QRS 1010 Pelvicenter

Repetitive peripheral magnetic stimulation to correct functional pelvic floor disorders

Scientific documentation and medical information

Women after childbirth - postpartum

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definition

Urgent recommendations for postnatal gymnastics are usually automatically equated with weight loss and a necessary tissue tightening by those affected. Of course it is important for self-acceptance and self-confidence to return to the previous figure as soon as possible. However, the actual problem of birth lies less in the figurative aesthetics than in far-reaching changes in the female pelvic physiology. A birth process is always of a "natural brutality" since the emergence of new life takes no account of the health of the woman giving birth.

For example, natural births are associated with a considerable risk of injury due to the enormous stretching and shearing forces, with the severity of the complications always being proportional to the extent of the injury [1] , [2] . Possible consequential damage such as incontinence and genital prolapse must therefore be counteracted as early as possible with appropriate measures.

Epidemiology and Prevalence

In 2017, more than 785,000 children gave birth in Germany [3] . Although the proportion of caesarean births is slightly decreasing again, 31.6% of all births are still caesarean sections [4] . According to a systematic review [5] , 85% of all women suffer injuries to the perineum, including skin injuries. According to estimates by the Royal College of Obstetricians & Gynecologists, the rate is said to be as high as 90% [6] . Above all, perineal tears of the third or fourth degree (OASIS = Obstetric Anal Sphincter Injuries) are feared here, which - depending on the literature source, definition and perineal protection - are between 0.6 and 10.2% [7] , [8] , [9] , [10] , [11] .

Perineal tear / prolapse

If one does not rely solely on the usual manual inspection, the ultrasound reveals a worrying picture: In a retrospective analysis (6 weeks postpartum) in women who had given birth for the first time (primiparae), anal ultrasound found 26.9 % birth-related defects of the anal sphincter, of which almost a third became symptomatic [12] . It is therefore reasonable to assume that a large part of all OASIS have remained undiscovered [13] . This is also confirmed in another study with 27.9% OASIS injuries detected by ultrasound [14] . In England, a large cohort study (over 1 million women) even warns of the "dangers" of a natural birth, as it increases the risk of a subsequent uterine prolapse - which is 10% for a 20-year-old and 20% for a forty-year-old % - should increase [15] , [16] . For the sake of completeness, it should be mentioned that the official incidence for an OASIS (manual inspection) is 11% [17] .

Avulsion / POP

Although the perineal tear and the associated OASIS damage (perineum, vagina and anus) have long been seen as the most important cause of postpartum problems, new imaging procedures (MRI / 3D / 4D -Ultrasound) prove that in 20% of all women a so-called avulsion (traumatic avulsion or tear of the M. levator ani / tear on the pubic bone) has taken place after vaginal birth [18]. For example, 36% of women who had given birth vaginally 3 months earlier had an avulsion of the levator ani, which was also associated with stress incontinence [19]. In another avulsion study, this was 14% of women who had delivered vaginally and for the first time [20]. It is therefore assumed that 10 to 40% of all vaginal births result in injuries to the M. levator ani (LAM) [21], [22], [23], [24], [25], while traumatic overstretching in about 30% of primiparae to be diagnosed [26]. Associated with this, 83% of women with avulsion defects also had a pelvic organ prolapse (POP) [27]. Although avulsion is only hesitantly finding its way into urogynecological textbooks, it is already becoming apparent that it is possibly the most important factor in the pathogenesis of prolapse symptoms [28].

Stress urinary incontinence (SUI) / anal incontinence

While the prevalence of SUI during pregnancy is said to be 23 to 67%, it is said to be 6 to 29% after vaginal delivery [29]. According to other sources, urinary incontinence develops in 49% of all parturients [30].

In the EPINCONT (Incontinence in the Country of Nord-Trondelag) study, the prevalence of urinary incontinence was 10.1% in non-pregnant women (nullipara), 15.9% in the caesarean group and 15.9% in women who gave birth vaginally , at 21.0% [31]. Another study reported a prevalence of 0.3% to 44% for postpartum urinary incontinence [32], with the risk of urinary incontinence increasing with the number of births [33]. Compared to childless women, primiparae are three times more likely to develop urinary incontinence [34]. This also applies to prolapse, which increases linearly with the number of births [35]. The SUI is said to persist in almost 28% of the primiparous [36]. According to another source, however, the incontinence symptoms had not regressed in 56% of cases even after 12 years [37]. Retrospectively, 60% of incontinent women see the beginning of their pelvic floor weakness in connection with their first pregnancy and childbirth [38].

