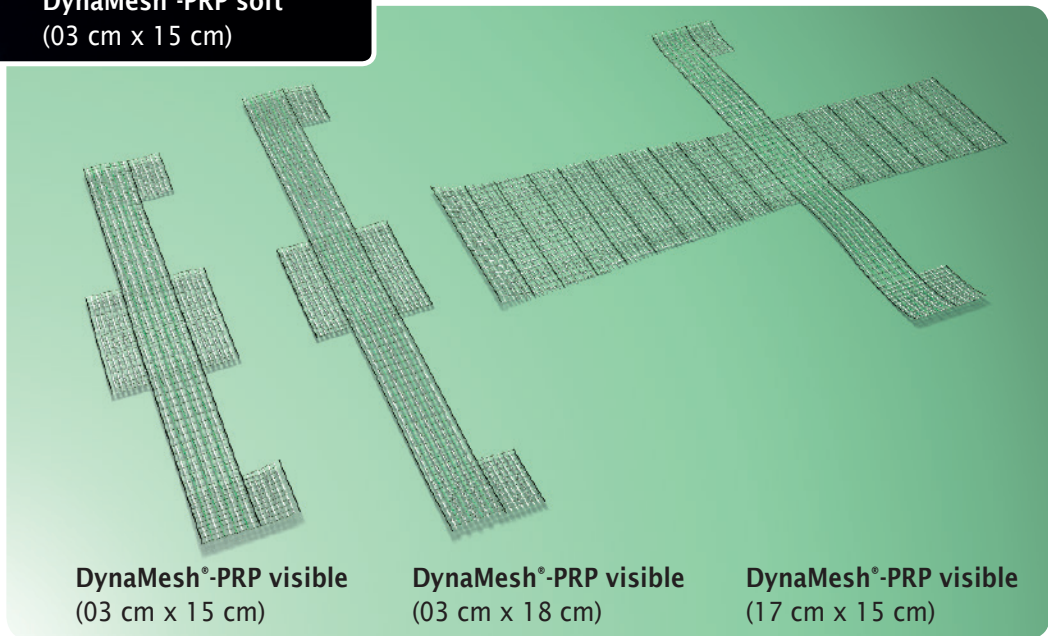
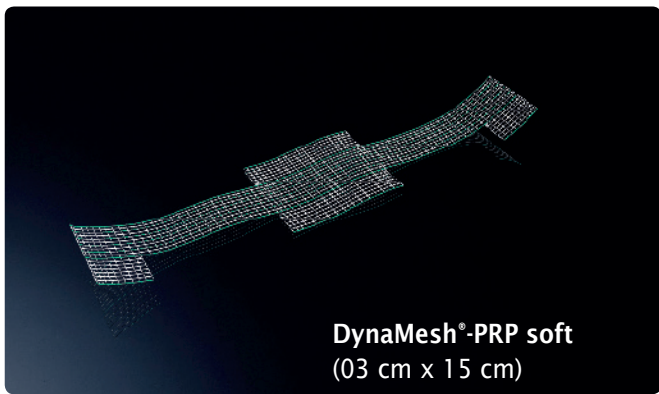


Pectopexy Surgical Training Handout

Pectopexy of the Vaginal or Cervical Stump
Anterior Hysteropexy. For a small uterus
Posterior Hysteropexy. For a uterus of more than approx. 70 g
Pectopexy - Total Repair



A Prerequisite for Long-Term Success in Prolapse Surgery



Dr PD Günter K. Noé
Rhein-Kreis Neuss Clinics
Head physician of the clinics for
gynecology and obstetrics
Medical Director of Dormagen County
Hospital, Germany
Vice-President Int. Soc. Gynecological
Endoscopy (ISGE)

Although anatomical correction is indeed an aim of genital prolapse treatment, the focus should be on the patient's well-being. This is not necessarily associated with a complete anatomical reconstruction, as on the contrary, even slight overcorrections can lead to uncomfortable side effects and long-term consequences.

In addition to how the operation is carried out, the choice of material also plays a decisive role. The bridging and also the reinforcing function of the material should not change even in the long term. The shrinkage of many mesh materials does not occur in the material itself, but rather through the formation of connective tissue on the material. As PVDF causes a greatly reduced tissue reaction, the implant remains elastic even in the long term and it does not shrink. This is of vital importance in urogynaecology so that complaints caused by the hardening or shortening of the material do not occur in the longer term.

