Preparation for the Examination

Before the start of the examination, the proposed procedure and its purpose are explained once again to the patient, who has already received information about them. She is told that she can have the procedure stopped at any time. The patient may bring a companion to be present at the examination, or request the presence of another member of staff [Haslam 2001]. The examination takes place in a well-lit room that can be locked. The patient should be able to undress and dress without being disturbed, and washing facilities should be available.

For the examination, the patient lies on her back, with the lower body exposed and a sheet under the buttocks. The legs are abducted and drawn up [Haslam 2001]. If there is a problem with relaxation [Wennergren et al. 1991], the legs can be supported with a pad or a pillow. The position of the lumbar spine is adjusted. The therapist explains each step in the course of the procedure. The patient's face should be monitored for any signs of discomfort.

Procedure for Vaginal Examination of the Pelvic Floor

- Inspection
- Findings on vaginal palpation
- Assessment of muscular function
- Evaluation of the degree of descent
- Measurement of vaginal pressure
- Feedback to the patient concerning the findings
- Documentation

Inspection

Observation of the external structures provides information about the condition of the skin, perineal scars, and the trophic status of the vaginal introitus, as well as about the distance between the posterior commissure and the external urethral meatus, the elevation of the perineum above the opening of the introitus, and whether signs of descent are evident at rest and without load.

The patient is requested to contract the muscles of the pelvic floor ("like lifting up inside, a closing round the entrance to the vagina, and drawing the anus in"), and the perineum and labia are observed. If the contractions are correct, visible changes include posterior displacement of the clitoris, narrowing and inward movement of the introitus, a shortening and drawing upward and forward of the perineum, retraction of the anus, and increased wrinkling around the anus. Visible synergic contractions of the adductors, gluteals, or rectus abdominis are not correct [Morkved and Bø 2000]. If the perineum descends or the introitus opens, the movement is paradoxical movement and indicates that the patient is not straining correctly.

When the patient is requested to cough, attention focuses on the presence of a reflex contraction, the type and extent of perineal movement, urinary leakage, and signs of descent. Signs of descent include loss of labial contact, opening of the introitus, gaping of the vagina, descent of the perineum, and prolapsing vaginal walls.

Findings on Vaginal Examination

The therapist thoroughly washes her hands, puts some lubricating gel on a tissue, puts on examining gloves, and applies the lubricating gel. The labia are separated, and the pad of the gloved index finger palpates slowly internally along the posterior side of the vagina to about 5 cm [Haslam 2001]. The lateral vaginal walls are palpated by turning the finger from the 3-o'clock to the 9-o'clock position, looking for scars, tenderness, and changes in sensation. The muscular volume and contours of the levator ani on the left and right are assessed in particular, and differences between the sides are noted. Wasting of the pubococcygeus is often unilateral and more prominent on the right. Healthy pelvic floor muscles feel full and tensely elastic, and exert pressure on the palpating finger when contracted (Fig. 4.**44**). Prolapse of the anterior and/or posterior vaginal walls can be felt as a bulging of the tissue, while uterine prolapse is present when the tip of the finger meets the cervix prematurely [Haslam 2001]. The cervix can be distinguished by feel from the surrounding tissue, because it is firmer and tenser.

N. B.: The stability of lubricating gel is limited. Tubes that have been opened should be discarded after one week [Haslam 2001]. If they are only rarely used, single-use packages are more suitable. If either the patient or the therapist is allergic to latex, non-latex gloves should be used. Sterile gloves are only required in exceptional cases (e. g., postpartum).

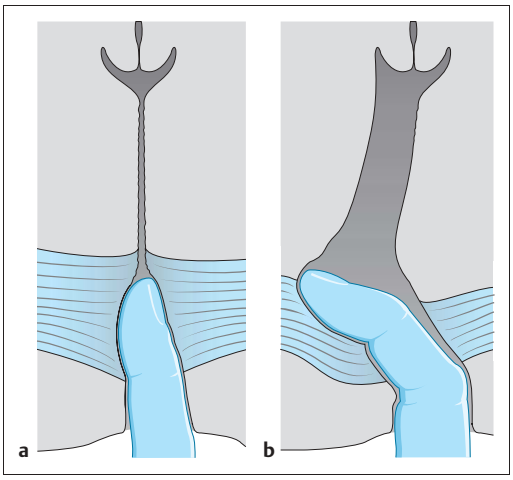

Fig. 4.**44** Vaginal examination. **a** The healthy pelvic floor musculature feels full, turgid, and elastic. During contraction, the finger is encircled. **b** The hypotrophic pelvic floor musculature feels relaxed, a muscle belly is not felt, the vagina is dilated, and there is no pressure on the palpating finger.

