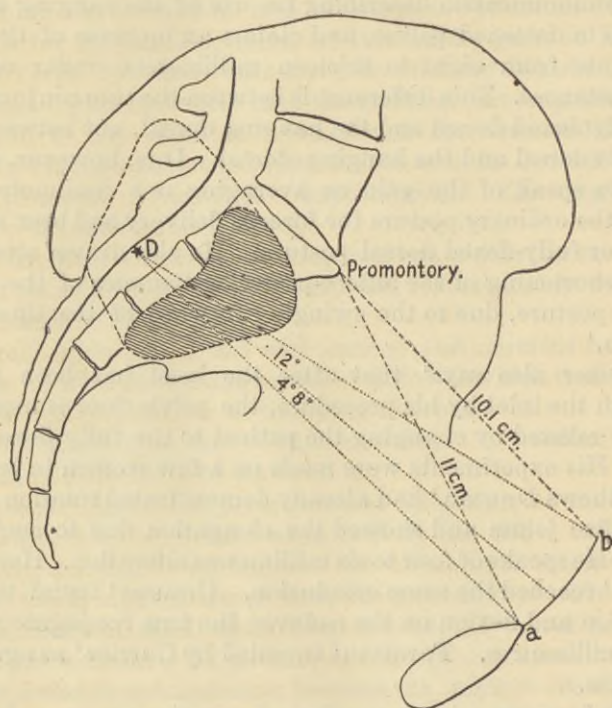


FIG. 5.—Rotation of the innominate bones about the centre "D." (Klein.)

true conjugate, starting in the straight dorsal posture. The average was about five millimetres either way. Walcher claimed that the gain is actually greater in flattened than in normal pelvis. Klein found this to be true. The latter believes that three elements produce the lengthening in the vera—rotation, the sliding which takes place in the sacro-iliac joint, and the slight spring of the bones. The first is the only important one. A motion on the part of the symphysis of one centimetre up or down affects the vera three millimetres. The pull of the full leg weight is twenty-four to thirty kilogrammes (thirty-three pounds). He fears that the position is unbearable, and this criticism has weight for every other method but mine.

Fehling¹ strongly advocates a widespread use of the hanging dorsal posture, particularly in high forceps and head-last extractions. Dührssen's experiments² showed an average increase of nine millimetres in the Walcher posture. Wehle³ reports success in various operative procedures—for instance, in a version with a true conjugate below eight centimetres. He thinks that twenty per cent more living children will be born through this means. Both Dührssen and Wehle prove that the usual posture for obstetric operations, namely, the full-flexed dorsal, actually shortens the antero-posterior diameter of the inlet, but that the hanging dorsal lengthens it.

Jewett⁴ reports his results on several living subjects examined within two weeks after labor. The gain from Walcher's posture varied from .5 to .75 centimetre. In four non-puerperal pelvises in the dissecting room the increase was four, five, six, and four millimetres. Bristow⁵ measured three non-puerperal cadavers with extreme accuracy. The gain, comparing full flexion with full extension, was one-eighth of an inch (three millimetres) in each instance, from promontory to mid-symphysis, while the diameter from the subpubic arch to the tip of the sacrum was lessened one-sixteenth, one-sixteenth, and five-sixteenths inch respectively.

My paper read before the Brooklyn Gynecological Society in February, 1896, based on cases dating from the one detailed in the published paper, which occurred in April, 1894, was illustrated by cuts of sections and by the living model.⁶ In December, 1898, I hunted up the literature here given.

Fehling⁷ says: "I have in [three] cases [the earliest occurring in August, 1894], placed upon each other at the head of the bed, mattresses divided into three parts (*drei theilige Mattrazen*), so that the legs hung down freely inside the bed without touching the floor, while the buttocks lay exactly on the edge of the upper mattress. Of course the upper part of the body has a great tendency to slip down if it is not firmly supported against the headboard. This is done with towels broadly folded or with girdles which, passing under the armpit, hold the shoulder girdle up. In the same manner the hip region is fastened upward by a girdle passing on each side, broadly around the curve of the thigh." Carrier speaks of Fehling's method as a modified

¹ Verh. d. Deut. Gesell. f. Gyn., 1893, p. 45.

² Id., 1893, p. 47.

³ Arch. f. Gyn., 1894, p. 325.

⁴ Brooklyn Med. Jour., Nov., 1894, vol. viii., p. 653.

⁵ Id., p. 654.

