Lacerations of the perineum : their causes, formation, and primary repair : with report of forty-eight illustrated cases / by Ellice McDonald.

Contributors

McDonald, Ellice, 1876-1955.
Royal College of Surgeons of England

Publication/Creation

[Chicago] : [American College of Surgeons], 1908.

Persistent URL

https://wellcomecollection.org/works/aese4nye

Provider

Royal College of Surgeons

License and attribution

LACERATIONS OF THE PERINEUM [1]

Their Causes, Formation, and Primary Repair, with Report of Forty-Eight Illustrated Cases

By ELLICE McDONALD, M.D.

Instructor in Obstetrics, College of Physicians and Surgeons; Clinical Assistant in Obstetrics, Vanderbilt Clinic; Instructor in Obstetrics, New York Post-Graduate Medical School and Hospital, New York

THE subject of perineal lacerations and repair is one which has been debated amongst medical people for many years, and the more debated, the more obscure the subject has become. The multitude of operations which have in recent years been exploited is evidence of the lack of uniform appreciation of the underlying causes, processes, and mode of repair of these wounds.

Although modern gynecologists have been most successful in the treatment of these conditions, the possibility of their successful treatment has long been known. The first historical reference to the subject is found in an early work supposed to have been handed down by tradition and edited by an unknown author who states that Tortula, a midwife attached to the school of Salernum, who lived in the eleventh century, cured a laceration of the perineum by operation — "Postmodum ruptura intra anum et vulvam tribus locis vel quatuor suimus cum filo de serico" (1).

Ambrose Paré (2) was another of the early investigators of the subject and is credited with having performed the operation. He reports a cure of two cases, but does not state that the operation was done immediately after labor. He gives directions as follows: "But if through the violence of extraction the genital parts are torn, so that the two cavities, the rectum and vagina, are torn into one, the tear must be stitched up, and the wound cured according to want. I have thus cured two women living in Paris."

Various other investigators followed Paré, amongst them his pupil, Guillemeau, (3) who operated upon one case of complete rupture of the perineum six weeks after labor. He pared the edges of the old cicatrix and used one figure-of-eight and two interrupted sutures. The operation was a success. Others who performed the operation for complete tear were De La Motte, Morlanne, Saucerotte, Noël, and Dupuytren in France, Rowley in England, and Osiander and Dieffenbach in Germany. Dieffenbach (4) wrote extensively upon the subject of complete perineal tear and followed the plan of making lateral incisions at each side of the perineum after suturing the recto-vaginal septum. In 1837 he advised the primary repair of all lacerations of the perineum, including first and second degree tears.

Amongst American surgeons Mettauer (5) of Virginia published a report of a successful operation for complete tear six months after its occurrence. He used sutures of lead and fastened them by twisting.

Roux (6) wrote extensively upon the subject and published many successful cases of complete perineorrhaphy. He was an earnest advocate of the operation.

Amongst those who did primary operations for incomplete tears of the perineum were Bayer (8) in 1823, Churchill (9) in 1824, and Williams (10) in 1827, while Alcock (11) performed the intermediate operation for incomplete laceration in 1820.

The secondary operation for laceration of the second degree tears also was first done about this time. Fricke (13), in 1835, has done the operation four times with three successes. Nick (14) also reported in 1838 that he had done two operations for incomplete tear of the perineum. Baker Brown (15) was, however, the surgeon who did most to bring the operation into general use and encouraged others to study the subject of perineal injuries. In 1866, Baker Brown had done 112 operations upon the perineum. His work stimulated Savage (16) to excellent researches upon the anatomy of the perineum, which have remained classic in gynecological literature.

Following after these were Hegar, Sims, Agnew, Emmet, A. Martin, and Lawson Tait.

[1] Read before the New York Academy of Medicine on October 25, 1907.

Of these, Emmet (17) has been the greatest contributor toward the subject and recognized that the torn muscles and fasciæ caused a loss of support to the pelvic floor. His operation is the one commonly performed at the present time.

Since the time of these masters, a multitude of new operations have been devised to restore the anatomical support of the pelvic floor and close the perineal wound, caused by descent of the head at labor. All these operations have as their aim the intimate approximation of the edges of the torn fasciæ and muscles. To this end, in secondary operations, many forms of denudation of the vaginal mucous membrane have been exploited. The majority of these attempt the excision of the scar tissue of the old wound and the restoration of the torn muscles and fasciæ.

Without a proper appreciation of the causes, processes, and forms of perineal rupture, it is useless to attempt to judge the value of each modification of the various operations. With this end in view I have made sketches of forty-eight consecutive perineal lacerations at the time of labor and have noted the most evident and directly causative factors. These lacerations occurred in 100 women, of whom 90 were primiparæ. This gives a percentage of occurrence of forty-eight percent, which is within Williams' estimate of 45 to 58 per cent. Every wound of the mucous membrane other than a small tear of the fourchette has been reckoned in the series, none over 1.5 cm. in length have been excluded.

The various causes of perineal laceration are usually cited as follows: 1. Too rapid expulsion of the child, so that tearing of the perineum instead of stretching results; 2. Relative disproportion between the presenting part and the parturient outlet; 3. A faulty mechanism of labor whereby the largest circumference of the head passes the perineal ring; 4. The use of forceps.

Rapidity of delivery is without doubt the most frequent cause of perineal laceration. This is particularly seen in those cases of precipitate delivery where the head comes through the birth canal rapidly and impinges upon the perineum with almost the force of a blow. This rapidity of advancement of the head is sometimes seen in cases of contracted pelvis, where strong uterine pains are required to force the head through the bony pelvis, with the result that the less resistance of the soft parts does not retard its way. The quick descent of the head was also seen in one case (No. 25), where the membranes had remained intact until the head had come through the brim; when the membranes ruptured, the head was advanced with great rapidity, causing a laceration in a multipara with a comparatively lax outlet.

The passing of the head through the perineal outlet should undoubtedly be retarded, until the parts have softened and stretched. A preliminary digital stretching is most useful in primiparæ, although often a painful procedure. It can, however, be done during the labor pains and is a means of stimulation of their force and frequency.