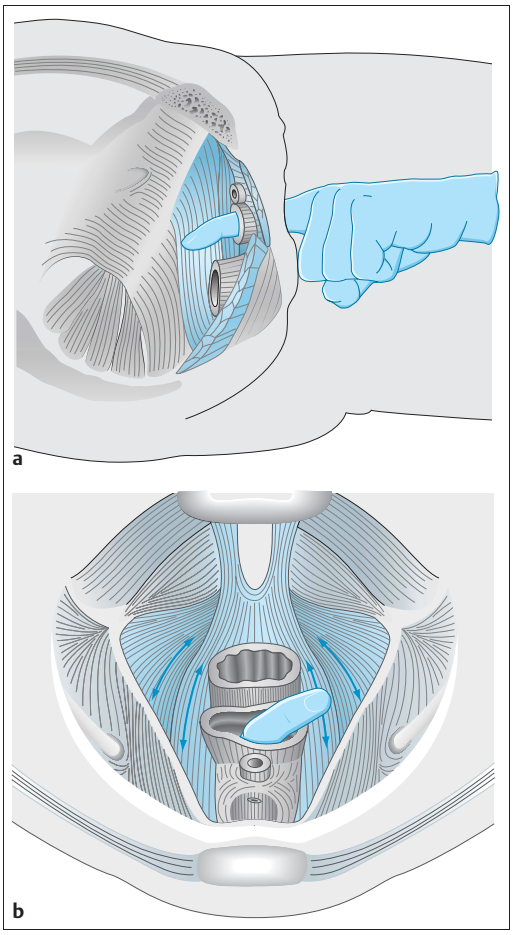

Fig. 4.**45a, b** Transvaginal palpation of the pelvic floor muscles. (Adapted from Schüssler et al. [1994].)

Assessing Muscle Function Vaginally

The patient is asked to contract and completely relax the muscles of the pelvic floor several times. The therapist, using one finger (the second) or two fingers (the second and third) notes any narrowing of the vagina or any elevation of the levator ani, and any upward and forward movement (Figs. 4.**45**, 4.**46**, Table 4.**20**). The therapist evaluates whether the patient is able to relax voluntarily and completely, and whether she is aware of these changes in tension. The therapist also evaluates whether the patient is able to contract the pelvic floor before or while increasing intra-abdominal pressure (coughing). The components of the levator ani can be palpated individually: with the finger palpating the dorsal vaginal wall, the therapist can discern a cranial/ventral movement. This corresponds to contraction of the puborectalis. On the lateral vaginal wall, the examining finger feels the action of the pubococcygeus: a movement medially and cranially (narrowing and elevation of the urogenital hiatus). To check whether the bladder neck is elevated during contraction of the pelvic floor, the palmar surface of the examining finger rests behind the urethra and the vesicourethral junction (Fig. 4.**46**). Coughing helps assess whether the muscles of the pelvic floor are contracting reflexly and whether the bladder neck is remaining stable. During the examination, the therapist observes the patient's breathing and determines whether the gluteals, adductors, and rectus abdominis are contracting together. The strength, endurance, and fast contractions of the muscles of the pelvic floor are then assessed systematically and graded according to the modified Oxford grading system. The PERFECT assessment scheme can be used for this [Laycock 1994].