Hardened material can also lead to mechanical complications such as erosions.

These complications often only occur years after the implantation.

What impact can the use of other materials have on the pectopexy?

The main advantages of pectopexy are:

- ensuring the correct vaginal axis (through correct lateral fixation)
- no narrowing of the lesser pelvis (the large intestine is not affected)
- placement of the **DynaMesh®-PRP** tape in an "organ-free" zone

1. The use of polypropylene, for example, will lead to shrinkage in the long term. Even if there is only 10% shrinkage, this will still lead to a ventral overcorrection. This can cause, on the one hand, symptoms of urge incontinence, but also increased de novo stress incontinence.
2. Advantage 2 is not negatively affected.
3. Although the tape is in an area where it will not directly disturb organs, there are naturally blood vessels and nerves in the vicinity. The lateral fixations are located in close proximity to the iliac blood vessels and the obturator nerve. It is also a key advantage in this regard that the material (PVDF) causes a minor inflammatory response and that it does not lead to the vessels being obstructed due to excessive fibrosis.

Why does a prefabricated product have to be used for pectopexy?

The products developed for the intervention are specifically tailored to the purpose that the tape intends to fulfil. The natural pulling direction and also the directions of movement of the pelvic floor were taken into consideration in terms of the design.

If a tape is manufactured through in-house production by means of cutting out (e.g. from a large hernia mesh), the desired properties cannot be achieved. These meshes are manufactured for another purpose and become deformed under the pull that arises when walking upright.

This results in a change to the porosity, which again entails even quicker and more severe fibrosis and shrinkage.

The mechanical faults therefore become even more significant.

The requirement for a highly effective implant porosity was also implemented through the development of the surface mesh **DynaMesh®-PRP visible** (17 cm x 15 cm).

It is used in the indication of cystocele and/or rectocele that cannot be treated through autologous tissue reconstruction and it was developed as an enhancement of the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm) and **DynaMesh®-PRP visible** (03 cm x 18 cm), which were developed solely for apex stabilisation.

It is especially important with combined therapy that the implant is produced as “one piece”, as the combination of mesh materials inevitably creates dead spaces, which are susceptible to infection and these infections are difficult to treat. Extending the standard tape essentially reinforces the anterior and/or posterior vaginal wall. As they are connected to the fascia and the vaginal wall in the long term, there should also not be any shrinkage here even after several years, as this can lead to a wall deformity, pain or erosion. The material properties of PVDF also play a vital role in this regard.

Achieving good and safe outcomes for patients even in the long term depends, on the one hand, on the correct placement by the surgeon, but also on the material that is used, which is a decisive factor in the long-term success of the treatment.

*

DynaMesh®-PRP soft (03 cm x15 cm)

PV540315F1 Unit = 1 EA / BX

PV540315F3 Unit = 3 EA / BX

DynaMesh®-PRP visible (03 cm x15 cm)

PV780315F1 Unit = 1 EA / BX

DynaMesh®-PRP visible (03 cm x18 cm)

PV780318F1 Unit = 1 EA / BX

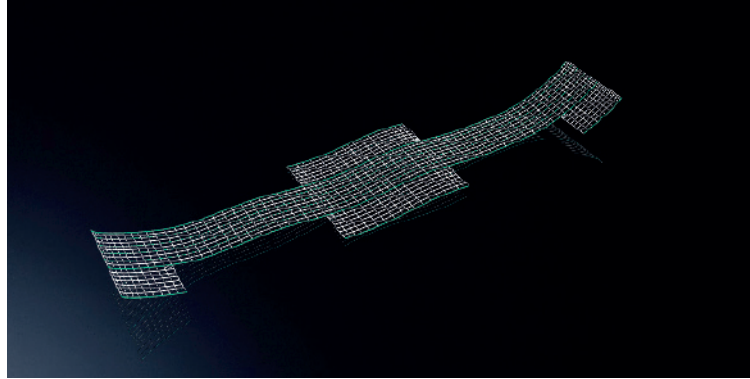
PV780318F3 Unit = 3 EA / BX

DynaMesh®-PRP visible (17 cm x15 cm)