A frequent cause of perineal laceration is the pressure of the head upon the perineal body and the lack of retraction between pains. The maternal parts become bloodless and tense, and tear readily with further descent of the head. An additional factor in the production of this condition is the attempt to control expulsion by pressing the taut perineum against the sinciput. This wounds the perineum and aids in the production of the anemic condition. The advancement of the head should be controlled without making any pressure upon the perineum.

Strong pains are a definite factor in the production of perineal injuries, but may be readily controlled by chloroform.

Relative disproportion between the presenting part and the parturient outlet is commonly thought to be one of the main causes of perineal injuries.

In any attempt to estimate the size of the fetal head in relation to the perineum, it should be decided which is the greatest diameter of the fetal head to engage in the perineal ring. In this study, it will be considered to be the occipito-frontal diameter, which comes into relation with the perineum by the final extension of the head. It is the diameter most capable of accurate measurement and gives a more dependable estimate of the size of the fetal head than do the suboccipito-bregmatic

or biparietal diameters. The various circumferences of the fetal head offer too much possibility of error in measurement to make them useful as indications.

Therefore, in attempting to estimate the size of the presenting part in its relation to the size of the perineal ring, the greatest engaging diameter, the occipito-frontal, is taken as a criterion. However, as the size of the head increases in direct proportion to the weight of the child, the increase of weight in its relation to perineal lacerations is also considered. This increase in the size of the fetal head in proportion to the weight was shown to be constant in 100 cases studied in its relation to intra-uterine cephalemetry (19).

In this series, the 48 perineal lacerations may be divided into two classes: 1. Those not involving the muscle, and 2. Those involving the muscle of the perineum. Of those not involving the muscle, there were 21. The average weight of the 21 babies was 3,310 grammes, and the average occipito-frontal diameter was 11.27 cm. The 27 cases of lacerations involving the muscle had children averaging 3,550 grammes, and with an average occipito-frontal diameter of 11.75 cm. The average weight of 100 babes, of whom these 48 cases here reported are a part, was 3,300 grammes, and the average occipito-frontal diameter was 11.40 cm. Therefore the result may be summarized:

	O.-F. Diam.	Weight.
21 cases of laceration not involving muscle	11.27	3,310 gm.
27 cases of laceration involving muscle	11.75	3,550 gm.
100 cases, including 48 cases of laceration	11.40	3,300 gm

From this summary it will be seen that the babies causing lacerations not involving the skin were of average weight, but of less than average size of head; while those causing lacerations involving muscle were of more than average weight and size of head. However, the slight increase in weight of two hundred grammes (7 oz.) can hardly explain the causation of the lacerations in view of the fact that the heads were but slightly larger than average. Nor will the fact that, in 21 cases of minor lacerations, the fetus was of average weight

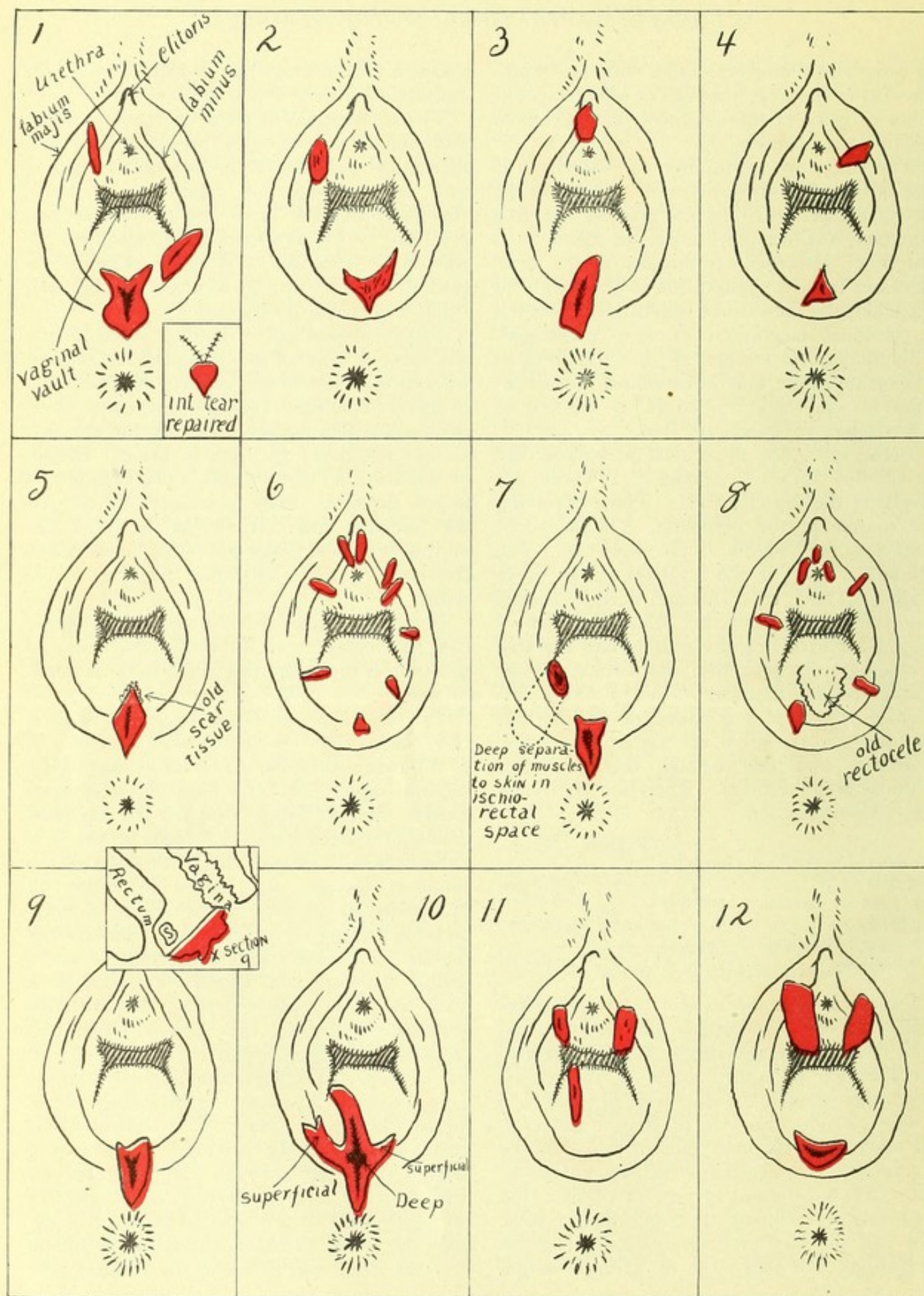and less than average size of head explain the causation of these tears.