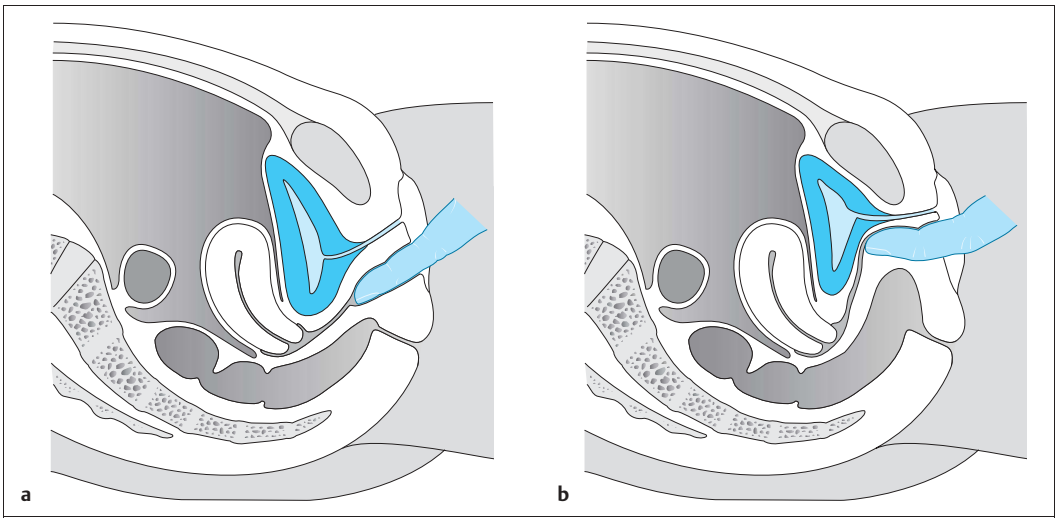

Fig. 4.**46** **a** Palpation of the urethra and bladder neck with relaxed pelvic floor muscles. **b** Cranial and anterior displacement of the urethra and bladder neck with adequate pelvic floor muscle contraction. (Adapted from Schüssler et al. [1994].)

Table 4.**20** Muscles that can be palpated [Lütolf-Keller 2001]

Muscle	Type of contraction	Sensory impression in the examining finger
Levator ani	Auxotonic	Distal finger feels changes in tension, lifting, narrowing and shortening of the levator hiatus
Pubococcygeus	Auxotonic	Compresses medially with an upward movement
Puborectalis	Auxotonic	Compresses toward the pubis: anterior shift
Iliococcygeus	Isometric	Change in the tension of the levator plate, which can be felt with the fingertip
Urogenital diaphragm	Auxotonic	Compresses circularly around the proximal index and middle finger, narrows the introitus

N. B.: As a rule, movements of every kind involve auxotonic tension (Greek *auxo* = increasing; tonus = tension). The word refers to a mixed muscle action with static as well as dynamic components and changes in tension, due to the changing torque and different velocities depending on the movement [Radlinger et al. 1998b].

! The mnemonic PERFECT stands for:
P for *p*ower
E for *e*ndurance
R for *r*epetitions
F for *f*ast contractions
ECT for *e*very *c*ontraction *t*imed

In the modified Oxford grading scale, the strength of the pelvic floor muscles is graded from 0 to 5 (Table 4.**21**).

Undesirable patterns noted during attempts to contract the pelvic floor muscles are:

- Contraction of the gluteals, raising of the buttocks, straightening of the pelvis
- Adductor contraction
- Visible tensing of the rectus abdominis, internal and external obliques
- Sharp inspiration with retraction of the abdominal wall, or breath-holding

Table 4.**21** Oxford scale for grading pelvic floor muscle strength [Laycock 1994]

Grade	Characteristics
0	No discernible contraction
1	Barely palpable, flickering contraction, not visible on inspection of the perineum
2	Weak, distinctly palpable contraction, felt as slight pressure on the examining finger
3	Moderate muscle strength, distinct pressure on the examining finger, and palpable upward and forward movement, visible on the perineal surface
4	Good muscle strength, elevation possible against slight resistance, circular pressure can be felt around the examining finger. During simultaneous examination by the index and middle finger these are pressed against each other
5	Very strong muscle strength, contraction possible against vigorous resistance, with suction-type effect on the examining finger. During simultaneous examination by the index and middle finger, these are pressed against each other despite resistance

Advantages of digital examination

- The method is easy to learn.
- Little equipment is required and no instruments are needed.
- It makes it possible to distinguish between the left and right side of the levator ani.
- It is capable of quantifying strength, strength endurance, fast contraction, and fast contraction endurance for clinical (but not scientific) purposes.

Disadvantages of digital examination

- It is subjective.
- It is not sensitive.
- There is only moderate interrater reliability.