⁶ AMERICAN JOURNAL OF OBSTETRICS, Dec., 1898.

⁷ Münch. Med. Wochenschrift, No. 41, Oct. 30, 1894, S. 861.

Trendelenburg posture. From Fehling's description it is not quite clear to me whether it covers my ground or not. I knew nothing of Fehling's posture or Currier's suggestion until three years after I began using the arched dorsal posture.

Currier,¹ in an article covering the subject well—with the exception of Klein's article—says in conclusion, in speaking of the discomforts of the Walcher posture: "It may be that this difficulty may be remedied by placing the patient in the Trendelenburg position, in which the condition of extension would be preserved."

Fothergill² thinks that the hanging dorsal posture relaxes the pelvic floor in the perineal stage, and the traction rods on the axis-traction forceps will, therefore, damage the perineal structure little. Herein he is at odds with Walcher himself, who places the patient in the full-flexed dorsal posture when the head reaches the pelvic floor, in order to lessen the danger of laceration.

Eiermann,³ after quoting good results, says that the number of high forceps applications will be lessened by employment of the Walcher posture. Valuable service is rendered in delivery of the aftercoming head, and perforation of both head-first and head-last cases is rendered easier. It is in the minor grades of contraction that the procedure is chiefly of use.

Klein,⁴ Pazzi,⁵ La Torre, and Simanti⁶ contribute historical notices of the hanging dorsal posture. Pazzi it was who, incorrectly, fastened Melli's name on the posture in conjunction with Walcher's. He has reported on the procedure for face cases with the chin to the rear.⁷ Fothergill⁸ gives encouraging reports. Jardine⁹ gives an instance of happy issue with this proceeding, where, in five previous pregnancies, no living full-term child had been born: the true conjugate measured $2\frac{3}{4}$ inches; the child weighed $8\frac{1}{2}$ pounds.

Huppert's¹⁰ observations on 28 cases of flat and generally contracted pelves lead him to state that in flat pelves with true conjugates down to 7 centimetres (eventually lower) and in generally contracted pelves down to 7.5 centimetres (seldom lower) spontaneous labors in vertex presentations are rendered possible. In this classification should be included normal pelves

¹ Med. News, March 7, 1896, p. 265. ² Edin. Med. Jour., 1895, p. 142.

³ Die Praxis, Frankfurt-a-M., 1896, No. 9.

⁴ Centralbl. für Gyn., 1897, No. 45. ⁵ Atti della Soc. ital. di Ost. e Gin.

⁶ Proceedings Moscow Intern. Congress.

⁷ Rassegna di Ost. e Gin., 1896, Nov.-Dec. Ref. Centralbl. f. Gyn., No. 32, 999.

⁸ British Med. Jour., 1896, No. 1870.

⁹ Glasgow Med. Jour., April, 1897.

¹⁰ Arch. f. Gyn., Bd. lvi., pp. 199.

with abnormally large children. Huppert gives the following indications: good quality of contractions, ruptured membranes, obliterated cervix, vertex presentation. Even in greater relative disproportion where spontaneous delivery is not to be expected, operative procedures are rendered easier and the child's chances bettered. Huppert even states that the lowest limit of contraction in which he succeeded in delivering a living child (49.5 centimetres in length, 2,850 grammes) fell within the class for Cesarean section for relative indication. Huppert says that the posture produced most effect when the head, still somewhat movable, lay in the inlet or projected little into the true pelvis. When more deeply engaged no progress is to be

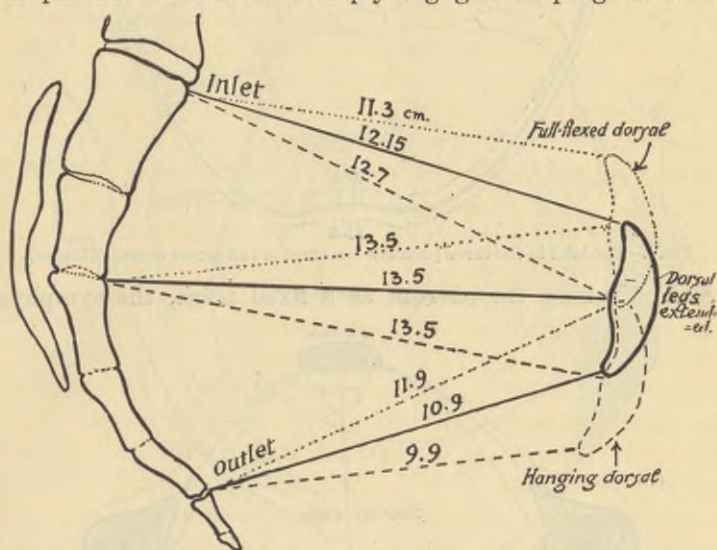


FIG. 6.—Pulling down of symphysis and longer vera in hanging dorsal posture. (Küttner.)

expected from the posture. In half the cases the effect followed promptly.