PV781715F1 Unit = 1 EA / BX

PV781715F3 Unit = 3 EA / BX

Pectopexy of the Vaginal or Cervical Stump



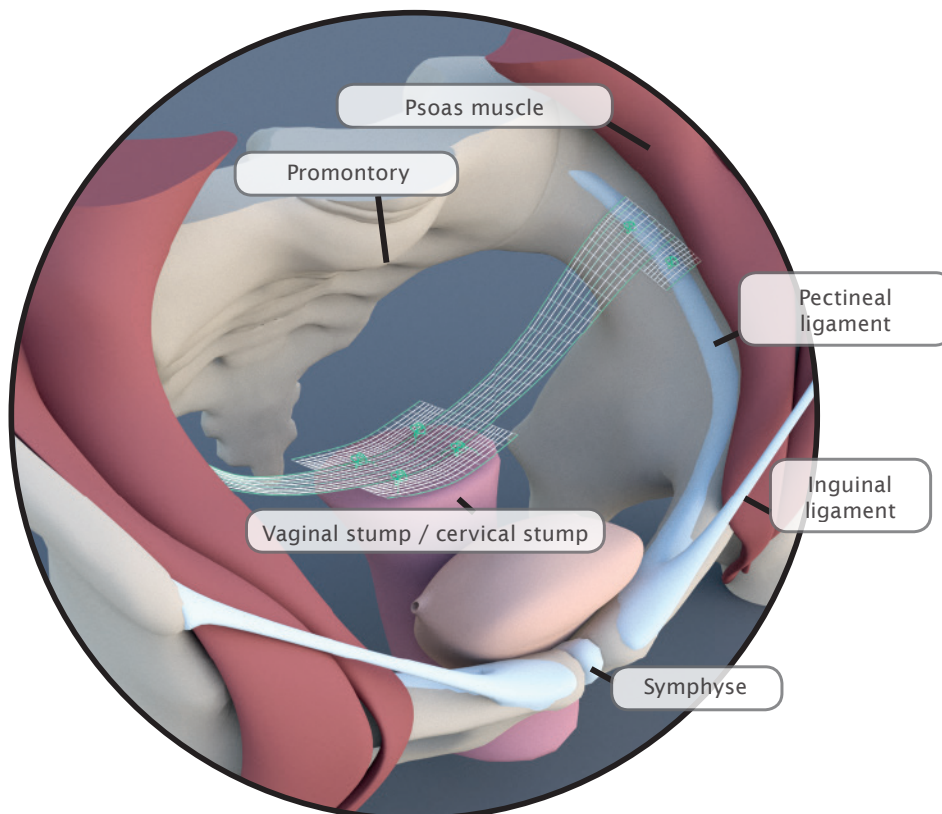
DynaMesh®-PRP soft (03 cm x 15 cm)

DynaMesh®-PRP visible (03 cm x 15 cm)

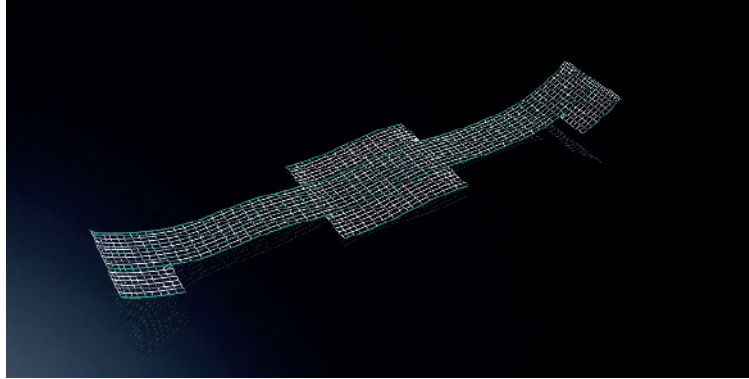
1. Visualisation of the round ligament and medial umbilical ligament bilaterally.
2. Incision in the peritoneum along the round ligament.
3. Preparation of the stumps in the trigonum between the two ligaments in the direction of the pubic bone.
4. Dissection and coagulation of lymphatics for the avoidance of lymphoceles
5. If necessary: Sealing the communicating vein between the external iliac vein and the obturator vein (corona mortis).
6. Visualisation of the psoas muscle and the adjacent pectineal ligament with exposure of about 3 cm of the ligament.
7. Repeat on the contralateral side.
8. Dissection and separation of the vaginal vault over a retractor that is as flat as possible in order to sufficiently distance the bladder and generate a supporting surface centrally measuring 4 cm x 3 cm for the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm). If the tissue is very thin, it can be thickened by means of compression sutures. This step is omitted if the procedure is carried out in combination with a LASH.