The risk of anal incontinence is also three times higher [39]. Depending on the study, the frequency of an injury to the anal sphincter muscles is estimated at 1.5 to 9.0%. If OASIS is present, the prevalence is given as 15 to 61% [40], [41], [42].

Postpartum Pain

18 months postpartum, 24% of women still suffer from pain during sexual intercourse [43]. In another publication, 77% of first-time mothers reported constant back pain 1 year after delivery. Surprisingly, postpartum pelvic pain syndrome (PPS) not only affects vaginal births (40% [44]), but also caesarean sections. This could be the reason why there is no difference in prevalence between vaginal and operative birth for PPS 6 to 11 years after delivery [45].

physiology

perineal tear

A perineal tear corresponds to a soft tissue injury in the area of the perineum, i.e. in the area between the vulva and the anus, with a tear in the vaginal mucosa. While the M. sphincter ani externus (MSAE) remains intact in grades 1 and 2, in grade 3 there is a deep injury to the MSAE or a partial or even complete transection. In grade 4, the anterior wall of the rectum is also injured. Grand 3 and 4 are also known as OASIS (Obstetric Anal Sphincter Injuries). An injury to the internal spinal column (IAS) also plays a major role here. That is why the episiotomy (perineum incision) is considered the most important preventive measure during the expulsion phase of the child. However, this can sometimes have the opposite effect. The surgical treatment of a perineal tear is the most common operation in women in Germany [46] .

Consequence OASIS

The possible consequences of OASIS are fecal incontinence as well as flatus and anal urge symptoms. In a large prospective study in which OASIS patients were interviewed over a period of 3 years after primary care, 18% reported anal urge symptoms, 15.1% flatus incontinence and 10.5% fecal incontinence [47] . Remarkably, the symptoms decreased during the survey period despite a persistent anal sphincter defect. This of course underlines the importance of adequate surgical primary care [48] , since this also determines the physiotherapeutic rehabilitation options.

LAM injuries

LAM injuries are always caused by irreversible overstretching of the “levator gate” (hiatus levatorius). The levator hiatus is an opening in the pelvic diaphragm through which the rectum, urethra, and vagina pass. The diaphragm itself is an inner muscular layer of the pelvic floor composed of the levator ani (LAM), which in turn is composed of the puborectalis, pubococcygeus, iliococcygeus, and coccygeus muscles. The special orgasmic importance of the M. coccygeus is described elsewhere (see "rPMS in anorgamsia"). It has an average area of 15 cm ^{2} through which the child's head should come with a minimum area of 60 to 70 cm ^{2} [49] .

While the LAM only needs to expand by 25% in one woman, it is 245% in others. This means that the muscle fibers have to lengthen by a factor of 1.25 to 3.45 during strong expulsion. This actually goes against basic muscle physiology, which states that skeletal muscle can only stretch about 150% of its normal length. Despite all physiological laws, this seems to work well for about 2/3 of women. This is probably due to the hormonal influences of pregnancy. For example, the hormone relaxin influences the collagen structure [50] .

Complete tears (avulsion) of part of the LAM, namely the puborectalis muscle, occur primarily in the expulsion phase of the child's head. The older a woman is, the greater the risk of avulsion.

Consequences of LAM trauma

LAM damage sometimes has significant consequences that are based on massive changes in the architecture of the pelvic floor. First-time mothers experience a sustained weakening of the pelvic floor muscles with the corresponding symptoms of SUI. Both types of injury (rupture and overstretching of the LAM) are also predestined for a prolapse of the pelvic organs (e.g. uterine prolapse), since the anatomical and functional integrity of the LAM is of central importance for the support of the pelvic organs [51] , [52] . LAM damage therefore suggests itself as the missing link for the epidemiological connection between childbirth and a pelvic organ prolapse [53] . Unlike OASIS, LAM trauma does not affect the development of anal incontinence [54] .

neurogenic consequences

In addition to the mechanically caused damage described, neurogenic causes n must of course also be taken into account. This is due to an injury to the pudendal nerve, which runs superficially through the birth canal and supplies both the urethral and the external anal sphincter and also affects the nerve supply to the clitoris [55] (see also "anorgasmia"). The injuries result from stretching of the vagina and compression of the nerve and affect - at least as a temporary phenomenon - 38 to 42% of all vaginal births [56] or require a longer period of rehabilitation in severe cases [57] . Damage to the pudendum has a particular effect on the M. sphincter ani externus and the development of anal incontinence [58] .