Bø [2001] questions the reliability of digital quantification of pelvic muscle strength, especially for scientific research. She recommends restricting the evaluation of the pelvic floor musculature to its ability to contract correctly:

- Contracts correctly
- Contracts only with synergists
- No contraction
- Bearing-down maneuver

Assessing the Degree of Prolapse

Incipient signs of descent are not easily observed when the patient is lying down, because the effects of gravity and visceral pressure are absent. Nevertheless, in order to determine the maximum degree of prolapse present and to make this visible to the patient, she is asked to bear down as strongly as possible. The introitus is brought into view by spreading the labia, and with the use of a magnifying hand-held mirror, the woman can join in observing how and to what extent abdominal pressure changes affect the position of the vaginal walls and the perineum. If genital descent is present, the bulging walls of the vagina visibly cross the longitudinal axis of the vagina [Shull et al. 1999]. Coughing, explosive vocalization, and laughter can be elicited to test the force of the descent resulting from varying pressures. In the recumbent position with the upper body elevated, the effect of a contraction of the pelvic floor muscles on the prolapse can be assessed. The therapist tests whether or not descent during increased intra-abdominal pressure (e.g., during coughing) can be countered by contraction of the pelvic floor muscles. If the result is positive, the same test is conducted with the patient in the standing position with one leg raised on a stool. The descent is often considerably clearer under the influence of gravity with pressure from the abdominal viscera than in the recumbent position.

Vaginal Pressure Measurement

To provide an objective measure of the effect of exercise on the strength of the pelvic floor muscles, the vaginal pressure can be measured before and after a period of exercise. Admittedly, this test measures the muscle but provides no information about the effect of exercise on the prolapse. Contraction of the pelvic floor musculature generates an increase in intravaginal pressure that can be measured with a vaginal balloon catheter [Morkved and Bø 2000]. The value used is peak pressure. The effective size of the balloon is 1.7 × 4.7 cm; the length of the neck of the balloon above the catheter is 2 cm (Fig. 4.**47**). The catheter is attached to a manometer, and the middle of the balloon is positioned in the levator hiatus. To obtain a reliable and reproducible measurement, it is essential that the positioning of the patient, of her legs, and of the balloon in her vagina should take place in standardized conditions. According to Morkved and Bø [2000],

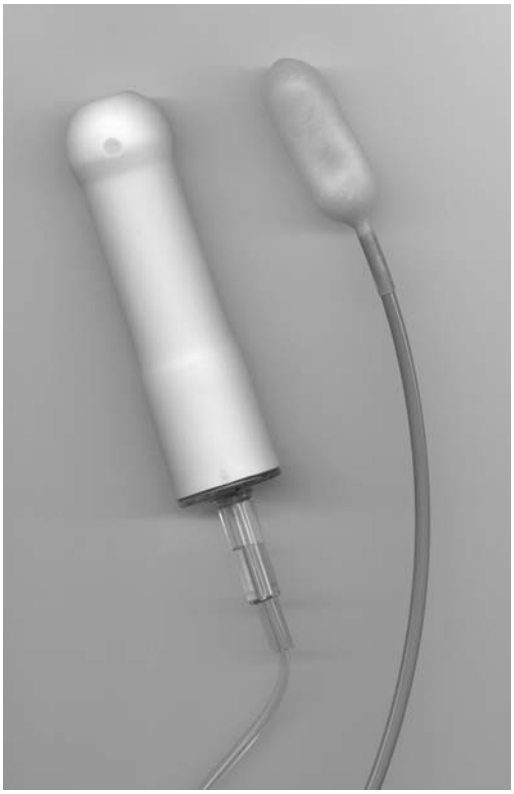

Fig. 4.**47** Comparison of the size of a traditional pressure probe and a balloon catheter (Camtech, Norway).

measurements made in this way are valid and reliable. The results of recent investigations in Australia on simultaneous activation of the abdominal and pelvic muscles have cast fresh light on the interpretation of vaginal pressure measurements. With maximal contraction of the pelvic floor muscles, the transversus abdominis is also activated [Sapsford and Hodges 2001]. It would be of interest to determine whether this leads to an increase in intra-abdominal pressure [Richardson et al. 1999], which might add to the increase in intravaginal pressure and thus be registered by the balloon catheter.

