MODIFIED PARTIAL COLPOCLEISIS OF KAHR IN THE TREATMENT OF VARIOUS DEGREES OF UTERINE PROLAPSE IN THE ELDERLY WITH PROHIBITIVE ANAESTHETIC RISK: AN ALTERNATIVE TO RING PESSARY.

PAUL JOSEPH BARTOS

M.MED. PART III DISSERTATION (OBSTETRICS & GYNAECOLOGY)

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

UNIVERSITY OF CAPE TOWN

AUGUST 1989

INDEX PAGE NO.

INTRODUCTION 1

THE CONCEPT OF PELVIC SUPPORT ANATOMY AND FUNDAMENTALS IN THE UNDERSTANDING OF THE ETIOLOGY AND PATHOPHYSIOLOGY OF VARIOUS DEGREES OF UTERINE PROLAPSE, WITH A VIEW OF SURGICAL REPAIR BY THE PARTIAL, THAT IS NON-LE FORT COLPOCLEISIS 3

MATERIALS AND METHODS 15

RESULTS 26

Comparison table of Le Fort colpocleisis experience in Groote Schuur Hospital 31

DISCUSSION 33

Review of other surgical techniques in the treatment of various degrees of uterine prolapse including procidentia with an exclusion of vaginal hysterectomy 50

CONCLUSIONS AND FURTHER STUDIES 64

ACKNOWLEDGEMENTS 67

FIGURES 68

REFERENCES 90

INTRODUCTION

The management of various degrees of uterine prolapse especially that of procidentia in the elderly patient who is at prohibitive anaesthetic risk, remains a serious problem (Ball, 1963; Dewhurst, 1986; Krige, 1965; Ranney, 1981; Stallworthy, 1971).

Even with current anaesthetic and surgical techniques there are certain limitations regarding the extent of surgical correction (Bloch, 1987; Krige, 1965; Langmade, 1986; Martius, 1982; Williams, 1968). Vaginal hysterectomy with anterior repair, enterocoele repair and possibly posterior repair is the most acceptable operation to treat all degrees of genital prolapse. However, because of various complications this operation is not justified in elderly patients who are prohibitive anaesthetic risks (Douglas, 1954; Havas, 1967; Langmade, 1986). According to our records in the Department of Obstetrics and Gynaecology, University of Cape Town, the patients with various degrees of uterine prolapse who are serious anaesthetic risks are invariably fitted with a ring pessary. It is our experience, which is consonant with the literature, that some 25% of these patients are considered pessary treatment failures (Langmade 1986; Russell, 1961). In addition, a further approximate 20% can be considered marginal failure due to general unhappiness about the treatment (Williams, 1968). Activities of these patients are restricted for various reasons. The possibility of colpocleisis is thus a valid one and can be offered to them under saddle block or

local anaesthesia. There are two types of colpocleisis in the literature, namely total (Falk, 1955; Goldman, 1981; Hanson, 1969; Le Fort, 1877) and subtotal (partial) (Kahr, 1937; Labhardt, 1932; Langmade, 1986; Massenbach, 1965). In 1986 the Licensing Board of American College of Obstetricians and Gynaecologists recommended that some form of subtotal colpocleisis should be a procedure of choice on these patients and the total colpocleisis of Le Fort in its original form should be abandoned (Langmade, 1986). This is because there are clear advantages in performing a partial colpocleisis as opposed to the widely used Le Fort procedure (Langmade, 1986). These include the decreased incidence of stress incontinence, zero mortality rates, a minimal failure rate, short operating time, minimal blood loss and thus minimum morbidity.

Because of its simplicity, we have chosen the partial colpocleisis technique of Kahr of Vienna (Kahr, 1937).

The objectives of our study were, firstly, to identify a group of patients eminently suitable for this procedure on the basis of history, examination and special investigations. Secondly, to compare the Le Fort total colpocleisis to subtotal colpocleisis of Kahr. This comparison is judged against the background of a full review of the literature (1932 - 1989). Thirdly, to investigate the effect of this operation on urodynamic function, namely voiding difficulty, urinary retention associated with cystocoele and production of stress incontinence. The literature has not addressed this problem or its correction

by Kahr colpocleisis. Therefore, the correction of stress incontinence will also be documented and discussed on our group of 6 patients so far operated by this method.

THE CONCEPT OF PELVIC SUPPORT ANATOMY AND FUNDAMENTALS IN THE UNDERSTANDING OF THE ETIOLOGY AND PATHOPHYSIOLOGY OF VARIOUS DEGREES OF UTERINE PROLAPSE, WITH A VIEW OF SURGICAL REPAIR BY THE PARTIAL, THAT IS NON-LE FORT COLPOCLEISIS

It was long assumed that as a result of evolutionary events the human pelvis represented the pelvis of the quadruped after a simple 90% rotation. Closer study, however, reveals that many additional modifications have occurred that assure appropriate function and protection for the pelvic viscera (Nichols, 1983).

(A) Bony skeleton:

It is notable that although the pelvic girdle of other mammals is a uniformly cylindrical ring, carried at right angles to the axis of the vertebrae, in man it is funnel-shaped and meets the vertical axis of the vertebral column at the angle of 45^{o}. The pelvis has been able to partially maintain its horizontal position because the vertebral column above has acquired the compensatory lumbo-sacral curvature. The single most effective structural modification has been the shortening of the caudal skeleton and its incorporation into the pelvic floor as the relatively rigid coccyx. Finally, only in the human does one find the blades of the iliac bones turned both outwards

and upwards in a manner which firmly supports the contents of the iliac fossae, transmitting these forces down the columns of the lower extremities and away from the central cavity (Nichols, 1983).

(B) Musculature:

The detailed knowledge of the evolution and anatomy of the pelvic musculature is important in understanding the concept of partial colpocleisis (Langmade, 1986). Four pairs of muscles originate on the inferior circumference of the bony girdle, with fibres running centripetally and edges slightly overlapping from back to front, are inserted into the coccygeal sacrum or its continuation as a firm tendineous raphe extending to the anal sphincter.

The resultant so-called levator plate provides an effective hammock which occludes all the outlet area except for a narrow slot between the puborectalis and iliococcygeus components and immediately under the symphysis pubis (Figure 1). It is significant that the same paired muscle sets are found in the quadruped emerging through the outlet and inserting into the root of the tail as the iliosacralis. Here, their action controls the position of the tail which is fully mobile. In the human with disappearance of the tail and loss of mobility in its remnant, one would expect that these muscles would be atrophic or vestigial. In actual fact the reverse is true. The human levatores ani are bigger, thicker, stronger and more powerful structures then their evolutionary antecendants and provide the support

of the pelvic outlet. The urinary, faecal and generative tracts as they emerge upon the skin are crowded forward into the slot between the levatores. In the erect posture this would present an area of diminished resistance and potential herniation, were it not additionally reinforced by a structure unique to the human, the urogenital diaphragm (Figure 2). This is a triangular platform of fascias and muscles, two sides of which attach firmly to the inferior pubic rami from symphysis to the ischial tuberosities.

Penetrated in the male only by the urethral canal, it successfully closes off the last area where bulging could occur. In the female it provides a passage for the vaginal canal. It is notable that two muscles of the urogenital diaphragm are used in the subtotal colpocleisis procedure, namely the bulbocavernosus and transverse perinei muscles. The vagina represents a potential site for herniation and this potential is enhanced by vaginal enlargement resulting from parturition and coitus. The passage of a hollow viscus through the urogenital diaphragm creates the problem of how to minimise to and fro bulging, through the apperture around the perforating viscus. Wherever this anatomic dilemma presents a serious threat in the human body, the anatomic solution has always been the same: (Krige, 1965; Langmade, 1986; Ranney, 1981) the viscus penetrates the barrier at an angle so oblique that pressure exerted at the superior end cannot impinge on the orifice at the inferior end of the tunnel. Remarkably, the same solution seems to have been developed in the human pelvis, for under normal

circumstances the apex of the vagina is found well banked in the hollow of the sacrum and the axis of the vagina is almost parallel with the plane of the levator plate. This concept of the appropriate vaginal angulation (170^{o}) is fundamental in understanding the pathology of procidentia and the surgical repair in cases of procidentia (Labhardt, 1932; Nichols, 1970).

However, confusion and disagreements often arise because concepts and definitions vary as to what precisely constitutes the normal state. It is stressed that the gynaecological surgeon must first clearly understand what the normal relationships are, the extent of the individual variations and the changes to be expected as a result of ageing of the tissues. The anatomy of the living differs considerably and significantly from the relationships in the anaesthetised patients, relationships which differ still further from those readily observed in the embalmed cadaver. Many surgical reconstructions have been planned in the past with the objective of recreating what has been visualised in terms of restoring the anatomy of the cadaver. Furthermore, the standard text books of anatomy provide extensive descriptions based on but a small number of dissections (Martius, 1982; Nichols, 1983).

1. Pelvic floor:

The levator ani (Figure 1) is composed of the three parts, named according to the origin and insertion of each. The medial and anterior division is the pubococcygeus. This is

the muscle used in subtotal colpocleisis. From the clinical point of view the pubococcygeus is the most significant component of the levator ani. Taking origin from the deep surface of the pubis about 1 to 1,5cms on each side from the symphysis, the fibres sweep downwards and posteriorly around the urethra and vagina, where it causes an angulation. It is inserted into the perineal body. The puborectalis angulates the rectum (Figure 3(I) and 4). There are clinically significant attachments to the connective tissue along the sides of the urethra, the vagina, rectum and the deeper portions of the perineal body. There appears to be considerable variation in the strength and integrity of these attachments (Martius, 1982; Nichols, 1983). The other part of the levator ani is the iliococcygeus which often is convex in shape rather than concave. The result of pressure from fat within the ischiorectal fossa is to push the soft, yielding belly of the muscle upwards and medially. When as a part of massive weight reduction, loss of ischial rectal fat occurs, the under support of the pelvic diaphragm is thus removed predisposing toward sagging of the levator muscle tipping of the levator plate and subsequent genital prolapse (Nichols, 1983).

2. The perineal muscles as a part of urogenital diaphragm (Figure 2):

The deep transverse perineal muscles arising from the inferior surface of the ischia are enclosed within the layers of the urogenital diaphragm. The presence of the vagina interrupts the extent of their development in

contrast to the male and only a few fibres cross the line between rectum and vagina. The superficial transverse perineal muscles arise from the pubic rami and attach both to the perineal body and the portion of the external anal sphincter. Again, this muscle is utilised in the subtotal colpocleisis. The internal anal sphincter is the lower border of the inner circular smooth muscle of the rectum and is of secondary importance in control of anal continence. The external anal sphincter is divided into three parts. The subcutaneous portion is continuous with fibres of the bulbocavernosus.

3. The concept of perineal body (Figure 3:IV):

Subject to marked individual variations in tone, thickness and composition, the perineal body may be likened to the hub of a wheel to which various supporting structures attach like a spoke: the superficial and deep transverse perineal, the bulbocavernosi, the external sphincter ani and some fibres of the levator ani, together with anterior and posterior attachments to the smooth muscle fibres in the wall of the vagina and rectum. Some of these muscles are utilised in the subtotal colpocleisis operation. With its two fold origins, it is apparent that there can be genetically determined variations in strength of either the cranial or caudal division of the perineal body, or both, and these differences may help to determine the noticeable ethnic differences in the severity as well as the types of genital prolapse. Ethnic differences occur because of difference in connective tissue (Geldenhuys, 1950; Heyns,

1956). The large amount of smooth muscle within the perineal body provides it with physiological characteristic of tone, when this characteristic has been lost, as occurs with unrepaired perineal lacerations, the supportive value of the perineal body is reduced or lost and the vaginal outlet becomes physiologically unstable. Normally, the caudal or superficial portion of the perineal body, by its attachment to the superficial perineal muscles, becomes fixed to the ischial tuberosities and is further fastened by its attachment to the bulbocavernosi which are utilised in the subtotal colpocleisis. Superficially the posterior pyramid of the perineal body is attached to the Colles fascia. The medial margins of the pubococcygeal muscles are in contact with the lateral surfaces of the perineal body at the border between its distal and proximal divisions.

(C) The cardinal and uterosacral ligament complex (Figure 3:II):

These ligaments are condensations of the pelvic fascia and serve to hold the cervix and upper vagina above the levator plate.

The connective tissues contain many smooth muscle fibres. Strands of this connective tissue become condensed and longitudinally orientated in the direction of a force applied to them. The uterosacral ligaments attached to the posterolateral aspect of the cervix at the level of the internal os, are also attached to the lateral vaginal fornices. There is much individual variation in the thickness and strength of these ligaments and they do

increase in prominence when tension or traction is applied to them. Histologically, the anterior and cervical third of these ligaments contain in order of prominence smooth muscle, fibroelastic connective tissue, blood vessels, sympathetic and parasympathetic nerves and lymphatics (Last, 1978).

(D) The concept of the vaginal axis

The vaginal depth and axis are maintained as a result of multiple but varying anatomic support along the length of the vaginal walls (Nichols, 1983; Nichols, 1970). The lower third is supported predominantly by fibrous attachment to the pelvic diaphragm, eg. levator ani, urogenital diaphragm and perineal body. Support of the middle third is by lateral fusion with fibres in the pelvic diaphragm, but even stronger lateral support is obtained by attachments to the inferior portions of the cardinal ligaments. The upper third of the vagina is adjacent to the rectum which in turn rests on the levator plate. The upper vagina and cervix are as a unit maintained in position anterior to the levator plate by their lateral attachments to the cardinal and uterosacral ligaments. Normally the walls of the vagina do not maintain a vaginal cavity or lumen but remain in aposition while in a relaxed state. Since the sidewalls of the vagina are suspended by attachment to the paravaginal connective tissues from which their blood supply is derived, the relaxed vagina tends to assume a H-shape throughout its central portion (Figure 3:III). The muscle fibres primarily orientated in a longitudinal direction become noticeably

circular to the periphery. This knowledge is also utilised in the initial U-shape incision of subtotal colpocleisis. The vagina is normally narrower in the lower third where it tends to be constricted laterally by the adjacent portions of the levator ani (Last, 1978; Nichols, 1983) (Figure 4). Embryologically, the vaginal fornices are of paramesonephric origin. The lower two-thirds of the vagina are derived from urogenital sinus and its outgrowths, the sinovaginal bulbs (Sandler, 1985).

(E) Connective tissue planes and spaces (Figure 5)

There are 6 connective tissue plains and spaces. These are:

the prevesical space

paravesical space

pararectal space

vesicovaginal space

rectovaginal space

retrorectal space

With respect to the partial colpocleisis, the rectovaginal space and cleavage plane are of particular importance to us. The rectovaginal septum is a distinct, strong, fibromuscular, elastic tissue layer fused to the undersurface of the posterior vaginal wall muscularis and forming the anterior border of the rectovaginal space.It was described by Tobin and Benjamin as the anterior layer of Denonvilliers fascia which forms capsule of prostate in male (Sandler, 1985). Embryologically it consists of two fused layers of peritoneum and is subject to wide individual

variations in size, strength and consistency. It is normally formed by the 14th fetal week (Sandler, 1985). In its fresh state it is translucent and in a coronal plane parallels the sacral curvature. It also curves postero-laterally to become indistinctly fused with the parietal endopelvic fascia. The rectovaginal septum extends from the inferior margin of the Pouch of Douglas to the superior point of the perineal body. It is a fixation point for the upper or proximal border of the perineal body. Histologically the septum consists of a fibromuscular elastic layer of dense collagen. The functional independence of the posterior vaginal wall from the anterior rectal wall depends upon maintenance of the relatively avascular midline rectovaginal space which permits the two organ walls to slide over one another with considerable independence. The anterior wall of this space is formed by the rectovaginal septum.The rectovaginal space is in the midline between the recto-vaginal septum which is attached to the posterior vaginal wall and the fat covered rectal adventitia. The lateral walls are separated from the pararectal spaces by a descending rectal septum on each side. The roof is the peritoneum of rectouterine peritoneal pouch of Douglas and the inferior margin of this space is the perineal body. The rectovaginal space ends where the levator ani muscles are attached to the cranial portion of the perineal body. This coincides with the caudal end of the fascia of Denonvilliers at the point at which it is attached to the perineal body. The relative freedom, according to Nichols (1970), with which the vaginal wall can move independently of both

bladder and rectum undoubtedly facilitates the segmental type damage important in the pathophysiology of prolapse (Nichols, 1983).

(F) Applied anatomy in relation to genital prolapse - a surgical point of view:

The main deficiency in the usual anatomic or morphologic classification of degrees of genital prolapse is that such a classification does not take into account the significant differences in etiology of the prolapse (Martius, 1982; Nichols, 1983). Basically, genital prolapse falls into one of two groups:

(a) Inversion of the upper vagina

(b) Inversion of the lower vagina

These may occur separately or together either simultaneously or at different times. The upper vagina may become gradually inverted within itself. There is usually an enterocoele present (Ranney, 1981) and often some degree of cystocoele, but an accompanying rectocoele is uncommon while the pubic and urogenital diaphragm generally remains intact. Since the damage is anterior to the rectum, rectocoele is usually not present even though the cul de sac is being pulled downward to produce a traction type enterocoele. Vaginal eversion results from loss of support of the lower vagina especially from damage to the pelvic and urogenital diaphragms. There is a third possibility, when these two conditions could be observed simultaneously in which case the vagina will be inverting above and everted inferiorly. Which of these two mechanisms is dominant or initial one,

selecting cases for partial colpocleisis, as the so-called anterior segment damage or so-called telescopic prolapse seem to be the ideal types for this procedure as opposed to the posterior segment damage. The concept of segmental damage was mentioned by Krige (1965) and promoted by Nichols and Randall (1983). It is a useful one in assessment of the patient for the partial colpocleisis. Procidentia with inversion of the upper vagina may permit the entire uterus and much of the bladder to protrude outside the introitus, with coexistent enterocoele along which these structures may slide (sliding hernia) (Ranney, 1981). Such a condition, especially involving the bladder, may be called primary anterior segment damage and often results from chronically increased intraperitoneal pressure or during the first stage of labour it may be the result of long bearing down or attempted delivery before full dilatation of the cervix. Anterior segment damage per se does not include damage to the levator ani or its sheath, which is very important as these structures would be utilised in the partial colpocleisis.

MATERIALS AND METHODS

Selection of patients

Six patients in the age group of 66 - 86 years had the Kahr subtotal colpocleisis with the Martius modification. Those patients who were considered a pessary failure fulfilled one of the following criteria.

1. Recurrent prolapse/repeated displacement of pessary.
2. Repeat complaints of irritation and pain.
3. Recurrent ulceration/infection
4. Immobilised patient due to a psychological fear of the prolapse and unhappiness about the numbers of check-ups and transport problems.

Additionally, the patients were evaluated by senior anaesthetists and were assessed as having a prohibitive anaesthetic risk. The following special investigations were performed:

Urine Microscopy and Papanicolaou Smear

Full Blood Count and Erythrocyte Sedimentation Rate

Electrolytes and Random Blood Sugar

Urea and Creatinin

Electrocardiogram

Bedside Urodynamic Investigations:

1. Cystometrogram
2. Bladder Capacity
3. Residual Urinary Volume
4. Assessment of Voiding Function

The anaesthetist determined whether the patient would

be suitable at least for saddle block or whether the local infiltration only was to be used.

