

Construction of Artificial Vagina

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CONGENITAL absence of vagina is an anomaly due to failure of development of the Mullerian ducts and is fortunately a rare malformation. It has been estimated to occur once in every 4000 female births (Counsellor, 1949).

Formation of an artificial vagina was first attempted by Dupuyren in 1817 (Whitacre, 1945).

Since then many ingenious operations have been devised. But, at present, there are only few methods of practical interest.

Frank (1938) recommended a non surgical method for creation of a vagina by inward pressure with a pyrex tube at the centre of the Hymenal region. But in most cases surgical construction of artificial vagina becomes necessary.

Wharton (1938) devised an operation for construction of vagina based upon the remarkable proliferative power of the vestibular epithelium. This technique includes channel dissection of the space between the Bladder and Rectum, and insertion of balsa wood mould in the newly constructed cavity. The use of the mould is continued for 5 to 6 months. By this time, all tendency to contracture of the cavity is over. But main-

tenance to the cavity by an obturator alone requires many months for healing by epithelisation from below. McIndox (1938) described an operation very much like that of Wharton with the additional step of skin grafting the newly formed vaginal cavity with a split thickness skin graft over a mould.

Shears (1960) described a new technique for construction of artificial vagina. His study showed that the plane of separation between Rectum and Bladder was wider-lateral to the meridian and vestiges of Mullerian ducts were present in the connective tissue plane off the meridian. His operation is based on the knowledge of these embryological findings, and includes dilatation of the vestigeal Mullerian ducts and formation of a double barreled canal. The next step is resection of the connective tissue septum and conversion of the double barrel canal into a single cavity.

The epithelium of the vestibule is then allowed to creep upwards in the tunnel. He holds that Embryonic Mullerian elements exert a growth accentuating influence on the vestibular epithelium and also provide an extra island of epithelium. Thus there is rapid epithelisation over a wide area in a short time and there is no need of the

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additional step of skin grafting of the newly formed vaginal canal.

The present study is undertaken to ascertain the advantages and limitations of Shears' operation for construction of artificial vagina.

Material :

In the Present series there are 11 cases of congenital total atresia of vagina. Nine of them were married and two were unmarried. Their age varied from 17 to 21 years.

In 1 case of congenital atresia, a vaginal canal of sufficient depth formed mechanically from persistent coital effort. Operation was considered unnecessary in this case. Surgical construction of artificial vagina was done in the other 10 cases following Shear's modification of Wharton's technique. Split thickness skin graft was inserted at initial operation in one case. This case was used as a control for those where skin graft was avoided.

Operative technique :

A racquet-shaped incision is made around the rim of the rudimentary vaginal pouch, the handle extending backwards over the forchette to include a 1cm. width of skin over the perineum. Dissection of the vestibular flap is carried out from periphery to the mid saggittal plane. So that the completely separated flap is still attached to the deeper tissue in the midline. On either side, in the centre of the contralateral dissected area, a dimple surrounded by fibrils of tissue will be distinguishable. A no. 4 Hegar's dilator is inserted into the centre of each dimple and pushed gently in the direction of the pelvic axis. If the right plane has

been entered the dilator slides into a depth of 10-12 cm. without including any bleeding. The racquet shaped mucosal cum perineal handle skin flap is then dissected off its attachment in the mid sagittal plane and allowed to hang down posteriorly. This flap of vestibular epithelium and split perineal skin will be available later as an isograft for covering the raw surface of the tunnel.

The partially dilated canals on each side are gradually dilated by dilators upto No. 25 Hegar. Thus a double barrelled canal separated by a thick septum results (Fig. 1-2 & Fig. 3-4).

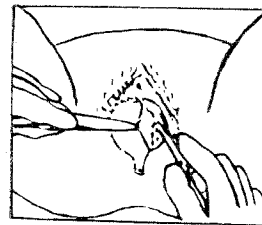


FIG. 1

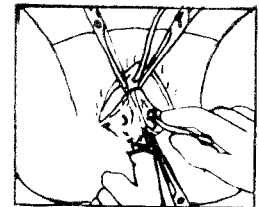


FIG. 2

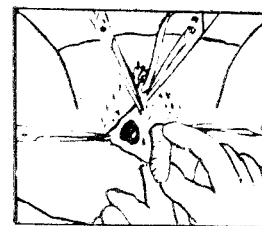


FIG. 3

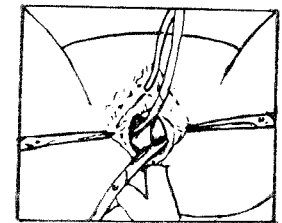


FIG. 4

- Fig. 1—A racquet shaped incision is made around the rim of the rudimentary vaginal pouch. Dissection of the vestibular flap is carried out from the periphery to the mid sagittal plane.
- Fig. 2—On either side, in the centre of the contralateral dissected areas, a dimple surrounded by fibrils of tissue is distinguishable. A No. 2 Hegar's dilator is inserted in each dimple.
- Fig. 3—The canals on each side are gradually dilated until the dilation is carried upto No. 25 Hegar. The result is a double barrel canal with a central septum separating them.
- Fig. 4—The double barrel canal is then converted into a single chamber by resecting the septum between them.