Advantages of intravaginal pressure measurement

- It is easy to learn.
- Only moderate instrumentation is needed.
- Measurements can be made with the patient either lying or standing.
- It is suitable for providing biofeedback and assisting with subjective sensation.

Disadvantages of intravaginal pressure measurement

- It is not capable of distinguishing between the left and right sides of the levator muscle.
- It may be affected by artifacts: a pressure rise recorded intravaginally may also be due to a rise in intra-abdominal pressure.
- There is no gold standard instrument [Shull et al. 1999]
- Pressure measurements are not comparable between different instruments and probes.

Discussing the Findings

The findings should be discussed with the patient immediately after the examination. A realistic treatment goal and exercise regimen should be developed. The exercise regimen should allow the patient to develop and improve as many different modalities of strength in the pelvic floor muscles as possible. The functional goal should be to engage the pelvic floor in an optimally coordinated fashion when physical exertion is anticipated. The regimen should minimize the symptoms of the prolapse and slow down its progression.

Contraindications to Vaginal Examination

- Absence of patient consent
- Surgery or birth during the previous 6 weeks
- Recent radiotherapy
- Pregnant women with complications of pregnancy or who are sexually inactive [Haslam 2001]
- Age < 18

Situations in Which Special Caution is Needed

- Patients with a history of sexual or physical abuse
- Patients with certain cultural or religious convictions [Haslam 2001]
- Patients who are allergic to latex or to preservatives in the lubricating gel
- Optimal hygienic measures should be taken to prevent infection

Documentation

All findings must be documented.

Treatment Plan

The treatment advocated here includes the following items:

- Patient education
- Training the patient in developing sensory awareness of the pelvic floor
- Specific targeted muscle exercises
- Behavioral strategies

N. B.: Various biofeedback techniques and electrostimulation are supplementary measures used in pelvic floor rehabilitation. They are used for specific conditions, and are discussed in greater detail in section 2.4.

Patient Education

Patient education is a continuous process of training and motivation in physical therapy that accompanies the treatment in a planned fashion [Niedermann and Maspoli Büchi 1998].

The physiotherapist communicates information about the anatomy and functioning of the female pelvic organs in a way that the patient can understand, using charts and models. They explain the synergistic working of the pelvic floor muscles and the pulmonary diaphragm, and instruct the patient in applying this synergism consciously—e. g., always combining lifting a load with expiration. The therapist illustrates the effect of gravity and intra-abdominal pressure changes on the structures of the pelvic floor. With the patient, they analyze common and unusual positions in relation to their stressing and relaxing effects on the pelvic floor. The patient develops an ability to minimize or consciously grade the strain on the pelvic floor. The therapist informs the patient about risk factors related to disease and works with the patient on strategies for avoiding such risks. In this way, changes in the patient's attitude toward her prolapse are initiated and supported. Patient education allows the patient to become assured in conscious ways of coping with her specific prolapse. She is encouraged to become as independent and responsible as possible. This process of guiding and educating the patient should form part of every therapy session and should vary in intensity as appropriate.

Each patient learns at a different rate. The process of learning is most effective when it is adapted to the individual's capacities. By taking considerations of this type into account, the therapist can create an open and respectful treatment atmosphere that is adapted to the patient's needs [Niedermann and Maspoli Büchi 1998].

Instruction in Sensory Awareness

Sensory awareness refers to adequate reception and processing of stimuli from inside the body. In relation to the pelvic floor, this means that it can be perceived, consciously and selectively stimulated, and integrated into the body image.

Indication

Intact sensorimotor awareness is a necessary precondition for targeted muscle and behavioral training of the pelvic floor. The examination will determine whether, and to what extent, it is deficient. To the extent that a patient is not able to identify the muscles of her pelvic floor unambiguously, feel them, or uncouple them from synergistic muscles, perceptual education aimed at improving sensory awareness becomes the sole initial focus of therapy. Using various modalities adapted to the patient, the therapist awakens the patient's awareness of the pelvic floor musculature. She introduces the material sensitively and paces herself in accordance with the patient's ability to learn. By doing this, the physiotherapist creates the conditions necessary for the subsequent steps. As therapy progresses, intensive muscle exercises start to generate adequate sensory stimuli, so that sensory awareness can be dispensed with as a distinct aspect of the treatment [Radlinger et al. 1998a].