TABLE I

PATIENT	1	2	3	4	5	6
Age	66	86	73	77	77	76
Type of Prolapse	Uterine Cystocele Rectocele	Uterine Cystocele	Uterine Cystocele	Uterine Cystocele	Uterine Cystocele	Uterine Cystocele
Parity	6	2	1	0	12	2
Degree of Prolapse	3^{o}	2^{o}	1^{o}	3^{o}	1^{o}	1^{o}
Duration of Prolapse	4 years	3 years	2 years	1 month	1 month	2 years
Decubital Ulcers	Yes	No	No	No	No	No
Spotting and Discharge	Yes	No	No	Yes	No	No
Preoperative Urinary Tract Infection	Yes	No	No	Yes	No	No
Stress Incontinence	No	No	No	Yes	Yes	No

The age range was 66 - 86 years. The average age being 75.8 years. The parity range was 0 - 12 with mean of 3.8. Three patients had first degree prolapse, one patient second degree prolapse and two patients third degree prolapse. The duration of prolapse was between 1 month to 4 years, the mean duration being 1.9 years. Only one patient had a decubital ulcer and two patients had stress incontinence. Additionally, we found that half of the patients were widows, two patients were never married. The one patient who was married, had a disabled husband who was bedridden, a severe cardiac

and hemiplegic. None of the patients had been sexually active for many years.

TABLE II: Effect of Pessary Application and reasons for failure:

PATIENT	1	2	3	4	5	6	TOTAL
Recurrent Prolapse Repeated Displacement of Pessary	YES	YES	NO		YES	NO	3
Repeated Complaints of Irritation and Pain	YES	YES	YES		YES	YES	5
Recurrent Ulceration and Infection	YES	NO	NO		NO	NO	1
Immobilised Patient due to Psychological Fear of Prolapse	YES	NO	NO		NO	NO	1
Unhappiness about the Number of Check-ups and Transportation Problems	YES	NO	NO		NO	YES	2
Voiding Difficulties	YES	YES	YES		NO	YES	4
PESSARY DIAMETER IN MM	90MM	68MM	85MM	-	85MM	80MM	AVERAGE 82MM

The most common feature was the irritation and pain caused by the ring pessary. Five out of six patients complained about this. The second most common problem were voiding difficulties - four out of six patients had severe voiding difficulties. Three patients complained of recurrent prolapse despite having ring pessaries and two out of six patients complained that the number of check-ups and transportation were a considerable problem. The mean size of the ring pessary was 82mm. Patient No. 4 was a schizophrenic and could not tolerate insertion of pessary. Indeed, urodynamic investigations could not be carried out on this patient for the same reason.

TABLE III: The patients' characteristics according to underlying disease:

PATIENT	1	2	3	4	5	6
Cardiac	Yes	Yes	Yes	Yes	Yes	Yes
Diabetic	Yes	No	No	No	No	Yes
Hypertensive	Yes	Yes	Yes	Yes	Yes	Yes
Malignant Tumour	No	No	Yes	No	No	No

All the patients had severe degrees of cardiac disease, all had severe hypertension, two out of six patients were non-insulin-dependent diabetics and one patient had metastatic breast disease which was apparently static over the past 6 months.

TABLE IV: The characteristics of the patients according to the special investigations:

PATIENT	1	2	3	4	5	6
FBC	Normal	Normal	Normal	Normal	Normal	Normal
ESR	60	18	15	12	10	18
CEUG	Abnormal	Normal	Normal	Normal	Normal	Normal
ECG	Chronic Ischaemic Changes	Left Cardiomegaly	Normal	Chronic Ischaemic Changes	Chronic Ischaemic Changes	Chronic Ischaemic Changes
CXR	Normal	Cardiomegaly	Metastatic lesion in 6th left rib	Chronic Bronchitis	Left ventriculomegaly	Cardiomegaly
MSU	Urinary Tract Infection	Negative	Negative	Urinary Tract Infection	Negative	Negative
PAP	Normal	Normal	Normal	Normal	Normal	Normal
VDRL	Negative	Negative	Negative	Negative	Negative	Negative

Five out of six patients had abnormal electrocardiograms and chest X-Rays. Two patients presented with pre-operative urinary tract infection and all patients had a normal Papanicolaou smear and negative VDRL. The range of Erythrocyte Sedimentation Rate was 10 - 60mm/1hr. The severity of these disease processes is reflected in the results. These factors, as well as the clinical status resulted in the consultant anaesthetist refusing general anaesthesia (and in the patients No. 2, 4, 5, 6 even a saddle block was being contraindicated).

FBC = Full Blood Count

CEUG = Creatinine, Electrolytes, Urea and Random Blood Sugar

ECG = Electrocardiogram

CXR = Chest X-Ray

MSU = Midstream Urine

Pap = Papanicolaou Smear

ESR = Erythrocyte Sedimentation Rate

VDRL = Venereal Disease Research Laboratory

TABLE V: The pre-operative characteristics of the patients according to bedside urodynamic investigations:

PATIENT	1	2	3	4	5	6
Stable/Unstable Bladder	Stable	Stable	Stable	Stable	Stable	Stable
Bladder Capacity	390ml	390ml	350ml	400ml	380ml	350ml
Stress Incontinence Demonstrated	No	No	No	Yes	Yes	No
Voiding Difficulties	Severe	Severe	Severe	Not known	No	Severe
Residual Urine	80ml	40ml	90ml	15ml	20ml	25ml

All patients had stable bladders on bedside cystometrogram using water column in a CVP line. The average bladder capacity was 361ml. Four out of six patients had severe voiding difficulties and they were practically unable to void without mechanical repositioning of the prolapsed uterus and bladder. The situation of patient No. 4 could not be established as she was a schizophrenic and uncooperative. The average residual urine volume was 45ml. Two out of six patients had mild stress incontinence on full bladder which was demonstrated.

Description of Surgical and Anaesthetic Technique

Kahr Partial Colpocleisis (Figure 9 (I - IV)):

We used two types of anaesthetic in our group of six patients. We either used the saddle block which was administered 20 minutes before the operation by an anaesthetist using a heavy lignocaine solution consisting of 5% lignocaine and 150mg of 10% glucose. One ml of the solution was administered. The patient was subsequently put into lithotomy position. Patients No. 2, 4, 5, 6 had local anaesthesia. The local anaesthesia was administered while the patients were in the lithotomy position after a routine preparation for the vaginal

operation. Fifteen ml of 1% lignocaine were used via three infiltration routes. Route 1 was in the midline in the fourchette and the next two routes were half the way up bilaterally on the inside of the labia minora into the vagina. This infiltration high up on each side of vaginal introitus and posteriorly towards the external urethral orifice, is necessary for achieving good infiltration of upper parts of pubococcygeus muscle, which is to be dissected. A 15ml of Ornipressin (POR 8; Sandoz) solution (5 i.u. in 30ml of normal saline) was administered to all patients via the same infiltration routes as mentioned above. The patients who had local anaesthesia were also sedated with 3mg of Midazolam intravenously.

An U-shaped incision was made in the border between the labia majora and minora commencing at a point just below and lateral to the urethra and extending into the fourchette (Figure 9(I)). This incision was made bilaterally. The area was denuded from the vaginal wall by a sharp dissection. Great care was taken to preserve the rectovaginal fascia adjacent to the denuded vaginal wall. Thus a sharp dissection was used slightly deeper than is usual for routine posterior colporrhaphy. (The fascia is very important for healing of the vaginal wall which is sutured by a purse string suture). The dissection was extended for about 4cms into the vagina and we incorporated the principle of Martius modification of the Labhardt colpocleisis (Massenbach, 1965) in that we performed very high horizontal dissection almost on the level of the external urethral meatus. This enabled us to expose the levatores very high up. The operation at

this stage resembled possibly a beginning of a total colpectomy. However, at this stage the denuded vaginal wall is lifted up towards the symphysis and a purse string suture using Chromic Catgut No. 1/0 is utilised (Figure 9(II)).

This suture involves only vaginal investing fascia and the needle does not go through the whole thickness of the vaginal wall. Subsequently, the musculature of the pelvic floor and urogenital diaphragm sutures is utilised in this order: the levatores muscles are brought to the midline by interrupted sutures as high up as possible (Figure 10) and also the levatores lying more below. Then the bulbocavernosus muscles are brought to the midline by interrupted sutures (Figure 9(III)). The muscle sutures are completed by the suturing of superficial perineal muscles. (All sutures Vicryl No. 1/0). The purse string suture which was left clamped on the artery forceps, in order to avoid undue tension, was tied up at this stage.

Finally, the skin was sutured by interrupted sutures of Vicryl 1/0 (Figure 9(IV)). The result of the procedure was a pencil size vagina just beneath external urethral orifice. The length of the vagina was 40% shortened and natural angulation of the vagina was not only restored, but in fact grossly exaggerated. The uterine cervix is consequently supported in a very high position.

RESULTS

The results were evaluated according to intraoperative, postoperative and follow-up data. These parameters were obtained during the operation, hospitalisation and on discharge including assessment of the urinary function. The patients were re-evaluated at 6 weeks after the operation and afterwards at 3-monthly intervals. They were interviewed about the effects of the operation on their lifestyle, quality of life in general and urinary problems.

I. The intraoperative parameters:

TABLE VI:

PATIENT	1	2	3	4	5	6
Type of Anaesthesia	Saddle Block	Local Anaes.	Saddle Block	Local Anaes.	Local Anaes.	Local Anaes.
Blood Loss	20ml	20ml	20ml	15ml	15ml	15ml
Duration of Operation	25min	24min	32min	19min	18min	19min

Saddle block anaesthesia was used in only two out of six patients reflecting the severity of the concomitant medical disease in the remainder. The mean duration of the operation was 22 minutes. The operative time for the patients who had local anaesthesia includes the time spent on infiltration. The average blood loss was about 18ml. The amount was estimated according to the number of Raytex swabs checked by the anaesthetist and the author independently.

II. The postoperative characteristics:

TABLE VII:

PATIENT	1	2	3	4	5	6
Day of Discharge	4	4	4	4	4	4
Pyrexia	No	Yes	No	No	No	No
Urinary Tract Infection	No	Yes	No	No	No	No
Perineal Haematoma	No	No	No	No	No	No
Duration of Catheterisation	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs
Effect on Prolapse	Asymp-tomatic	Asymp-tomatic	Asymp-tomatic	Asymp-tomatic	Asymp-tomatic	Asymp-tomatic
Mobility of the Patient	Imme-diate	Imme-diate	Imme-diate	Imme-diate	Imme-diate	Imme-diate
Vascular Complications	No	No	No	No	No	No
Voiding Difficulties	No	No	No	No	No	No
Retention of Urine	0ml	0ml	5ml	0ml	0ml	0ml
Stress Incontinence Subjectively	No	No	No	No	No	No

All the patients stayed for 4 days because the week-end followed immediately after the operating day. The excellent mobility of all patients immediately after the operation was striking. All of the patients had a full lunch immediately after the operation and were able to walk and sit. In view of the novel nature of the procedure with consequent necessary evaluation, a conservative policy of discharge was followed. As experience grew, immediate discharge became a reality. Five of the six patients remained afebrile. One patient had documented urinary tract infection after removal of her catheter. Prophylactic antibiotics were not used pre-operatively for

urinary tract infection prevention per se. Though one patient had prophylactic antibiotics due to aortic valve disease and two patients had antibiotics for documented urinary tract infection pre-operatively. The catheter was removed the following day after the operation, eg. after 24 hours. None of the patients showed any signs of perineal haematoma and all patients were asymptomatic with reference to the operation. No vascular complications were noticed. The four patients who previously exhibited severe voiding difficulties had no voiding difficulties on discharge. Those without voiding difficulties preoperatively remained so except one patient who had a residual volume of 5ml. The rest of the patients had 0ml residual volume. Two patients with previous stress incontinence denied any stress incontinence on questioning at the time of discharge.

III. Follow-up data:

TABLE VIII:

PATIENT	1	2	3	4	5	6
Length of Follow-up	14mths	4mths	7mths	5mths	2mths	2mths
Voiding Ability	Good	Good	Good	Good	Good	Good
Stress Incontinence	No	No	No	Not known	No	No
Effect on Prolapse Subjectively	Asymptomatic	Asymptomatic	Asymptomatic	Not known	Asymptomatic	Asymptomatic
Healing	No complications	No complications	No complications	No complications	No complications	No complications
Improvement in Lifestyle	Yes	Yes	Yes	No	Yes	Yes

The range of the follow-up was 2 to 14 months. Five of the six patients reported markedly improved lifestyles. They were asymptomatic regarding prolapse and had no voiding difficulties whatsoever. No satisfactory history was obtained from patient No. 4, the schizophrenic and mentally retarded patient, though the effect of the operation was very much welcomed by the attending personnel in the Psychiatric Institution where she was hospitalised. All of the patients showed excellent healing and there was no documented infection.

The two patients with previous documented stress incontinence were still subjectively asymptomatic.

IV. Comparison of the study group was made with a retrospective analysis of Le Fort procedures at Groote Schuur Hospital 1975-1988. Thirty two such procedures had been carried out, but in only 11 patients were the hospital records obtained, many of the older records having been destroyed

TABLE IX:

Number	11 patients
Severe Underlying Disease	9 cardiacs and hypertensives
Stress Incontinence	4
Voiding Difficulties	unknown
Preoperative Urodynamic Investigations	not done
Type of Prolapse	7 procidentia 4 1^{o} - 2^{o} of uterine prolapse and cystocoele
Previous Pessary Treatment	5
Type of Anaesthesia	6 spinal 5 general
Duration of Operation	34 minutes (range 27 - 40 min.)
Stress Incontinence at 6 Weeks Postoperatively	4 previous patients subjectively worse 1 new stress incontinence
Failure Rate	1 (recurrence of a large cystocoele).

In general, the hospital records were deficient, not allowing an adequate comparison. Some of the characteristics were similar to our group, eg. severity of underlying disease. It is of note that the patient with recurrence had one of the shortest operating times. Also of note is that those patients with stress incontinence were subjectively worse postoperatively and there was one new case. The

duration of the operation was significantly less in comparison with the literature (Hanson, 1969). No local anaesthesia was used. Because of the small numbers, one patient with a treatment failure might not be statistically significant. Further conclusion about urodynamic function cannot be made as these tests were not performed. It is possible that stress incontinence and voiding difficulties were not considered to be a priority.

DISCUSSION

Three questions are important to the practising gynaecologist.

1. How frequent is the problem of uterine prolapse in the elderly?
2. How serious is it?
3. How long is this patient expected to live?

Quinlivan (1964) assessed the gynaecological findings in elderly women, in reviewing over 600 women admitted to a hospital for chronically ill patients in Pittsburg. These patients were admitted to a non-gynaecological ward for other various problems. Gynaecological findings in a group of 65 to 80 year old patients, were as follows.

Vulva

97% atrophy of labia majora

25% atrophy of labia minora

Vagina

98% atrophy

45% prolapse

30% stenosis

Uterus

75% small atrophic

25% prolapse:

15% second degree of prolapse

10% third degree of prolapse

Stress Incontinence: 9%

Similar figures were also previously found by Folsome (1956) in his series. Assuming that Quinlivan's statistics are applicable to our population, one out of four women over the age of 65 years would have some degree of uterine prolapse. (Interestingly enough, approximately one out of four women in this age group would have vaginal stenosis, a condition which prevents vaginal prolapse) (Quinlivan, 1964). Paldi (1966) in Israel, looked at the problem from a different angle. He reviewed all patients in this age group who have been admitted to gynaecological wards in a government hospital in Haifa. He found the following reasons for admission: 15% due to malignancy, 15% due to benign tumour, 14% due to incontinence, 50% due to some degree of prolapse, 6% miscellaneous. The significantly higher percentage of patients with prolapse can be explained by the fact that these patients actively sought help from a gynaecologist and because all these patients are drawn from immigrant population of European and Eastern-European origin, such as Austrian, German, Polish, Hungarian and Russian. These

populations are said to have the highest incidence of prolapse in the world (Marsalek, 1976). It is said that in Russia the percentage with prolapse is even higher and could be as high as 65% (Marsalek, 1976). The reasons for this may be hereditary (Geldenhuys, 1950; Heyns, 1956) and a life-style (Marsalek, 1976). Bloch (1987) found the following. The practice of gynaecology at Groote Schuur Hospital appears to be confined mainly to women over 60 years of age, mainly in the White and Coloured population. The female population of Cape Town was almost 500,000 with 15% 60 years or older. He believed the topic of geriatric gynaecology was of importance to the future. He analysed 1364 patients over the age of 65 who were admitted to the gynaecological wards at Groote Schuur Hospital. They were retrospectively analysed for two 5-year periods during 1974 to 1978 and 1979 to 1983. He concluded that geriatric gynaecology although important did not merit consideration as a subspeciality at the present time.

However, it is conceivable this may change in the future as the ageing population is likely to increase. Bloch noted that in these two 5-year periods 12.8% and 14.7% of patients were over 80 years old. The most common reason for admission were malignant tumours (30.1% and 36.3%), postmenopausal bleeding (31.7% and 31.2%) and uterovaginal prolapse (23.5% and 20.3%). He answered the very important question as to how many patients were not fit for surgery.

17.8% and 23% of patients would fall into this category after standard anaesthetic assessment.

Del Guercio and Cohn (1980) have shown that a further 23% of patients would have been rejected in their series on results derived from serial intracardiac and pulmonary artery pressures and blood pH and gas measurements.

Stallworthy (1971) expressed his opinion about the second question as to how serious the problem is. He thought that it is seldom a lethal condition although its neglect or injudicious treatment can make it so. If a prolapse is neglected, recurrent urinary tract infection and obstructed renal drainage over a period of years may cause uraemia. In cases of injudicious treatment reports of operative and postoperative deaths indicate the main causes of death are cardiovascular lesions, embolism, uraemia and infection. He states that the purpose of operation is not to save life but to restore comfort and the implications of this are sometimes forgotten. The ideal aim should be to relieve symptoms and give the patient maximum security against developing either recurrent prolapse or other possibly more serious complications. He reports 5 deaths in 6,490 patients who had vaginal hysterectomy or Manchester repair. Krige (1965) reports 0.26% of mortality rate in the series of 1,930 vaginal hysterectomies.

Filzwieser and List (1983) have shown that in the elderly there is still a mortality rate of 3.4% for general major elective surgery. Major surveys also indicate the increase in morbidity due to major surgery in the elderly. Goldman et al. (1977), using multivariate discriminate analysis, have identified nine independent significant correlates of life threatening and fatal cardiac complications: they include preoperative third heart sound or jugular venous distension, myocardial infarction in the preceding 6 months, more then five premature ventricular contractions per minute, rhythm other than sinus rhythm, age over 70 years, important valvular aortic stenosis, emergency operation and poor general condition. Non-cardiac risks have yet to be evaluated, but other factors, such as hypertension, diabetes, mitral valve disease and congestive heart failure, affect postoperative outcome (Schneider, 1983).

Seymour and Pringle (1983) have also evaluated postoperative morbidity in the elderly and found this was due to respiratory complications (40%), acute cardiac failure (10%), wound infection (16%) and thromboembolic disease (3.2%). They found an overall incidence of 10% of confusional states.

On the other hand, Williams (1968) claims that a discomfort and restriction of activities of the patient with a ring pessary and her immediate family are grossly underestimated

by most of the gynaecologists. This can often lead to a severe disruption of a family life and the patient can become bedridden on the basis of fear of prolapse recurrence, often with a ring pessary still in situ.

The gynaecologist should bear in mind that the decision between conservative management and surgical management is of paramount importance. Injudicious use of surgery can cause severe complications and can even be fatal. However, the same can be said about conservative management.

The last question was how long the patient can be expected to live. Kent (1980) stresses an important fact that a significant number of women are living in apparently good health for many years after ages often quoted as the average life expectancy. He called attention to the importance of recognising the significant differences of two ages: life expectancy, which is the average age an individual may expect to live and maximum life span which indicates the age at which the ageing process currently can be expected to terminate the lives of the humans who have reached old age. Life expectancy (the average age at death) has been increasing dramatically from 30 years in the era of Greek and Roman empires to 49 years in 1900 and to 77 years in 1970. He then emphasises the less familiar fact that the maximum human life span has remained practically unchanged throughout the last 100,000 years in spite of the remarkable

gains in life expectancy for the average child at birth and for the young adult. He indicates that the life expectancy of an adult in good health at 65 is little higher today than it was in 1900. Of the utmost significance, however, when we consider the treatment of prolapse in women of 65 years of age, is the estimate that the maximum life span of the individual over 65 and in good health should approximate 110 years.

