

## Original Articles.

### RETROVERSION AND ITS TREATMENT: AN ANALYSIS OF FIVE HUNDRED CONSECUTIVE CASES AT THE FREE HOSPITAL FOR WOMEN.\*

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ALTHOUGH retroversion of the uterus, next to plastic surgery of the vagina, is the most common condition which gynecologists have to treat, and one about which more has been written and for which more operations have been devised than any other, there are still many points of disagreement among surgeons, especially with regard to causation and treatment. It was with the hope of gaining information on these disputed issues that I have been led to investigate the subject by a study of cases operated on in recent years at the Free Hospital for Women. The method which I have pursued was to tabulate from the history of five hundred consecutive cases preceding June 1, 1906, such facts as would give information on the symptomatology, causation, nature of the operation and after-results. A letter was then written to each patient asking an answer to a series of questions covering symptomatic results of the operations, later pregnancies and present conditions, with the request also to report in person at the out-patient department.

#### CAUSATION.

It is of great importance that the surgeon should have an intelligent knowledge of the causation of retrodisplacements, on account of the necessity of applying the proper operation to the individual case. This subject is one of a very wide difference of opinion, and one which is frequently a matter of contention.

In order to discuss intelligently the causation of retrodisplacements, it is necessary to consider briefly the question of the supports of the uterus. The extremely complicated set of supporting structures with which nature has endowed the uterus in order to meet the extraordinary changes in size and position which it is its function to undergo, may, to all practical purposes, be reduced to comparatively simple terms. An idea of what constitutes the support of the uterus can best be appreciated during the performance of a complete hysterectomy, which consists merely of a systematic severing of the supporting attachments of the uterus.

During such an operation one becomes impressed with the fact that the uterus is supported around its middle by a diaphragm of tissue which has its ultimate support from the walls of the bony pelvis, and which has in it certain fibromuscular thickenings which are termed ligaments. There are, first, the lumbo-ovarian ligaments, which act to limit mildly the lateral antero-posterior mobility of the uterus. That they are real ligaments and have some true function is shown by the

severe malposition of the uterus which they may cause when they are abnormally developed. It is, however, during embryonal life that they possess their chief function, for at that time they are the most important supporting attachments of the pelvic organs.

Next come the round ligaments, which are strong elastic structures that help to preserve the forward position of the uterus. They exert a gentle but firm and effective force to keep the uterus in its forward position resting on the bladder, their elastic nature allowing for the antero-posterior play caused by the constant change in the size of the bladder. The round ligaments have little or no office in maintaining the uterus at its physiological level in the pelvis. The broad ligaments serve to limit the lateral mobility of the uterus, and support it to a considerable extent through numerous smooth muscle fibers and elastic tissue, most highly developed along the course of the uterine vessels. We then come to the three structures of the pelvic diaphragm which are most important for sustaining the uterus in its physiological plane, namely, the uterovesical and uterosacral ligaments, and the fibromuscular vault of the vagina. The uterovesical and uterosacral thickenings of the pelvic diaphragm act as a swing to support the uterus antero-posteriorly between the sacrum and pubes. They are tough, rather inelastic bands, and are often of great strength, as is shown by the difficulty which one occasionally encounters in cutting them in operations on nulliparous women. In cutting through the vault of the vagina one encounters the last and most important tissue which maintains the uterus in its normal position, and one which is the last to give way when all other supporting structures are gone. It must be remembered that the uterus and vagina actually constitute one organ, the muscular connection between the two being very strong and of great importance. Regarding, then, the vagina as a constituent part of the uterine system, it follows that whatever supports the vagina also supports the uterus, and in my estimation the powerful attachment of the vagina to the rami of the pubes is the most important of all the supporting structures of the pelvic floor. The gradual weakening of the round ligaments may result in a partial retroversion; the gradual weakening of the uterosacral ligaments will result in retroversion and partial prolapse; and the gradual weakening of the uterovesical ligaments will result in cystocele and partial prolapse; *but when the vaginal attachment to the pubes gives way, everything falls and procidentia results.*

With this brief summary of the chief supports of the uterus, it is natural to conceive that the most obvious cause for weakening these supports, with the resulting malposition, would be the condition of pregnancy and childbirth, where all the pelvic tissues are profoundly stretched and distorted from their usual position. It is readily apparent that the heavy subinvolved uterus, during the period of convalescence, with

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the patient lying on her back, would have a strong tendency to overcome the damaged elasticity of the ligaments and thus result in permanent displacement. This factor as a causation of retroversion is so obvious and so universally accepted that in making my statistics I have tabulated as a result of childbirth all cases of non-adherent retroversion in women who have borne children. This class of cases of retroversion amounts to 51% and agrees with the generally accepted view that pregnancy and childbirth constitute the most common causes of retroversion.<sup>1</sup>

