

## Research Article

# Vaginoplasty Outcomes in Terms of Post-Operative Complications and Patient Satisfaction after Reconstruction with Bilateral Pudendal Thigh Flap

Farhat-ul-Ann Tayyaba,<sup>1</sup> Zahid Tayyab,<sup>2</sup> Hafsa Noreen,<sup>3</sup> Brig Tahir Mosood Ahmad,<sup>4</sup> Javeria Mahmood,<sup>5</sup> Akasha Amber Awan<sup>6</sup>

<sup>1,3,5,6</sup>Bahawal Victoria Hospital, Bahawalpur, <sup>2</sup>Department of Plastic, Reconstructive Surgery and Burn Unit, Mayo Hospital, KEMU, Lahore, <sup>4</sup>CMH Peshawar

### Abstract |

**Background:** Vaginal agenesis is a rare congenital anomaly. Vaginal reconstruction with adequate length having good sensations and minimal complications is a challenging task. There are multiple methods of reconstruction with their own pros and cons and each have variable learning curve. The aim of our study is to see the patient satisfaction and safety of pudendal thigh flap for vaginal reconstruction in congenital vaginal agenesis in our population.

**Methodology:** This prospective study was conducted at Bahawal Victoria Hospital, Millat Hospital Bahawalpur, and Mayo Hospital, Lahore. Data was collected over a 3-year period from November 2018 to November 2021. All patients of vaginal agenesis who underwent vaginal reconstruction with pudendal thigh flap were included. Outcomes were assessed in terms of vaginal length achieved, patients' satisfaction with their sexual lives, and post-operative complications.

**Results:** A total of 8 patients underwent vaginal reconstruction with bilateral pudendal thigh flaps during the study period. 87.5% of married females were sexually satisfied. Vaginal length of at least 6 cm was achieved in all patients. Wound infection was observed in two (25%) patients, wound dehiscence in one (12.5%), and folliculitis in two (25%).

**Conclusion:** Pudendal thigh flap is a sensate and reliable flap with excellent patient satisfaction and acceptable post-operative complications.

Received | 07-02-2022: Accepted | 05-08-2022

Corresponding Author |

Keywords | Vaginal Agenesis, pudendal thigh flap, vaginal reconstruction.

### Introduction

Vaginal agenesis is a rare malformation of the Mullerian duct system. Its incidence ranges between 1/4000 and 1/5000.<sup>1</sup> It may occur as an independent developmental disorder or as a part of other syndromic complexes, most common being Mayer-Rokitansky-Kuster-Hauser (MRKH) Syndrome. Diagnosis is often made at adolescence due to primary amenorrhea or coital problems.<sup>2</sup> Reconstructing a functional neo-vagina is a very challenging task. It should be of an appropriate length and caliber, and with good aesthetic appearance<sup>3</sup>. Anatomic deformity and the presence or absence of

internal genital viscera will determine the timing of surgical intervention. There is difference of opinion with respect to this.<sup>4</sup>

There are many surgical and non-surgical methods for vaginal reconstruction, each with their own pros and cons. In the early days, serial dilatation was practiced. This is a non-operative technique and has very low morbidity, but it requires long extended duration of stent use to be effective.<sup>5</sup>

McIndoe technique with use of split skin graft is considered as the gold standard by which all other techniques are compared. It's a relatively simple procedure, carries

less morbidity, and a reasonable vaginal length is often achieved.<sup>6</sup> Disadvantage is shrinkage of the cavity in overtime due to contraction of the skin. To avoid this development, the patient has to wear some sort of stent for a long period of time, which is cumbersome. Use of a full thickness skin graft (FTSG) rather than split skin was carried out in order to reduce contraction of the graft, but it carries a higher donor site morbidity. Also the necessity of wearing the stent remains.<sup>7</sup> Use of amniotic membrane to line the cavity rather than skin graft has been done but results are not satisfactory, as amniotic membrane never takes but acts as a biological dressing that helps in accelerating the wound healing. Again, this also requires wearing a stent.<sup>8</sup> Baldwin popularized the use of ileum and sigmoid colon to reconstruct the vagina.<sup>9,10</sup> The added morbidity of intra-abdominal surgery is the major restricting factor. Other disadvantages of ileum include bleeding with coital trauma, excessive mucus, periumbilical pain related to coitus, and tendency to prolapse.<sup>11,12</sup>

To overcome the problems associated with use of grafts, flap reconstruction was implicated. Gracilis myocutaneous flap became very popular for perineal reconstruction. The disadvantage is that pedicle dissection is tedious, and chances of flap failure are quite high especially for a surgeon in his early learning curve<sup>13</sup>. Furthermore it produces a really conspicuous thigh scar. Wee and Joseph first described pudendal thigh flap and used it for vaginal reconstruction in cases of pelvic exenteration.<sup>14</sup> Comparing this way of reconstruction with above-mentioned procedures, the pudendal thigh flap is an ideal flap with a robust blood supply, least chances of flap necrosis and a short learning curve for the surgeon.<sup>15,16</sup>

The aim of our study is to assess our results of vaginal reconstruction using bilateral pudendal thigh flap, and to standardize and simplify the procedure for consistent and acceptable results.