The causation of perineal lacerations, while undoubtedly influenced by considerable increase in size of the fetal head, does not depend to any extent upon this condition. It must, therefore, depend more upon the size and condition of the perineum itself than upon the size of the fetus and fetal head. The disproportion may be due to firmness of fiber and rigidity of perineal structure.
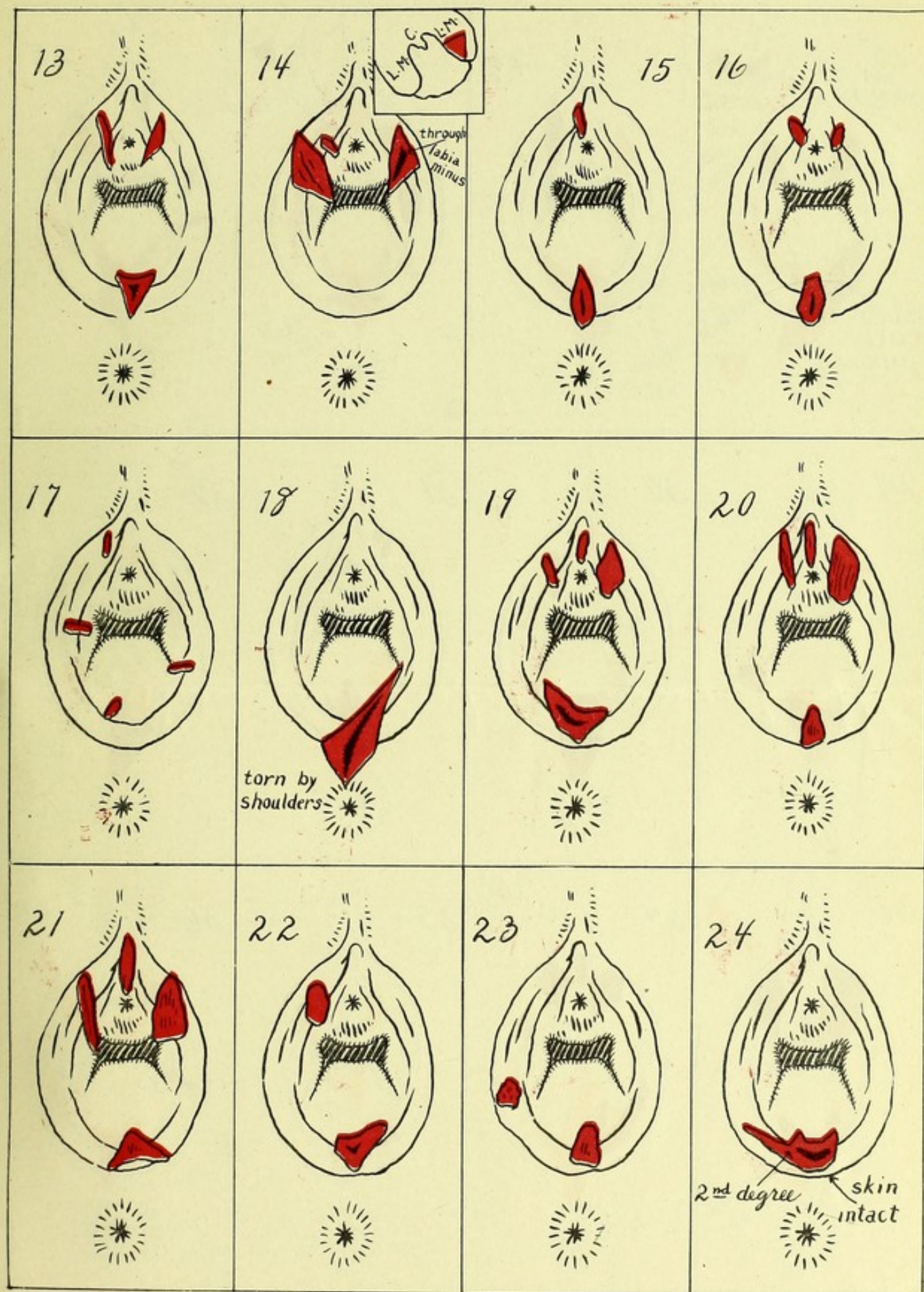
Faulty mechanism of labor is undoubtedly the cause of a small percentage of lacerations, but this has an influence in but a small number of cases. Amongst them are those cases where the occiput does not present under the symphysis as in delivery by face to pubes. Whenever the flexion of the head is not sufficient, a larger diameter than necessary must pass the perineal ring. If flexion is good, the occiput may pass under the pubic bones before the occipito-frontal diameter engages in the outlet.
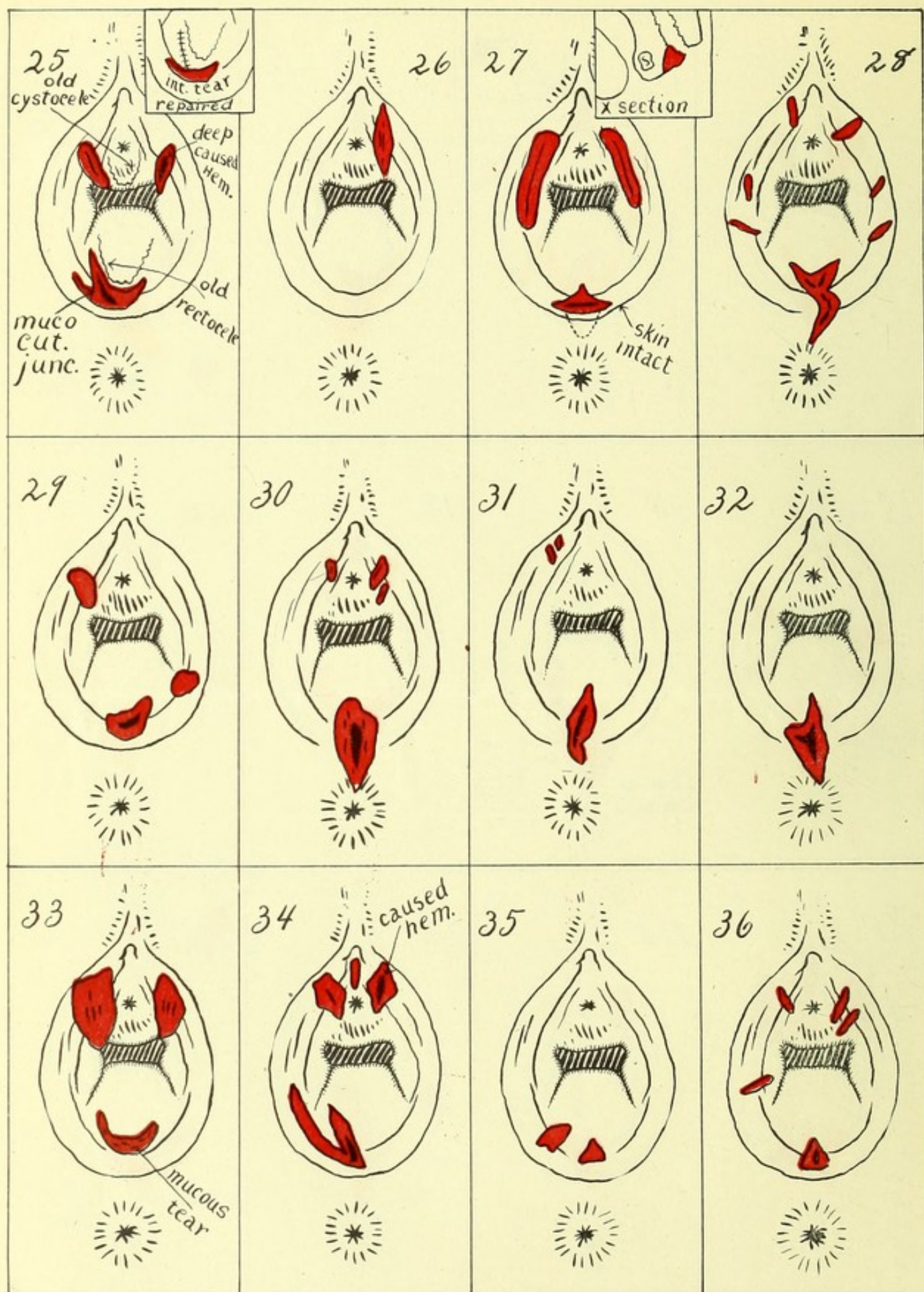
In breech deliveries the reverse must ensue, i. e. the occiput remain within the ring and pivot under the symphysis, allowing the sinciput to engage first in the ring.

