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Effects of Pregnancy and Childbirth on the Pelvic Floor

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Childbirth and the Pelvic Floor

For many women, pregnancy, as well as labor and delivery, represent the key physiological events predisposing to incontinence and pelvic floor dysfunction. Our knowledge of obstetrical pelvic floor injuries, and their connection to incontinence and pelvic floor disorders later on, has vastly increased in recent years. Primary care clinicians addressing urogynecology problems should be aware of the potential effects of pregnancy and childbirth on the pelvic floor.

The basic foundation of female pelvic support consists of the paired levator ani muscles,^{1,2} whose position is maintained by endopelvic connective tissue, and tone preserved by nerves arising from the lumbosacral roots. All of these components—muscular anatomy, connective tissue supports, and nerve supply—are exposed to acute physical strains during childbirth, as well as to chronic “wear and tear” resulting from intraperitoneal forces.

Injury to the pelvic floor commonly accompanies even a seemingly uneventful childbirth, and perhaps this should come as little surprise. After all, a woman’s first vaginal birth routinely involves soft tissue compression lasting for hours. The second (“pushing”) stage of labor generates pressure between the fetal head and vaginal wall averaging 100 mmHg and reaching as high as 230 mmHg. When applied over many hours, these obstetrical forces often result in permanent physical and functional changes. (Figure 3.1)

Perineum and Anorectum

Injury to the perineum, whether from episiotomy or spontaneous laceration, may result in loss of vaginal or rectal tone and/or anal incontinence. External anal sphincter defects can be identified by endoanal ultrasound in 20% to 53% of women after normal vaginal delivery,^{3–7} a possible risk factor for anal incontinence that will be subsequently reported in 4% to 50% of cases.^{8–13} Flatal incontinence is reported six times more often by women who have experienced an anal sphincter injury during delivery.⁸ The risk of anal incontinence is increased with prolonged labor, forceps use, and episiotomy.¹⁴ The *internal* anal sphincter, extending an additional 12 mm cranial to the external sphincter margin, is prone to disruption by perineal lacerations and may be commonly overlooked during primary obstetrical repair.¹⁵ Using transanal ultrasonography, internal anal sphincter lacerations have been identified in 17% of primiparas experiencing no visible perineal injury at delivery.¹⁶

Neurological injury to the anal sphincter may also play a role, explaining why normal function may not always be restored by surgical repair. Prolonged motor latencies may persist in the internal (upper) anal sphincter for up to five months after vaginal delivery.¹⁷ Because of the limitations associated with the surgical repair of severe perineal and anorectal injuries, primary prevention of obstetrical trauma at the time of delivery should be considered the best approach for reducing chronic post-reproductive dysfunction in these areas. (Figure 3.2)

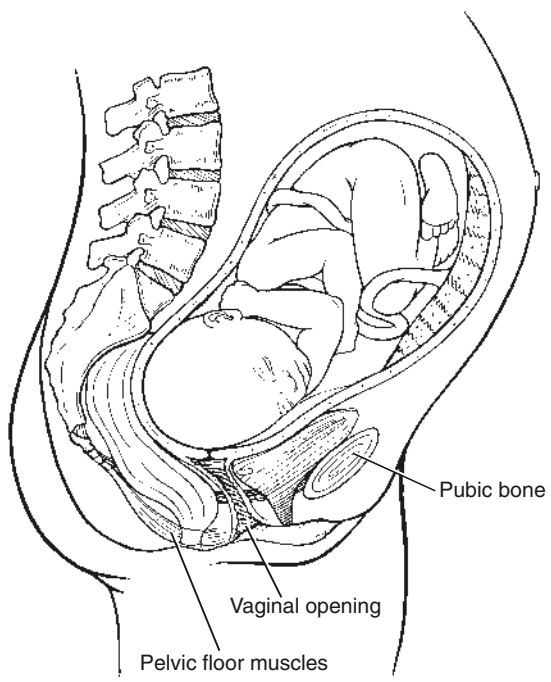


FIGURE 3.1. Pelvic organs and pelvic floor during pregnancy.