### Methodology

This prospective study was conducted at Bahawal Victoria Hospital, Millat Hospital Bahawalpur, and Mayo Hospital Lahore, over a 3-year period from November 2018 to November 2021. All patients who presented with congenital vaginal agenesis secondary to Mayer-Rokitansky-Kuster Hauser Syndrome were included in the study. All patients underwent standard pre-op evaluation, including baseline investigations, pelvic ultrasonography, karyotyping and MRI pelvis. Informed written consent was signed from all patients regarding surgery, pre and post-operative photography and anesthesia.

### Surgical procedure:

In all patients the neo-vagina was created using bilateral

pudendal thigh flaps. The procedure was carried out under general anesthesia. After placing the patient in the lithotomy position, bladder was catheterized and emptied. We used a hand-held Doppler probe to identify posterior labial artery and then marked the skin territory of the flap, which was approximately 15 cm long and 5 to 6 cm wide extending from lateral side of labia majora to medial thigh laterally (Figure 1).

A pocket was made between the rectum and bladder with blunt dissection avoiding iatrogenic injury to surrounding vital structures.



**Figure 1:** *Marking the bilateral pudendal thigh flap.*

Dissection of flap started from the periphery of flap, from anterior to posterior and was done in the sub-facial plane. When the dissection reached the adductor muscle, we elevated epimysium of adductor longus muscle along with flap. Posteriorly in the buttock area, after rechecking the location of the pedicle with hand-held Doppler, we performed subcutaneous undermining around the pedicle carefully toward the base of flap in order to facilitate proper rotation of the flap (Figure 2).

A subcutaneous tunnel was made in the postero-lateral aspect of the introitus, for transposition of the flap. This tunnel was created wide enough to avoid compression of the pedicle. The portion of flaps present underneath the tunnel were de-epithelialized. Tubularization of the flap was done starting from posterior to anterior.



**Figure 2:** *Dissection of bilateral pudendal thigh flaps*

The tubularized flap was transported in space created previously. The external opening was formed by suturing ectodermal pit junction with ends of the flap. Primary

closure of the donor site was done (Figure 3).



**Figure 3:** Insetting of pudendal thigh flap and primary closure of donor sites



**Figure 6:** patient 3: (a) pre operative (b) inseting of flap (c) immediate post operative (d) three weeks post operative.

Post-operative care: Customized conformer is placed in neovaginal space to obliterate dead space to prevent hematoma and seroma. T-bandage was secured to give gentle external compression. Complete bed rest was advised for initial 48 hours, with the patients thighs maintained in abduction. Conformer was first removed after 48 hours, vagina washed with pyodine, and the conformer replaced after applying new condom (lubricated with paraffin based antibiotic ointment) over it. Urinary catheter was kept for 1 week. All patients received triple intravenous antibiotic regimen including 1st generation cephalosporin, aminoglycoside and Metronidazole for five days.

Patients were discharged on 7<sup>th</sup> post operative day. Follow up was taken weekly for one month and fortnightly for 3 months and then yearly.

**Outcome measures:**

- 1) Flap survival (assessed by clinical examination on 5th post-operative day)
- 2) Wound dehiscence/infection (assessed by clinical examination at each change of dressing during the hospital stay, and at the follow-up visit)
- 3) Vaginal length achieved (measured in centimeters, as the length of conformer easily inserted into the neovagina, at the 3-month follow-up visit)
- 4) Sexual satisfaction (categorized as ‘satisfactory’ or ‘unsatisfactory’ and rated by sexually active patient, at their 3-month follow-up visit)

**Results**

A total of 8 patients were included in the study. The



**Figure 4** patient 1: (a) pre operative (b) flap markings (c) two weeks post operative (d) three months follow up



**Figure 5:** Patient 2: (a) pre operative flap markings (b) flaps raised (c) immediate post operative (d) one month post operative.

mean age was 25 years (range 21 to 32 years). All patients had well-developed secondary sexual characteristics, as per detailed clinical examination. Of these, two were already married at the time of presentation. Three patients got married within 3 months of the surgery. Main presenting complains was primary amenorrhea in all, and failure of coitus in the 2 married females.

There were no incidences of flap necrosis, as the flaps survived in all<sup>18</sup> (100%) patients

Mean vaginal length achieved was 8.4cm. All patients achieved a length of at least 6 cm. Table 1 depicts the details of vaginal length achieved in all patients.