Stanton (1987) claims that the life expectancy at 80 years is 6.5 years, at 85 years it is 5 years and at 90 it is 3.5 years. These are patients without major medical disease.

In conclusion, there has been a remarkable gain in life expectancy for young adults. I believe all these data should support the view that no elderly patient should be "written off" by an attending gynaecologist because of age and even underlying disease. In the ageing world, the patients with medical diseases are being kept alive.

What management options are then available to us? There are 5 possibilities:

Conservative:

1. Nil
2. Pessary

Operative:

3. Colpocleisis
4. Manchester repair and various modifications
5. Vaginal hysterectomy and pelvic floor repair

In selecting one of these options, the gynaecologist has to have a clear idea of the particular reasons or indications for his choice. The best operation for this particular group of patients must fulfil certain requirements. A general anaesthetic should be avoided when appropriate. Even an epidural may not be suitable.

The operation should be done in a short period of time. There should be minimal blood loss, minimal tissue trauma, the effect of the operation should be lasting without recurrences, the operation should not have any other side-effects. There must be no restriction of activities as a result of the operation. In trying to satisfy these criteria, it is obvious that the management choice will often be in between a pessary and some form of colpocleisis. The question to be addressed is: What are the advantages and disadvantages of these two management options?

I. PESSARY

The situation with regard to the pessary has historically been rather paradoxical. Before World War II, the pessaries were quite acceptable management and the reason for this was that sophisticated anaesthesia was not available (Dewhurst, 1986). However, pessaries had a lot of side-effects such as discharge, infection, decubital ulcers (Dewhurst, 1986; Williams, 1968; Wright, 1986) and eventually a slightly increased incidence of malignancy of the vagina (Russell, 1961) (after more than 20 years of use). Most of the disadvantages were overcome by an invention of the polyethylene pessary. The main advantage was that the device was sterilised by boiling and by chemical methods, for example by Savlon.

The place of pessaries is controversial. Recent technological advances in man made materials being counterbalanced by anaesthetic advances. Rather extreme opinions emerged, for example one promoted by Russell (1961). He claims that there is no place for pessaries in the treatment of the condition because of the development of highly sophisticated anaesthesia and advanced operational technique. He believes that the pessary has no place but is a temporary measure after childbirth when the size must be gradually reduced. It is of help in diagnostic evaluation

and when surgery has to be delayed. He is particularly enthusiastic about the Le Fort colpocleisis.

Williams (1968) promotes the pessary as an excellent device. He calls the pessary a "modern treatment". His main indications for pessaries were :

1. the patient's refusal to be operated upon,
2. the failure of previous operations,
3. a serious organic disease including repeated coronary attacks and carotid aneurysm.

He uses semirigid polyethylene pessaries.

Stallworthy (1971) considers the pessary to be a controversial device but thinks that the pessary still has a role in management. His main reason for using a pessary would be the woman who has to wait a year or more in discomfort for the operation, because of the long waiting list. If she is comfortable and there is no discharge the pessary does not need changing and may remain untouched for a year if necessary. Some patients, who are completely free of symptoms, will decide against the operation and fail to report back until ulceration occurs perhaps some years later. Even vesicovaginal fistulas may develop as well as vaginal carcinoma (Robertson, 1966; Russell, 1961).

On the other hand, it must be appreciated that approximately 25% of patients who are managed by ring pessary are considered to be treatment failures (Langmade, 1986). This is due to:

1. Irritation and fear of prolapse.
2. Unhappiness about number of check-ups and transportation.
3. Recurrent prolapse and displacement of pessary.
4. Pain.
5. Recurrent infections and ulcerations.

The view is widely held that the pessary can always be tried as a first choice and in a case of failure some kind of surgical management can be considered. On the other hand a large number of patients can be "a marginal failure". Those patients are profoundly unhappy about the state of affairs, due to a combination of the abovementioned complications. These patients are rather resigned to their condition despite the fact that their activity might be quite restricted. In my personal experience, one gets the impression that they believe that there is no other option available to them other than a major operation.

Barry (1988) found that the factors that influence elderly patients to refuse hospitalisation and invasive treatment are often related to negative perceptions of hospital care. She found previous negative interactions with the health

care system. Social characteristics such as language difficulties and ethnic factors, did not play a major role. She emphasised that none of the patients refused further medical treatment but only made the decision to receive the treatment at home rather than at hospital. She felt that these decisions may be appropriate for some elderly patients and that efforts to encourage acceptance in patients who nevertheless might benefit from hospitalisation should be directed toward those negative factors that elderly patients have identified as being associated with hospitalisation.

O'Rourke (1988) in his article about the relationships of the younger medical practitioners to the geriatric patients, found the major fault to be in the communication. He found that the elderly has special medical needs and the typical geriatric patient has 3 or 4 chronic disabilities or illnesses to control.

Moreover, his research demonstrates that elderly patients come to medical practitioners for more than medical care. They often visit medical practitioners primarily for the psycho-social needs. The acute care model of medical care is emphasised in the preparation of young physicians. This enables the medical practitioner to make accurate and swift diagnosis for patients with serious illnesses, but the aim of medical care for the elderly is more likely to be

preventative, rehabilitative, supportive and palliative (O'Rourke, 1988).

Adequate communication with the elderly lady can not be overemphasised because the option of colpocleisis in this particular type of problem is very valid and deserves a closer scrutiny. The author feels strongly that these patients are often underevaluated and discussions are poorly done. This leaves lots of unhappy sick old ladies having to tolerate increasingly unpleasant implications of ring pessary.

II. COLPOCLEISIS

In considering the possibility of colpocleisis, it is necessary to look at the operation from a historical perspective. It is of interest that the first colpocleisis was performed by Neugebauer in Warsaw in 1867, however he published his experience only in 1881. Le Fort, Professor of Operative Medicine, without prior knowledge of Neugebauer's contribution presented his technique in 1887 in Paris. His operation is referred to in the literature as a total colpocleisis. This is certainly correct from a functional (coital) point of view, but anatomically this is inaccurate as after the proximation of anterior and posterior vagina wall, two narrow canals on the sides of the vagina and one transverse in front of the cervix will be

left. Uterine secretions can consequently drain in this way (Figure 6).

This operation became quite popular in the USA and the Continental Europe. Since the initial publication, several reports of small series of cases have appeared in the literature (Douglas, 1954; Falk, 1955; Mazer, 1948; Ranney, 1981); all gave favourable results. However, at least three surveys presenting large numbers of patients were published in the last 25 years and these revealed a far greater rate of complications and side-effects (Goldman, 1981; Hanson, 1969; Pratt, 1960). The latest modification that developed in the United States, was so-called lateral Le Fort (Langmade, 1986) which tried to prevent the increased incidence of stress incontinence postoperatively. The other well-known modification was that of Power-Goodal (1937) which leaves a part of the distal vagina functional. In discussing this method, Heaney of Chicago (1937) remarked that he was pleased that two-thirds of the Le Fort principle were taken away. He added, rather sarcastically, that he would be even more pleased if even remaining "one-third" would be abandoned.

The Le Fort procedure was never popular in the British Isles compared to the USA. One of the reasons was probably a strong tradition and enthusiasm for the Manchester repair which was promoted since 1930 by Shaw.

Krige (1965) states that the Le Fort operation for procidentia in the aged and feeble has been completely discarded with no regrets in favour of vaginal hysterectomy with repair. He states that if the colpocleisis has to be performed it should be some kind of procedure which achieves an excessive narrowing of the vagina, eg. partial colpocleisis. Krige (1965) quotes Symmonds and Pratt who had found the partial colpocleisis a useful procedure in cases of extensive post-operative enterocoele and also in complete eversion of the vagina, if there is no concern about the sex habits of the parties involved.

Hanson in 1969 still performed three to four Le Fort colpocleises per year. This operation required 60 - 90 minutes. General anaesthesia was used in 75% of the patients while local infiltration was used in about 10% of patients. He estimated the blood loss generally between 100 - 300ml and about 3% of the patients received a blood transfusion. He had two delayed post-operative deaths. One at 8 days and the other at 17 days after the operation due to cerebral vascular accident and due to pulmonary embolus. He had 15% patients who developed minor degrees of stress incontinence and two patients who thought their pre-existing stress incontinence was made worse by the operation. Varying degrees of recurrence of the prolapse occurred in 13 patients (4.8%). He found that one of the most frequently mentioned objections to this operation namely the concern

about future malignancy, is not a valid objection. He mentioned that prior to 1936 only one case report of malignancy developed after a Le Fort operation and appeared in the literature. Hanson's series was rather large as he reports on 288 patients. The other major reviews present a very similar result (Goldman, 1981; Pratt, 1960). It is emphasised that in the American publications, the authors almost always add a massive posterior repair which probably plays a role in the rather low recurrence rate, e.g. 1 - 4.8% (Falk, 1955; Hanson, 1969).

It is therefore important to realise that the posterior repair may play an important role as regard to the failure rate of the colpocleisis. This is because high perineum restores the vaginal angulation and also because of the vaginal narrowing. This idea is utilised in the concept of the partial colpocleisis. However, the posterior colporrhaphy alone will not be enough in the treatment of this particular problem (Langmade, 1986).

In our selection of the operation we were not only searching for a palliative operation for the uterine prolapse but also for a procedure which would possibly improve or cure the stress incontinence of the patient and achieve the containment of the moderate to even large cystocoele without performing the anterior colporrhaphy.

REVIEW OF OTHER SURGICAL TECHNIQUES IN THE TREATMENT OF VARIOUS DEGREES OF UTERINE PROLAPSE INCLUDING PROCIDENTIA WITH EXCLUSION OF VAGINAL HYSTERECTOMY

The objectives of procedures for treatment of genital descensus are to provide new supports for the urogenital organs or to reinforce those that have been weakened (Martius, 1982). A prerequisite is a precise anatomical knowledge of the fascial and ligamentary structures involved as well as an understanding of the pelvic floor including the levator ani muscles and the urogenital diaphragm. All of these structures are integrated. One attempts to establish an equilibrium between the intra-abdominal pressure exerted by the visceral contents and the counter pressure of the pelvic floor. From this it follows that anatomical distortions of the urogenital diaphragm and the levator ani cannot be corrected separately when they are encountered in the course of surgery. To ensure a good result such measures are generally carried out together. When performed together they accomplish a functional unity. Posterior colporrhaphy is very important here, because without it the desired result may not be achieved. It is emphasised that partial colpocleisis incorporates some of the principles of posterior colporrhaphy. The methods used in operations for pelvic relaxation can be divided as follows:

(a) Substitution methods

This is the plastic reconstruction of the pelvic floor in the form of anterior and posterior colporrhaphy. This repairs the integrity of the supporting structure of the genital organs and the bladder closure mechanism and deposits these organs into their original pelvic locations.

(b) Suspension methods

This plastic reconstruction of the suspensory angles seeks to develop the normal relationship between bladder floor and urethra as well as the genital organs.

An overview of the more relevant surgical procedures is provided by the following listing.

(a) Substitution methods.

(i) Anterior colporrhaphy with urogenital diaphragm reconstruction methods.

(ii) Posterior colporrhaphy with reconstruction of levator ani supports and perineum.

(iii) Levator fascia plasty (Shaw and O'Sullivan method) as used for enterocoele repair.

(iv) Fothergill-Manchester repair.

These methods above are sometimes called anatomical in that they try to mimic normal anatomical conditions and preserve a functional vagina. Those listed below are, on the other hand, called non-anatomical in that they use existing anatomical structures for the reinforcement to the extreme and leave a non-functional vagina.

(v) Döderlein crossbar colporrhaphy

(vi) Schaetzing longitudinal bar colpoepisiocleisis

(vii) Labhardt subtotal colpocleisis

(viii) Conill colpoepisiocleisis

(ix) Le Fort total colpocleisis

(x) Kahr subtotal colpocleisis

(xi) Colpectomy

(xii) Hysterocolpectomy

(b) Suspension methods

(i) Marschall-Marchetti-Krantz urethropexy

(ii) Sling operations

(iii) Sacrospinous fixation for vaginal prolapse

(iv) Sacropexy

The non-anatomical operations can further be grouped into two groups.

<u>Group I:</u>

Le Fort total colpocleisis

Conill colpoepisiocleisis

Döderlein crossbar colporrhaphy

Schaetzing longitudinal bar colpoepisiocleisis

Group 2:

Labhard subtotal colpocleisis

Martius subtotal colpocleisis

Kahr subtotal colpocleisis

The division is based on the eventual physiology. The first group would mean total colpocleisis, the second group would mean subtotal colpocleisis.

TOTAL COLPOCLEISIS OPERATIONS

The Neugebauer-Le Fort total colpocleisis (Hanson, 1969) (Figure 6)

The rectangular areas of the everted anterior and posterior vaginal walls are denuded of mucosa and reduction of the prolapse is accomplished by suturing together this rectangular areas beginning with the margins closest to the cervical os. When this is completed the uterus rests above an elongated bar of tissue formed by the union of the anterior and posterior vaginal walls and the cervical os opens in a short horizontal canal which connects with lateral canals on either side through which any secretions from the upper genital tract may drain. It is important that the rectangle on the anterior wall should not be expanded near the urethral meatus because traction of the urethro-vesical angle after suturing may result in urinary incontinence. For this reason a perineorrhaphy must be done to complete the procedure.

Conill Colpoepisiokleisis ((1952) (Figure 7)

The operation starts by the excision of two rectangular areas on the anterior and posterior vaginal wall. The lower part on the posterior vaginal wall reaching up to the fossa navicularis. Care should be taken that the upper limit of the excision on the anterior vaginal wall should be at least 2cm from the external urethral meatus. Furthermore two parallel incisions on the borderline of labia minora and labia majora are made on each side. The upper limit will reach about 1cm below the external urethral orifice. The lower limit will reach almost to the lower level of the fourchette. The next step is approximation of both denuded areas on the anterior and posterior vaginal wall and two parallel incisions on the borderline in between the labia minora and labia majora; also the approximation of the two denuded areas in between themselves. The last step is the closure of the vagina and perineum by a series of 4-5 horizontal stitches.

Döderlein crossbar colporrhaphy (1960) (Figure 8)

The operation starts by the excision of a triangular portion of the mucosa anteriorly. The base of the triangle is adjacent to the cervix. Posteriorly a superficial excision of a rectangle of the vaginal skin is performed. The first crossbar layer is formed by the suturing of the anterior and posterior vaginal skin edges together alongside the cervix

by externalised sutures. The second layer is created by means of a tier of sutures that join the vesicovesical fascia with the rectovaginal fascia. The caudal angle sutures of the skin layer of the vagina have been left long and are held in a clamp. The third crossbar is created by means of tying together the vaginal skin angle sutures that were left long. This is followed by the urogenital diaphragm reconstruction, where the levator sutures are placed and anterior and posterior colpotomy incisions are closed.

Schaetzing longitudinal bar colpoepisiocleisis (1959, 1960, 1973)

This is an important modification of Le Fort and Döderlein total colpocleisis. The operation is started by two longitudinal incisions on each side of the vestibulum. These serve as a base for a rectangular shape denudation area on each side of the vagina, e.g. laterally. These two denuded areas are then approximated by a series of sutures, resulting in longitudinal bar ("längsriegel"); the two narrow canals are in this particular modification situated just below the urethra and below the longitudinal bar.
The important fact, that the periurethral area should be free of sutures is stressed in this modification.

CONCLUSION - GROUP I

Quite clearly, the Le Fort procedure with its recurrence rate, its production of stress incontinence (as also shown in the Groote Schuur Hospital records) as well as a considerable morbidity and even mortality was therefore rejected. We did not consider the other three procedures because they are performed on the principle of the Le Fort operation. All of these procedures are relatively major operations. Although, notably, the Schaetzing longitudinal bar colpoepisiocleisis is the only one out of the Le Fort group of colpocleisis, which is recommended by the American College of Obstetricians and Gynecologists (Langmade, 1986). This procedure is called in the United States of America "lateral Le Fort". Notably, it is the only procedure out of the Le Fort Group which addresses the important question of increased incidence of stress incontinence following a classical Le Fort operation.

PARTIAL COLPOCLEISIS OPERATIONS

1. Labhardt Partial Colpocleisis (1932) (Figure 11:I)

The Labhardt partial colpocleisis has a typical pentagonal incision. The operation starts with the resection of the vaginal wall at the medial aspect of the labia minora. The rectovaginal fascia is exposed and plicated. The pentagonal incision is created by the transverse posterior commissure incision. This is followed by the opening of the anterior edge of the labia minora up to the level of the urethral meatus. The edge of the mucosa is mobilised and triangular

wedge of mucosa is resected. At the end of the operation the anterior mucosal edges are co-opted starting at the upper wound angle. The result is a high perineum which extends up to the urethral meatus.

2. Martius Partial Colpocleisis (1965) (Figure 11:II-VI)

This is modification of the Labhardt colpocleisis. In this modification the vaginal mucosa on the side of the vagina with incision reaching about 1cm below the external urethral meatus is dissected about 4cms into the vagina. This enables the suture of the levatores very deep and high up in the vagina. This creates non-anatomical situations but an excellent support for the uterus and bladder.

3. Kahr Partial Colpocleisis (1937) (Figure 9:I-IV; 10)

This has been described earlier on page 26.

CONCLUSION - GROUP II

The final decision was between the Labhardt and Kahr colpocleisis. We did not use the Labhardt colpocleisis for the following reasons. In the initial article by Labhardt in 1932 the mortality was still 1% and the length of the procedure would be similar to the Le Fort colpocleisis, also the blood loss would be very similar, although the long term results however demonstrate a far lower failure rate of 1%. Labhardt on the other hand reports 92% improvement of the stress incontinence. The Labhardt colpocleisis was later

modified by H Martius (1982) who was considered to be a father of the German vaginal plastic surgery. In the review of Von Massenbach and Ohlenroth (1965) of the 101 cases which were operated on by the Labhardt colpocleisis with Martius modification, the post-operative mortality was still about 1% and the minor complication rate 7%. Follow-up examinations were performed in 96 of these patients and 1 operation failed. Repeat operation was however successful in this case. Duration of operation was an average of 40 minutes.

Preoperatively disturbances of micturition were found in 75% of patients and postoperatively in only 5%. The modification of the Labhardt's colpocleisis was introduced because of the known fact that the more superficial the operation, the more frequent the recurrence. This may be avoided by more extensive operation such as the Dö derlein transverse interposition (Döderlein, 1960). But this would hardly be less extensive than perhaps even curative classical vaginal hysterectomy and corporrhaphy. Therefore, Martius introduced so-called high suture of the levatores (Käser, 1967; Martius, 1982). In principle, the Kahr partial colpocleisis seems to be the most promising. In the original article by Kahr in 1937, the average operating time was 20 minutes. The operation could be performed under local anaesthesia. No stitches were eventually used in the vagina as all the stitches were buried underneath the

vaginal flap. This technique is also mentioned by Mills (1978). It makes this operation very elegant and efficient as well as decreasing postoperative complications - not a negligible consideration in frail old patients hardly able to care for themselves. The result by Kahr were similar to the Labhardt partial colpocleisis except that there was no mortality. Massoudnia (1974) reported 24 patients with various degrees of uterine and vaginal wall prolapse who had Kahr partial colpocleisis. The average age was 65 years and ranged between 61 to 82 years. Eighteen patients had an excellent result. They had no urinary incontinence and were able to perform their normal activities. Light to moderate haematoma developed in four cases without abscess formation. Operating time averaged 12 minutes.