The use of forceps as a causative force is one which varies very much with the methods of different operators. The harm they cause depends upon — 1. The kind of forceps employed; and 2. Upon whether the operator delivers the head with the forceps or not.
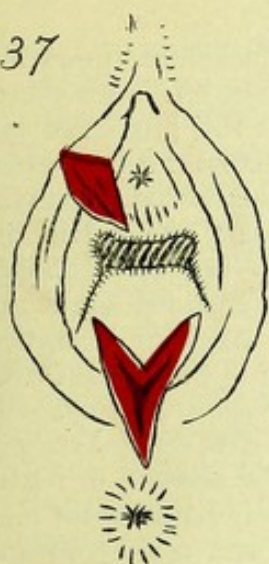
Forceps with long blades of the type of the Simpson forceps may cause laceration of the perineum in two ways. First, directly on a backward pull by the breadth between the shanks where they join the handles, which unduly stretches and wounds the outlet at a level with its greatest frailty, the posterior fourchette. Second, the blades themselves do not closely approximate the fetal head, and the edge of the blade extending beyond the head, impinges upon the vaginal floor and is forced into the tissue. This condition is quite common when attempts are made to deliver the head through the ring without removing the forceps. When the handles of the forceps are turned upward in order to extend the head, the blades, not fitting snugly over the head, but grasping the parietal pro-

1 urethra — clitoris
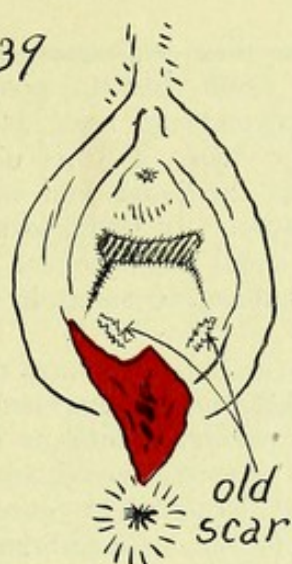labium majus — labium minus
vaginal vault
int. tear repaired

2

3

4

5 old scar tissue

6

7 Deep separation of muscles to skin in ischio-rectal space

8 old rectocele

9 Rectum — Vagina — S — x section 9

10 superficial — superficial — Deep

11

12

13

14 through labia minus

15

16

17

18 torn by shoulders

19

20

21

22

23

24 2nd degree skin intact

25 old cystocele
int. tear repaired
deep caused Hem.
old rectocele
muco cut. junc.

26

27
X section
skin intact

28

29

30

31

32

33
mucous tear

34 caused hem.

