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Fabrication Of A Prosthetic Dilator For Vaginal Agenesis: A Case Report

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Abstract

Vaginal agenesis is one of the major congenital anomalies affecting women in which the reproductive system fails to develop in the mother's uterus. The child may be born without a vagina or have other reproductive organs absent. Apart from prevailing physical abnormality it can cause severe psychological stress in young women. Postoperative prosthetic vaginal dilators are indicated in patients treated surgically for vaginal agenesis. This case report presents a young woman with vaginal agenesis who was referred from the Dept. of Plastic Surgery to the Dept. of Prosthodontics for the fabrication of a dilation prosthesis which was to be used after the surgery to maintain a patent passage and to lead a normal life thereafter.

Keywords: Vaginal agenesis, vaginal dilators, vaginal prosthesis, McIndoe procedure, Mullerian Aplasia

Introduction

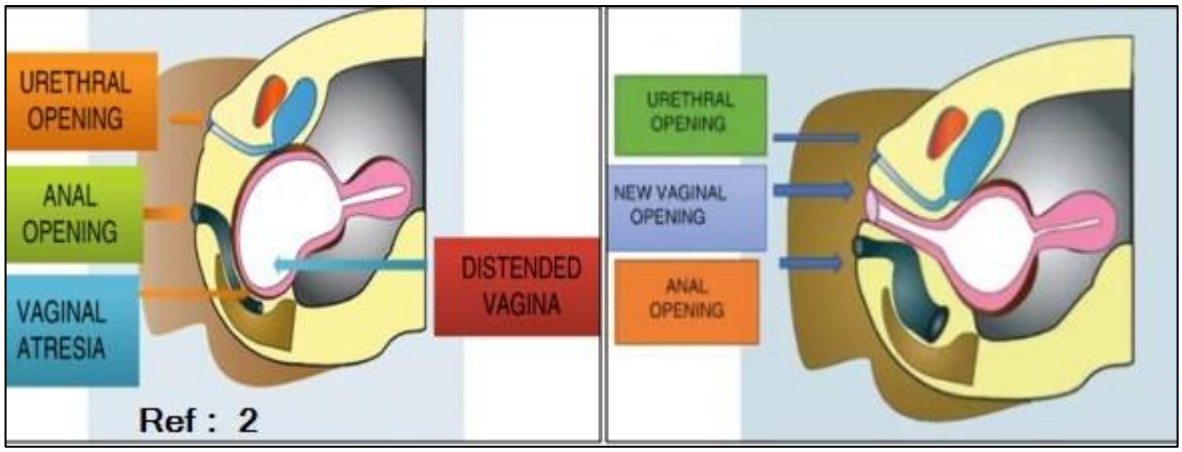
Vaginal agenesis is a condition that develops before birth, in which the muscular canal to the uterus fails to develop fully. It is often accompanied by a small uterus or more commonly no uterus at all. Vaginal agenesis is one of the main congenital anomalies affecting the female genital tract. It affects 1 out of 4000 to 5000 female infants[1].

This condition is known by various names like:

1. Congenital Absence Of Uterus And Vagina (CAUV),
2. Mullerian Aplasia (MA),
3. Genital Renal Ear Syndrome (GRES), And
4. Mayer-Rokitansky-kuster-Hausers Syndrome (MRKH)

Etiology

MRKH Syndrome/ Mullerian Aplasia (MA), results from embryologic failure of development of the mullerian duct, resulting in agenesis or hypoplasia of the uterus and vagina[1, 2]



Clinical Features

Patients normally present with primary amenorrhea but have normal secondary sexual characteristics and are genetically female. They have an absent or short blind-ending vagina. Most affected individuals have small, rudimentary uterine bulbs without functional endometrium. The ovaries are normal in structure and function because of their different embryologic source. There is an association with other congenital anomalies; 30% have renal anomalies and 12% have skeletal, mainly vertebral anomalies. 2

Treatment aims to create a neovagina either by surgical (vaginoplasty) and non-surgical procedures (prosthetic dilators). The nonsurgical Frank and Ingram methods of progressive self-vaginal dilation with handheld dilators or dilators mounted on a bicycle seat stool carries the least morbidity and requires a prolonged period of treatment and may cause discomfort. Surgical options for the creation of a neovagina include split-thickness skin graft (McIndoe procedure) or full-thickness skin graft, sigmoid vaginoplasty, peritoneal graft (Davydov procedure) for satisfactory results.3, 4 Prosthetic vaginal prostheses are indicated after surgical intervention of vaginal agenesis to prevent the possible contraction of the reconstructed neovagina.