QRS Pelvicenter rPMS effect

Based on the results of active pelvic floor training and the principle of action of rPMS, it makes sense to use magnetic stimulation to treat the consequences of pregnancy and childbirth. This is especially true with regard to stress and anal incontinence, genital prolapse, pelvic pain syndrome and dyspareunia. In addition to the influence on the muscular situation of the pelvic floor, the rehabilitation of the pudendal nerve is particularly important. This is derived from new results of postpartum electrical stimulation, according to which above all the up-regulation of a birth-related down-regulation of the regenerative cytokine BDNF (Brain Derived Neurotrophic Factor) plays a special role and stimulates axonal nerve growth [59] , [60] , [61] . Although electrostimulation of the pelvic nerve is a promising treatment method [62] , it is very doubtful whether patients can be found for this very painful intra-anal application.

Only one study is indexed for rPMS after vaginal birth, which also does not refer to the effect on urinary or fecal incontinence or other consequential damage, but only to the muscle strength of the pelvic floor [62] . She also suffers from significant methodological weaknesses in that she does not examine women with birth defects or pelvic floor weakness, but only primiparous women six weeks after delivery. This is certainly also used to treat women with the consequences of childbirth - but mainly women who overcome the consequences of childbirth through natural healing processes on their own. The result that there was no significant increase in muscle strength compared to a sham treatment is therefore in absolute contrast to the extensive study of rPMS with a weak pelvic floor and SUI.

The extent to which three other studies [64] , [65] , [66] on rPMS in anal incontinence can be used to assess postpartum rPMS treatment is also doubtful, since this is genuine anal incontinence, i.e. not birth-related showed the most significant results only with an intact anal sphincter.

Scope of treatment and duration of therapy

Rehabilitation of the pudendal nerve

With regard to stimulation of the N. pudendus and the associated growth factor BDNF, early rPMS use is recommended (average frequency / daily treatment over 10 days).

SUI and organ prolapse

Only then should an rPMS treatment follow, which is based on the treatment procedure for stress incontinence and - depending on the symptoms - includes 12 to 18 training units within 5 to 8 weeks. For reasons of muscular coordination, light pelvic floor training that may be carried out at the same time should be maintained on the rPMS-free days.

Anal incontinence / anal flatus symptoms

In the case of proven pudendal damage, application is carried out according to the above protocol. Otherwise, or following this “pre-therapy”, the treatment procedure is the same as for SUI (“weak pelvic floor”).

General

It is advisable to determine the respective symptoms 6 weeks postpartum with the ICIQ-SF questionnaire and then again 1 week (3 months / 6 months) after the rPMS application.

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expectation of success

The success of rPMS is based less on absolute "dryness" of the postpartum urinary incontinence, healing of anal or POP symptoms or freedom from pain after 18 training units at the latest, but on promoting natural healing processes in such a way that by the time 3 or 6 months postpartum, the results are significantly higher than those of conventional pelvic floor training or prevent later incontinence or prolapse symptoms. On the basis of systematic reviews on electrical stimulation of SUI (17 RCT + 7 non-RCT studies), in which symptom relief or a significant improvement in symptoms can be achieved in 73 to 97% of women [67] , or in anal incontinence (19 RCT studies) with a success rate (continence) in 40 to 50% of the patients after 6 months [68] , the rPMS results should be slightly above the results of electrical stimulation.