35

36

37 38 39 40
41 42 43 44
45 46 47 48

old
scar

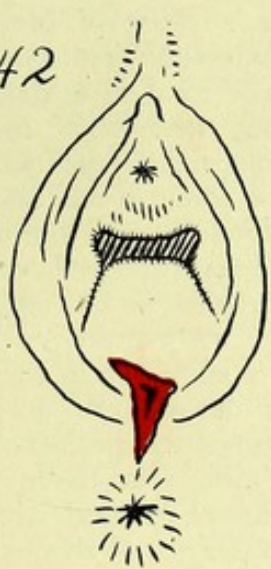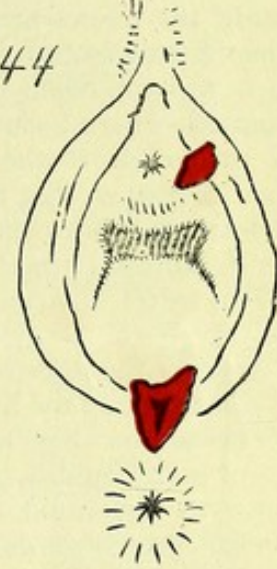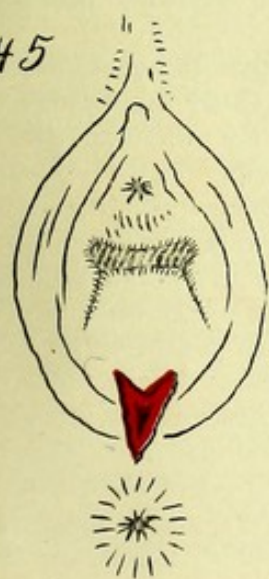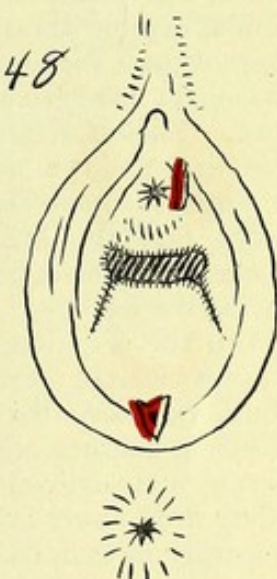cesses firmly, turn upon these eminences as upon a pivot, with the result that the point of the blade extends beyond the head and impinges upon the pelvic floor. Further descent of the head drives the point into the tissue and starts a laceration. In such conditions it requires but a small beginning of a tear in the mucous membrane to result in a large laceration.

The secret of success in the prevention of perineal lacerations is to keep the mucous membrane intact: once the mucous membrane is ruptured, as by the point of the forceps' blade, the head stretching these tissues often causes a severe tear, while, if the mucous membrane is kept intact, delivery is often made successfully through most rigid perinea. In other words, the tissues are like cotton, in which, if a tear is once begun, it may be easily extended. Such was the result in one case (No. 7), here reported, where a small laceration was caused by the points of the Elliott forceps and the muscles split so that the finger could be thrust between the muscular planes to the skin of the ischiorectal space.

The secret of avoidance of tears in forceps delivery is the use of proper forceps and the removal of the forceps as soon as the head can be controlled by the hand.

The author has made trials by practical use of many models of forceps and has finally come to use solid blade forceps after the Tucker-MacLane model. These forceps fit the head well, cause little traumatism to the vagina and perineum, and are easily applied without causing abrasions or injury. The best types of these forceps are the Cragin and the McDonald models, made by Tiemann, New York. These forceps may be applied and the head drawn down until it can be controlled by pressure upon the forehead between the coccyx and the anus. No attempt should be made to deliver the head without first removing the forceps.

With the acquirement of skill and the use of proper forceps, there is no reason why there should be more lacerations directly due to forceps in instrumental deliveries than in non-instrumental deliveries. The head may be delivered as slowly and as much care taken of the perineum as in non-instrumental deliveries.

A frequent cause of perineal laceration which is often credited to the forceps operation is the traumatism done by the prolonged stay of the head at the outlet and the pressure caused by the ineffectual labor pains pressing the presenting part against the pelvic diaphragm. In those cases (Nos. 19, 30, and 38) in which the head had remained some time upon the pelvic floor, the resulting lacerations were extensive and deep; the tissues were edematous and fragile, being repaired with difficulty, as the sutures cut out. The presenting head should not be allowed to remain upon the perineum without advance for more than an hour and a half, and usually not that time.

Posterior positions are also often spoken of as a cause of perineal lacerations and undoubtedly predispose to this condition. Forceps rotation is dangerous with the old style long fenestrated forceps. The vaginal mucous membrane may be stripped off, as was the result in one case (No. 32), reported here. However, with the modern solid blade model, the operation of rotation by forceps is easy, and there is but little danger of damage to the mucous membrane.

Scar tissue in the perineal ring as a result of old wounds or previous perineorrhaphies makes the perineum more easily torn. The fibrous scar tissue has not the elasticity of normal perineal structure, and rupture is apt to occur at this spot. In several cases of multiparæ (Nos. 5, 8, and 39), the perineal outlet was of fair size, yet a laceration occurred at the site of the scar.

It is frequently stated that the shoulders in head presentations often cause lacerations of the perineum. Such is not my experience. I have never seen a laceration from the shoulders alone; but large shoulders quite frequently increase the extent of a tear which was begun by the head. The phenomenon already referred to holds good that a tear once begun readily extends: such was the result in one case (No. 18) in this series.

For the purpose of consideration of these lacerations, they may be divided into tears of the anterior and posterior part of the perineal outlet. The posterior tears may again be divided into — 1. Tears not involving the

muscle, or minor tears; 2. Tears involving the muscle, or major tears; and 3. Tears involving the sphincter.

The relation of the skin surface to the lacerations has no bearing upon its depth or gravity. Ofttimes a laceration may not involve the skin surface, yet extend deep into the muscle of the pelvic floor. Such cases are Nos. 7, 24, 27, and 36. There may be extensive injury to the pelvic muscular support without any rupture of skin surface.

Minor lacerations occurred 21 times. Forceps were done 4 times. The average weight of the babies, as before stated, was 3,310 grammes.

Major lacerations occurred 27 times. There were 11 forceps deliveries. The average weight of the babies was 3,550 grammes.