He concluded that low morbidity and safety of performance and a few common complications compared to other similar procedures justify its use in patients considered to be poor risks for a vaginal hysterectomy and repair. Therefore, we have decided to use the Kahr colpocleisis in the management of this problem, but we were concerned about the superficial nature of this operation, using mainly as in its original description the bulbocavernosus muscle only. We therefore chose to modify this procedure and to add Martius' modification and to perform high suture of the levatores on these patients. Thus, our technique is not original. However, the technical performance of this operation in

detail is not reported in this way in the literature to the best of our knowledge.

The high suture of the levatores using the pubococcygeus muscle in fact means that we are using a type of Pacey's suture, close to the area of the bladder neck. The difference is, that with the Pacey's suture the anterior colporrhaphy is performed and the dissection of the vaginal skin around the area of the bladder neck is performed sideways. We leave the area around the bladder neck intact and we do not do anything about the cystocoele. Our stitch is positioned slightly lower than the classical Pacey's stitch. This is because we have decided that our lateral dissection would not extend above the level of the external urethral meatus. This is, however, originally suggested by Labhardt (1932) and Martius (1982). In their series the external urethral orifice is in fact hidden in the vagina. They can see no problem about this and see no problem about the collection of the urine in the vestibulum. However, we decided not to follow this technique and we ended our incision about 1 - 1/2cm beneath the external urethral orifice which would enable us to see the external urethral orifice and to have about a 8mm opening in the vagina just under the urethra. Consequently, the author believes that this operation quite adequately addresses the question of urodynamic dysfunction on these patients - a concept neglected to a large extent in the literature and

also in Groote Schuur Hospital study of Le Fort colpocleises.

THE EVOLUTION OF THE SUBTOTAL COLPOCLEISIS IN THE WIDER CONTEXT OF THE TREATMENT OF GENITAL PROLAPSE FROM THE HISTORICAL PERSPECTIVE (KRIGE, 1965)

It was Roux in 1834 in France who reported two successful extensive repairs of the perineum and hoped to stimulate others to similar operations for complete cure. In Germany it was Dieffenbach in 1829, who first began to operate for prolapse and was called the father of the vaginal plastic surgery.

Later, Hemming in England in 1831, acting on a suggestion by Marshall Hall (1832), narrowed the vagina by denuding the anterior wall from the cervix to the urethra between two parallel incisions and sewing up the raw area. Fricke, in 1832 was dissatisfied with the denudation of the vagina and he denuded 3/4 of the labial inner surface before sewing up, calling the operation an episiorrhaphy. In 1840, Geddings in the United States, extended this operation into the perineum. The results, however, were initially disappointing and Sir James Young Simpson persisted with conservative treatment. In his 1861 lecture, he did not think operations were justified except to narrow the outlet enough to retain the pessary. He also discussed the different types of operations then "en vogue".

1. U-shaped denudation and bracing the labia and perineum.
2. Triangular and rectangular denudations on the anterior or posterior vaginal wall.
3. Amputation of the cervix.
4. Scarring and shrinking of the vagina by the use of the actual cautery.

In these early operations one can trace the germs of the principles of the Kahr colpocleisis as in No. 1 and Le Fort colpocleisis as in No. 2. Therefore, the Le Fort colpocleisis developed directly from Hemming's denudation as opposed to the subtotal colpocleisis of Labhardt or Kahr which developed directly from Fricke's episiorrhaphy. In the meantime at the end of the 19th century there were more developments. Freund in 1895 tried a posterior interposition of the uterus while in 1898 both Watkins and Wertheim performed the anterior interposition which for many years found favour in the USA and on the Continent. The Spalding-Richardson operation in 1937 went a step further and dealt with cases of prolapsed diseased uteri by interposing the isthmus anteriorly after a high subtotal vaginal hysterectomy with or without amputation of the cervix. And eventually in the early years of the century Bumm (1904) of Berlin and after him Mayo in the United States in 1915 considered genital prolapse the chief indication for vaginal hysterectomy with repair. By constant improvement in technique, especially by Ward

(1915), vaginal hysterectomy with repair has established itself as the most complete operation for prolapse cases of any degree. Simultaneously, the Manchester repair was introduced in the UK at the beginning of the century by Fothergill (1911) and eventually this technique was introduced in 1933 by Fletcher Shaw in the United States and that proved an immediate success. The operation reached its peak in the 1940's but by the 1950's its limitations were becoming more evident except to its die hard protagonists. These were: large percentage of diseased uteri, which had to be removed later, infertility, cervical incompetence and cervical dystocia.

At the same time the Le Fort operation for procidentia in the aged and feeble has been almost completely discarded. Nor has it been found necessary to do a Le Fort operation in conjunction with a vaginal hysterectomy in cases of procidentia in old women. The same and better physiological results can be achieved by excessively narrowing the vagina after the hysterectomy using the principles of subtotal colpocleisis (Krige, 1965). The subtotal colpocleisis has therefore not yet been abandoned.

CONCLUSIONS AND FURTHER STUDY

The results of this pilot study are highly encouraging. It shows that this type of operation can be used on any degree of uterine prolapse and on cystocoele. This operation seems to be particularly valuable on the patient with voiding difficulties. Four out of our six patient had a complete relief of this problem. Two patients out of six had a stress incontinence but they seem also to be cured which correlates well with the literature (Kahr, 1937; Labhardt, 1932; Langmade, 1986). It also correlates well with the modified Labhardt operation when the high suture of the levatores is used (Massenbach, 1965). The advantages as regard to the operating times are obvious. The blood loss was minimal. In the future it might be possible to discharge the patient the same day because there were no voiding difficulties immediately after the removal of the Foley's catheter. The possibility of not using the Foley's catheter and thus prevent a newly developed urinary tract infection is a viable alternative. This would bring this operation very close to the Conill's (1952) total colpocleisis. Conill reported that he performed this operation on all his patients as an out-patient procedure and discharged the patients the same day. He reports minimal complications. However, he also reported an increase in stress incontinence which is inherent to this type of procedure (Le Fort Group).

Additionally, our operation would meet the requirements of the American College of Obstetricians and Gynecologists of 1986, because our results are similar to those of Langmade (1986) (Figure 12:I-III) who, in his review of 102 patients which were operated on by the partial colpocleisis method (similar to Labhardt's), made the following points: he did not see any failures, no new cases of stress incontinence were reported and two patients continued having stress incontinence. Symptoms of urgency incontinence however disappeared in 5 out of 20 patients. We cannot comment on this because none of our patients exhibited urgency incontinence.

In conclusion, vaginal hysterectomy with pelvic floor repair remains the most acceptable procedure in a case of prolapse. However, this procedure is not justified in the elderly with prohibitive anaesthetic risk. The author believes that patients should be offered the option of partial colpocleisis as a first line of treatment. If the waiting list for the procedure is long, a ring pessary can be fitted in these initial stages. If the patient is happy about a ring pessary after a certain time has lapsed, her management with a ring pessary could be continued.

A detailed analysis of family background of these patients is mandatory. Hospital management in respect of this, is deficient in many ways and needs improvement. It is the

Kahr colpocleisis in our modification using the Martius principle which offers decisive advantages over similar operations. It is our estimate that about 6 to 10 patients could be operated on by this method each year at the University of Cape Town. The material presented in this pilot study consists of a neglected group of patients. The study has all the inherent deficiencies of pilot studies viz. a small number of patients and too short a period of follow-up.

In further studies we wish to present a considerably larger group of patients, especially those with a stress incontinence.

ACKNOWLEDGEMENTS

I would like to thank Dr Peter Baillie for his invaluable supervision on this project, Dr Basil Bloch for his kind permission to quote from his 1986 Margaret Orford Lecture, Dr Ed Coetzee in whose gynaecological firm these patients were operated on and Mrs Antoinette Rabe for typing this dissertation.

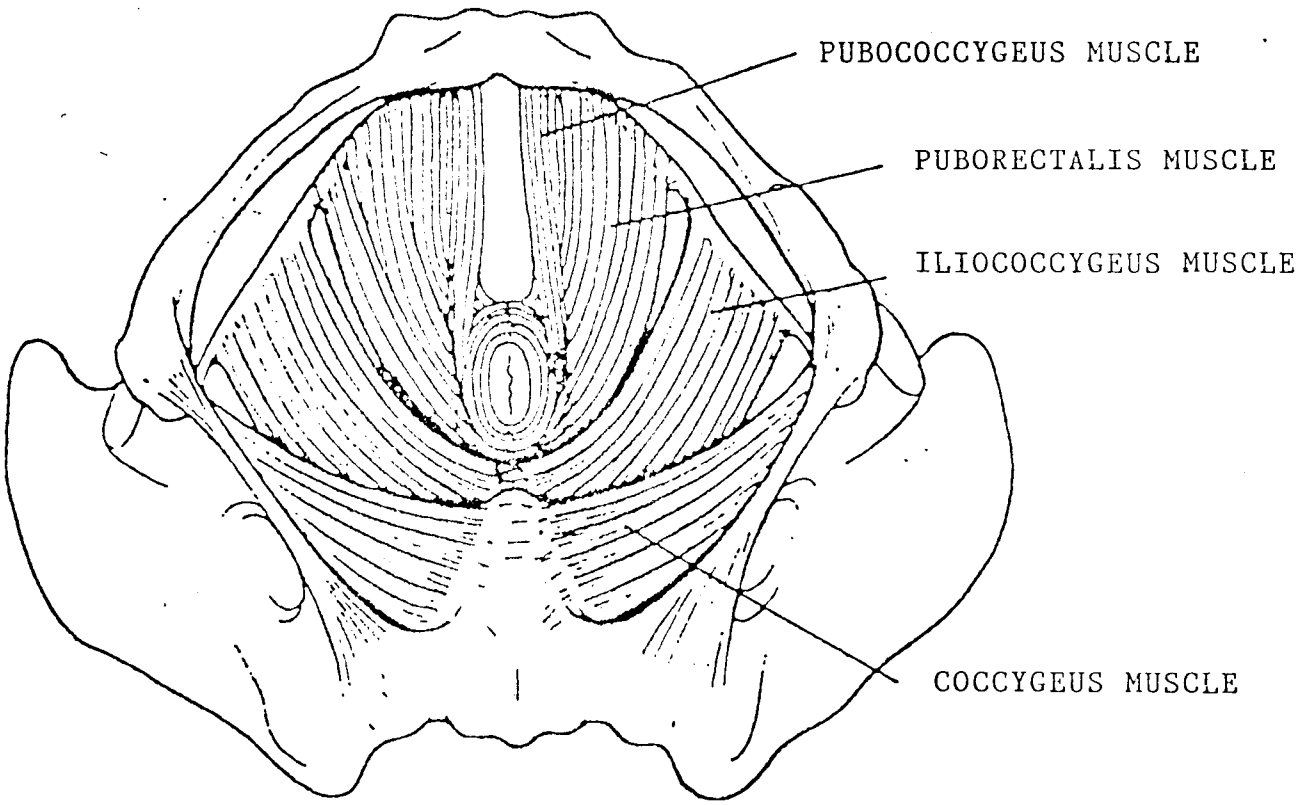


FIGURE 1: PELVIC FLOOR

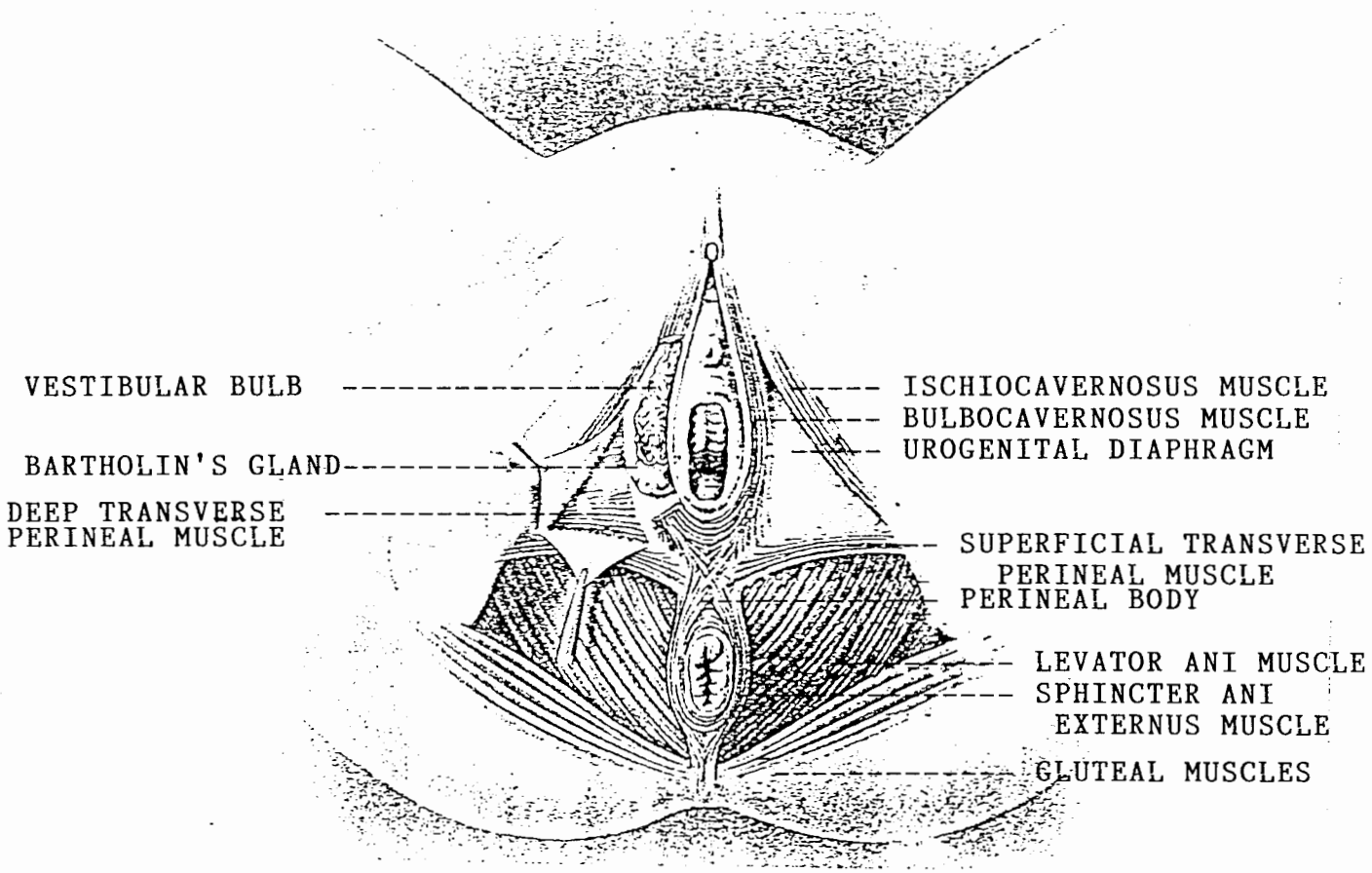
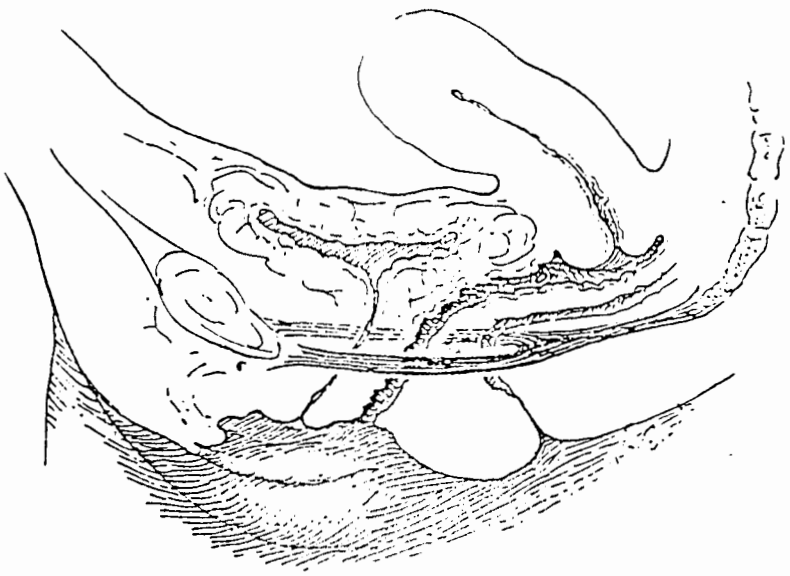
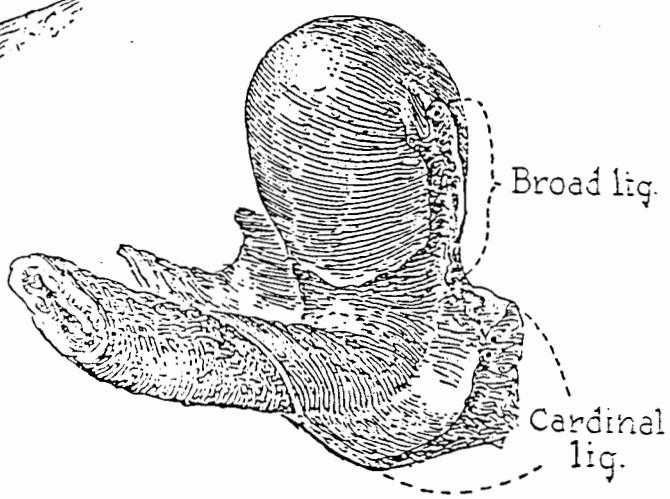


FIGURE 2: PELVIC DIAPHRAGM
(AS SEEN FROM BELOW)