The second most common cause for retroversion found in my series is pelvic inflammation with the formation of adhesions. These adhesions originate from an infection through the tubes, as is well known, and form most commonly on the posterior surface of the pelvic organs, and have a marked tendency to draw the uterus backward into the posterior cul-de-sac. Not only is the uterus drawn backward by adhesions immediately on its posterior surface, but it is also dragged in the same direction by the adhesions which draw the tubes and ovaries deep into the posterior lateral pockets of the true pelvis. Such a retroversion may take place without the essential weakening of the supporting structures of the uterus, it being less common to find the uterus in the last degree of retroversion, a point which, as may later be seen, would have some bearing on the choice of operative treatment.

Retroversion of this kind constitutes 20% of my series of cases. The causes of pelvic inflammation which bring about this adherent condition of the uterus in a posterior position are, in the great majority of cases, gonorrhea and sepsis following miscarriage.

The third most common cause shown by my statistics is what I should term developmental. The term "congenital retroversion" is one which has long been in use, but is one which is inexact and does not take into account the period of time at which these malpositions take place. The uterus, as I have observed it in a number of dissections of full-term children dead at childbirth, is an unimportant and extremely undeveloped organ. It lies high in the pelvis, and in the cases that I have seen has been pressed and flattened against the sacrum by the pressure of the small intestines, so that conditions of retroversion, antelexion and retrocession, which are ordinarily called congenital, cannot, at this period of life, be considered as existing. The uterus grows slowly during the early life of a child, it being extremely rare that it makes known its existence by either physiological or pathological processes. At the age of puberty, however, ensues a process of extraordinarily rapid development, and it is then that it assumes approximately the size and type of that of

mature womanhood, or else, retarded in its development, either intrinsically or in association with other organs, suffers the malpositions or distortions which are ordinarily designated as congenital. Such malpositions are most commonly represented by permanent antelexion, retroversion and retroflexion, and antelexion combined with retroversion.

The diagnosis of a developmental retrodisplacement is, as a rule, not difficult to make, and this could be done with a reasonable degree of accuracy both by direct examination and by a study of the history and operative findings in the hospital cases that I have investigated. A large number of cases which I have classified as developmental showed unmistakable stigmata of developmental defects; for example, abnormally short posterior vaginal wall, short uterosacral ligaments, together with antelexion and infantile character of the cervix and fundus, short lumbo-ovarian ligaments, bicornate form of the uterus, hypoplasia of one side of the uterus and congenital absence of one ovary, defective growth of the round ligaments and other interesting conditions, which leave no doubt whatever of the real cause of the retroversion. In other cases, where an Alexander's operation had been done, and the condition of the pelvis not recorded, the retroversion was classified as developmental where symptoms of severe dysmenorrhea or sacral backache had existed since the institution of menstruation. The majority of these cases were young women, usually under twenty-five, or young married women who were sterile.

No case was included in this class where there were evidences of adhesions, a point which calls to mind the prevalent belief that the uterus which has been retroverted for a considerable length of time becomes adherent. The falsity of this theory is, of course, apparent when it is considered that there is no more reason for the uterus to become adherent while lying in contact with the peritoneal surface covering the upper portion of the rectum than while in contact with the peritoneal surface covering the upper portion of the bladder. It may be added that in none of the cases to which a developmental origin could be assigned in my series, even where the patient had menstruated for twelve or fifteen years, were there any adhesions.

It is undoubtedly true that some cases of retroversion occur during the period when the uterus is developing, as a result of habitual constipation, or of keeping the bladder distended, a frequent habit among young girls. Such uteri might present no evidence of developmental defect other than a weakening of the ligaments.

I regard the consideration of this developmental type of cases as of very great importance, for it is probably true that many of the so-called acute retroversions which are regarded as so common, belong to this class.

Cases of developmental retroversion constitute 16% in my classification.