No cases of sphincter tear occurred in this series. The author has repaired a number of sphincter lacerations in obstetrical work and has had two occur in his own hands. One of these was due to an ill-directed and ill-controlled forceps traction when the head was near the perineum. The head came down suddenly with the last traction, and, as the direction of the traction was wrong, ruptured the perineum. The other case was one in which, while an assistant delivered a case of placenta prævia under my direction, the arms became extended in the breech extraction and caused delay, so that I was compelled on account of the safety of the child to extract the head very hurriedly. The head came through the pelvis so quickly that the extension of the face was not done. The chin caught against the perineum and caused a sphincter laceration. Both of these tears should have been prevented. Most sphincter lacerations are without excuse, and, with proper care, should not occur.

In a consideration of these 48 cases, it will be seen that lacerations of the anterior portion of the perineal ring have occurred 32 times. These lacerations occurred in the region of the vestibule, through the labia minora and around the urethral orifice. They frequently caused hemorrhage. In one case (No. 14) the labium minus was torn completely through, as if cut with scissors. These anterior tears have but seldom been referred to (save by Bar and

TABLE OF CASES

| No.	Para	Pelvis	Occ. Fr.	Wt.	Remarks
1	I	Normal	12.75	3600	
2	I	normal	12	3500	
3	I	normal	11	3300	Precipitate. Age 39.
4	I	normal	11.25	3400	
5	II	sl. contr.	11.5	2900	Scar of old operation caused rigidity.
6	III	sl. contr.	11.75	3900	
7	I	normal	11.75	3450	Med. forceps. Muscle split begun by sharp edge of forceps.
8	II	normal	12	3950	Old scar tissue.
9	I	contracted	11.5	3050	High forceps; torn after removal.
10	I	contracted	11.75	4000	High forceps, dry labor.
11	I	contracted	11.25	2850	
12	I	normal	11.25	3100	Low forceps.
13	I	normal	11.25	3650	
14	I	normal	10.50	2950	
15	I	normal	11.25	3400	
16	I	sl. contr.	10.75	2800	
17	I	normal	11.25	3600	
18	I	sl. contr.	11.50	3700	Tear increased by large shoulders.
19	I	normal	11.75	3800	R. O. P. Head on perineum 1½ hours, tissues contused.
20	I	normal	12	3750	
21	I	normal	11.75	3600	Low forceps.
22	I	normal	12	3500	
23	I	normal	11.5	3025	
24	I	normal	11	2950	Second degree. Skin intact.
25	II	normal	10.75	3200	R. O. P. Head came down quickly when membranes ruptured.
26	I	normal	11	3200	
27	I	normal	10.5	3100	R. O. P. Second degree. Skin intact.
28	III	contracted	12.25	3800	Med. forceps.
29	I	normal	11.5	3650	Low forceps.
30	I	sl. contr.	10.75	3000	Low forceps. Head on perineum 1½ hours.
31	I	normal	11.25	3500	
32	I	normal	11.25	3300	Med. forceps. L. O. P. Caused by attempts at rotation.
33	I	normal	11.25	3100	R. O. P. Low forceps, age 44.
34	I	normal	10.30	3500	Very rigid.
35	I	normal	11	2650	
36	I	sl. contr.	10.75	2900	
37	II	normal	11.5	3800	Med. forceps. Dry labor.
38	I	normal	11	2650	Low forceps. Head on perineum 1½ hours.
39	II	normal	11.50	3800	Low forceps. Old scar of previous repair.
40	I	normal	11.25	3500	Med. forceps.
41	I	normal	12	3300	
42	I	normal	11.75	3200	
43	I	normal	11.50	3400	Med. forceps.
44	I	normal	11.50	3500	
45	I	sl. contr.	11.25	3400	
46	I	normal	11.25	3000	
47	I	normal	11	3000	
48	I	normal	11.25	3200	
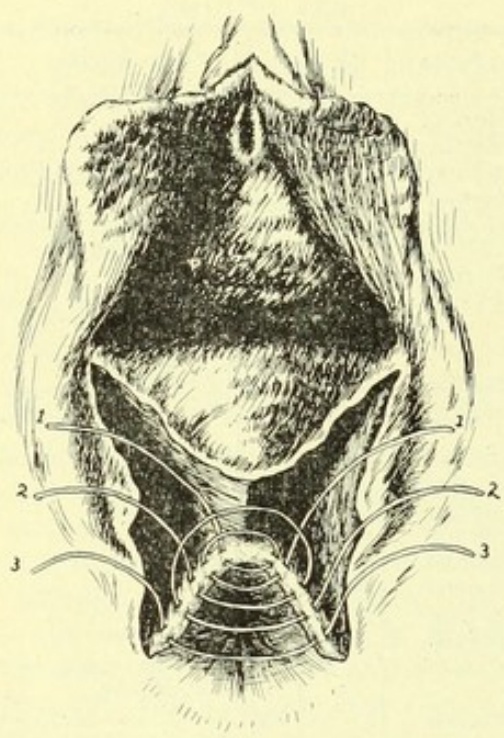
Fig. 5.
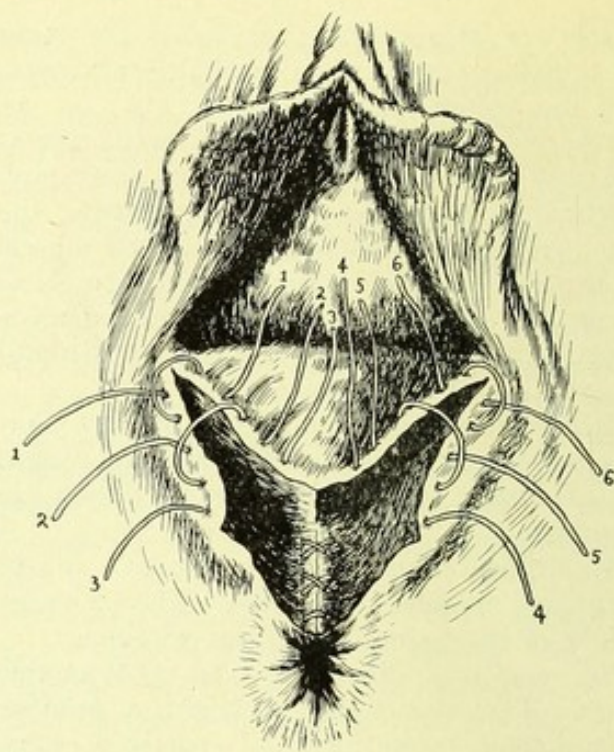
Fig. 6.