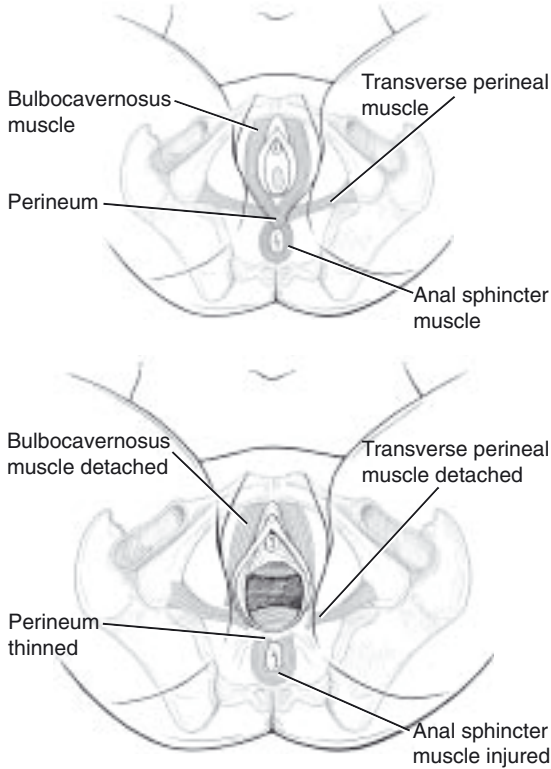


FIGURE 3.2. Perineal anatomy before and after childbirth.

Episiotomy

The routine use of episiotomy was once thought to provide an array of maternal benefits including preservation of pelvic muscle tone and sexual function, improved perineal healing, and reduced rates of anal sphincter injury. However, the bulk of modern evidence strongly suggests that episiotomies increase, rather than decrease, the risk of pelvic floor dysfunction.

Midline episiotomy has been associated with a sharply elevated risk of severe lacerations into the vagina, perineum, and rectum.^{18–20} Mediolateral episiotomies carry a much lower (1% to 2%) likelihood of anorectal injury. (Figure 3.3)

Episiotomies are associated with slower and less complete recovery of pelvic floor muscle strength than is experienced with either an intact perineum after delivery or spontaneous perineal lacerations.^{19,21} Pain and healing complications are more common when episiotomies are performed routinely rather than selectively, according to one randomized trial of selective episiotomy (RCT).²² A separate RCT²³ found that nearly all

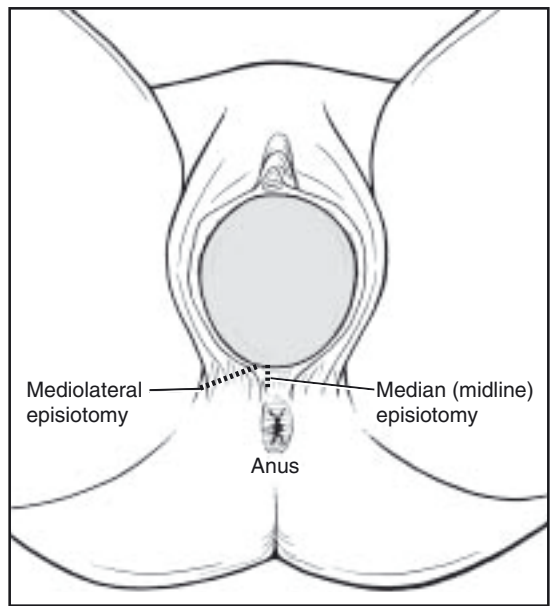


FIGURE 3.3. Episiotomy types: Median and mediolateral.

perineal lacerations involving the anal sphincter were associated with midline episiotomy (46 of 47 in primiparous women and 6 of 6 among multiparous women). The authors concluded that restriction of episiotomy use among multiparous women results in significantly less perineal injury. A retrospective cohort study²⁴ found midline episiotomy to be associated with an elevated risk of fecal incontinence at three (odds ratio 5.5) and six (3.7) months postpartum compared with women with an intact perineum. Compared to spontaneous laceration, episiotomy tripled the risk of fecal incontinence at three months (95% confidence interval 1.3 to 7.9) and six months (0.7 to 11.2) postpartum, and doubled the risk of flatal incontinence at three (1.3 to 3.4) and six months (1.2 to 3.7).