9. Fix the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm) evenly to the cervix with deep sutures using a non-absorbable material (e.g. 0 thickness braided polyester); for the vaginal pectopexy, the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm) is fixed with sutures of a monofilament suture material (e.g. PDS 2-0) as evenly as possible onto the apex.
10. Adjust the cervix or vaginal apex to the desired level using a manipulator.
11. Fix the lateral arms of the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm) using a non-absorbable material (e.g. 0 thickness braided polyester) according to the necessary length, without further lifting the cervix or the vaginal vault. The lateral arms are fixed level with where the psoas muscle crosses the pectineal ligament (preferably using a two-point fixation).
12. Closure of the peritoneum using continuous sutures with 2-0 thickness absorbable suture material.

Apical mesh repair following hysterectomy with
DynaMesh®-PRP soft / visible (03 cm x 15 cm)



Anterior Hysteropexy. For a small uterus



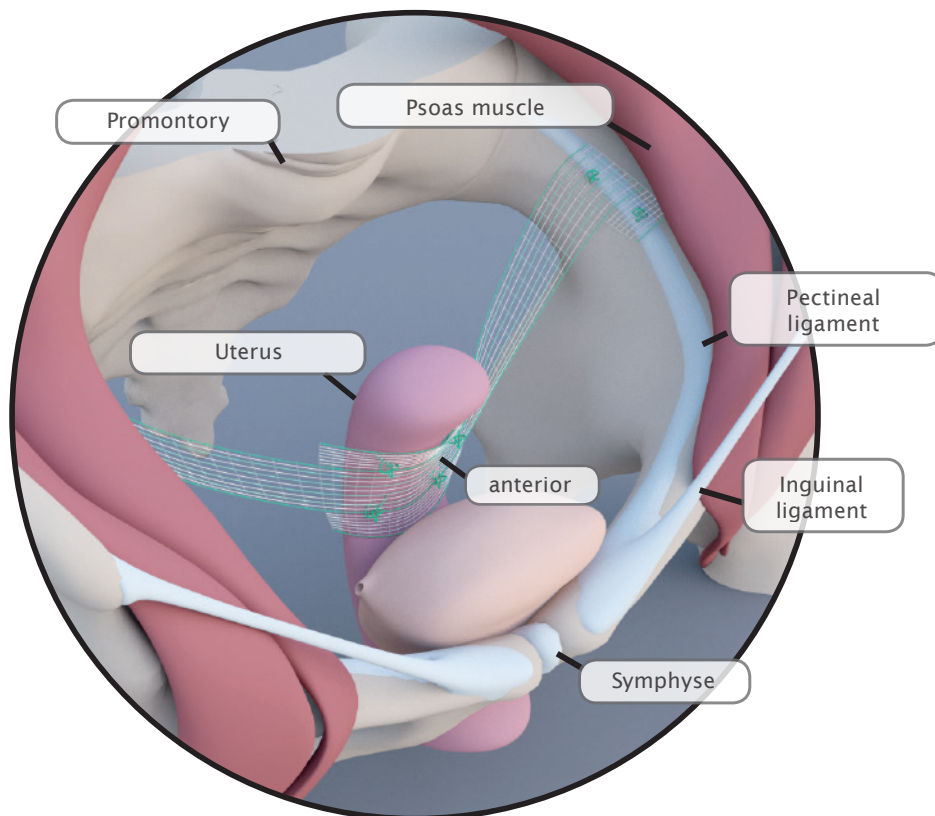
DynaMesh®-PRP soft (03 cm x 15 cm)

DynaMesh®-PRP visible (03 cm x 15 cm)