Schmidt¹ had employed the full-flexed dorsal posture for eight years to increase the diameters of the outlet when the head was stationary in the pelvic cavity or at its outlet, thereby lessening the percentage of his low forceps extractions.

Von Küttner,² in a paper containing an excellent critical review of previous researches, reports exact results on entire puerperal cadavers, not on pelvis alone as did Klein. He took

¹ Centralbl. f. Gyn., 1897, p. 1394.

² "Experimental Investigations upon the Alterability of the Pelvic Space in Parturients" Beiträge zur Geburtshilfe und Gynäkologie, 1898, i., Heft 2.

plaster casts of the pelvic cavity by an ingenious method in each of the three postures, hanging, straight, and full-flexed

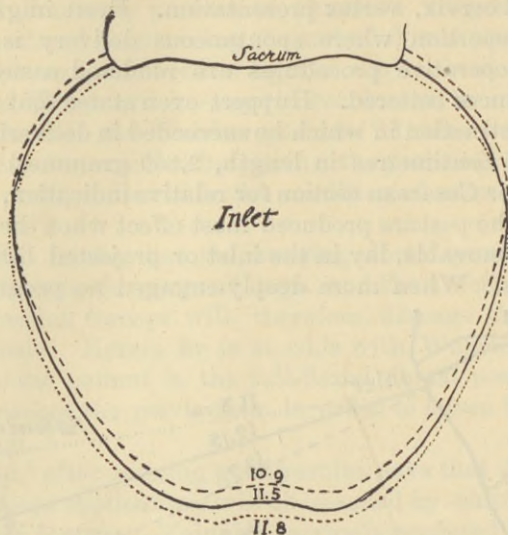


FIG. 7.—The inlet in the three postures—smallest in full-flexed dorsal (Küttner).

dorsal. Taking the sacrum as a fixed point, the symphysis

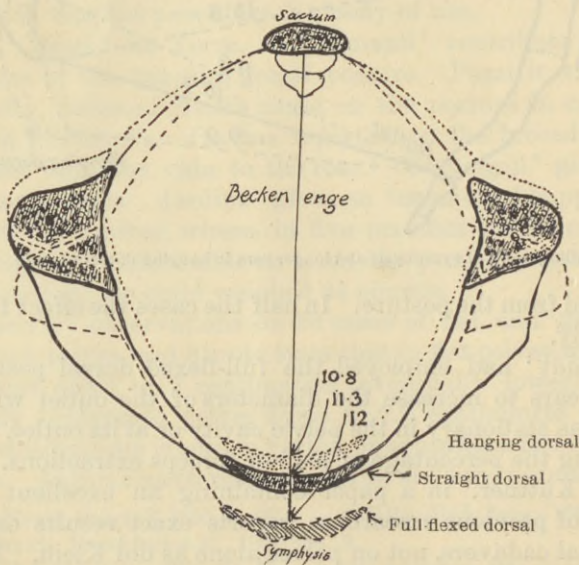


FIG. 8.—The outlet in the three postures—longest in the full-flexed dorsal. (Küttner.)

may be said to "wander" up or down, according to the position of the legs, as shown in the diagram, Fig. 6. Coincident

with this alteration in the relative location of the symphysis, rotation of the symphysis took place about a transverse axis passing through its middle portion. Thereby, as the symphysis rises, its upper edge approaches the promontory, whereas the lower border goes further and further away from the sacrum (Fig. 6). Conversely, if the legs hang down, the upper edge increases its distance from the promontory, while the lower border approaches the sacrum.