Two patients (25%) had post-operative wound infection, one (12.5%) patient experienced wound dehiscence at introitus, and two patients (25%) presented with folliculitis of hair follicles transferred into vagina. The details of these are depicted in table 2.

Sexual satisfaction was assessed at the 3 month follow up visit for each patient. Of the 5 females who were sexually active at the time of assessment, 4 reported being satisfied with their sexual life. The one patient who reported being unsatisfied was found, on further probing, to have other ongoing problems in her relationship. Figures 4-6 show representative patients at various stages of their treatment.

**Table 1:** Length of neo-vagina

Length of neo-vagina (cm)	n (%)
6 – 6.9	1
7 – 7.9	2
8 – 8.9	3
>9	2

**Table 2:** Complications and their management

Complication	n (%)	Management
Wound infection	2	Settled with vaginal wash
Wound dehiscence	1	Healed with secondary intention
Folliculitis in neo-vagina	2	Managed with oral antibiotic therapy

## Discussion

Vaginal reconstruction is a very tricky task. The main purpose of reconstruction is to make the female sexually active with good psychological health and restoration of body image. At the same time, the reconstructive procedure should be safe with minimum complications<sup>17</sup>.

In our set-up we mostly performed Mc Indoe's procedure as it is relatively straightforward, but in the long term neo-vagina got stenosed especially in patients who

were not sexually active and who did not comply with regular use of silicon stents. In contrast to this, pudendal thigh flap provides sensate pliable skin in neovagina, and stent is not needed beyond 2 weeks. Sexual activities can be started as soon as healing takes place, which is 30 to 40 days on average. Moreover there is minimal donor site morbidity with well hidden scar in groin crease. Reliability of flap is also proven by Stan Monstrey in his study where all 31 flaps survived<sup>18</sup>. Similarly in another study conducted by Lis & Liu Y, there was only one flap necrosis in 24 flaps<sup>19</sup>.

For flap survival we recommend few maneuvers. Use of hand-held doppler to identify and place the vascular pedicle in center of flap improves outcomes. If hand-held doppler is not available, one should remain more medial as vascular pedicle lies medially<sup>20</sup>. One should avoid isolating and identifying main vessel, rather a wide base of pedicle should be maintained. Subcutaneous tunnel should be wide enough so as not to compress the pedicle. During mobilization, one must make sure there is no twist in the pedicle base. Lastly, a customized conformer should be made by placing foam over 10 cc syringe for proper pressure distribution to prevent hematoma and seroma formation.

In our study, mean vaginal length of 8.4cm was achieved, with all patients having a length of at least 6cm. Ganatra observed mean vaginal length of 7cm which is comparable to our study.<sup>21</sup> In one patient of our study who was not sexually active length decreased from 8.6cm to 6.2cm. This was due to neovaginal vault prolapse. Study conducted by Ajmal S reported average length of 9.3cm<sup>22</sup>. Loss of neovaginal length was observed in the first two cases, after which they started anchoring upper end of neo-vagina to perivesical and perirectal tissues which improved their outcomes. However, we never tried this due to fear of injury to pelvic organs and the technical difficulty in execution of these stitches. We observed that use of proper postoperative customized conformer for 15 days reduced incidence of this complication.

Pudendal thigh flap has some disadvantages. It requires longer operative time and a longer learning curve than McIndoe technique. Wound infection and dehiscence is relatively common, and are usually dealt with daily vaginal washes with antiseptic lotions. In our study we observed wound infection in 2 cases and wound dehiscence in one for which we advised proper wound care and healing occurred with secondary intention. Study conducted by Fein L.A reported similar immediate complications of wound infection and dehiscence and

they also advised same conservative measures<sup>23</sup>.

Another long term problem is hair growth in neo-vagina especially at introitus that looks aesthetically bad. Moreover one of our patients presented with late folliculitis of these hair follicles. This is due to negligence of proper cleaning of vaginal canal. This problem may be solved by regular removal of hair with depilatory creams. A permanent solution with laser hair removal may also be done at the extra cost that comes with it.

Functional outcome in terms of both partner's sexual satisfaction is good in all married patients with no post coital dyspareunia.

Limitations of our study are small sample size with relatively short follow-up. We recommend multicenter study to increase number of patients of this rare congenital anomaly, with possible comparison of a few selected routinely performed surgical procedures.

### Conclusion

Pudendal thigh flap is a safe and reliable option for vaginal reconstruction if we adhere to basic principles of proper design of flap, gentle tissue handling, use of magnification, adequate tunnel, and good and consistent post-operative care.

Both functional and cosmetic outcomes are satisfactory, with a low donor site morbidity, and no requirement of long term use of regional stent.