The next step is to convert the double barrel canal into a single chamber by resecting the central septum. The racquet shaped mucosal cum perineal flap is then inserted into the tunnel posteriorly and held in position by a few 000 plain catgut stitches. As a rule there are only a few bleeding points that require ligature. The wall of the canal is usually smooth. A plastic mould of the size of 12 cm x 4 cm is then inserted in the cavity. The vulva is partially sutured together to insure retention of the mould. A Foley's catheter is introduced for continuous drainage of the bladder.

Post-operative

The patient is kept on liquid diet and constipating regimen. The catheter is removed on the 7th post operative day. The mould is removed on 15th day. It is cleaned lubricated and reinserted. The patient is discharged on 28th day. The vaginal mould is worn constantly for 6 months with removal for defaecation. After 6 months it could be left out in married women, but must be inserted at least once daily for another year. Unmarried women must continue to wear the mould constantly until she gets married.

Result :

The depth and width of the newly constructed vaginal canal was adequate in 9 out of 10 cases of congenital absence of vagina (Table I).

Table-I.

Results of operation for construction of artificial vagina

Total No. of absence of vagina. ... 11

No. of cases operated on	...	10
Opn. with Skin graft	...	1
Opn. without Skin graft	...	9
Failure due to contracture	...	1
Complete epithelisation	...	6
Incomplete epithelisation	...	2
Subsequent Skin graft required	...	2
Incision of post op. cicatrix required	...	3
Opn. successful	...	9

It measured 12 x 3 cms. in 6 and 10 x 3 cms in 3 cases. In the remaining 1, there was contracture of the vaginal canal and failure of operation. This happened in an unmarried girl and was due to early removal of the mould epithelial growth was evident in the lower third of the canal at 4 weeks. But it was not complete in any case before 8 weeks, and was sometimes delayed upto 12 weeks. At the end of this period, the walls of the artificial vagina resembled those of normal vagina in 6 cases (Figure 5-6).

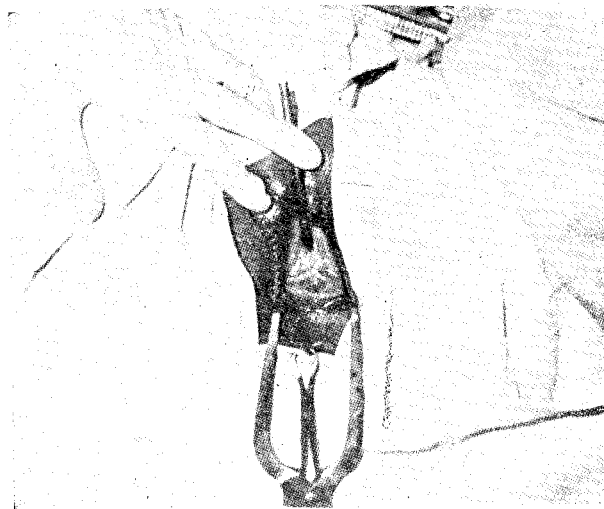


Fig. 5—The picture of congenital absence of vagina.

In them, histology of the section from the

wall also showed stratified squamous epithelium.



Fig. 6—The same case after construction of artificial vagina by Shear's technique without any skin graft.

In the remaining 2, there was formation of granulation tissue at the upper part of the newly constructed canal.

These were cauterised, but it did not promote epithelial growth: A second operation for insertion of skin graft was done in these 2 with good take of the graft, like that in the case where skin grafting was combined with the initial operation. The subsequent result was satisfactory also in these 2 cases. There was no major complication in this series. No patient required blood transfusion during or after operation. There was no incidence of early extrusion of the mould nor was there any complication like vesicovaginal or rectovaginal fistula (Table II).

Table-II

Complications of operation

Haemorrhage (Primary & Secondary)	... Nil
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Urinary fistula	... Nil
Rectal fistula	... Nil
Urinary infection	... 1
Deep vein thrombosis	... Nil

With an object to assess the long term result of the construction operations, all cases were followed up for 5 to 7 years. The artificial vaginal canal remained adequate and permitted satisfactory sexual intercourse in all 8 married women in this series (Table III).