The fourth most common cause of retroversion, and occupying 8% in this series, is the displace-

<sup>1</sup> A certain element of error in the classification is unavoidable. For example, a woman with retroversion following childbirth, or one with developmental retroversion, may later suffer from adhesive pelvic peritonitis. In such cases a mistake might be made in assigning the cause for the retroversion. Doubtful cases of this kind did not occur with sufficient frequency to affect materially the final classification.

ment due to pressure of pelvic tumors; for example, ovarian cysts, uterine fibroids, extra-uterine pregnancy and broad ligament tumors. The pressure of these tumors exerts very little effect on the essential supports of the uterus, and it is not infrequent to see the uterus immediately assume its normal former position after removal of tumors, even of long standing. This was seen in one case where I recently removed a large pedunculated fibroid with a twisted pedicle which was growing over the frontal portion of the fundus. The uterus was retroverted backward and to the right, and firmly held there by the tumor above it, which measured six inches in diameter. The size of the tumor proves that the uterus must have been in this position for a considerable number of months at the very least. After the removal of the tumor the uterus immediately assumed a perfectly normal position. In another case where I found an enormous mass of organizing blood clot, the result of an extra-uterine pregnancy, which had existed in the abdomen for five weeks, the uterus, though held in a position of retroversion during all this period, immediately assumed its normal position after removal of the mass in the pelvis.

There is left 4% of cases for which I have been unable to make a satisfactory classification. In a few of them the histories were incomplete. Most of them were unmarried or sterile women between the ages of thirty and forty, who had non-adherent retroversion, but whose symptoms dated back for only a few years. In none of them was there any history of an accident or fall, or an acute onset. In my own opinion they would undoubtedly either fall into the class of developmental retroversion where symptoms were absent, a condition which I have not infrequently noted in young women, or be included among those individuals whom Tuffier has aptly described as possessing a physiological inferiority of tissues. Here the retroversion must be considered as a gradual process similar to floating kidneys or other visceral ptosis.

#### SYMPTOMATOLOGY.

The symptom complex of a typical case of retroversion is so characteristic that it is very frequently possible to make a correct diagnosis from the history alone. A woman who suffers from a constant sacral backache, ovarian pain, dysmenorrhea or profuse menstruation, and who is nervous and constipated, and suffers from frequent headaches, presents the typical history of a patient with a retroverted uterus. No one of these symptoms, however, is pathognomonic of the condition, the most nearly constant being sacral backache, which occurred in 76% of all the cases. This symptom is usually the most prominent and is the one which, as a rule, brings the patient to consult her physician.

The second most common symptom is ovarian pain on one or both sides, more frequently on the left side and occurring in 62% of the cases. Ovarian pain is probably due to a disturbance in

the circulation of the ovary caused by the malposition of the uterus and a certain amount of prolapse of the ovaries, which usually takes place. Microscopically these ovaries are apt to show cystic degeneration of the follicles or subinvolution of corpora lutea. The ovary is usually edematous and is larger and heavier than normal.

Some disturbance of menstruation, though occurring in only 56% of the cases, may, nevertheless, be regarded as one of the cardinal symptoms of retroversion, together with backache and ovarian pain. This symptom also is due to a disturbance in the circulation of the uterus, and must be referred rather to a mechanical obstruction than to a faulty control of the nervous system. In developmental cases the menstrual irregularity is much more constant and usually takes the form of a dysmenorrhea, while in cases caused by childbirth the complaint more often is of too frequent and profuse menstruation, a condition which is the result of a gland hypertrophy of the endometrium.

It is a question whether constipation should be regarded as a cardinal symptom or as a referred symptom due to a general constitutional deterioration resulting from the retroversion. I am inclined to regard many cases of constipation directly due to the influence on the rectum caused by the pressure of a retroflexed fundus. Constipation appeared as a pronounced symptom in 51% of all the histories. Whether this percentage is larger than would appear in the histories of 500 women taken at random who were not suffering from any pelvic trouble I am unable to say, but the fact that 48% of these cases were either cured or greatly relieved by the operation is at least suggestive that many cases of constipation are directly due to the uterine displacement.

Seventy-one per cent gave nervousness as one of the principal symptoms, while a considerable number complained of frequent or constant headaches, usually locating the pain in the back of the head and neck. Many of them complained of headache only at the menstrual periods, and in view of the fact that a considerable portion of those suffering from headaches reported great relief or cure after operation, one should not neglect the consideration of retroversion in diagnosing the cause of headaches among women.

Viewing symptomatology from a general standpoint it may be said that women suffering from retroversion caused by childbirth are far more apt to have the symptom complex, backache being the most prominent, than are those with retroversion from other causes. The most characteristic symptom in inflammatory cases is ovarian pain, while the most characteristic symptom in developmental cases is dysmenorrhea. It is not uncommon to find young women with developmental retroversion having no symptoms whatever.