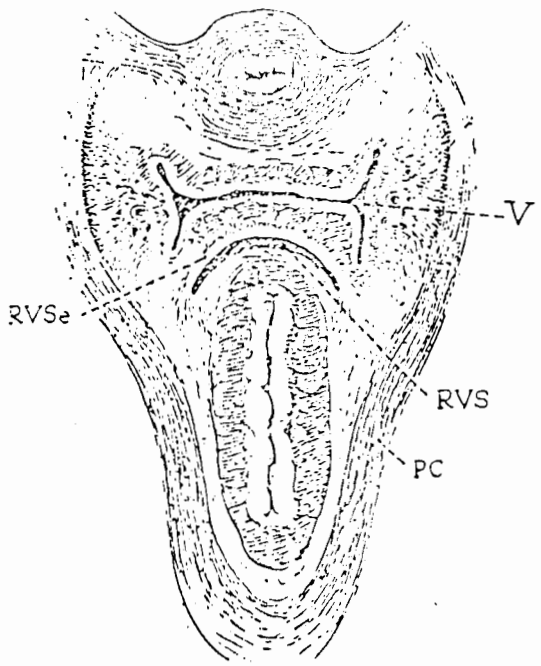


I. PUBORECTALIS SLING



II. FASCIAL CONDENSATION OF PELVIC FASCIA - THE CARDINAL LIGAMENT

III. "H"-SHAPED VAGINA



IV. RECTOVAGINAL SEPTUM AND PERINEAL BODY

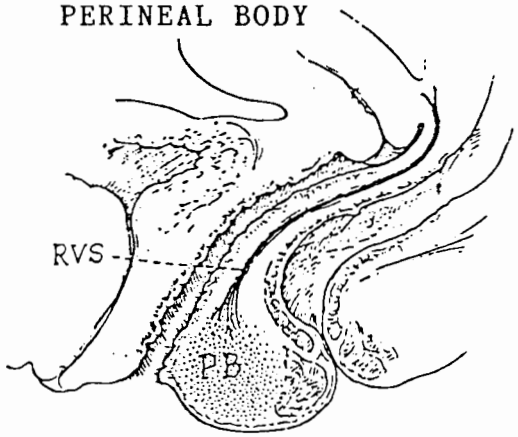


FIGURE 3

RVSe	-	RECTOVAGINAL SEPTUM
V	-	VAGINA
RVS	-	RECTOVAGINAL SPACE
PC	-	PUBOCOCCYGEUS MUSCLE
PB	-	PERINEAL BODY

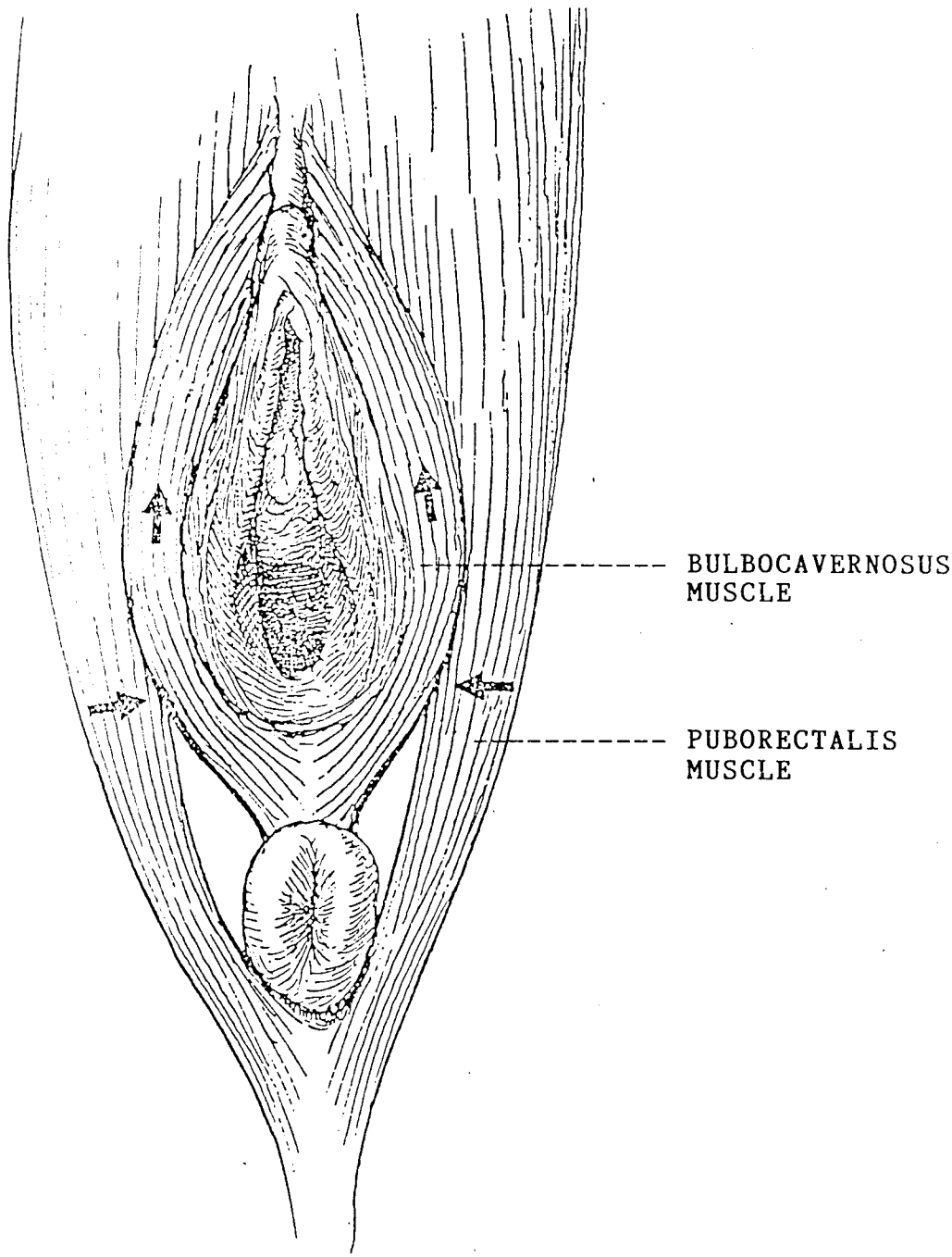


FIGURE 4: RELATIONSHIP OF PUBORECTALIS AND BULBOCAVERNOSUS MUSCLE

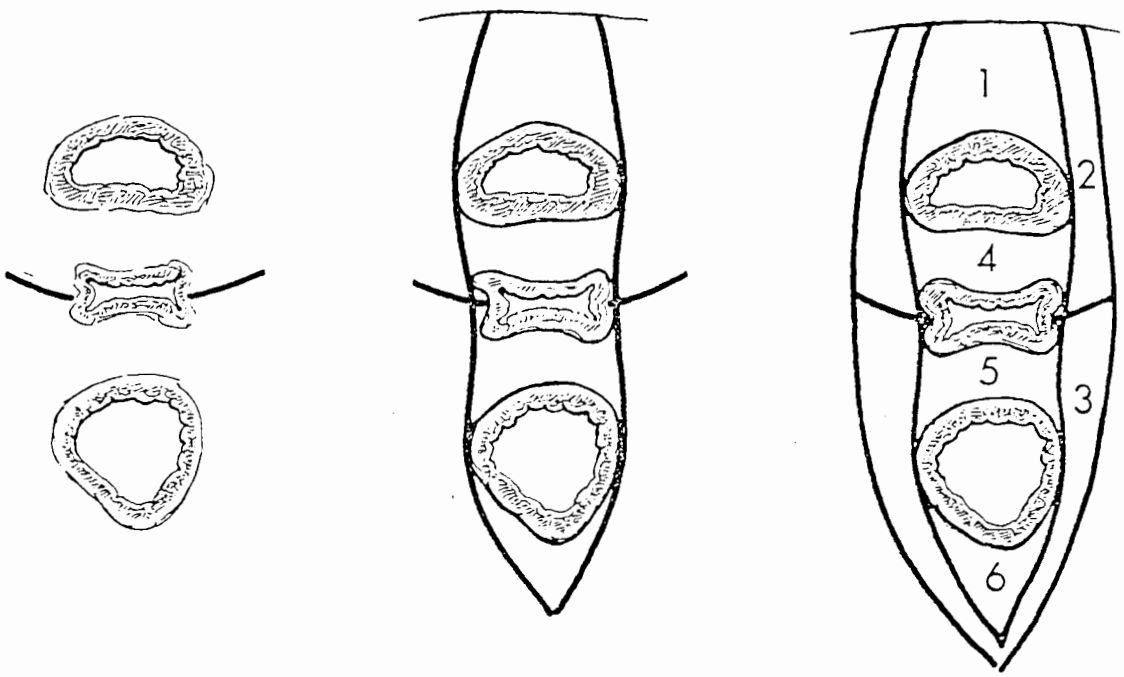


FIGURE 5: CLEAVAGE PLANES AND SPACES

1 = PREVESICAL SPACE
2 = PARAVESICAL SPACE
3 = PARARECTAL SPACE
4 = VESICOVAGINAL SPACE
5 = RECTOVAGINAL SPACE
6 = RETRORECTAL SPACE

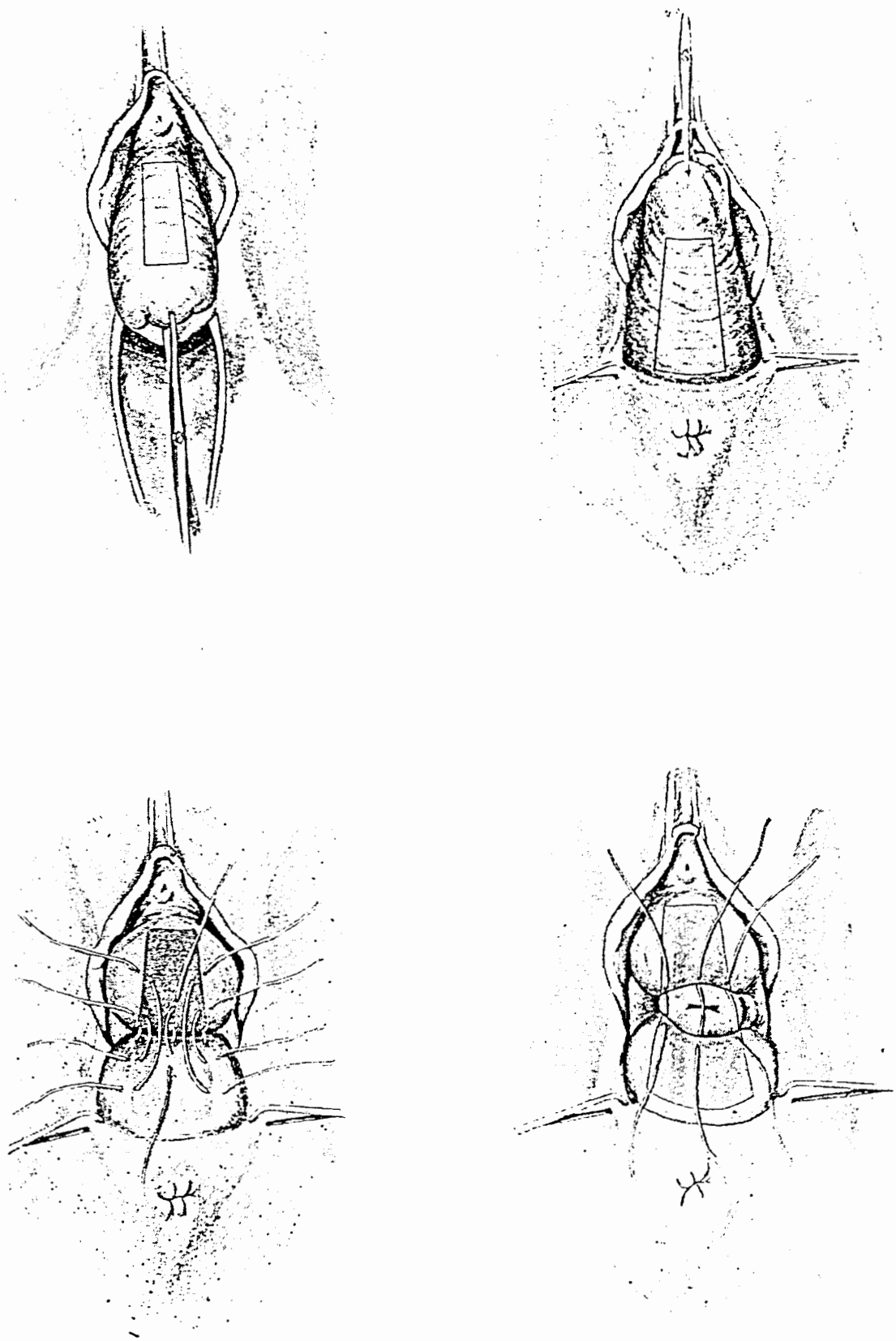


FIGURE 6: LE FORT TOTAL COLPOCLEISIS

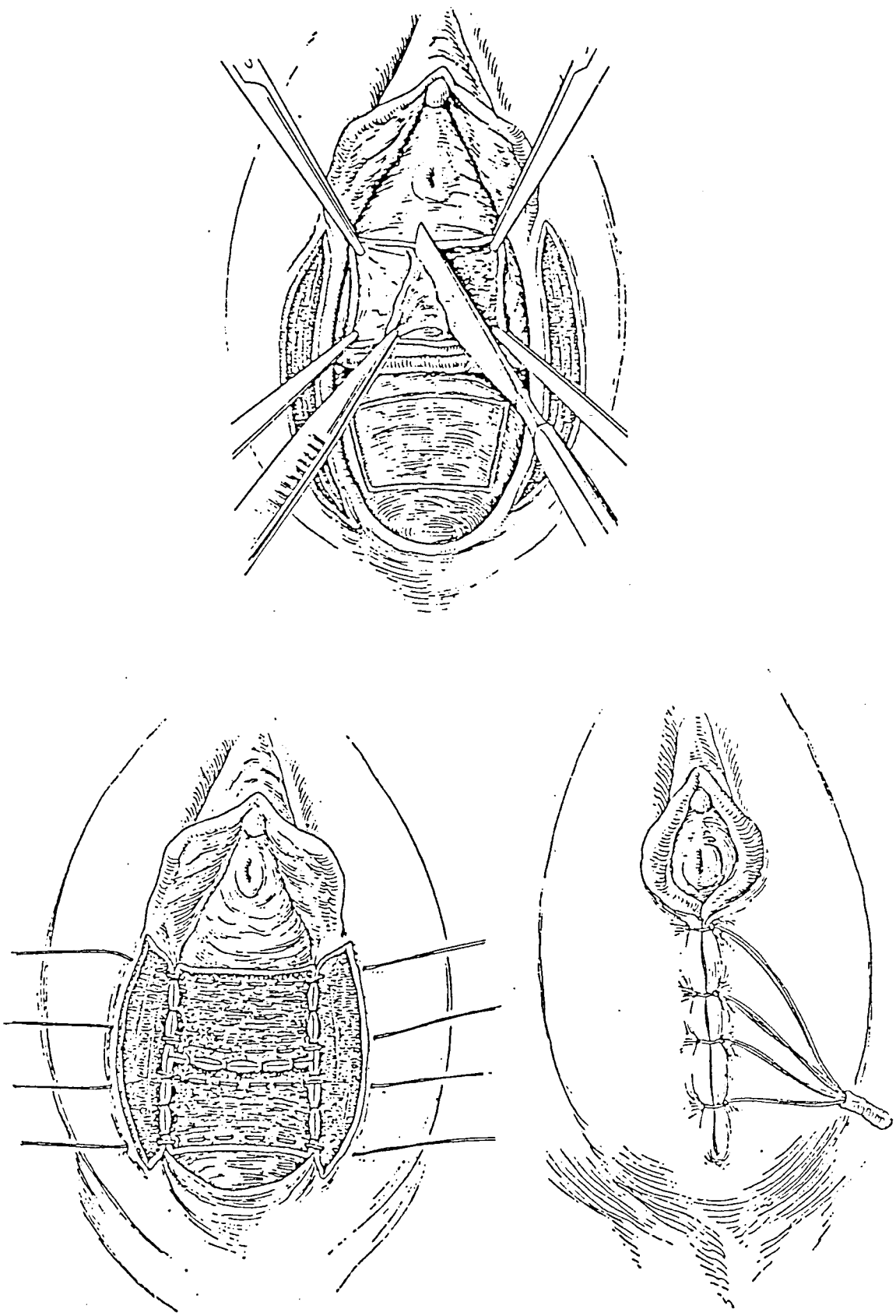


FIGURE 7: CONILL TOTAL COLPOCLEISIS
(COMBINATION OF BOTH PRINCIPLES: LE FORT'S AND KAHR'S)