### Conflict of Interest

*None*

### Funding Source

*None*

### References

- Fontana L, Gentilin B, Fedele L, et al. Genetics of Mayer-Rokitansky-Kuster-Hauser (MRKH) syndrome. *clin genet*. 2017;91:233-46.
- Müllerian agenesis: Diagnosis, management and treatment. ACOG Committee Opinion no. 728. American College of obstetricians and gynecologists. *obstet gynecol*. 2018;131:35-42.
- Davies MC, Creighton SM. Vaginoplasty. *Curr Opin Urol*. 2007;17:415-8.
- Davies MC, Creighton SM, Woodhouse CRJ. The pitfalls of vaginal construction. *BJU Int* 2005;95:1293-8.
- Ismail-Pratt IS, Bikoo M, Liao LM, Conway GS, Creighton SM. Normalization of the vagina by dilator treatment alone in Complete Androgen Insensitivity Syndrome and Mayer-Rokitansky-Kuster-Hauser Syndrome. *Hum Reprod*. 2007;22:2020-4.
- Bastu E, Akhan SE, Mutlu MF, Nehir A, Yumru H, Hocaoglu E, et al. Treatment of vaginal agenesis using a modified McIndoe's Technique-long term follow up of 23 patients and literature review. *Can J Plast Surg*. 2012;20(4):241-4.
- Karapinar OS, Özkan M, Okyay AG, Şahin H, Dolapçioğlu KS. Evaluation of vaginal agenesis treated with the modified McIndoe technique: a retrospective study. *J Turk Ger Gynecol Assoc* 2016;17:101-5.
- Ye G, Özgenel, Özcan M. Neovaginal construction with buccal mucosal grafts. *Plast Reconstr Surg* 2003; 111: 2250-4.
- Baldwin JF: XIV. The Formation of an Artificial Vagina by Intestinal Transplantation. *Ann Surg*. 1904; 40: 398-403.
- Piro C, Asensio M, Martín JA, Giné C, Ormaetxea E, Chicaiza E: Sigmoid colon vaginoplasty: experience with five cases. *Cir Pediatr*. 2006; 19: 19-22.
- Bouman MB, van Zeijl MC, Buncamper ME, et al. Intestinal vaginoplasty revisited: a review of surgical techniques, complications, and sexual function. *J Sex Med*. 2014; 11:1835-1847
- Kim SK, Park JH, Lee KC. Long-term results in patients after rectosigmoid vaginoplasty. *Plast Reconstr Surg* 2003;112:143-51.
- Singh M, Kinsley S, Huang A, Ricci JA, Clancy TE, Irani J, et al. Gracilis flap reconstruction of the perineum: an outcomes analysis. *J Am Coll Surg*. (2016) 223: 602-10.
- Wee JT, Joseph VT. A new technique of vaginal reconstruction using neurovascular pudendal thigh flaps: A preliminary report. *Plast Reconstr Surg*. 1989; 83:701.
- Monstrey S, Blondeel P, Landuyt KV. The versatility of the pudendal thigh fasciocutaneous flap used as an island flap. *Plast Reconstr Surg* 2001;107:719-25.
- Mostafa W. Pudendal thigh flap in vaginal agenesis. *Egypt, J Plast Reconstr Surg*. 2012;36(1):99-108
- Walton, L, Gehrig, P, "Reconstructive Surgery After Treatment of Female Genital Tract Malignancies" *Glob. Libr.women's med.*(ISSN: 1756-2228) 2008; DOI 10.3843/GLOWM.10265.
- Stan M, Phillip B, Koenraad VL, Alexis V, Patrick T, Guido M. The versatility of pudendal thigh flap used as an island flap. *Plast Reconstr Surg* 2001; 107: 719-24.
- Li S, Liu Y, Li Y. Twelve cases of vaginal reconstruction using neurovascular pudendal thigh flaps. *Zhonghua Fu Chan Ke Za Zhi* 2000;35:216-8.
- Tham NL, Pan WR, Rozen WM, et al. The pudendal thigh flap for vaginal reconstruction:optimising flap survival. *J Plast Reconstr Aesthet Surg* 63:826-831, 2010.
- Ganatra MA, Ansari NU. Pudendal thigh flap for congenital absence of vagina. *Pak Med Assoc* 2005; 55: 143-5.
- Ajmal S, Yusuf K. Vaginoplasty with bilateral islanded pudendal thigh flaps. *J Ayub Med Coll Abbottabad* 22: 1-6, 2010.
- Fein L.A., Salgado C.J., Pearson J.M. (2017) Singapore Flap (Pudendal Thigh Fasciocutaneous Flap) for Vaginal Reconstruction. In: Anh Tran T samira