Table-III

Long term result (5—7 Years follow up)

No. of married women-8.

Satisfactory	Satisfactory	Unsatisfactory
Fairly		factory
7	1	Nil

Discussion :

The non-surgical method of formation of vagina as advocated by Frank (1938), would have superseded operative construction of artificial vagina in many instances. But subsequent experience in the non-surgical technique did not substantiate the early good results. However, formation of a deep vagina of sufficient calibre as a mechanical effect of persistent intercourse, in one case in this series, suggests that Frank's method is expected to give good results where the vestibular flap is resilient and where intelligent cooperation of the patient could be depended upon.

Free skin graft was used as early as in 1872. However, real success with the technique awaited insertion of split thickness skin graft over a mould, introduced by

McIndoe in 1938. McIndoe (1959) reported result of this operation in 105 cases. It was excellent in 89 percent, satisfactory in 6 percent and poor in 5 percent of the cases. There was one case each of vesicovaginal and recovaginal fistula in his series.

Simons (1959) followed up 41 cases of McIndoe operation for 1 to 10 years. He reported success in 32, partial success in 3, and failure in 6 cases. There was 1 rectovaginal and 4 urethrovaginal fistula and 2 haemorrhage in this series. Three patients required second skin graft.

In a review of 128 cases in which McIndoe operation was performed. Jackson (1965) reported long term result as satisfactory in 85 percent and unsatisfactory or failure in 15 percent. There was 9 rectovaginal and 2 urethrovaginal fistulae and 2 haemorrhage. Two patients also required second skin graft.

Evans (1967) reviewed the result of surgical construction of vagina in 110 cases of which 100 were congenital and 10 were acquired vaginal atresia. In 23, all cases of congenital absence of vagina, channel was dissected and vaginal mould inserted without skin graft. But the result was satisfactory, only in 2, the remaining 21 had marked degree of vaginal atresia. Other 77 congenital 10 acquired atresia of vagina had vaginal construction with insertion of split thickness skin graft over polyethylene mould. A good result was achieved in 75 percent 13 percent had satisfactory result but an almost equal number had poor outcome. A high incidence of surgical complication was recorded in this

series. Eighteen had vaginal infection. 12 severe urinary infection and 4 had haemorrhage. There were 3 cases each of Rectovaginal and vesicourethro-vaginal fistula. Sixteen required dilatation of the vagina or the incision of the post-operative cicatrix under anaesthesia. His result suggests that the simplicity of McIndoe operation might have been overemphasized. All the same, Evans experience clearly shows that the rate of success of surgical construction of artificial vagina is greatly increased when skin graft is used.

Shears' new technique of construction of artificial vagina by dilatation of the vestigial mullerian ducts is based on proved embryological concept and sound logic. He reported result of the new technique in 18 cases of congenital absence of vagina. There was no complication like haemorrhage, rectovaginal or vesicovaginal fistula. Epithelisation was rapid. Epithelial growth was noted at 2 cm. point above the vestibule on 28th day and epithelisation was complete by 35th day. He claimed good result in all cases in this series.

Like wise, in the present series, there was no complication like haemorrhage and urinary or faecal fistula. Epithelial appearance was noted on 28th day, but the average time taken for epithelial growth at the upper end of the newly constructed canal was as long as 10 weeks. In contrast, skin epithelium was noted at all parts of the artificial vagina on the 15th day in the case where skin graft was inserted with construction of the canal by Shears' technique.

The result in the present series suggests

that Shears' technique of construction of the cavity is safer than channel dissection of the rectovaginal space. But it has the same objection as those of original Wharton's operation. Spontaneous epithelial growth in the newly constructed canal is unpredictable, delayed and is often incomplete. Thus, for uniformly satisfactory result Shears' method of construction of the canal should be combined with insertion of a split thickness skin graft over a mould.

The success of construction of an artificial vagina lies in the normal coital performance over subsequent years of marital life. The satisfactory long term result in all married women in this series is attributed to the continued use of vaginal mould over a long period, early detection and correction of any tendency to contracture, and insertion

of skin graft where-ever epithelial growth was delayed.

Summary :

1. The present series consists of 11 cases of congenital absence of vagina. Surgical construction of artificial vagina was done in 10 cases following Shears' modification of Wharton's technique.
2. Initially, split thickness skin graft was used only in 1 case. Of the remaining 9, only 6 had spontaneous epithelisation of the cavity, 2 subsequently required insertion of skin graft, and 1 had contracture of vagina.
3. Importance of skin grafting of the newly constructed canal is emphasized.
4. Long term result was satisfactory in all married women.

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