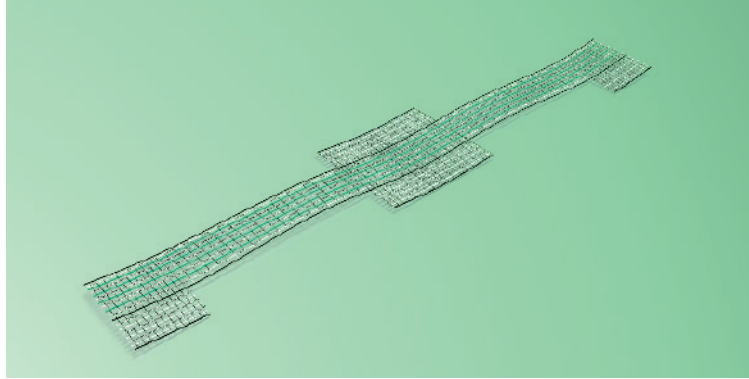
1. Visualisation of the round ligament and medial umbilical ligament bilaterally.
2. Incision in the peritoneum along the round ligament.
3. Preparation of the stumps in the trigonum between the two ligaments in the direction of the pubic bone.
4. Dissection and coagulation of lymphatics for the avoidance of lymphoceles.
5. If necessary: Sealing the communicating vein between the external iliac vein and the obturator vein (corona mortis).
6. Visualisation of the psoas muscle and the adjacent pectineal ligament with exposure of about 3 cm of the ligament.
7. Repeat on the contralateral side.
8. Once the peritoneum has been completely opened, separate the bladder from the cervix.
9. Fix the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm) to the anterior wall of the cervix with deep sutures using a non-absorbable material (e.g. braided polyester).

10. Adjust the uterus to the desired level using a manipulator.
11. Fix the lateral arms of the **DynaMesh®-PRP soft / visible** (03 cm x 15 cm) using a non-absorbable material (e.g. braided polyester) according to the necessary length, without further lifting the uterus. The lateral arms are fixed level with where the psoas muscle crosses over the pectineal ligament (preferably using a two-point fixation).
12. Closure of the peritoneum using continuous sutures with 2-0 thickness absorbable suture material.

Apical mesh repair for uterus preservation
 (with small uterus) with
DynaMesh®-PRP soft / visible (03 cm x 15 cm)
 Uterus anterior fixation



Posterior Hysteropexy. For a uterus of more than approx. 70 g

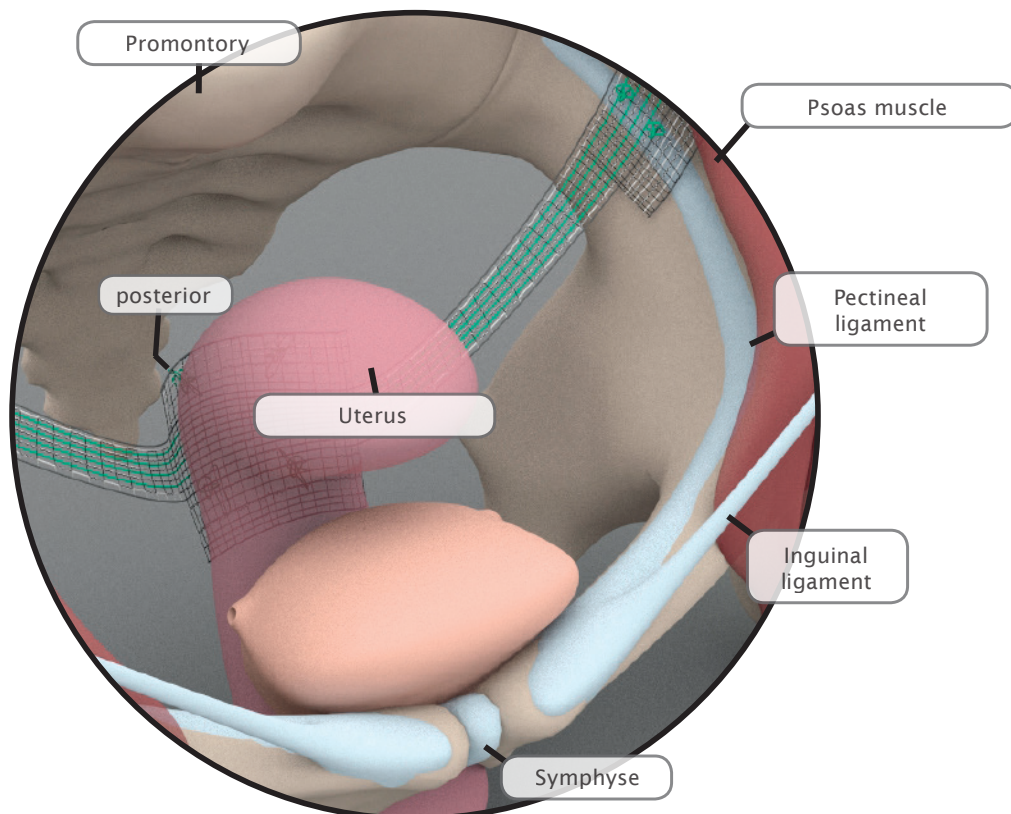


DynaMesh®-PRP visible (03 cm x 18 cm)