The most striking result of Von Küttner's casts is shown in Fig. 8. The alteration in shape of the plane of the outlet is

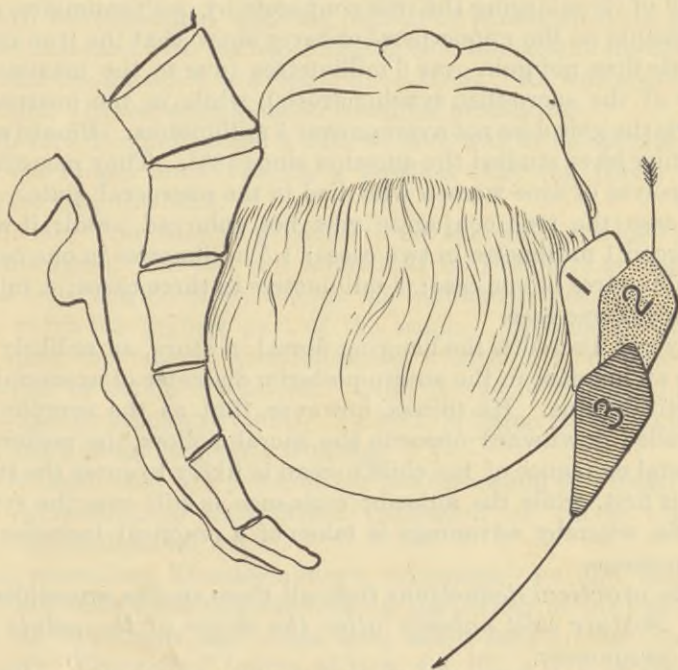


FIG. 9.—Pinard's idea of the effect of the Walcher posture. No room gained.

much greater than that of the inlet; and opposite in effect, so that in the full-flexed dorsal posture the antero-posterior diameter of the outlet is at its maximum, whereas in the hanging dorsal it is at its minimum. There is much more alteration obtainable through posture on the outlet diameter than in the inlet measure. Change from hanging to full-flexed dorsal lengthened the conjugate of the outlet 1.4, 1.8, and 2 centimetres respectively (Figs. 7 and 8), while the true conjugate was lengthened, by changing from full-flexed to hanging, 1, .9, and 1.4 centimetres, the pelvis being named in like order. The transverse measurements are not affected.

Pinard¹ argues against the hanging dorsal posture, because he believes that it narrows the diameters between the midsacrum and the back of the symphysis, and also those of the outlet, as shown in the diagram. This seems to me fallacious.

Varnier² declares that symphyseotomy should replace all other methods of treating narrow pelves. The pelvis cannot be enlarged without section, and studies in mensuration on cadavers disprove the claims of Walcher. In 1894 Varnier had already discussed the *pro* and *con* of Walcher's position. Instead of its enlarging the true conjugate by one centimetre, experiments on the unpuerperal cadaver show that the true conjugate does not gain over 6 millimetres (due to the maximum play of the sacro-iliac synchondrosis), while in the puerperal pelvis the gain does not average over 5 millimetres. Pinard and Varnier have studied the question since 1894. They measured the pelves of nine women who died in the puerperal state. In one case the true conjugate was not enlarged at all; it was enlarged 1 millimetre in two cases; 1.5 millimetres in one case; 2 millimetres in one case; 3 millimetres in three cases; 4 millimetres in one case.

Ayers³ discredits the hanging dorsal posture, as unlikely to give an increase in the antero-posterior diameter of appreciable practical value. He thinks, however, that as the symphysis is pulled downward opposite the sacral hollow, the posterior parietal eminence of the child's head is likely to enter the true pelvis first, while the anterior eminence is still over the symphysis, whereby advantage is taken of a practical increase in the passage.

The *practical deductions* from all these studies are evident:

1. *Posture will notably alter the shape of the pelvis in late pregnancy.*
2. *Increase in available room in the pelvic cavity as a whole cannot be brought about.*
3. *To obtain the longest conjugate at the inlet the hanging dorsal posture is to be employed. The gain is nearly 1 centimetre.*
4. *To obtain the longest conjugate at the outlet the full-flexed dorsal posture is necessary. The increase promises to be from 1.5 to 2 centimetres.*

¹ Annales de Gyn. et d'Obst., xvi., 1894, 428.

² "Rapport sur la Symphyséotomie," Internat. Med. Cong. Moscow; also Ann. de Gyn., tom. xlviii., 1897, p. 252.

³ Obstetrics, April, 1899.

TRENDELEBURG OR INCLINED DORSAL POSTURE.

Trendelenburg's¹ paper of 1890 may be summarized as follows: Elevation of the pelvis was recommended by the old surgeons in connection with the taxis for hernia. The theory was that the weight of the mesentery, assisted by violent shaking, ought to set free the incarcerated loop of intestine.