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study situation

Pelvic floor training for postpartum urinary and fecal incontinence

3 months after childbirth, 20 to 30% of all women suffer from urinary [69] and 3 to 5% from fecal incontinence [70] . Only studies in which pelvic floor training was not started prenatally are listed below. The study situation on active pelvic floor training is presented for the reason of comparing it with a much more intensively effective rPMS training.

study 1

Randomized and controlled study on women who still suffered from urinary or fecal incontinence 3 months postpartum [71] . Although the control group also occasionally carried out exercises at home, they were not instructed by physiotherapists like the intervention group or occasionally visited at home.

Result:

After 12 months of training, only a little over 70% of the women were still available, which is probably due to the long duration of the training. The intervention group (IG) had a significantly lower incontinence rate (59.9% vs. 69.0%) than the control group. In the case of severe incontinence, this was 19.7% vs. 31.8%. The few women with fecal incontinence also improved (4.4% vs. 10.5%). After 12 months, 79% of the participants in the IG were still doing a training session, compared to 48% in the CG.

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study 2

Based on Study 1, a 6-year follow-up was performed. 69% of the women were available for this [72] .

Result:

The significant improvement at that time could no longer be maintained in the follow-up examination after 6 years, ie it had risen again to 69 vs. 76% for urinary incontinence and 12% vs. 13% for fecal incontinence. After 6 years, however, only 50% in both groups struggled with occasional pelvic floor exercises.

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study 3

Study 1 was followed up again after 12 years, in which 63.1% of the women at that time took part [73] . Half of them had by now had two children.

Result:

Result: After 12 years, the group results were now similar (urinary incontinence in 3/4 of all patients), also with regard to the prolapse symptoms. The authors come to the conclusion that new treatment strategies must be developed after conservative pelvic floor training does not last over a longer period of time.

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study 4

Randomized, controlled study on postnatal (3 months) urinary incontinence [74] . All 2 intervention groups (IG) received four individual instructions (physiotherapist / 3, 4, 6 and 9 months postpartum). IG1 carried out a pelvic floor training "according to Richard Millard". The exercise intensity was increased after each individual instruction. A perinometer was used to better perceive the pelvic floor. The program for IG2 involved the insertion of nine different vaginal cones (20 to 100 g) to be held in the vagina for 15 minutes twice a day. The weight was slowly increased. The control group (CG) only received instruction on pelvic floor exercises before and during the hospital stay and were given the freedom to practice them at home.

Result after one year:

High elimination rate in all groups (22 vs. 52%). Significant improvement in the active versus control group (50 vs. 76%). There was no difference between normal pelvic floor training and vaginal cone training. Only 89 women could be interviewed for the follow-up (24 to 44 months postnatal). This shows that independent practice does not bring any additional gain.

Electrostimulation study 5

The intervention group received electrical stimulation (35 to 50 Hz / 35 mA with an increase of up to 100 mA) with biofeedback support (30 minutes per session, twice a week [75]) for 6 weeks. After these 6 weeks, the patients were asked to continue for another 6 weeks to practice at home (3 x daily / 3 short cycles of strong contraction and subsequent relaxation with 50 to 60 repetitions. Whether they were carrying out the instructions correctly was checked once a week by a telephone check. The control group (24 women) did no training through.

Result:

After 12 weeks, the maximum and average strength development in the IG increased significantly compared to the control group. Also the contraction length. Subjectively, the urinary incontinence symptoms also decreased significantly compared to CG.

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study 6

This study relates to urinary and fecal incontinence problems arising from a grade 3 or 4 perineal tear [76] . The perineal tear is one of the most important reasons for postpartum incontinence. The aim of this prospective, randomized study was to compare postpartum incontinence symptoms with intensified pelvic floor training versus conventional pelvic floor training as part of postnatal exercises.

Study design: Of 97 women with DR III/IV sub partu, 38.5% described incontinence symptoms and 41% fecal incontinence. Of these, 58 women (control group) received standard postnatal exercises 6 weeks after delivery and 49 women (IG) received intensified pelvic floor training under biofeedback control or electrostimulation (vaginal or rectal probe).

Result:

After 6 months of intensified pelvic floor training, 25.6% still suffered from urinary incontinence. In the case of the normal rehabilitation gymnastics, this was 43.1%, ie the urinary incontinence had even worsened. Fecal incontinence improved from 41% to 23.1%, while it had increased to 44.8% in the postnatal exercise group. The mean LAM contractions of the women with biofeedback control were 1.05 at the beginning of the training and 2.56 after 6 months.