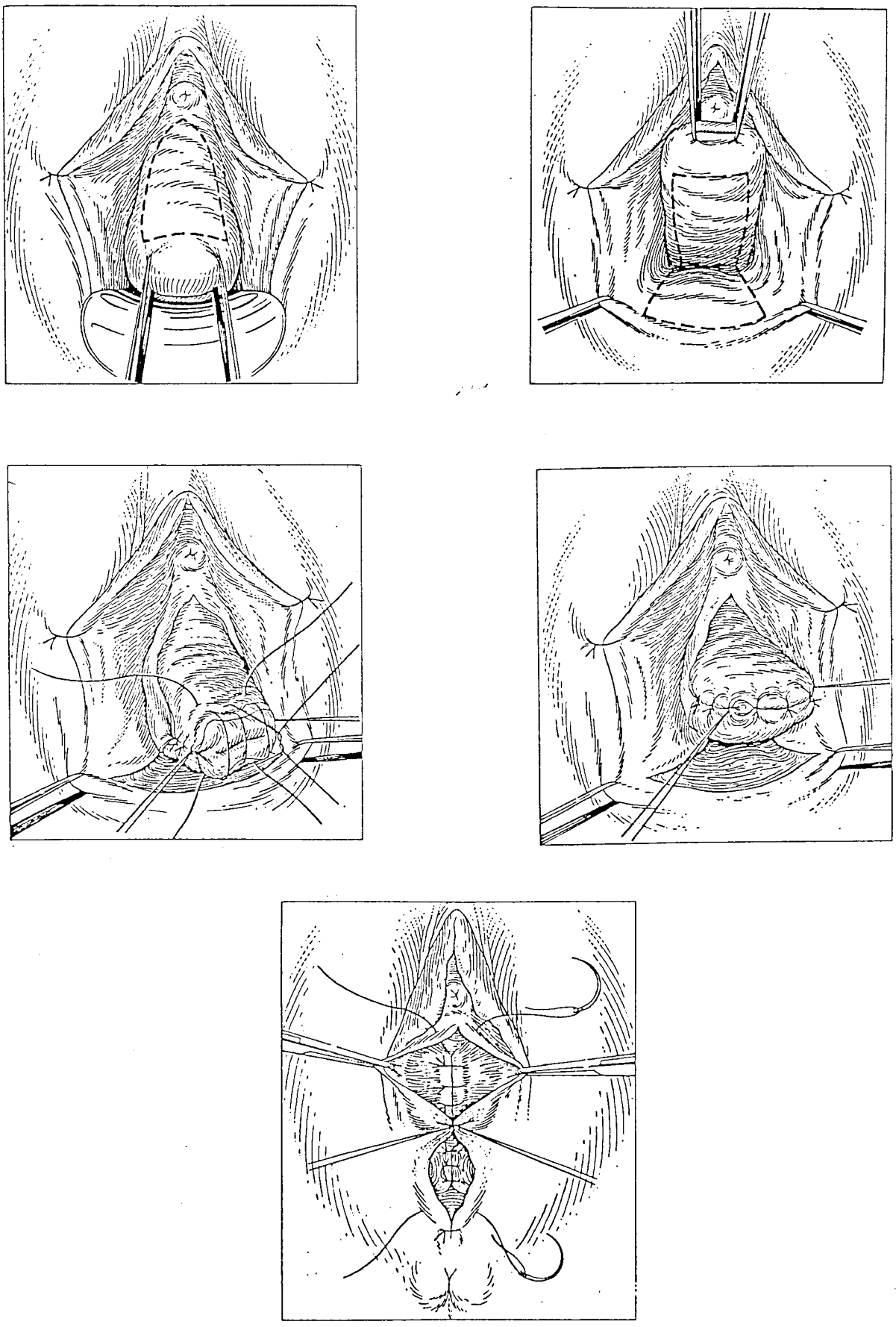


FIGURE 8: DÖDERLEIN CROSSBAR COLPORRHAPHY

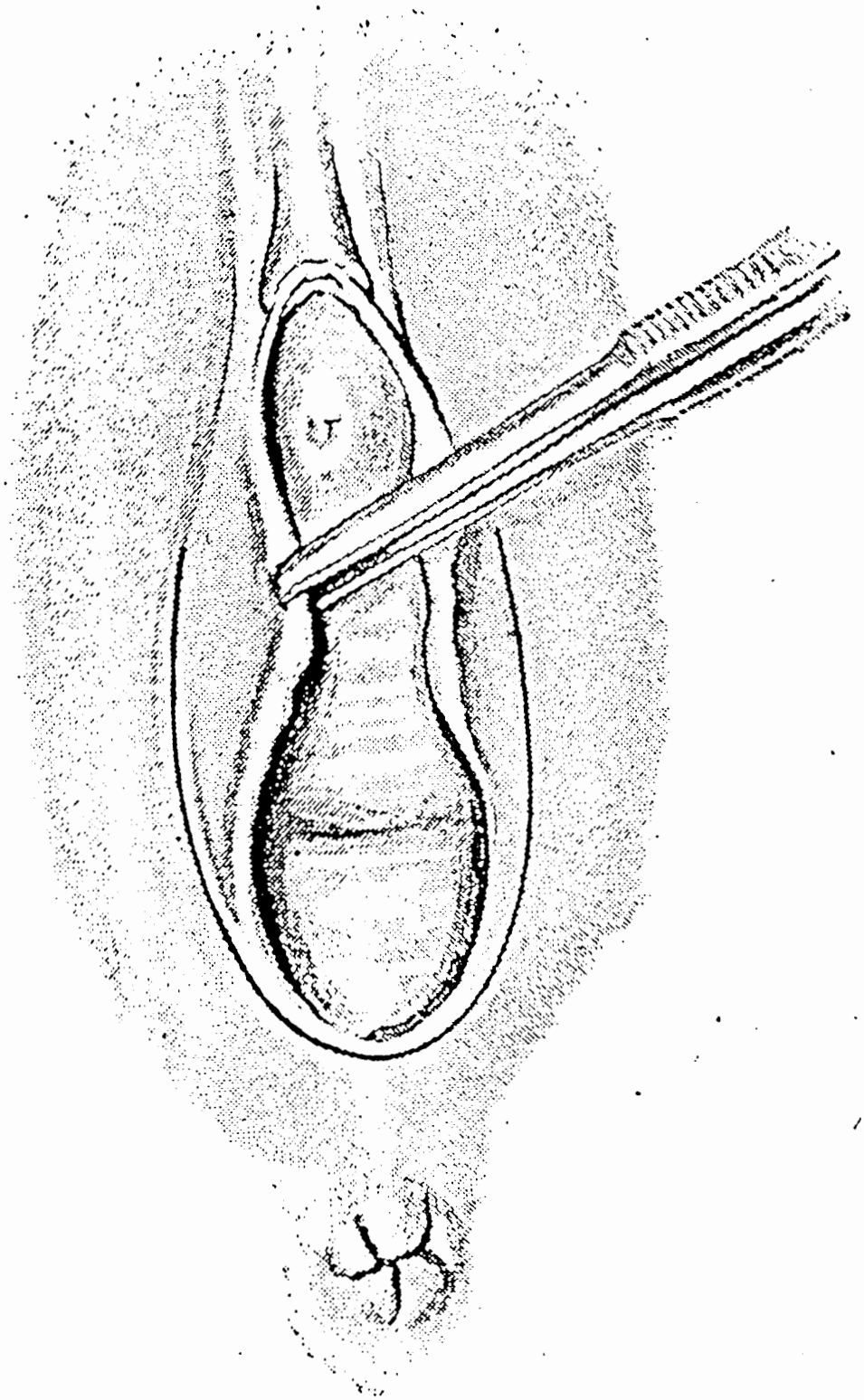


FIGURE 9: KAHR PARTIAL COLPOCLEISIS I
INITIAL INCISION

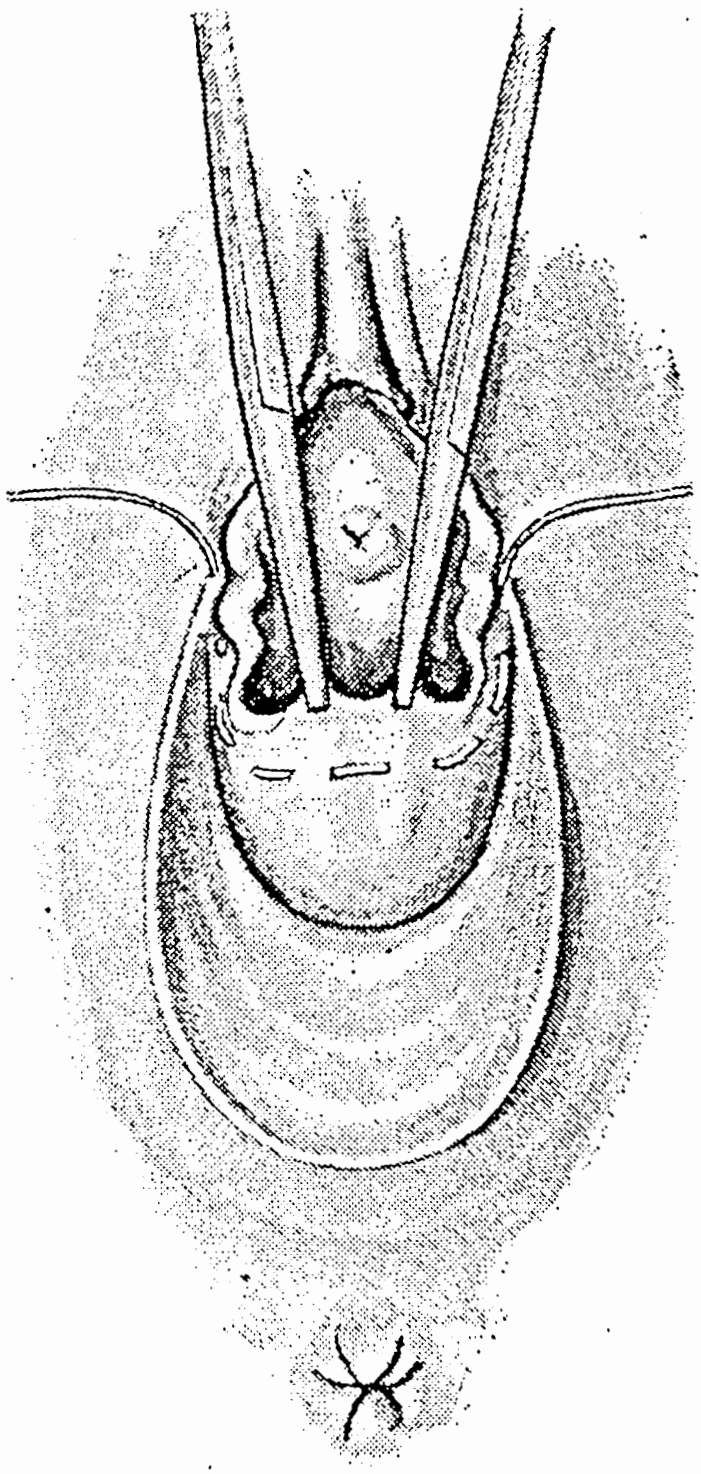


FIGURE 9: KAHR PARTIAL COLPOCLEISIS II
PURSE STRING SUTURE

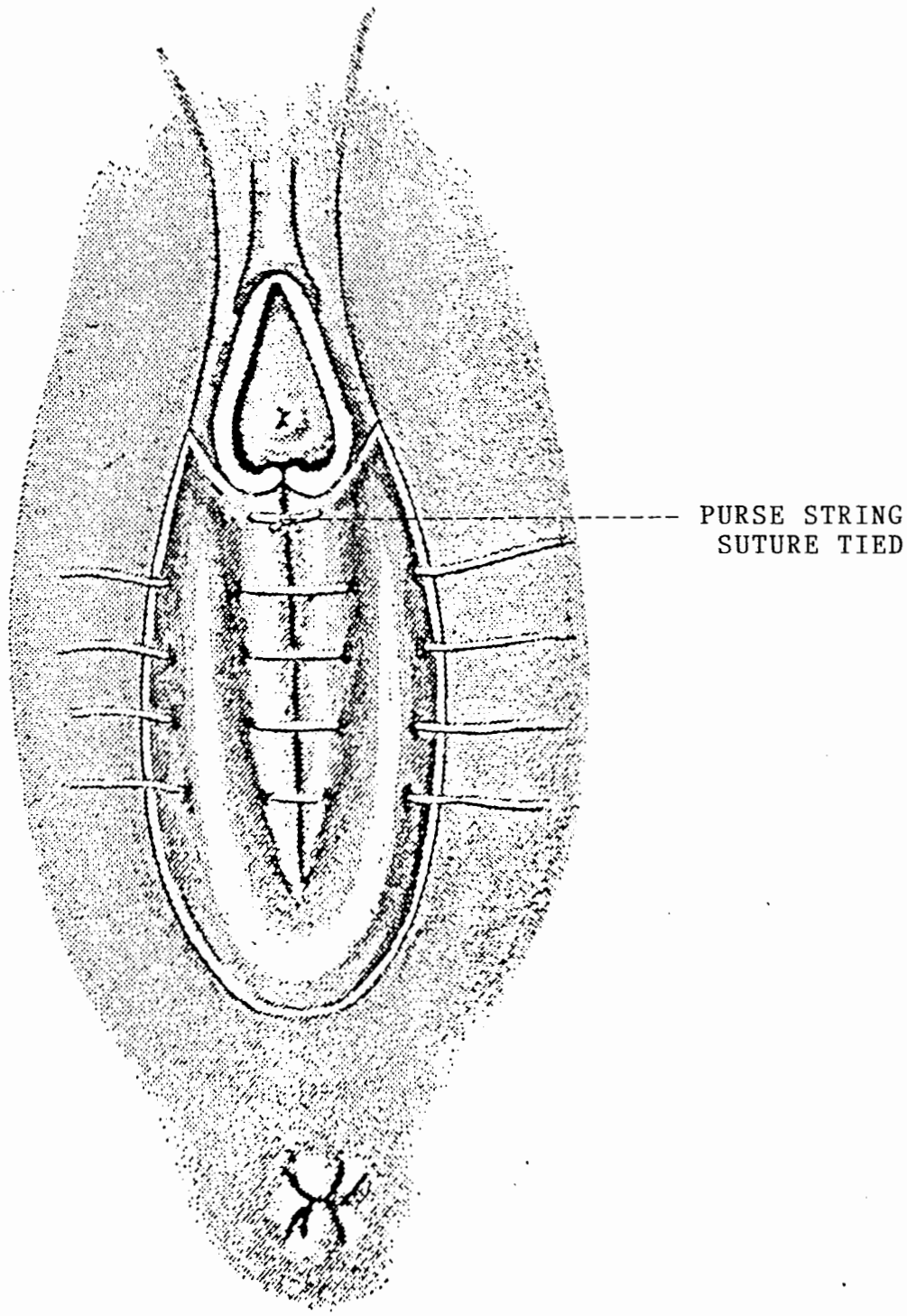


FIGURE 9: KAHR PARTIAL COLPOCLEISIS III
APPROXIMATION OF BULBOCAVERNOSUS MUSCLE

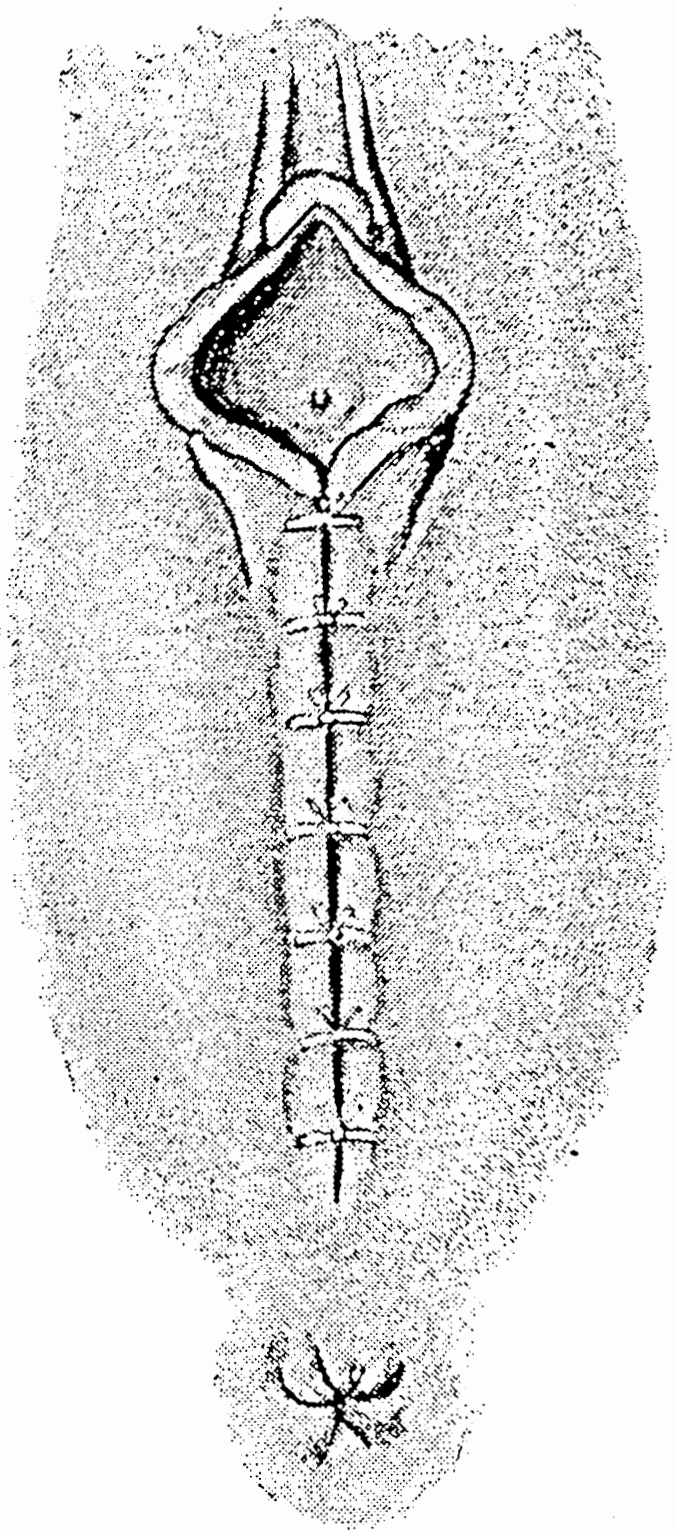


FIGURE 9: KAHR PARTIAL COLPOCLEISIS IV
PERINEAL SUTURES (HIGH PERINEUM CREATED)

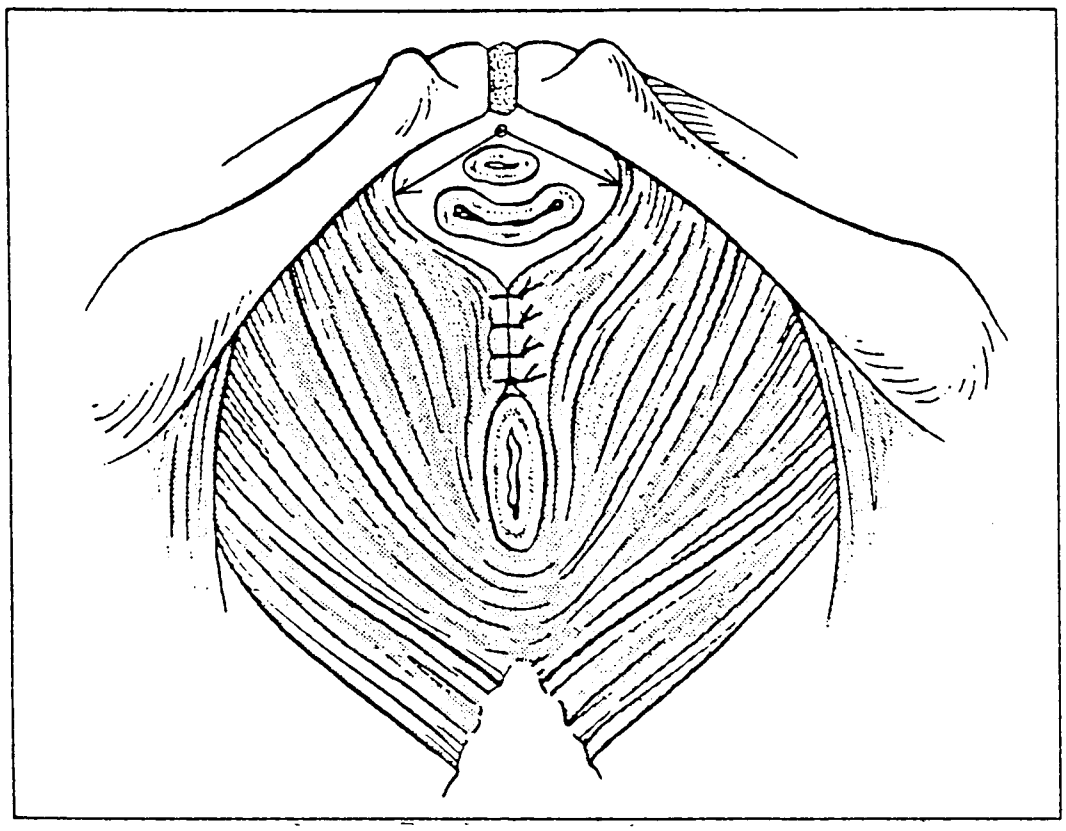


FIGURE 10: POSTERIOR COLPOPERINEORRHAPHY (CRANIAL VIEW) END RESULT OF LEVATOR PLASTY PROCEDURE.

THE ARROWS INDICATE THE HIGH LEVEL OF PUBOCOCCYGEUS UTILISED IN THE KAHR COLPOCLEISIS USING THE MARTIUS PRINCIPLE OF HIGH SUTURE OF LEVATORES