Literature review recommend the use of acrylic prosthesis postoperatively for vaginoplasty procedures. Prosthetic vaginal prosthesis can be made with materials including acrylic and silicone. Acrylic are the choice of material for vaginal prosthesis as they are harder than those made with silicone materials and they tend to reduce failure in achieving the recommended size of the vagina. However, rigid or semi rigid prosthesis tend to cause development of several complications, such as graft loss, pressure-related bladder or rectum perforations, fibrosis and contracture formation and most importantly, discomfort to the patients.5 ,6

This paper reports a case of a 21 year old girl who was diagnosed with vaginal agenesis of the proximal two-thirds of the vagina. The uterus and the ovaries appeared normal on MRI scan. She underwent modified McIndoe's vaginoplasty with full thickness skin grafts taken from the both groins to line the surgically created neo-vagina.4,7,8. The neovagina was communicated with the cervical canal. Following the surgery the full thickness skin graft in the neovagina had taken well and was planned for a vaginal prosthesis to prevent the contraction of the neovaginal skin graft. Polymethylmethacrylate (PMMA) was used for the fabrication of a vaginal prosthesis to prevent contraction of the created neovagina

Fabrication Of The Prosthesis

1. The required dimensions of the prosthesis were suggested by the Plastic Surgeon as 9 cm in length with a tapered design of 3 cm maximum diameter and 2 cm minimum diameter. A replica of the prosthesis with required inner dimensions were made with modelling wax (DPI Limited Mumbai,India) inorder to maintain the hollow passage. (Fig 1)

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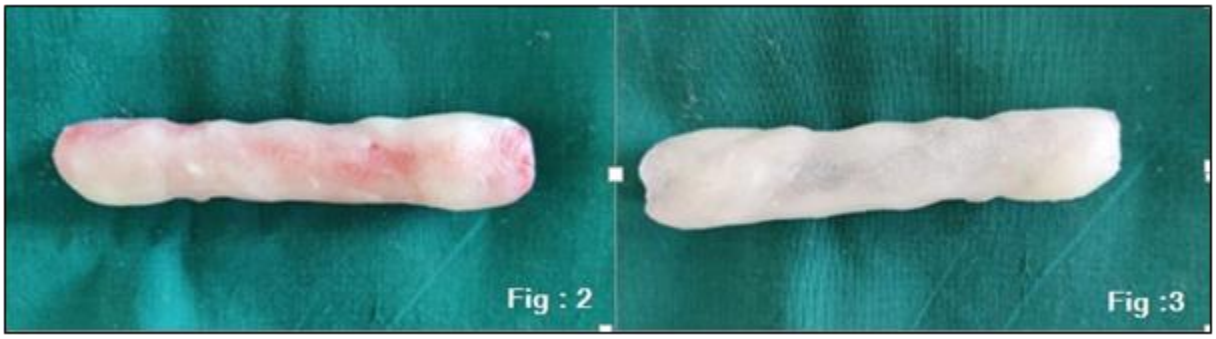
2. Self-cure acrylic resin (DPI limited, Mumbai, India) were then adapted over the wax replica (Fig2) inorder to maintain the minimum dimension after which the wax is removed. (Fig 3)



3. Now we got a mould with the specified inner dimensions for the opening. Over which wax up is done to the specified major diameter. (Fig 4) This is carried out in two stages inorder to maintain the major and minor dimension as per the guidelines received from the plastic surgeon.