#### TREATMENT.

A discussion of the treatment of retroversion involves first the question whether it shall be

operative or palliative, and, secondly, if operative, a correct choice of the great number of operations which have been devised for the relief of retroversion. The treatment of the cases in my series having been operative, the question as to its feasibility can be answered by an inquiry into the anatomical and symptomatic results of the operations. Information on this point was obtained by a letter sent to each patient requesting a statement regarding her cure, relief or non-relief from the operation in general, and from the particular symptoms of backache, ovarian pain, menstrual disturbances, constipation and headache. In considering the statistics which I gathered from these letters, it must be borne in mind that only a small per cent of the operations were uncomplicated by other operations performed at the same time, as, for example, laceration of the cervix and perineum, repair or removal of the tubes and ovaries, removal of tumors, the repair of hernias, etc., so that the answer as to whether the patient was cured by her operation does not in all instances imply an answer as to whether she was cured or relieved of the condition of retroversion. Inasmuch, however, as the cardinal symptom of sacral backache occurs in the great majority of cases, the answer to the question of relief or non-relief of that symptom will give approximate information concerning relief or non-relief from the condition of retroversion.

Two hundred and sixty-three patients answered the circular letter in a satisfactory manner. Of this number 86% stated that they were either completely cured or much relieved by the operation. Considering the numerous additional operations, many of them serious ones, which complicated the operation for retroversion, this percentage must be regarded a satisfactory one, and compares favorably with those published from other hospitals. It is interesting to note that those who were entirely cured or much relieved of the symptom of backache amounted to 85%, in comparison with 86% of those cured or much relieved by the operation. This would tend to show that in the great majority of these cases, though complicated as many of them were, the retroversion was the chief cause for suffering on the part of the patient. It is also interesting to note in this connection that the anatomical recurrences of retroversion after the operation, which, as will be seen, I have approximated at 15%, corresponds closely to the percentage of patients who stated that they received slight or no relief from the operation.

Seventy per cent of those having ovarian pain, and 70% of those suffering from some disturbance of menstruation, were either cured or relieved. Forty-eight per cent were cured or relieved of constipation.

With these figures in view and in consideration of the fact that the great majority of retroversion cases are complicated by other surgical diseases any argument as to the comparative merits of treatment by pessaries or tampons is practically out of the question excepting in a few selected cases.

In the days when pessaries were the only available treatment for retroversion of all kinds, Dr. F. H. Davenport was able to accomplish satisfactory results in 31%. Although this shows that such treatment is inapplicable in the majority of cases, it nevertheless proves that pessaries should be still kept as one of the resources of the surgeon, and not be absolutely disregarded.

One must in this connection take into account the danger to life involved in the operative treatment of retroversion. The mortality in this series of cases amounts to 2, one case dying six hours after operation, from heart embolism as shown by autopsy, the other case dying from the unusual condition of general peritonitis caused by the staphylococcus albus. This last case was complicated by the removal of a very adherent appendix. In considering this excellent mortality record it must also be borne in mind that many of the operations were complicated by serious and dangerous pelvic conditions.

#### DISCUSSION OF OPERATIONS.

Having established then the fact that in the great majority of cases operative treatment is advisable, it remains to choose intelligently the best method of surgical procedure. It is said that as many as 52 different operations have been devised for the treatment of retroversion and this large number of operations is frequently presented as a proof of the unsatisfactory results of operative measures.

In order to gain information of value with regard to the merits of the operations employed at the Free Hospital for Women I have tabulated the number of times each operation was performed and have computed a comparative set of percentages which each operation bears to the anatomical failures. I have found, all told, 60 recurrences of retroversion after operation. This constitutes 12% of the entire series. The number has been made up both from a large number of patients whom I have personally examined from eight months to several years after operation and from entries in the hospital records made by other members of the staff. Although the Free Hospital offers very unusual opportunities for following post-operative cases, there are some cases which have never been seen after leaving the hospital, and a certain number of recurrences have undoubtedly been overlooked. With this in view I have estimated that the recurrences have probably amounted to at least 15% of the entire number.

Though numerous methods have been employed by different operators, in my series I have tabulated the results only of those operations which have been frequent enough to furnish statistics of value, and this list includes Alexander's operation, ventro-suspension, ventro-fixation, and internal shortening of the round ligaments. Alexander's operation was performed 191 times with a known recurrence of 13%. Ventro-suspension and ventro-fixation were performed 267 times with a known recurrence of 9%. Internal shortening of the round ligaments was

performed 35 times with a known recurrence of 31%.

Using these figures as an assistance, I shall now attempt to discuss the comparative merits of these operations with a view both to the anatomical derangements which they are capable of repairing and also to their symptomatic results.