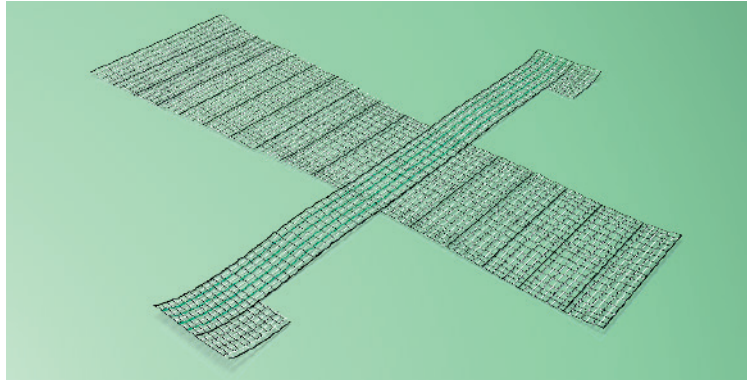
1. Visualisation of the round ligament and medial umbilical ligament bilaterally.
2. Incision in the peritoneum along the round ligament.
3. Preparation of the stumps in the trigonum between the two ligaments in the direction of the pubic bone.
4. Dissection and coagulation of lymphatics for the avoidance of lymphoceles.
5. If necessary: Sealing the communicating vein between the external iliac vein and the obturator vein (corona mortis).
6. Visualisation of the psoas muscle and the adjacent pectineal ligament with exposure of about 3 cm of the ligament.
7. Repeat on the contralateral side.
8. Create two openings in the broad ligament (peritoneum) bilaterally. At the level of the cervix-corporis isthmus. Open the peritoneum at the rectovaginal septum and separate the peritoneum from the upper third of the vagina.
9. Fix the **DynaMesh®-PRP visible** (03 cm x 18 cm) to the posterior wall of the cervix with deep sutures using a non-absorbable material (e.g. braided polyester).

10. Adjust the uterus to the desired level using a manipulator and pull the lateral arms through the openings on both sides of the broad ligament.
11. Fix the lateral arms of the **DynaMesh®-PRP visible** (03 cm x 18 cm) using a non-absorbable material (e.g. braided polyester) according to the necessary length, without further lifting the uterus. The lateral arms are fixed level with where the psoas muscle crosses over the pectineal ligament (preferably using a two-point fixation).
12. Closure of the peritoneum using continuous sutures with 2-0 thickness absorbable suture material ventrally and cover the sutured part of the **DynaMesh®-PRP visible** (03 cm x 18 cm) on the posterior wall with the mobilised peritoneum in the pouch of Douglas (Vicryl 2-0).

Apical mesh repair for uterus preservation
 (for a large uterus) with
DynaMesh®-PRP visible (03 cm x 18 cm)
 Uterus posterior fixation