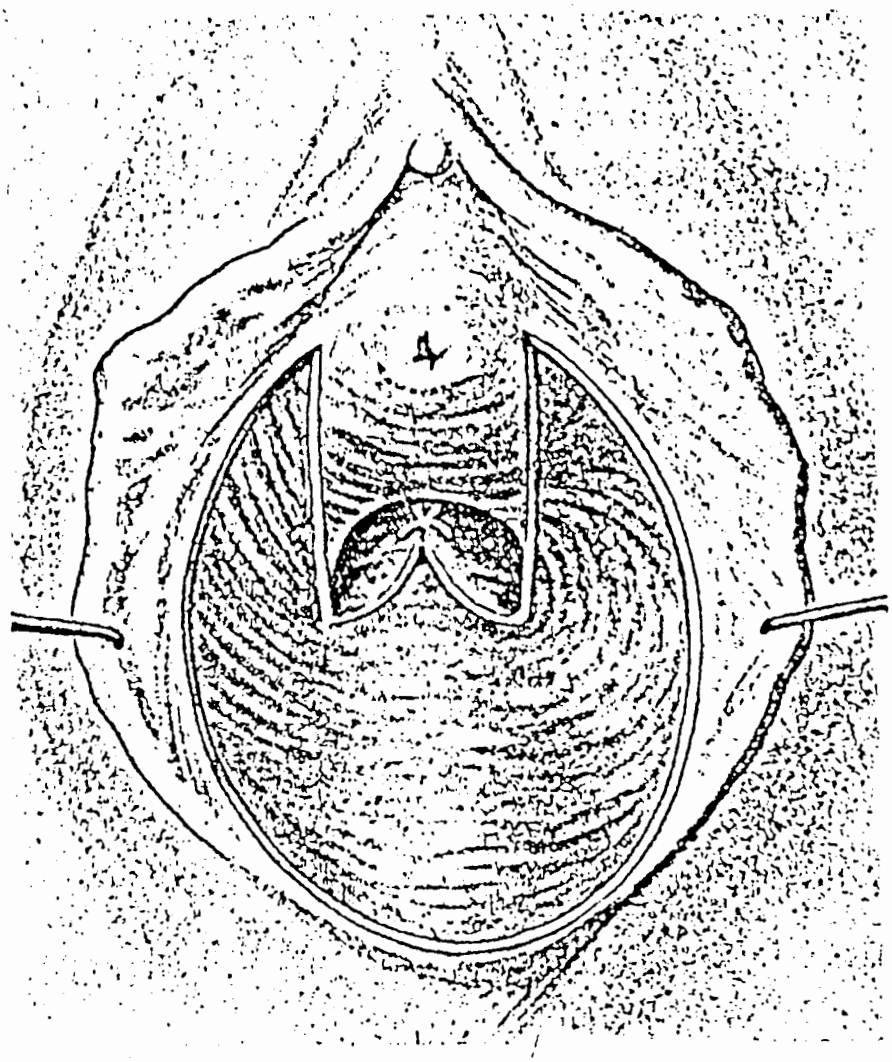


FIGURE 11: LABHARDT PARTIAL COLPOCLEISIS I
INITIAL INCISION AND DENUDATION AS
DONE IN THE ORIGINAL OPERATION

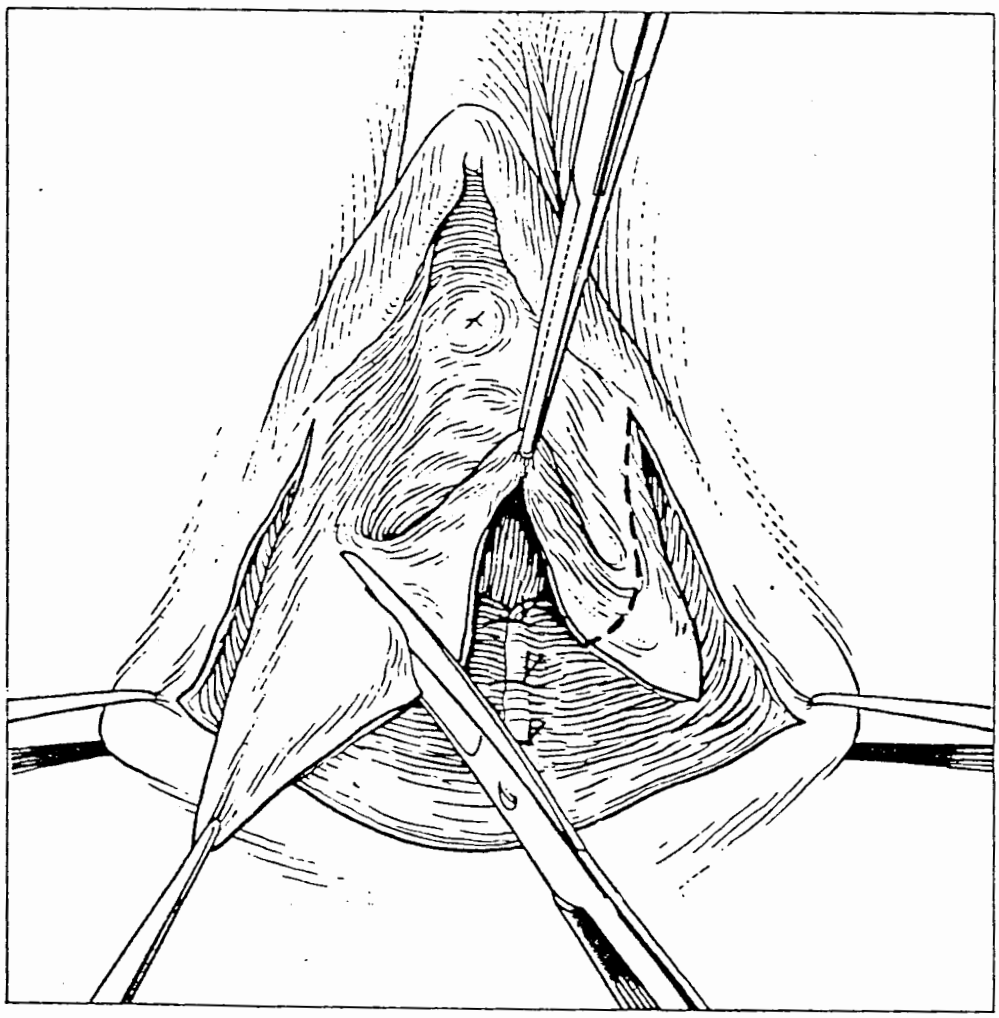


FIGURE 11: LABHARDT PARTIAL COLPOCLEISIS II
MARTIUS MODIFICATION

CREATION OF A TYPICAL PENTAGONAL WOUND

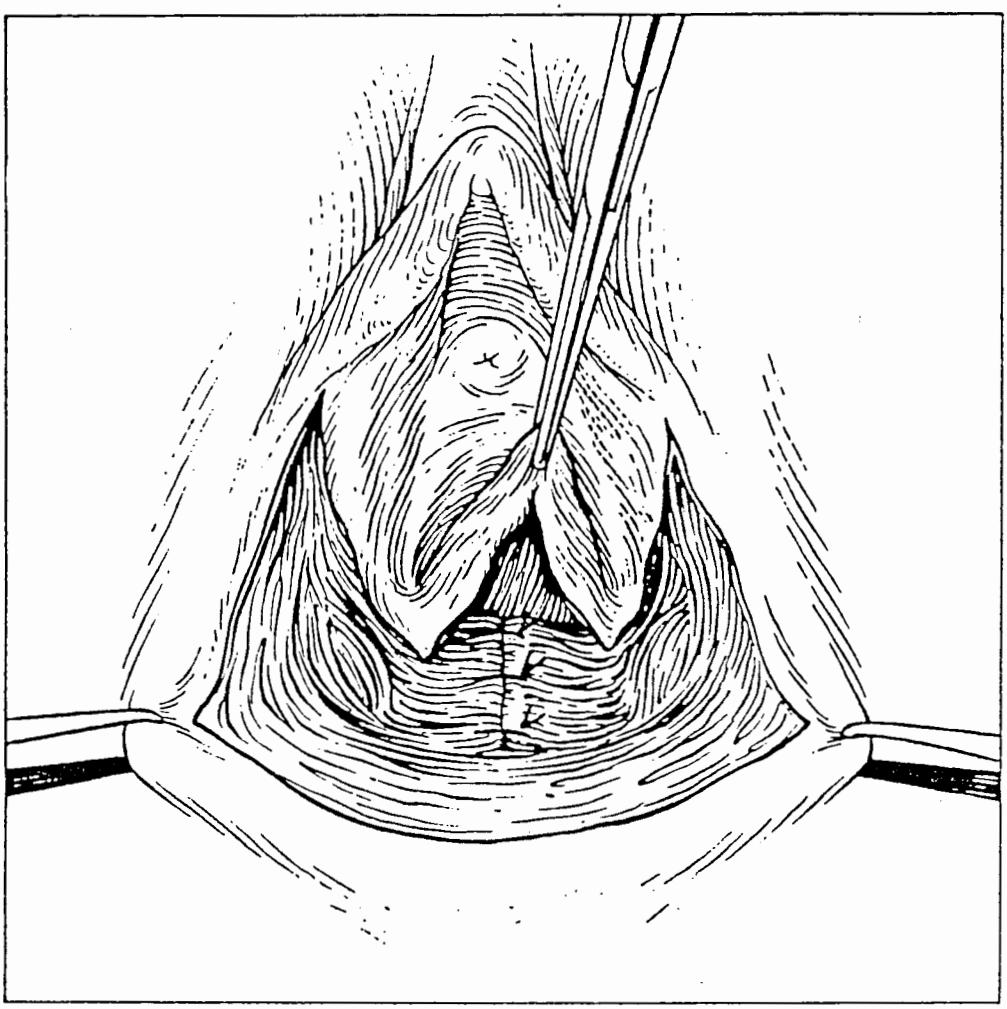


FIGURE 11: LABHARDT PARTIAL COLPOCLEISIS III MARTIUS MODIFICATION

THE TYPICAL PENTAGONAL INCISION, AFTER THE MUCOSA HAS BEEN RESECTED.

THE RECTOVAGINAL FASCIA IS ALREADY PLICATED. THE LEVATOR ANI MUSCLES ARE IDENTIFIABLE LATERALLY IN THE DEPTH OF THE OPERATIVE FIELD

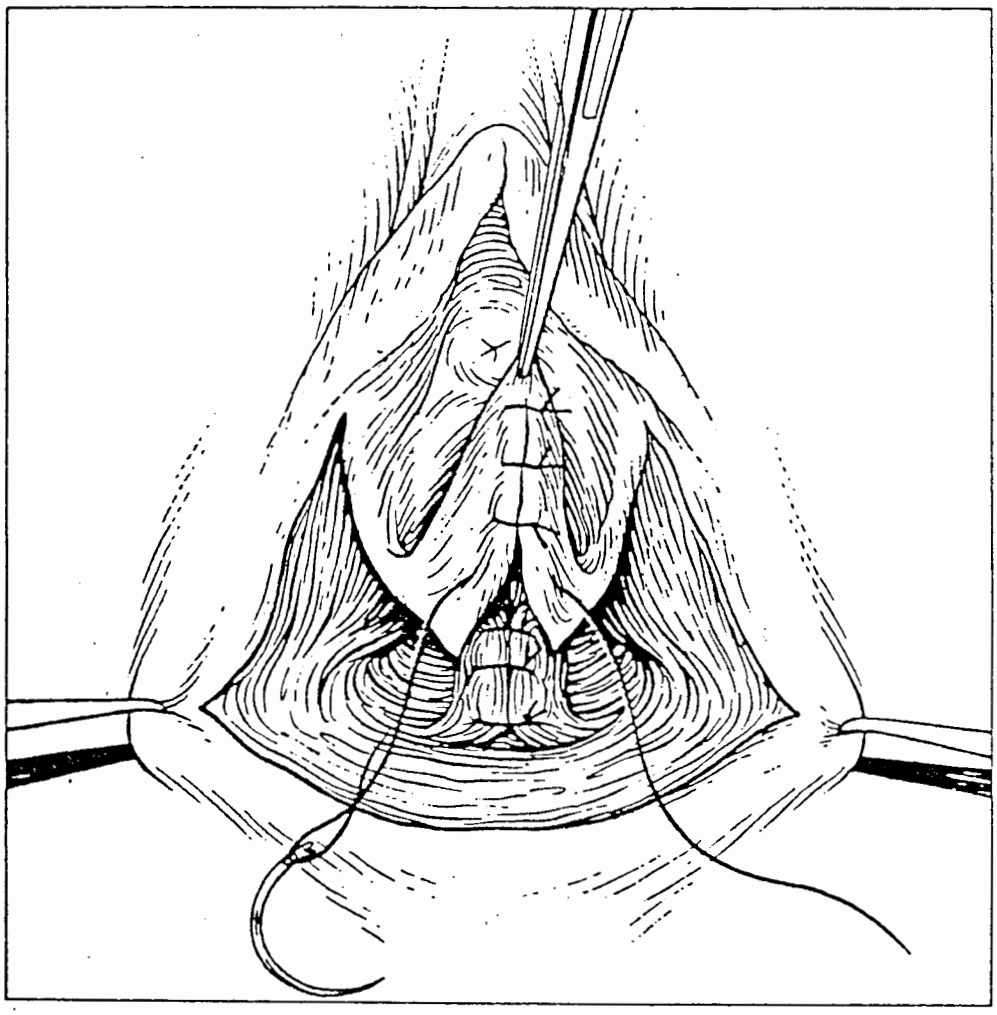


FIGURE 11: LABHARDT PARTIAL COLPOCLEISIS IV
MARTIUS MODIFICATION

CLOSING THE MEDIAN COLPOTOMY INCISION.
THE RECTOVAGINAL SEPTUM HAS BEEN SUTURED
TOGETHER AND THE LEVATOR MUSCLES ARE JOINED.

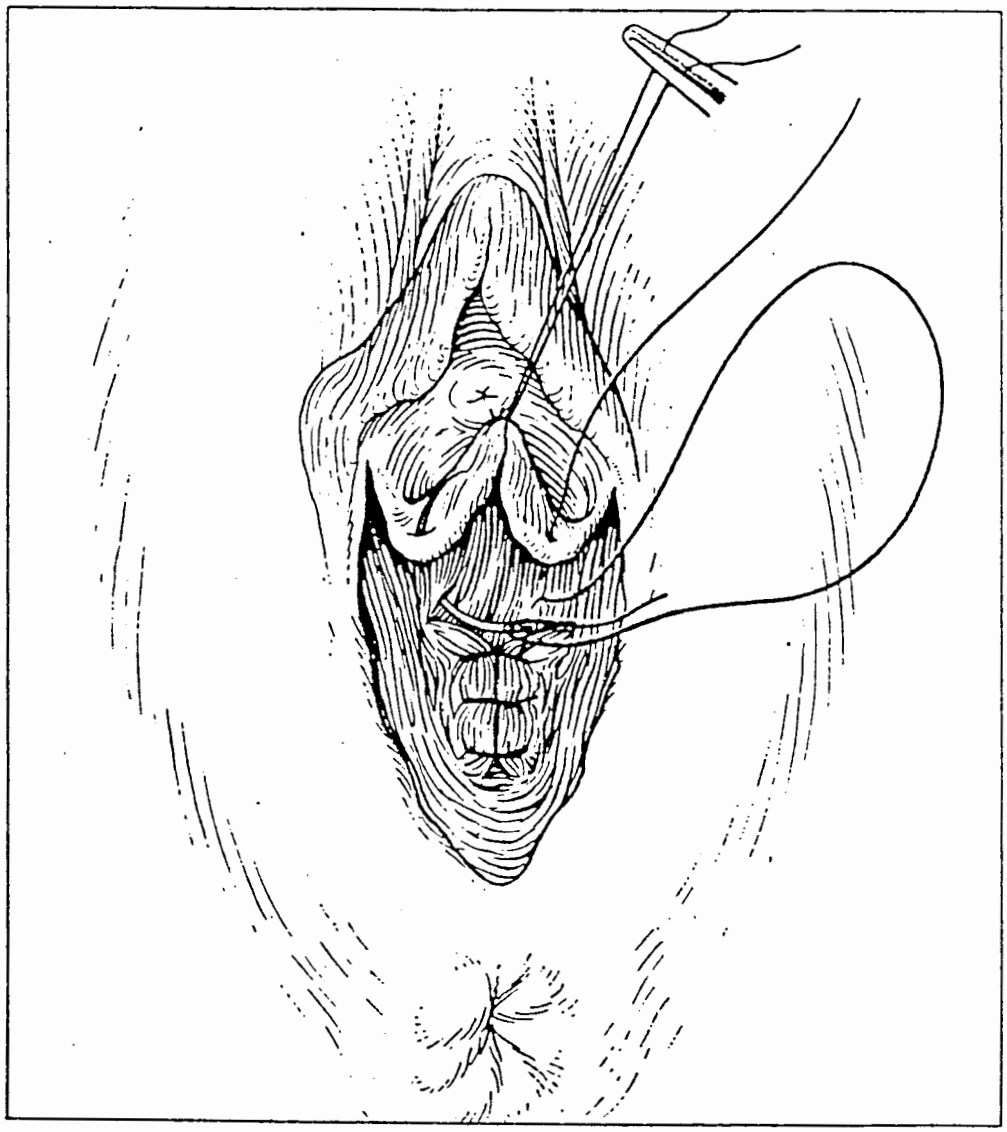


FIGURE 11: LABHARDT PARTIAL COLPOCLEISIS V
MARTIUS MODIFICATION

FORMING A HIGH POSTERIOR COMMISSURE
THE LEVATOR SUTURES ARE IN PLACE.

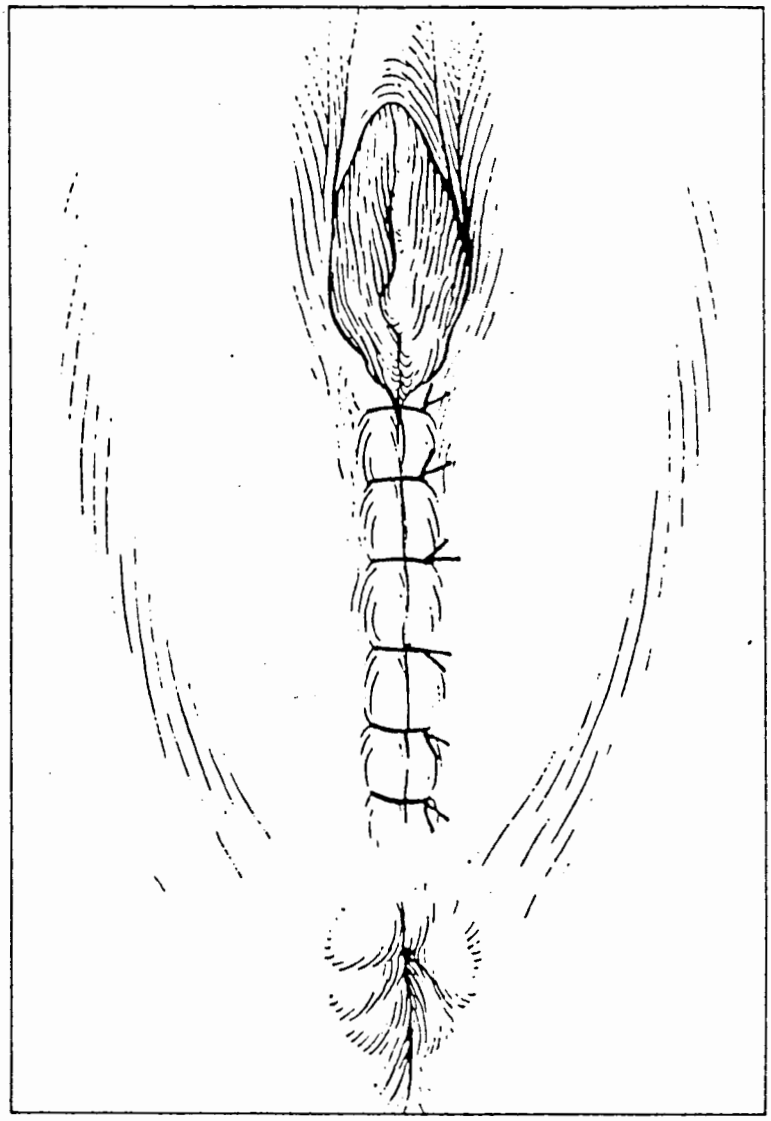


FIGURE 11: LABHARDT PARTIAL COLPOCLEISIS VI MARTIUS MODIFICATION

COMPLETING THE PERINEAL CLOSURE. HIGH PERINEUM EXTENDS UP TO THE URETHRAL MEATUS.