*Alexander's operation.*—This operation was originally devised during the days of constant sepsis to avoid the necessity of opening the abdominal cavity, and was in those days, of course, a most ingenious method of avoiding danger to life and served as a great benefit to suffering womankind. Considering now that in the light of our present surgical technic the original danger, to obviate which the Alexander's operation was devised, has been so far removed as to be of little weight, the question arises, "Is the operation a sufficiently satisfactory one?" Thirteen percentage of recurrences, even though it represented the true maximum, is much too high for a surgeon to view with equanimity. This high percentage of recurrences, as I have been able to prove by my personal examinations and by the history of after results, is largely attributable to the factor which constitutes the real defect in the operation, namely, the presence of pelvic adhesions, which were not diagnosed at the preliminary examination. In many such cases, where the adhesions are not particularly dense or where there is an unusual amount of yielding tissue, to which the uterus and adnexa are attached, it is possible to draw the uterus up to a position of comparative normality for a short period of time, but the continual dragging on the back of the uterus eventually overcomes the tension of the recently shortened ligaments and the uterus reverts to its former position often before the patient leaves the hospital. Other objectionable features of the operation are hernias and sepsis. Hernias occur as a result of an unskillful performance of the operation and are sufficiently frequent to make it inadvisable for any inexperienced operator to attempt it. Sepsis in the wounds is shown by the hospital records to be of frequent occurrence and the danger of this complication has not been entirely removed, even in most recent cases performed with every precaution of asepsis.

*Mechanically speaking,* reduced to simple terms, the uterus by this operation is practically suspended to the abdominal wall from its two weakest points. The ligaments themselves are frequently weak and ineffective, even at their uterine attachments, as is often seen in developmental cases, while the inability of even the most experienced surgeon sometimes to find the round ligament in the inguinal canal is a not unfamiliar spectacle. Notwithstanding all these objectionable features, it must be admitted in the cases that I have examined where Alexander's operation has been successfully done the anatomical and symptomatic results have been excellent, so that in selected cases given an easily replaceable uterus and a surgeon with good technical skill the operation may be regarded as a most desirable one.

*Ventrosuspension and ventrofixation.*—It is necessary to consider these two operations in conjunction in this series of operations on account of the indefinite manner in which the two terms have been used. Ventrofixation in the hospital records has been used where the supporting stitch has included the *aponeurosis covering the rectus muscle*, while ventrosuspension is used where the stitch includes the peritoneum alone or the peritoneum and part of the muscle. Strictly speaking, ventrosuspension should be used exclusively when the supporting suture passes only through the peritoneum, including no other structures of the abdominal wall. As a matter of fact, in the majority of so-called ventrosuspensions performed in this series the suture was actually passed through the rectus muscle and peritoneum, and really constitutes more nearly a ventrofixation than a ventrosuspension. As it has been impossible to differentiate exactly between these two procedures, I am compelled to consider suspension and fixation under one category. There were 267 of these operations with a known recurrence of 9%. Notwithstanding the confusion existing between the two terms suspension and fixation, valuable information could be gained from a study of the recurrences as to the most efficient method of fastening the uterus to the abdominal wall. Two thirds of the recurrences in this class of cases are attributable to the method of passing the suture only through the peritoneum, and as this method has been comparatively little used, the recurrences where the suture had passed through the muscle or through the fascia would be reduced approximately to less than 5%, not an ideal, but nevertheless a fairly satisfactory, result.

As a matter of fact there is probably little anatomical difference between a skillfully done ventral fixation and a successful ventral suspension. In each there is an adhesion formed between the fundus of the uterus and the anterior abdominal wall of sufficient strength to hold the uterus forward and maintain it at its physiological level in the pelvis. The stitch itself counts for very little after the adhesion has been formed. The reason that a ventral suspension performed by merely passing a ligature through the peritoneum gives uncertain results, is because the peritoneum may be pulled into a long string without the formation of an adhesion sufficient to hold the uterus to the abdominal wall. However, in many cases such an adhesion does form and the operation remains successful. In passing a suture so as to include the muscle or fascia the formation of an efficient adhesion is much more nearly insured. The danger attending a ventral fixation is of the formation of too dense an adhesion, so as either to immobilize the uterus or to cause dystocia in future pregnancies. The surgeon in attaching the uterus to the anterior abdominal wall should bear in mind possibilities of too weak or too strong an adhesion, and the result of the operation, therefore, depends largely on his technical skill. Where the uterus has been effectively attached to the abdominal wall, symptomatic

results and results in pregnancy in the present series of cases have been excellent.