4. Investing the wax mould in gypsum investment material (Dental stone Type III- Asian Chemicals,Rajkot, India) in two compartments such that the resin will not overflow into the passage. As the dimension of the specimen exceeds the dimension of a dental flask, the investing procedure is carried out in a kidney tray which can accommodate the length and width of the specimen. A layer of petroleum jelly (Jyothi laboratories, Bengaluru, India) is applied for easy separation. (Fig 5)

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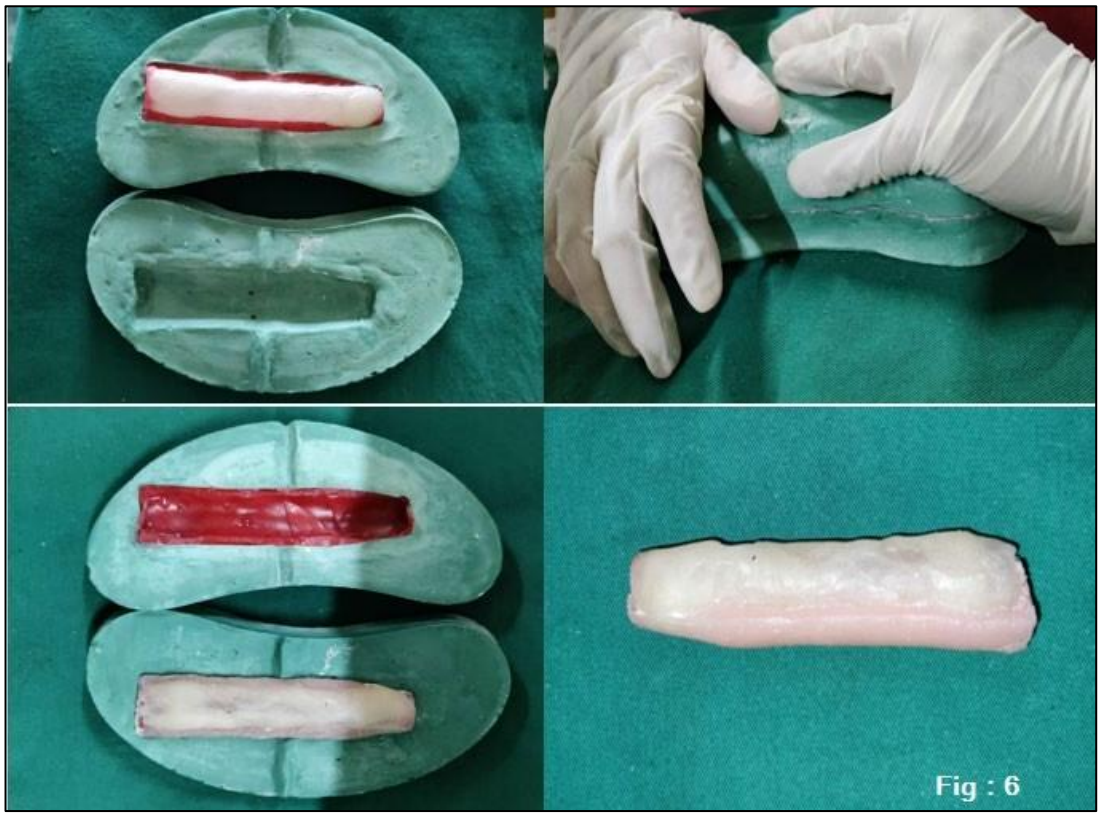
5. Once the investment material is set, the two part investments are separated. Polymer and monomer of polymethylmethacrylate is mixed to a dough stage and added to separate sections filling each side at a time. (Fig 6). After curing the half section, wax is removed from the remaining portion, PMMA is added and the investment is closed tightly and cured.



6. When the resin is cured the prosthesis is taken out from the plaster mould and examined for any voids or air bubbles. Final finishing and polishing is done with tungsten carbide burs and acrylic stone burs in a dental lathe (Confident, India). The prosthesis were ground to final dimension with abrasive paper. Pumice was used for final polishing. Care should be taken to avoid any rough surfaces over the final prosthesis (Fig 7).