Hirst) and are of considerable importance, as they often bleed profusely.

A scrutiny of the more severe tears of this series will show that the lacerations are usually lateral. Those which occurred in the mid-line did not extend centrally up the vagina, but deviate to one or other side, or separate to form a Y. The only lacerations which extended centrally up the vagina were those in which the perineum was the seat of old scar tissue which altered the normal relation of the fibers.

Thus it will be seen that any secondary operation which considers purely the middle line of the vagina does not attempt to repair the original trouble and is ineffectual in restoring the parts to their previous condition. The Emmet operation, as modified by Noble, best completes the exact anatomic restoration. It may be modified to suit any of the more severe lacerations shown in these pictures.

These lacerations were all repaired immediately after labor. The operation may be delayed 24 to 28 hours, if the woman's condition is poor, but should not be delayed longer, as the pyogenic organisms, constantly in the lochia, may cause infection of the wound. If it is necessary to delay longer, the laceration should be left for complete cicatrization, and a secondary operation done. The intermediate operation in the stage of granulation is one fraught with danger. Freshening the granulating surfaces of an infected wound of the perineum may cause a severe intoxication and open avenues of infection.

The technique of the operation was as follows: First, if there was a sphincter tear, the rectum was sutured by a modified Lauenstein suture with fine chromic catgut and a small needle. These sutures pass in and out close to the margin of the gut upon the vaginal side without penetrating the rectal mucosa. They are introduced in a figure-of-eight and tied not overtightly. The remainder of the operation, save for joining the sphincter ends, is the same as for a sphincter or major tear.

The mucous membrane is sutured with No. 2 chromic catgut, with a Kelly's needle. These needles should be rather heavy; a useful type, with a large (Lister's) eye in the side, is that sold by Codman and Shurtleff of Boston. The needle should be inserted 1 cm. from the edge of the mucous membrane and come out at the bottom of the laceration; be reinserted and emerge 1 cm. from the opposite edge (Fig. 6). Full bites of tissue should be taken.
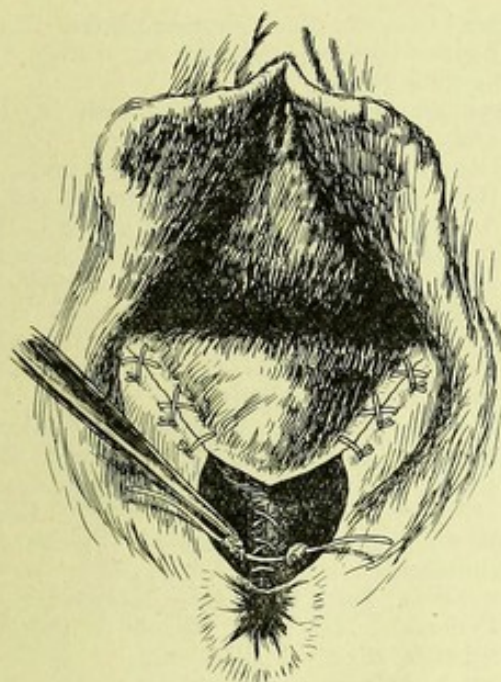
Fig. 7.

Fig. 8.

The sutures here are also passed as figure-of-eight. These double stitches save time, lessen the possibility of infection along the suture line and properly coaptate the parts. Care should be taken that the sutures completely close the sulci and do not connect them into closed gutters for the passage of discharges.

Twelve-day chromic gut is used and lasts in the vagina from six to ten days. Plain catgut is not of use in the soft succulent tissues of the postpartum passages, as it is absorbed too rapidly. No. 3 plain catgut lasts on an average three days under these conditions.

If the laceration is complete, the sphincter is now brought together by two sutures of No. 1 chromic catgut on a small needle. These sutures are buried (Fig. 7).

The next step in the operation is the closure of the external or skin surface of the laceration: this is done by silkworm gut sutures, with the Kelly needle. The sutures, as passed through one side of the wound, come out at the bottom and, if necessary, pick up any redundant tissue, and are reinserted to come out about 1 cm. from the skin surface. These sutures are drawn sufficiently tight, to bring the edges of the wound firmly together. It usually requires from three to five of these sutures. None should be tied until all are in place, the effect
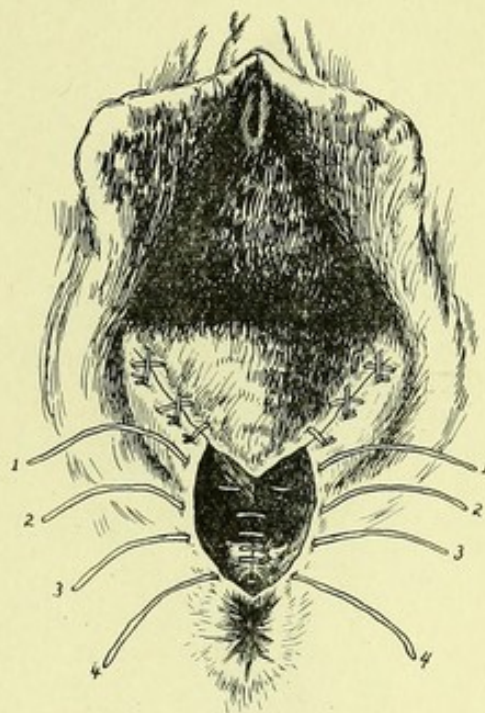
of each suture upon the wound by crossing the ends of the suture being to pull the edges of the wound together. When all are inserted, these sutures are tied.

Attention is then directed to the mucocutaneous junction at the level of the hymen. Here two or three fine chromic sutures are usually required, to effectually seal the wound.