*Intra-abdominal shortening of the round ligaments.*—This operation was performed thirty-five times and there is a known recurrence of 31%—an extremely bad showing. Various methods were used, the most common one being that devised by Wylie. There has been also a considerable number of these cases which have been examined by me before discharge from the hospital, where the uterus was sufficiently held in a forward position, so that it could not be called a recurrence, but where, nevertheless, there existed a certain amount of sagging in the pelvis, with corresponding symptoms. Fortunately only comparatively few of these operations have been done, the results from them being either symptomatically or anatomically in the great majority of cases bad.

The following case illustrates well the experience with intra-abdominal shortening of the round ligaments, as well as that of ventral fixation.

Mrs. T., age thirty-two, two children, one miscarriage. Operated on Oct. 31, 1899. Removal of dermoid cyst. Wylie's intra-abdominal shortening of the round ligaments. At the time of discharge the uterus was reported as in the first degree of retroversion.

June 5, 1900, the uterus having become entirely retroverted, a second operation of shortening of the round ligaments was performed. The uterus, however, continued to sag, and on Jan. 22, 1901, ventral fixation was performed.

Sept. 14, 1902, the patient had a normal labor.

April 24, 1903, the uterus was in good position.

Having thus reviewed the surgical experience of the hospital in these retroversion cases, it is in order to inquire what lessons may be learned from them. Bearing in mind the fact that the uterus is essentially supported around its middle by a thick diaphragm attached ultimately to the bony walls of the true pelvis, it is obvious that in the great majority of cases there exists some defect in this main central support. It can, in fact, be shown in most cases that besides the backward displacement of the uterus, there is some sagging of the main supports. This is almost universally true in cases due to childbirth, in chronic cases of physiological inferiority, and in a number of developmental cases. It is less frequent in cases due to adhesions, and sometimes entirely absent in cases due to the pressure of tumors. It will therefore be seen that treatment in order to meet the great majority of retroversion cases must overcome this sagging of the diaphragmatic support. In order to solve this mechanical problem it is conceivable that it may be done in three different ways: first, by supporting the diaphragm from below, as is done to a certain extent by the use of pessaries; secondly, by a complicated operation which would restore each essential structure of the diaphragmatic support to its proper function, and, thirdly, by suspending the uterus from above. The first method, namely, that of using a pessary is entirely inefficient, excepting in a few

cases, and can be usually disregarded. The second method of operating on the individual structures of the pelvic diaphragm has been attempted with some success, notably by Bouvé, who dissects out and restores the uterosacral and uterovesical ligaments. Even as complicated an operation as this meets only part of the requirements, and it is inconceivable that in many cases the uterus could be fully and permanently restored to its physiological level in the pelvis.

The reduplication of weakened and stretched-out ligaments is mechanically not an operation to be relied upon, as has been shown by experience in shortening the round ligaments internally, and the reason of this is that the ultimate attachments of these ligaments remain exactly as they did before the operation. These attachments have at one time proved inefficient, and it is reasonable to suppose that when the same forces again work against them the future result may be similar.

There remains then only the method of suspending the uterus from above. The only available point of permanent support is the anterior abdominal wall, and though it seems to be distorting natural anatomical relations to fix the uterus in this manner, nevertheless it has been shown by repeated experience that the abdominal wall is an admirable support to the pelvic organs. The elasticity, strength and plasticity of the abdominal wall make possible the performance of operations by which pelvic organs can be attached to it, even under great tension, without corresponding pain, bladder trouble, or symptoms of any kind, as has been shown by the repeated successful results in the operation of vaginapexy. A uterus firmly attached to the strong and elastic abdominal wall depends no longer on the diaphragmatic support of its center and lower third, and symptoms previously existing by deficiency in this support may be completely relieved. Any operation, therefore, like the internal shortening of the round ligaments which tends merely to restore the uterus to its anterior position, but which does not relieve the diaphragmatic support at all, cannot be expected to attain symptomatic results comparable with some method of attaching the uterus to the abdominal wall.

Having established this premise in our mechanical reasoning, it remains to choose the best method of suspending the uterus from above, and it is a well-known fact that the symptomatic and anatomical results attained by an effective ventrosuspension or fixation are excellent. The objections to this method, however, are, first, the long ribbon of tissue after a ventral suspension causing danger of strangulation of the bowel, and, secondly, evil results obtained in a subsequent pregnancy. The answer to the first objection would be never to perform a ventrosuspension by passing the ligature *only* through the peritoneum, for not only does the retroversion following such a procedure frequently recur, as we have seen in my cases, but it is usually only after such operations that the long peritoneal band of tissue

is formed. The second objection, namely, the danger of dystocia in future pregnancies, is a valid one and one which by no means should be disregarded.