Examples of Aids to Sensory Awareness

Depending on the preparedness of the patient and the physiotherapist, a number of different aids to sensory awareness may be offered.

- Information can be provided about the position, shape, and functions of the pelvic floor, using illustrations, models, pelvic skeleton, video, etc.
- The patient can explore the perineum or vagina in order to sense muscle tension or changes in tension (see also note below).
- The therapist can palpate and apply stretching to the levator ani, to facilitate contraction.
- Visualization can be encouraged as a subtle form of training in reinnervation.

- A vaginal probe can be used for electrostimulation.
- Electromyography biofeedback can be used as a means of displaying and controlling very small computer-enhanced voluntary changes in tension.
- Cones, balls, and tampons: pulling a thread to slide out these objects provokes a sensory stimulus, which facilitates contraction of the pelvic floor muscles.

N. B.: Not all women succeed in touching an area as intimate and fraught with taboos as the vagina freely and naturally. Prashar et al. [2000] examined 104 incontinent women and found that only 30 % of them felt quite comfortable about touching their genitals; this was age-dependent. Only 21 % were "quite willing" to introduce a continence aid into the vagina; this was only slightly age-dependent.

Choice of the Initial Position

The choice of the initial position for pelvic floor training will depend on muscle strength, sensory awareness, and the degree of prolapse. If the pelvic floor muscles are weak and sensory awareness is poor, the best initial position is lying down. The patient can direct her attention to the pelvic area, and in most cases will become more aware of her sensations, since neither gravity nor pressure from her viscera is placing a load on the pelvic floor. Further weight may be taken off the organs and their position can be improved using head-down positions—e. g., elevating the buttocks with a pillow while the patient is in the supine position or a modified quadruped position in the knee–elbow position. In cases of marked prolapse, exercises are only effective if the tissue has first been replaced above the plane of the levator using a pessary. This relieves the weak muscles of the load, so that they can be activated more efficiently. Once muscle strength has increased and the patient has become more aware of her sensations, exercises can be performed better in an erect, functional position, using the stimulus of gravity.

Training of the Pelvic Floor Muscles

The essential physiotherapeutic measure in patients with prolapse is training directed at the pelvic floor muscles. The findings in the pelvic floor musculature provide the basis for an individually adjusted training plan. The aim is to improve the pelvic floor musculature, with a functional goal of achieving an efficient, well-coordinated interplay between these muscles and intra-abdominal pressure changes. This desirable muscle activity is made automatic by numerous repetitions and eventually becomes preprogrammed by the central nervous system (see section 1.2 on motor learning). Improved supportive functioning of the levator ani muscle provides an opposing force to the pressures exerted on the pelvic floor, and in the most favorable outcome it prevents progression of the prolapse.

Strengthening Exercises for Weak Pelvic Floor Muscles

- Improvement in sensorimotor awareness
- Muscle strengthening
- Normalization of neuromuscular function
- Improved endurance
- Promoting regeneration

Exercises provide training in developing strength, strength endurance, fast strength, fast strength endurance, and reactive strength. Training proceeds from exercises with numerous repetitions to exercises with maximum intensity but only a few repetitions. During the initial phases of training—during which the aim is to improve sensorimotor awareness—the procedures are carried out with minimal, moderate, and eventually submaximal loading. This is an appropriate place for applying elements of Tanzberger's approach [Tanzberger 1998]. To provide an impetus for the development of muscle strength, the exercises should include specific stimulation and loading of the muscles. According to Bø [2001], the essential ingredient is the intensity of the contractions, not their frequency. Kegel exercises, with the prescribed 400 daily repetitions [Kegel 1948], are therefore obsolete from the point of view of current training theory.

In the course of the first 6–8 weeks after the start of training, a new adaptation occurs. The motor units are recruited more efficiently. After 8 weeks, hypertrophy supervenes and adaptation takes place in the connective tissue [Bø 2001].

Recommendations for Training

Exercise recommendations specify how many contractions should be performed in a series, their duration, intensity, at what intervals and how often per day they should be carried out.