Pectopexy - Total Repair

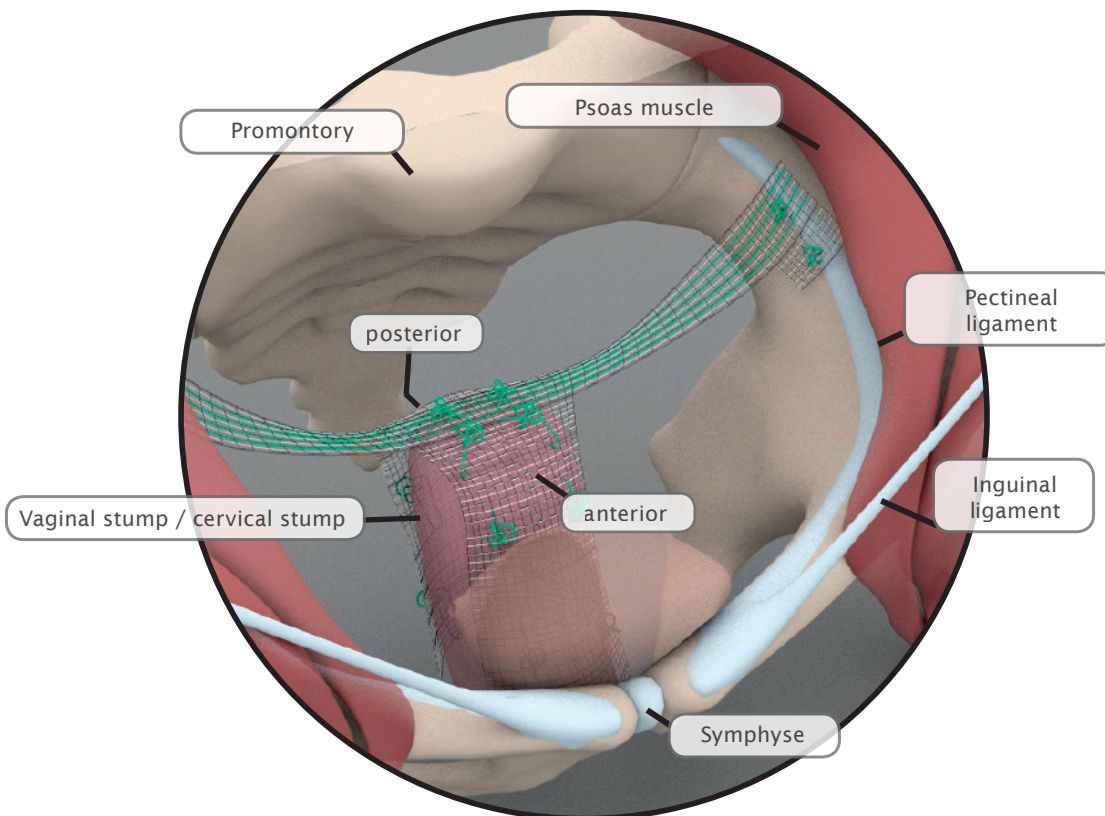


DynaMesh®-PRP visible (17 cm x 15 cm)

1. Visualisation of the round ligament and medial umbilical ligament bilaterally.
2. Incision in the peritoneum along the round ligament.
3. Preparation of the stumps in the trigonum between the two ligaments in the direction of the pubic bone.
4. Dissection and coagulation of lymphatics for the avoidance of lymphoceles.
5. If necessary: Sealing the communicating vein between the external iliac vein and the obturator vein (corona mortis).
6. Visualisation of the psoas muscle and the adjacent pectineal ligament with exposure of about 3 cm of the ligament.
7. Repeat on the contralateral side.
8. Prepare the vagina with a flat retractor (e.g. Breisky retractor) in order to separate the bladder from the vagina in an avascular area. The extent depends on the defect, but at least to the middle of the vagina.
9. Open the peritoneum at the rectovaginal septum and separate the peritoneum from the upper third of the vagina down to the anus and visualise the levator ani muscles. The rectum is located dorsally with a clear distance to the vaginal fascia.
10. Fix the **DynaMesh®-PRP visible** (17 cm x 15 cm) to the cervix (in the context of LASH) with deep sutures using a non-absorbable material (e.g. braided polyester). Following a hysterectomy, suture the central part with PDS 2-0 on the apex of the vagina.

11. Adjust the uterus to the desired level using a manipulator and fix the anterior and posterior flaps on to the vagina (trim as required/depending on the length of the vagina). Fixation using PDS simple interrupted sutures or continuous sutures.
12. Fix the lateral arms of the **DynaMesh®-PRP visible** (17 cm x 15 cm) using a non-absorbable material (e.g. braided polyester) according to the necessary length, without further lifting the apex. The lateral arms are fixed level with where the psoas muscle crosses over the pectineal ligament (preferably using a two point fixation / 0 thickness polyester).
13. Closure of the peritoneum using continuous sutures with 2-0 thickness absorbable suture material ventrally in combination with the pouch of Douglas.

Apical mesh repair following hysterectomy with
DynaMesh®-PRP visible (17 cm x 15 cm)
 posterior and anterior fixation





Dr. med. Michael Anapolski
Rhein-Kreis Neuss Clinics
Senior consultant of the clinics
for gynecology and obstetrics
Board Member Int. Soc.
Gynecological Endoscopy (ISGE)

Does the fixation after a pectopexy actually correspond to the physiological position?

Research at the Institute of Anatomy of Kiel University has confirmed that during a correctly carried out pectopexy, the fixation actually occurs at the level of S2.

By observing the anatomical orientation points for the mesh fixation on the pectineal ligament approach of the iliopsoas muscle at the pectineal ligament - no adverse ventralisation of the vaginal axis takes place.

Is there not a greater risk of vascular injury with a pectopexy than with a sacropexy?