Fabricius ab Aquapendente recommended that the patient be hung up by the hands and feet with pelvis higher than thorax, and that he should then be shaken violently. Corvillard practised complete inversion, hanging his patient by the feet. Sharp recommended that the patient be placed upon the back of an assistant with his legs hanging over the latter's shoulders, so that the knee-hollows rested upon them. He was also to be shaken. Ribes recommended a similar procedure.

In 1878 Freund placed a patient, who was to be operated on for carcinoma uteri, in such a position that the pelvis was higher than the head.

In 1880 Trendelenburg began to use the position which goes by his name. He was not influenced by Freund, but got his idea from Marion Sims, who, in his well-known position, made the vulva the highest part of the trunk. As Sims caused air to enter the vagina, Trendelenburg wished it to distend the bladder in fistula operations. Later it was found of value in suprapubic lithotomy (1884). In 1887 he began its use in laparotomy due to intrapelvic troubles.

De Leon used the position for the castration of women and for gynecological exploration (palpation of pelvic organs through abdominal walls).

In consulting Trendelenburg's references² we find that he did not take much pains to look up the history of his position, as his references and notes were taken bodily from Bardeleben's "Chirurgie," fourth edition, vol. iii., p. 775, section on hernia. These references are incomplete and often give no clue by which they can be looked up. The "similar procedure" of Ribes is as follows:

"Ribes places the patient at the foot of the bed in such manner that the knee-hollows rest over the shoulders of an assistant, who raises the pelvis and shakes the body of the

¹ "Ueber Blasenscheidenfisteloperationen und über Beckenhochlagerung bei Operationen in der Bauchhöhle." Volkmann's Sammlung, Chirurgie, No. 109, 1890.

² References given by Trendelenburg: Ribes, Bardeleben's "Lehrbuch der Chirurgie," 8th edition, iii., p. 792.

Freund, Samml. Klin. Vorträge, No. 183.

De Leon, Centralblatt f. Gynecol., 1888, No. 21.

patient while the operator makes taxis." No reference is appended to Ribes.

As for Sharp, there is no reference to him either. He is doubtless the renowned English surgeon (eighteenth century), but in looking through his *Surgery* I find it only stated that "the buttocks should be raised considerably above the head in making taxis."

OTHER POSTURES.

Palmer Dudley, in a discussion on my sheet sling,¹ expressed the opinion that the pelvic floor was subjected to increased tension from the full-flexed posture, while the head was escaping. If Fothergill is right, his argument applies to the arched dorsal as much as to the hanging posture.

Potter² presents a number of fine cuts tending to give clear ideas of the postures he describes. The full-flexed dorsal, but with the hands above the head, he calls the dorsal sacral position. The posture with partly flexed legs, yet with feet not on a table, he labels the dorsal recumbent. The ordinary posture for examination, the thighs and legs flexed and the feet on the table, the shoulders and head somewhat elevated, he calls the dorsal elevated. Hegar labels the latter the lithotomy posture, but Potter calls his dorsal sacral the lithotomy posture.

Howard Kelly, in examining the bladder, places two pillows under the sacrum of the patient lying in the fully-flexed dorsal posture. He calls this the "dorsal position with elevated pelvis."³ We might abbreviate his name for the posture to accord with my previous suggestions and label it the "inclined flexed dorsal."

Brothers⁴ emphasizes the value of posture in prolapse of the cord. The woman being placed in the genu-pectoral position, the body of the uterus tends to slip lower than the cervix, and the cord, owing to the same force of gravity, tends to slip down to the fundus and out of harm's way.

In 1894, in the Jenks prize essay on prolapse of the cord, the author expressed his opinion that the dorsal position with pelvis elevated would prove far superior to the genu-pectoral position, and added, "theoretically Trendelenburg's position ought to be followed by the same results."

He gives a history of two cases.

168 CLINTON STREET, BROOKLYN, NEW YORK.

¹ N. Y. Med. Record, April 5, 1890.

² AMERICAN JOURNAL OF OBSTETRICS, 1892, vol. xxvi., p. 758.

³ "Operative Gynecology," Appleton, November, 1898, vol. i., p. 279.

⁴ "A New Postural Method of Treating Prolapsus of the Umbilical Cord." By A. Brothers. AMERICAN JOURNAL OF OBSTETRICS, 1895, p. 849.