Of the cases, ventrofixation and ventrosuspension, which answered my inquiry as to future pregnancies, 27 reported one or more conceptions, 4 of them being pregnant at the time of reporting. Six of them had miscarried, 1 of these miscarriages being known to have been induced. One reported pain in the lower abdomen during the nine months. One who was pregnant reported pain in the site of the wound. All others reported no trouble, 2 of them saying that they had had less trouble than at previous childbirths. Two had had twins. It will thus be seen that of the 26 cases of ventrofixation, the only difficulties noted were, 6 miscarriages and 2 cases with pain in the lower abdomen during pregnancy, the conception being successful in one of them. This certainly is not a bad record, especially as the percentage of miscarriages corresponds nearly to the accepted percentage of pregnancies in general, namely, 20%. There were in all 48 cases who reported conception after an operation for retroversion. Twenty-six, as we have seen, were after cases where the uterus was attached to the abdominal wall, 22 followed Alexander's operation or internal shortening of the round ligaments. None of these cases had trouble at childbirth. The case which suffered most during pregnancy was one which followed an Alexander's. This case was one whom I examined when she was about four months pregnant. She was suffering intense pain in the two inguinal regions, and though I did not see her again until after the birth of her child, which was successful, she reported that she had spent three months in a hospital suffering greatly from this same pain.

It must be admitted, however, that cases of rupture of the uterus and Cesarean section following fixation have occurred, and the surgeon should bear in mind always that he is taking this remote risk in performing the operation on a woman in the child-bearing period.

It will thus be seen from the foregoing that outside of the intra-abdominal shortening operations the surgical treatment of retroversion has by the methods which have been employed been fairly satisfactory, and with the exception of a mortality of  $\frac{1}{2}$  of 1% there have been no untoward results. During the past year for ordinary cases, where it has been thought advisable to open the abdomen and where adhesions have not been too extensive, or where the pelvic diaphragm has not been too greatly relaxed, the operation usually designated as Mayo's internal Alexander has been very generally adopted at the Free Hospital. The results from this operation give excellent promise. It possesses all the advantages of Alexander's operation and most of the advantages of fixation, without the defects of either.

The operation, as is well known, is a modification of Gilliam's operation and consists in drawing the round ligaments up through the in-

ternal rings and joining them at the middle line of the abdomen above the rectus muscles and below the fascia, thus avoiding the undesirable weakening of the fascial covering which exists in Gilliam's operation.

The technic of Mayo's operation should be carefully observed and is briefly as follows: A median incision is made, the round ligament of the right side is then grasped by a pair of curved clamps at the junction of the middle and outer third. The assistant holding this clamp draws the ligament toward the median line, pulling the peritoneum at the point where the round ligament enters the abdominal wall into the form of a funnel. A pair of curved clamps with narrow blades is then inserted between the fascia and rectus muscle of the right side and pushed directly to the internal ring and down into the funnel of peritoneum, formed by the traction of the round ligament. It is then pushed along the course of the round ligament still underneath the peritoneum and made to grasp the ligament at the point where the other clamp holds it. The ligament is then drawn up through the internal ring and out to the median line under the fascia, the clamp at no time entering the peritoneal cavity. This procedure is then carried out on the left side and after the peritoneal wound is closed in the median line the two ligaments are drawn together over the rectus muscles and united by several interrupted sutures. The operation is a simple one to perform. It has been done many times at The Free Hospital for Women and the results so far have been universally excellent.

To summarize, then, my conclusions, with regard to treatment, I would make the following statement:

In a case where the uterus can be easily replaced and will remain in position and there is no necessity of inspecting the abdominal cavity, Alexander's operation may be recommended. Where it is desirable to open the abdomen and where there are no excessive adhesions and no marked relaxation of the diaphragmatic support, Mayo's internal Alexander is the operation of choice. In cases of many adhesions and marked retroflexion, or with much sagging of the diaphragmatic support, the uterus should be attached to the abdominal wall in a manner so that it will stay, the exact method of attachment being a matter of choice by the individual surgeon, the question of future childbirths never being disregarded. Attachment of the uterus to the abdominal wall by a suture merely through the peritoneum is an inefficient method of ventral suspension. Intra-abdominal shortening of the round ligaments is an inefficient treatment for retroversion.

*Prolapse and procidentia.*—The subject of prolapse and procidentia is so closely related to that of retroversion that it is necessary to mention it in a discussion of this subject. In these cases, as has been pointed out, the pelvic diaphragm has partially or completely lost its integrity as an element of support. It has been shown that the only efficient substitute for this



support is, primarily, firm suspension from above, and that the only available point of suspension is the anterior abdominal wall. In cases of extreme procidentia the operation of vaginapexy, devised by Dr. William H. Baker, the operation of colpo-orrhaphy devised by Dr. Polk and similar ones by Dr. Crile and others, where the vagina itself is fixed to the anterior abdominal wall, have entirely revolutionized the eventual success attending operations on these conditions. This subject is, however, so important as to require special study and is mentioned here chiefly to emphasize the use to which the anterior abdominal wall may be put in supporting the pelvic organs.