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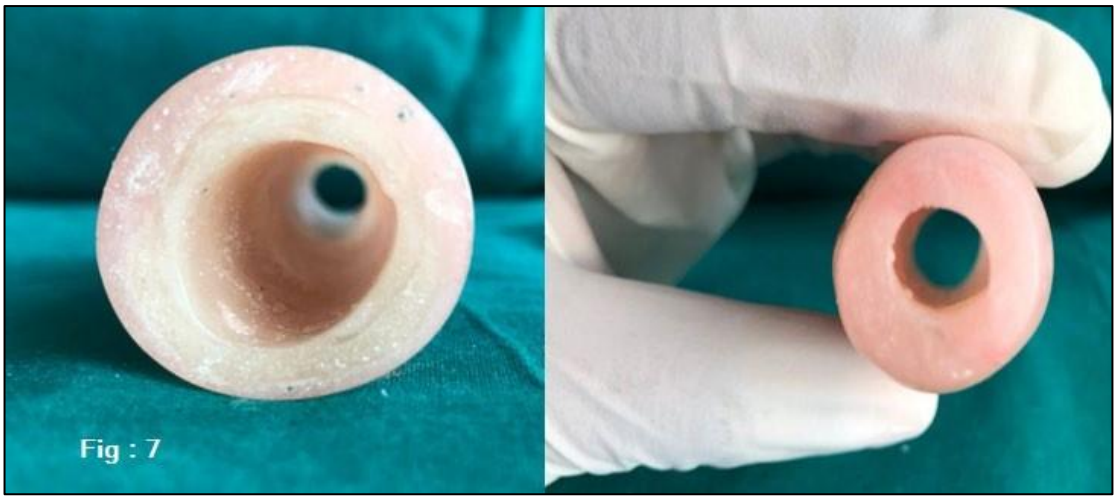
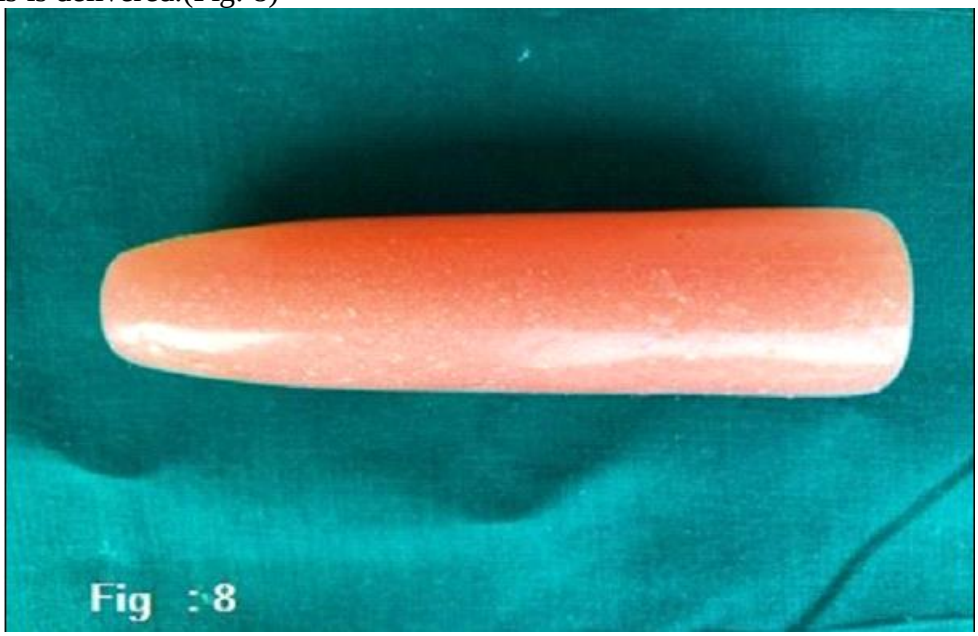


7. Final prosthesis is delivered.(Fig: 8)



Conclusion

The treatment of vaginal agenesis requires the skill, knowledge and expertise of the surgeon. The vaginal tissue is an elastic tissue that has the tendency to expand during the insertion of a dilator. The fabrication of a prosthetic mould for a patient with vaginal agenesis is the most effective and ideal passive method. It plays a key role in the post-operative success of the treatment. Soon after the surgery, the patient started using the prosthesis as instructed by her Plastic Surgeon. The routine personal hygiene that should be followed were also explained. The patient reported back for review one month after the surgery. The required length and patency of the vaginal canal was achieved by using the prosthesis. Further, as soon as such kind of abnormality is detected, it has been documented that professional and psychosocial counselling of the patient and the parents is vital in achieving desired results [16].

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