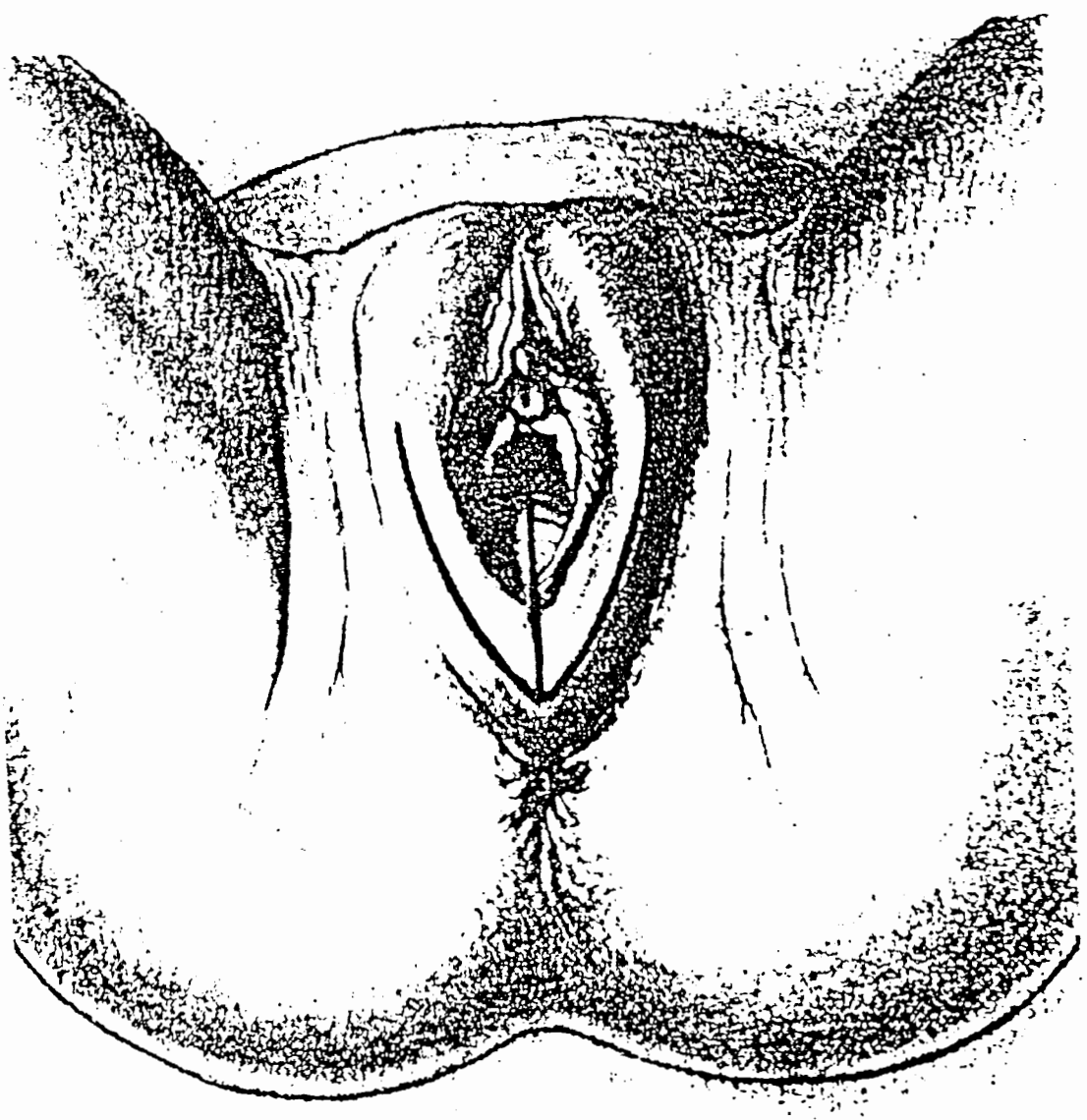


FIGURE 12: LANGMADE TYPE OF PARTIAL COLPOCLEISIS I
INITIAL INCISION

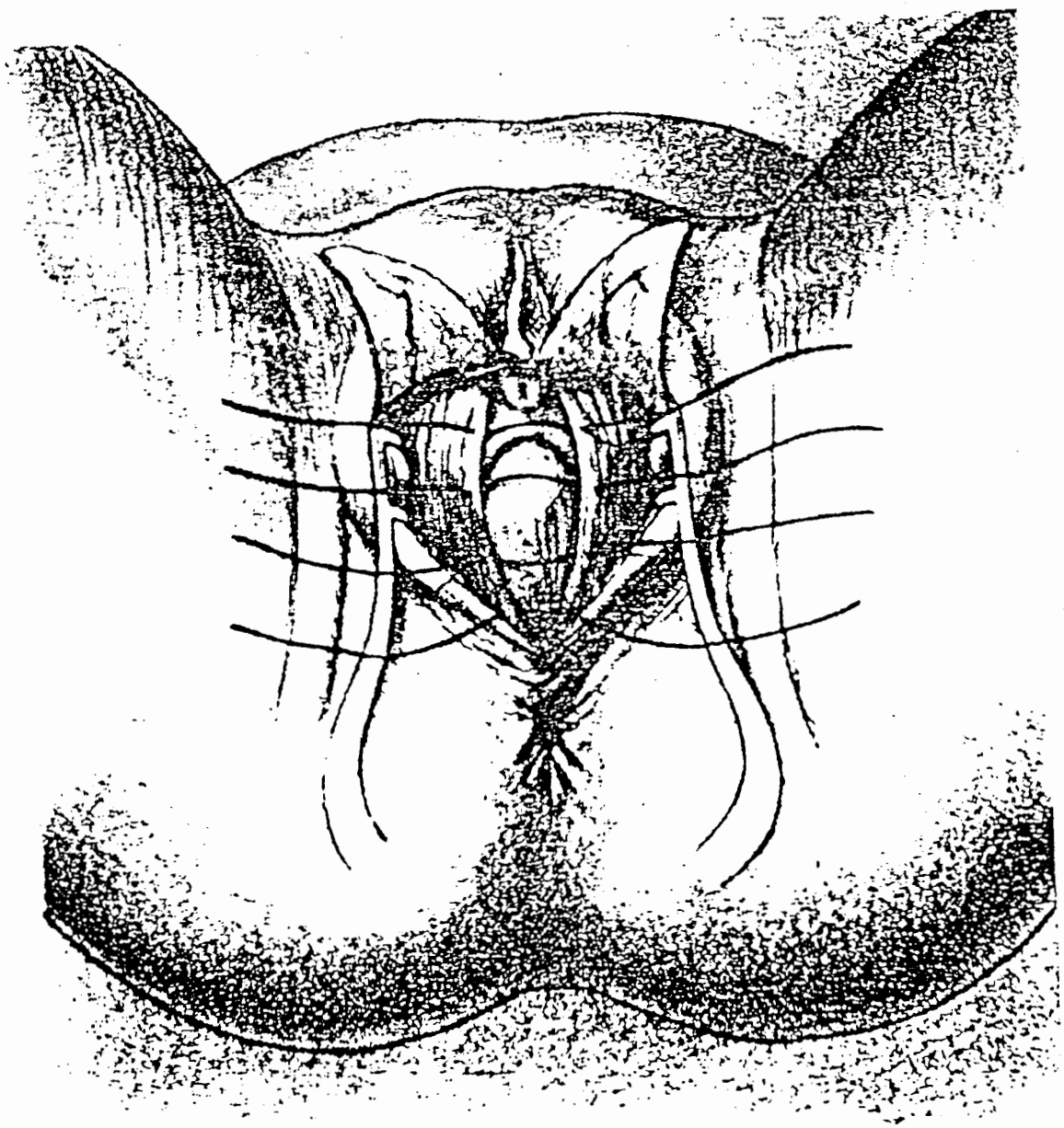


FIGURE 12: LANGMADE TYPE OF PARTIAL COLPOCLEISIS II

LEVATOR ANI SUTURES REACHING UP TO THE EXTERNAL URETHRAL MEATUS.

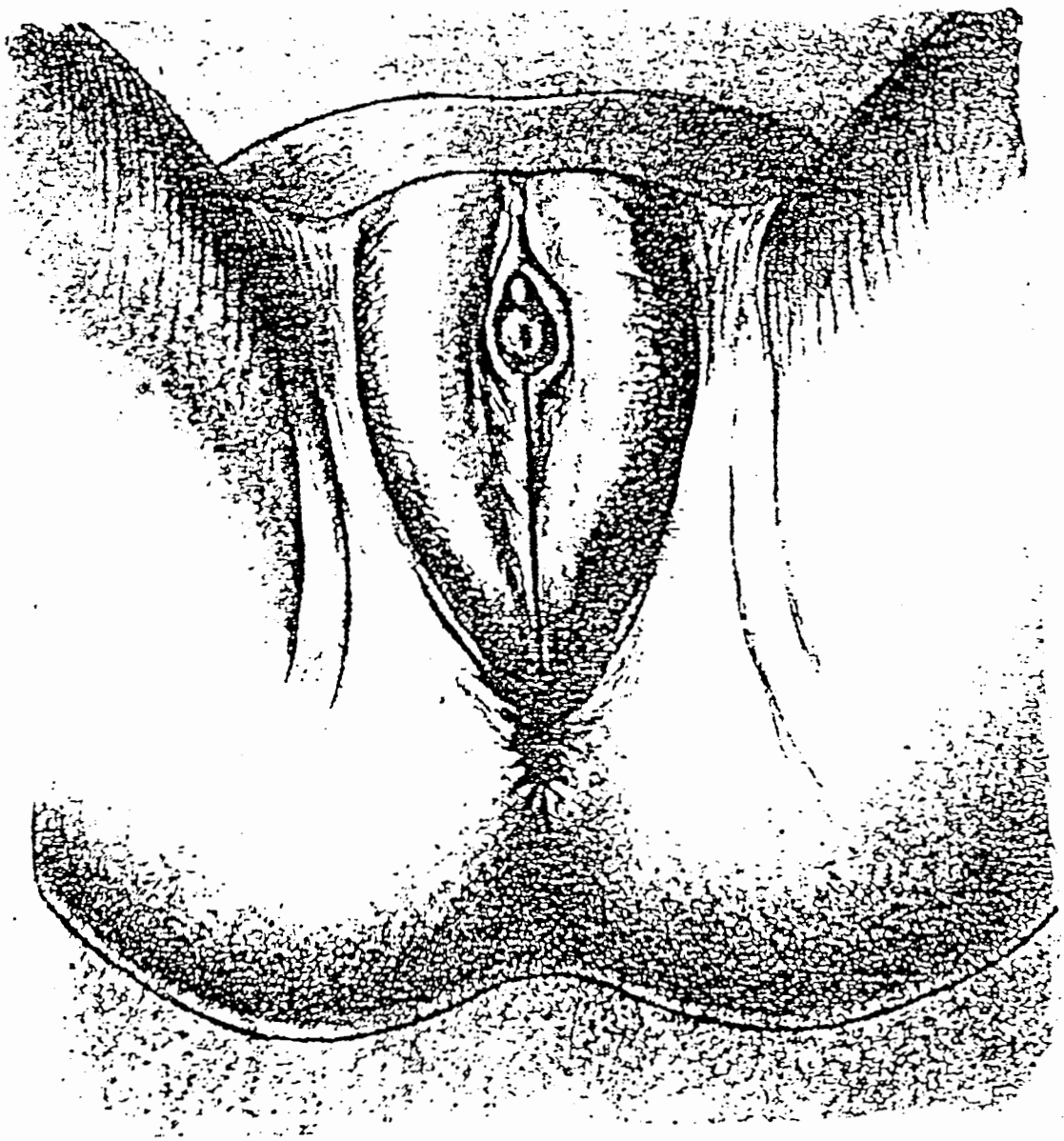


FIGURE 12: LANGMADE TYPE OF PARTIAL COLPOCLEISIS III

COMPLETED PERINEAL CLOSURE.
HIGH PERINEUM EXTENDS UP TO THE
URETHRAL MEATUS.

REFERENCES

Ball TL: Gynaecological Surgery and Urology 1963: 2nd Edition, Section IV, 140-143.

Barry PP, Crescenzi CA, Radovsky LI, Kern DC, Steel K: Why elderly patients refuse hospitalisation, JAGS, 1988, Vol. 36, 419-424.

Bloch B: Transactions of the College of Medicine of South Africa, January-June 1987: Vol. 31: No. 1: 39-50.

Bumm E: 1920, In Liepmann, W. ed, Der Gynäkologische Operationskursus, 2 Aufl. Bd. x S 434, 365-366; 1904, Verh. dtsch. Ges. Gynäk: as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Conill V: Ambulatorische Kolpoepisiokleisis bei senilem Prolapsus, Geburtshilfe und Gynäkologie 1952: Vol. 136: 113-117.

Del Guercio L, Cohn J: Monitoring operative risk in the elderly, 1980: JAM Assoc Vol. 243: 1350-1355.

Dewhurst J: Obstetrics and Gynaecology for Postgraduates 1986: 680-684: 692-694.

Dieffenbach JF: 1829, Chirurgische Erfahrungen, 89: as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Döderlein G, Schirk W: Die Querriegel-Operationen, 1960: Zbl Gynak: Vol. 82: 1551-1558.

Douglas GW, Studdiford WE: Major Gynaecological Surgery in the Aged Patient, Amer J Obstet Gynecol 1954: Vol. 68: 456-458.

Falk HC, Kaufman S: Colpocleisis: The Le Fort Procedure, Obstet Gynec 1955: Vol. 5: 617-619.

Filzwieser G, List W: Morbidity and mortality in elective geriatric surgery. In: Stanton SL (Ed.) Principles of gynaecological surgery. Proceedings of European Academy of Anaesthesiology, Springer, Berlin, New York 1982: 75-82.

Folsome CE, Napp EE, Tanz A: Pelvic findings in the elderly institutionalised female patient: Gynaecological Survey of 680 patients. JAMA 1956: Vol. 161: 1447-1454.

Fothergill WE: 1911 J Obstet Gynaec Brit Empt 20, 44, as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Freund WA: 1895 Post Interposition, quoted in Graham, Eternal Eve, 525, as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Fricke JC: 1832, as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Geddings E: 1840 Amer J Med Sci 26, 357, as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Geldenhuys FG: Genitale prolapse by die Bantoe, 1950: SAMJ: Vol. 24: 749-751.

Goldman J, Ovadia J, Feldberg D: The Neugebauer-Le Fort operation: A Review of 118 colpocleises. Eur J Obstet Gynecol Reprod Biol 1981: Vol. 12: 31-35.

Goldman L, Caldera D, Nussbaum S, et al: Multifactorial index of cardiac risk in non-cardiac surgical procedures: 1977: N Engl J Med: Vol. 297: 845-850.

Goodall JR, Power RMH: A modification of the Le Fort operation for increasing its scope. Am J Obstet Gynecol 1937: Vol. 34: 968-976.

Hanson GE, Keetle WC: The Neugebauer-Le Fort operation. Obstet Gynecol 1969: Vol. 34: 352-356.

Havas J: Atlas zakl. Gynekol Vag Oper VSAV 1967: 180-183.

Heaney NS: Discussion with Goodall, Am J Obstet Gynecol 1937: Vol. 34: 968-976; p. 975.

Hemming JO: 1831, Lond med Gaz 9, 269, as quoted in Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Heyns OS: Genital prolapse. In: GP Charlewood, Bantu gynaecology, 1956: Ch 11, 97-110.

Jeffcoate N: Principles of Gynaecology, 4th Edition, Butterworth, London, 1975: 702-705.

Kahr H: Ein einfaches Operationsverfahren zur Zurückhaltung des Gebärmuttervorfalles bei Matronen, Zentralblatt für Gynäkologie 1937: Vol. 61: 2106-2110.

Käser O, Ikle FA, Davis A: Gynaecologic operations, Grune and Stratton, New York-London 1967: 191-195.

Kent S: The evolution of longevity. Geriatrics 1980: Vol. 35 (1): 98-100, 104.

Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Labhardt A: Kolpoperineokleisis subtotalis, Zentralblatt für Gynäkologie 1932: Vol. 56: 834-838.

Langmade FCH, Oliver JA: Partial colpocleisis. Am J Obstet Gynecol 1986: Vol. 154: 1200-1205.

Last RJ: Anatomy regional and applied, 6th edition, Churchill and Livingstone 1978: 322-327, 353-355.

Le Fort L: Nouveau procede pour la querison du prolapsus uterin, Bull Cen Therap 1877: 92: 337. Quoted in Krige: Vaginal hysterectomy and genital prolaps repair, WUP, Johannesburg 1965: 9-27.

Marsalek J: Operacni lecba zen chorob. 3rd Edition, 1976: Avicenum, Prague, 123-126.

Martius G: Operative Gynaecology, George Thieme Verlag, Stuttgart, Edited by E A Friedman 1982: 205- 212.

Massenbach von W, Ohlenroth G: Resultate der subtotalen Kolpoperineokleisis nach Labhardt in der Modifikation nach H. Martius, Geburtshilfe und Frauenheilkunde 1965: Vol. 25: 695-699.

Massoudnia N: Kahr colpocleisis. International Surgery, 1974: Vol. 59, No. 1, 45-46.

Mazer C, Israel SL: The Le Fort colpocleisis: An analysis of 43 operations. Amer J Obstet Gynec 1948: Vol. 56: 944-949.

Mayo CH, Ward GG: 1915 Surg. Gynec. Obstet. 20, 235, as quoted In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Milley PS, Nichols DH: A correlative investigation of the human rectrovaginal septum: Anat Rec 1969: Vol. 163: 443-451.

Mills WG: The management of genital prolapse, British J of Hospital Medicine November 1978: 586-590.

Nichols DH, Randall CL: Vaginal surgery, 2nd Edition, Williams and Wilkens, Baltimore-London 1983: 1-62.

Neugebauer IA: Einige Worte über die mediane Vaginalnaht als Mittel zur Beseitigung des Gebärmuttervorfalles, Zentralblatt Gynäk 1881: 1: 2:3, 25: 1001, Quoted in Hanson : The Neugebauer-Le Fort operation, Obstet Gynaecol 1969: Vol. 34: 352-356.

Nichols DH, Milley PS, Randall CL: Significance of restoration of normal vaginal depth and axis. Obstet Gynaecol 1970: Vol. 36: 251-256.

O'Rourke K: Developing in younger Physicians an Ethical Perspective toward Geriatric Patients, JAGS: 1988: Vol. 36: No. 6: 565-568.

Paldi E, Peretz A, Pascal B: Gynecologic Surgery in Geriatric Patients. Geriatrics 1966: July: 131-136.

Pratt HJ, Baker RK: Urinary incontinence following the Le Fort operation. Obstet Gynecol 1960: Vol. 16: 722-723.

Quinlivan LG: The gynaecological findings in elderly woman. Geriatrics 1964: September: 654-657.

Ranney AL: Enterocoele, vaginal prolaps, pelvic hernia. Am J Obstet Gynecol 1981: Vol. 140: No. 1: 56-60.

Ricci JV, Thom CH, Kron WL: Cleavage planes in reconstructive vaginal plastic surgery, Am J Surg 1948: Vol. 76: 354-363.

Richardson EH: 1936 Amer J Obstet Gynecol 32, 641, as quoted In Krige CF: Vaginal hysterecomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Robertson EG, Russell JK: Prolapse in the elderly women, British Medical Journal 1966: ii: 1420-1423.

Roux PJ: 1834, In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Russell JK: The dangerous vaginal pessary, BMJ 1961: Vol. 2: 1595-1597.

Sandler PW: Langmans's medical embryology, 5th Edition. Williams and Wilkins, Baltimore 1985: 266-267.

Schaetzing E: Der Längsriegel beim Matronenprolaps. Zbl Gynäk 1959: 81: 1940-1954.

Schaetzing E: Der Längsriegel beim Matronenprolaps. Geburtsh Frauenheilk 1960: 20: 638-642.

Schaetzing E: Gynäkologische Intimkosmetik. Frauenarzt 1973: 6: 386-392.

Schneider A: Assessment of risk factors and surgical outcome. Surg Clin North Am 1983: Vol. 63: 1113-1126.

Seymour D, Pringle R: Postoperative complications in the elderly surgical patient. Gerontology 1983: Vol. 29: 262-270.

Shaw, Sir WF: 1933, Amer J Obstet Gynecol 26, 667: In Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Simpson, Sir JY: 1871, Obstetric and Gynaecological works, Vol. 1, as quoted in Krige CF: Vaginal hysterectomy and genital prolaps repair. Witwatersrand University Press, Johannesburg 1965: 9-27.

Stallworthy JA: Prolapse II, Treatment. BMJ 1971: Vol. 1: 539-540.

Stanton SL: Principles of gynaecological surgery, Springer-Verlag, London-Tokyo 1987: 2: 17-21.

Ward GG: 1915, Quoted in Kelly HA, Gynecology p.334, as quoted in Krige CF: Vaginal hysterectomy and prolaps repair. Witwatersrand University Press, Johannesburg 1965, 9-27.

Watkins TJ: 1899, Amer J Obstet Gynecol 15, 420: In Krige CF: Vaginal hysterectomy and prolaps repair. Witwatersrand University Press, Johannesburg 1965, 9-27.

Williams B: The modern pessary treatment of vaginal prolapse. BMJ 1968: Vol. 201: 782-783.

Wright M: Uterovaginal prolapse. Cont Med Educ 1984: Vol. 2: February: 93-96.