### NEURALGIA OF THE SUPERIOR MAXILLARY NERVE.

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#### A PERIPHERAL OPERATION TO REACH THE DENTAL BRANCHES.

NEURALGIA of the trifacial nerve is of common occurrence, but only in the very chronic and severe cases are all the branches involved. For a period, at least, the pain is referred to one of the divisions and, perhaps most commonly, to the superior maxillary nerve. In a small majority of the cases a definite cause may be found, such as some general disease, — malaria, diabetes mellitus, etc., or there may be a definite local lesion, — scar tissue, exostoses pressing on nerves in bony canals, some dental inflammation, an undescended tooth, etc. Occasionally, the exciting cause may be some lesion in a region supplied by branches of the fifth nerve. A definite neuritis may exist. On the other hand, in the great majority of these cases the cause is not evident and on subsequent examination of the excised nerve nothing pathological is found.

This paper will consider only the second or superior maxillary division of the fifth nerve for the purpose of suggesting a method of intercepting the nerve supply of the teeth of the upper jaw when these branches are involved and it is desired to resort to one of the so-called peripheral operations.

*Anatomy.* — The second division leaves the skull by the foramen rotundum to reach the sphenomaxillary fossa. Here are given off several branches, viz., the temporo-malar passing into the orbital fossa to be distributed eventually to the malar and temporal regions, the branches to Meckel's ganglion and the posterior dental nerves. The latter go forward to reach the posterior aspect (zygomatic surface) of the superior maxilla. There are two or three trunks which give off filaments to the gums and adjacent portion of the cheek and then enter the substance of the maxilla, passing through bony grooves and, eventually, through canals to reach the roots of the molar teeth; terminal branches pass forward to help form a plexus with branches of the middle and anterior dental nerves.

The main trunk of the superior maxillary nerve passes through the sphenoidal fissure into the orbit and thence through a bony canal on the floor of the orbit to make its exit at the infra-orbital foramen. Dental branches are given off in this canal. If there are any middle dental branches they pass outward and downward in the wall of the maxilla to reach the bicuspid teeth; if absent, these teeth are supplied from the plexus formed by the anterior and posterior dental nerves. Just before the main nerve emerges from the infra-orbital foramen it gives off the anterior dental nerve which enters a minute canal and passes through the substance of the maxilla to be distributed to the canine and incisor teeth and backward to complete the dental plexus. There may be two minute ganglia on this plexus.

After emerging from the infra-orbital foramen the main trunk terminates in its final branches of distribution, — the labial, nasal and palpebral nerves.

The main trunk of this nerve is readily accessible for a considerable distance into the orbit and, although the anterior dental nerve be cut off, the posterior dental nerves remain intact and through the dental plexus there would still be communication with all the teeth. The desire to intercept all the dental nerves without resorting to the more serious and disfiguring operation of reaching the nerve in the sphenomaxillary fossa was the occasion of devising the method described below.

*Treatment.* — Drug treatment for neuralgia which persists for any considerable period is discouraging. Acute attacks of neuralgia are not uncommon, and these tend to disappear permanently upon the removal of some obvious cause, such as exposure to cold, errors in diet, etc. The cases due to specific organisms disappear under special treatment. But the chronic recurring attacks yield only temporarily to drugs until finally nothing medicinal seems to afford relief. The benefit from electricity is doubtful and rarely lasting, while massage generally does harm. Occasionally some definite local cause is discovered, such as a lesion in the nose, pressure on a nerve trunk, or disease of the teeth, and the removal of such cause is followed by permanent relief.

In the majority of cases, however, no cause can be found, and eventually no drug treatment gives relief. The suffering is so intense that the patient consents willingly to surgical intervention and some sort of an operation is the ultimate outcome.

There are two general types of operation, the peripheral and the central. The former has to do with excision of some portion of the main trunk or its branches distal to the foramen rotundum; the latter is an intracranial operation whereby the nerve trunk and a part or the whole of the gasserian ganglion are removed.

There are several methods of approaching the nerve at the infra-orbital foramen so as to remove more or less of the main trunk, even as far back as the sphenomaxillary fissure. All these methods destroy the anterior dental nerve, for this is given off just before the main trunk leaves this foramen, but none of these superficial operations