The external iliac vein is a large and easily identifiable blood vessel.

In our experience, it is easier to keep an eye on one large blood vessel rather than several small blood vessels as is the case with a

sacrocolpopexy. In the unlikely event of injury to the external iliac vein, the intra-abdominal insufflation pressure can be increased for a short period of time and the vascular injury can be managed endoscopically. In the event of bleeding from a presacral vein during a sacropexy, haemostasis can be considerably more complicated.

Is it essential for the mesh to be sutured to the pectineal ligament?

As part of our pilot study, the tape was fixed to the ligament at two points by means of a braided non-absorbable suture material. At the follow-up examination, none of the patients showed any evidence that the mesh structure had become detached from the ligament. Under experimental conditions, it was demonstrated on body donors that, if applicable, even a single insertion on the ligament, if applicable, could suffice for permanent fixation. However, on a day-to-day basis we still prefer our tried and tested method of two point fixation, in order to distribute the pull on the ligament tissue more evenly.

The pectineal ligament stands out due to its high degree of resilience; however, it is considerably thinner than the anterior longitudinal ligament that is used for sacrocolpopexy. Hence the use of fixing clamps or staples for a pectopexy greatly increases the risk that the clamps could also penetrate the periosteum. In theory, this factor represents a higher risk of periostitis than with a sacropexy. Whilst we currently still do not have any reliable long-term data on the use of staples or clamps in a pectopexy, we favour fixation with a non-absorbable suture material.

What can one do if an anastomosis blood vessel crosses the preparation area?

Anastomoses between the external iliac vein and obturator are variable vessels and they are present in many patients in different forms.

If it is not possible/expedient to conserve these blood vessels, they can be severed following sufficient coagulation, as they alone do not play a major role in the blood supply of the obturator territory.

Which material can be used for the pectopexy?

Both the data published by us to date and the current multicentre study were carried out exclusively with the use of PVDF.

Each implant material exhibits its own behaviour pattern in the human body with regard to its long-term properties such as elasticity and fibrosis.

Due to the close proximity of the obturator nerve, the external iliac vein and the lymphatics, we expressly advise against making a decision on the material used based solely on the price of the material and replacing the original mesh with cheaper alternatives.

Is a manipulator required for the procedure?

A manipulator can of course also be used during a pectopexy. We prefer a Breisky retractor for manipulations of the cervix/vagina, as this instrument is usually available in all departments in a gynaecological surgery setting.



Literature

- ²². Noé K, Spüntrup C, Anapolski M:
Laparoscopic Pectopexy: A Randomised Comparative Clinical Trial of Standard Laparoscopic Sacral Colpo-Cervicopexy to the New Laparoscopic Pectopexy.
Short-term Postoperative Results.
Archives of Gynecology and Obstetrics 287: 275–280, DOI 10.1007/s00404-012-2536-7; ©Springer-Verlag (2012)
- ³². Noé K, Schiermeier S, Alkatout I, Anapolski M:
Laparoscopic Pectopexy: A Prospective, Randomized, Comparative Clinical Trial of Standard Laparoscopic Sacral Colpocervicopexy with the New Laparoscopic Pectopexy-Postoperative Results and Intermediate-Term Follow-Up in a Pilot Study
Short-term Postoperative Results.
Journal of Endourology. ahead of print. doi:10.1089/end.2014.0413; ©Mary Ann Liebert, Inc. (2014)
- ⁸⁴. Noé K, Schiermeier S, Papatheimalis T, Ulrich Fuellers U, Khudyakovd A, Altmanne H-H, Borowskif S, Morawskig P P, Ganterth M, De Vreei B, Zbigniewj T, Ugarteburuk R G, Anapolski M:
Prospective international multicenter pectopexy trial: Interim results and findings post surgery
European Journal of Obstetrics & Gynecology and Reproductive Biology,
DOI 10.1016/j.ejogrb.2019.10.0220301-2115 ; © Elsevier B.V. (2019)

Rhein-Kreis Neuss Kliniken GmbH

Kreiskrankenhaus Dormagen
Klinik für Frauenheilkunde und Geburtshilfe
Dr.-Geldmacher-Straße 20
41540 Dormagen, Germany

Kreiskrankenhaus Grevenbroich St. Elisabeth
Klinik für Frauenheilkunde und Geburtshilfe
Von-Werth-Straße 5
41515 Grevenbroich, Germany