Comment: This means that patients with severe perineal injuries must be offered intensified pelvic floor training as early as possible. A usual retraining gymnastics seems pointless.

Systematic review

This is an update of a Cochrane review from 2012 (22 studies, 8485 patients), which came to the conclusion that there is insufficient evidence for the effect of preventive BBT lasting longer than one year [77] . The number of women who do the exercises over a longer period of time also decreases over time [78] . The current review

includes 38 studies in pregnant women who had given birth within the last three months. The women reported involuntary loss of urine, stool, urine and stool, or no loss. They were randomly assigned to perform pelvic floor exercises or no exercises to compare the effects of both regimens.

Results:

Group 1 :
Pregnant women without urinary incontinence who performed prophylactic pelvic floor exercises before and during pregnancy report less involuntary urine leakage at three and six months postpartum.

Group 2 :
Women with urinary incontinence who did pelvic floor training during pregnancy or after childbirth: Here it remains unclear whether the exercises helped with the unwanted loss of urine.

Group 3 :
Women with or without urinary incontinence (mixed group) with pelvic floor exercises during pregnancy or after childbirth. Result: Training that was started during pregnancy less often leads to unwanted urine leakage during pregnancy and up to six months after childbirth. However, it remains unclear whether this effect lasts up to a year after birth. Even in the women who only started the exercises after childbirth, the effect on involuntary urine leakage was unclear one year after childbirth.

Fecal incontinence :
Only 6 studies provided evidence here. In women who started exercising after childbirth, it was unclear at one year postpartum whether it helped reduce leaking. It also remained unclear whether women with or without faecal incontinence (mixed group) who began pelvic floor exercises during pregnancy were less likely to have faecal leakage later in life or up to a year after birth.

Overall, the studies had significant weaknesses. The pelvic floor exercises, which differed in the individual studies, were often only inadequately described. It was also not possible to carry out blinding.

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summary

Although approximately 85% of all deliveries involve perineal injuries, the ultimate rate of serious injuries is lower. After all, the frequency of 3rd or 4th degree perineal tears (OASIS) at around 27% or of tears or tears or overstretching of the M. levator ani (avulsion) at 30 to 40% does not result from a simple addition of these potential damages , but is based on the resulting morbidity rate - insofar as it has not already resolved itself by natural healing processes on the key date (3 months after childbirth).

The rate of consequential damage is not easy to determine, since birth increases the fundamental risk of later urinary and fecal incontinence by a factor of three and that

of a genital prolapse by a factor of two. It is estimated that approximately 28% of all pregnancy and childbirth-related urinary incontinence will not resolve. In any case, 60% of all later incontinent women connect the beginning of their pelvic floor weakness with the first pregnancy and childbirth.

A later genital prolapse also correlates with the injuries and the defective healing of the pelvic floor. Here the number of cases is likely to be around 20 to 30%. With regard to anal sphincter symptoms (urge, flatus, incontinence), the frequency of an injury to the anal sphincter muscles is estimated at 1.5 to 9.0%. If OASIS is present, its prevalence for anal incontinence is given as 15 to 61%

There is a general urogynaecological consensus (guidelines) that after birth defects and especially in the case of incontinence, guided pelvic floor training including electrostimulation is helpful as early as 6 weeks postpartum. Even if the symptoms of many patients slowly subside as little as 3 months after delivery, this should not be a reason to prevent women from training. If stress or mixed incontinence persists 6 months after the birth, there is a very high risk that it will be all the more difficult or impossible to bring about an improvement later on.

In the case of the passive method of rPMS, which does not depend on the motivation and stamina of the women, there is a lack of corresponding study evidence. However, the results of active pelvic floor training with or without biofeedback control or electrical stimulation appear to be sufficient to propagate rPMS as the ideal form of therapy for postpartum urinary and anal incontinence and pelvic organ prolapse. This is mainly because active pelvic floor training often requires a training period of 6 to 12 months, while training using rPMS takes a maximum of 2 months. New findings from direct electrical stimulation of the pelvic nerve, which can be used to promote axonal nerve growth in neurogenic birth defects by activating BDNF, opens up an important area of application for rPMS in the case of the known painfulness and anal application of electrical stimulation.

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