The secret of success and primary union in this operation is to have no opening or gap in the line of the wound for the entrance of the lochial discharges which have been proved always to contain pyogenic organisms. These last chromic gut stitches effectually block a very commonly left gap which would permit the infiltrating discharge to obtain entrance to the lower part of the wound. These stitches correspond to the "crown-stitch" of Emmet's operation and restore the fascia in that plane as well as add to the cosmetic result.

The operation is done in three steps: 1. Suturing the mucous membrane; 2. Suturing the external tear; and 3. The "crown-stitches."

The anterior lacerations were all repaired with fine plain catgut. The tissues here are not so succulent, nor are they so exposed to discharges, as to require chromic gut. The difficulty in the repair of these anterior tears is to avoid puckering and to get a straight line of
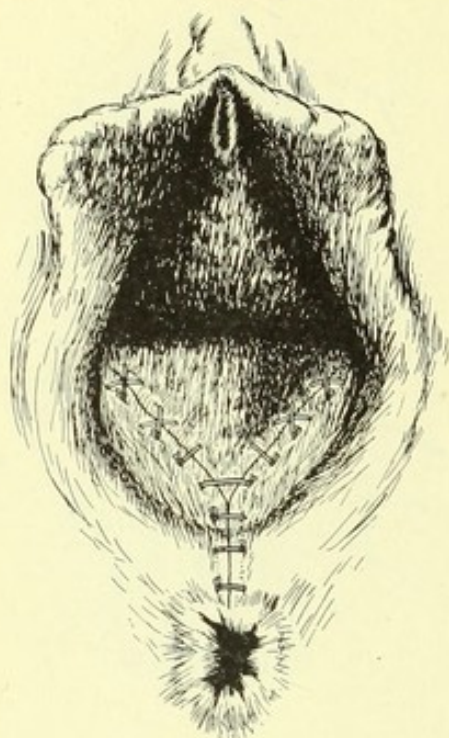
Fig. 9.

union. This is best done by beginning the continuous suture at one end of the tear and tying it. This tied end is used as a tractor and the suture continued as a "half-hitch" suture, i. e., after every bite of the needle the catgut is passed underneath the last stitch, as the tops of flourbags or bales are sewn. The suture is thus continued to the end, leaving a straight wound.

All these cases healed up by primary intention. One, in which plain catgut was used, had some separation and infection of the vaginal part of the wound. The sphincter tears, sutured by this method, and with fine chromic gut buried in the sphincter muscle, healed perfectly.

The aftercare consisted in keeping the women in bed for ten days. No douches were given, except on other indications. The silkworm gut sutures were removed in from ten to fourteen days, as the condition of the wound demanded. The women were often allowed up after ten days with the sutures in place, and about the house a day or so before their removal.

REFERENCES

1. Gynæciorum hoc est de Mulierum tum Aliis tum Gravidarum, etc. Basileæ per T. Guarinum. 1566-257, chapter xx. Gynæciorum sive de mulierum affectibus commentarii Græcorum etc. Basileæ 1586, vol. i, chapter xx, p. 105. Quoted by Kelly-Noble.
2. AMBROISE PARÉ. Opera Ambrosii Parei regis primarii et Pariensis chirurgi, etc. Parisiis. J. Dupuys, 1582. Liber xviii, chapter xxvii, p. 698. Ibid. "The Workes of that famous Chirurgien Ambroise Paré, translated out of the Latin and compared with the French by Th. Johnson," etc. London: R. Cates, 1649. Liber xxiv, chapter xxvii, p. 615. Quoted by Kelly-Noble.
3. GUILLEMEAU, J. Les Oeuvres de Chirurgie, etc. Paris: N. Buon, 1612. Livre iii, chap. vii, p. 354. Quoted by Kelly-Noble.
4. DIEFFENBACH, J. F. Chirurgische Erfahrungen, 1829, bd. 1, p. 64. Sur la rupture de Périnée. Jour. Complementaire au Dictionnaire de Science Médicale, 1830, xxxviii, pp. 193-206. Ueber die Zerreissung des Dammes bei Frauen, Medicinische Zeitung, 1837, bd. vi, p. 255.
5. METTAUER, JOHN P. A Case of Laceration of the Perineum. American Journal of the Medical Sciences, 1833, vol. xiii, p 113.
6. ROUX. Mémoir sur la restauration du Périnée, etc. Gazette Méd. de Paris, 1834. Tome ii, p. 17.
7. Ibid. Clinique chirurgicale. L'Union Médicale, 1849, vol. iii, p. 247.
8. BAYER, W. Cases of Ruptured Perineum treated successfully. Edinb. Med. and Surg. Jour., 1823, vol. xix, pp. 551-554.
9. CHURCHILL, J. M. Case of Lacerated Perineum. London Med. Repository, 1824, vol. i, pp. 464-468.
10. WILLIAMS, C. Case of Laceration of the Perineum. London Med. and Physic. Jour., 1827, vol. iii, pp. 101-102.
11. ALCOCK, THOS. On the Treatment of Laceration of the Perineum in Parturition. London Med. and Physic. Jour., 1820, vol. xliv, pp. 193-197.
13. FRICKE, J. C. G. Episorrhaphie ou nouvelle opération pour la cure de prolapsus de la matrice. Gaz. Méd., 1835. Tome iii, p. 249.
14. NICK. Beobachtung der vollkommenen Heilung einer noch ganz neuen Dammruptur. Med. Correspondenzblatt des Württembergischen Aerztevereins, Stuttgart, 1838, bd. viii, p. 301.
15. BROWN, I. BAKER. Diseases of Women, 1854. On Rupture of the Perineum and its Treatment, etc., 1855.
16. SAVAGE, HENRY. The Surgery. Surgical Pathology and Surgical Anatomy of the Female Pelvic Organs, 1870. London, sec. ed.
17. EMMET, T. ADDIS. A Study of the Etiology of Perineal Laceration with a new method for its proper repair. Transact. Amer. Gynec. Soc., 1883, p. 198.
18. WILLIAMS, quoted by Hinchey. Surgery, Gynecology and Obstetrics, 1907, 155.
19. McDONALD, ELLICE. Mensuration of the Child in the Uterus with new Methods. J. A. M. A. 1906, Dec. 15.