The relationship between episiotomy and sexual function is not fully clear although, at three months postpartum, sexual satisfaction appears to be highest among women without perineal injury, and lowest among women with an episiotomy that had extended during birth.¹⁹ One other study demonstrated the highest level of satisfaction among women whose perineum remained intact during delivery, but found no difference between women who had undergone episiotomy and those who had experienced spontaneous perineal laceration.²⁵

Although selective episiotomies have a significant place in obstetrical practice, their routine use is not justified. A Cochrane report²⁶ concluded that the practice of routine episiotomy increases the overall risk of maternal trauma and complications during vaginal birth. The American College of Obstetricians and Gynecologists (ACOG) has formally stated that routine episiotomy should not be considered a part of current obstetrical practice.

Levator Ani Muscles and Childbirth

The levator ani muscles represent the core of pelvic floor support, providing a muscular buffer against the constant downward force of the pelvic and abdominal organs. Obstetrical injuries to the levator ani muscles and their nerve supply may, in many instances, represent the seminal events eventually leading to pelvic prolapse or inconti-

nence. Trauma to the levator ani may include detachment of individual muscle components from their insertion points along the pelvic sidewalls. Generalized atrophy of these levators may result from pudendal nerve trauma.

Peschers et al.²⁷ evaluated levator ani function before and after childbirth, and found that muscle strength was significantly reduced three- to eight-days postpartum following vaginal birth, but not after cesarean, and returned to normal values within two months for most women. Allen and Hosker²⁸ also demonstrated a persistent reduction in muscle contraction strength. Using MRI to compare levator ani anatomy in nulliparous women against those after their first vaginal birth, DeLancey et al.²⁹ found no levator ani defects in the nulliparas. Twenty percent of primiparous women had a visible defect in the levator ani muscle, with the majority of defects seen in the pubovisceral (“Kegel”) portion of the levator ani.

Pudendal Nerve Changes

Pelvic floor neuropathy is a common repercussion of childbirth—less often recognized than vaginal and perineal injury, but arguably more significant as a risk factor for subsequent pelvic floor dysfunction. The pudendal nerve, arising from the S2-S4 nerve roots, supplies most of the anatomic structures maintaining pelvic support and continence—including the perineum and vagina, levator muscle complex, and anus. Compression and stretching of the pudendal nerve during childbirth appears to be a major risk factor associated with subsequent diminished levator muscle function. As a result of neuropathic changes, the sling-like components of the levator complex, such as the pubococcygeus muscle, may fail to reflexively contract and elevate sphincter pressure during a cough or sneeze. Likewise, the resting tone of the shelf-like levator plate and perineal body may diminish.

Stretching and compression of the pudendal nerve appears to be particularly vulnerable as the fetus descends past the ischial spine in the mid-pelvis. Snooks and Swash³⁰ reported that partially reversible pudendal nerve injury occurs commonly with vaginal birth, an effect that appears to be prevented by cesarean delivery.⁷⁷ Rates of nerve

injury are increased with forceps delivery, multiparity, longer second-stage labor, third-degree perineal tear, and macrosomia.^{28,31} Denervation within the pubococcygeus and anal sphincter muscles accompanies 42% to 80% of vaginal deliveries.³⁰ Although some reinnervation by surrounding nerves may occur, permanent loss of muscle function is common.^{32,33} Cesarean delivery appears to effectively prevent denervation injuries when performed electively, but does not confer full protection if performed after the onset of labor.

For many women, pelvic neuropathy will have no clinical consequences; for others, these nerve injuries initiate a pathophysiologic sequence eventually leading to incontinence, prolapse and pelvic floor dysfunction. Pudendal conduction abnormalities^{34,35} and denervation of the pelvic floor after childbirth have been associated with both genital prolapse and urinary incontinence.³⁶ Snooks et al.³³ demonstrated that denervation-reinnervation patterns on electromyography may become more pronounced with increased passage of time from delivery and indicate higher risks of urinary and fecal incontinence. Anal incontinence is associated with pelvic floor neuropathy in up to 75% to 80% of cases.^{30,37} Among multiparas, levator denervation occurs in up to 50% of women with symptomatic pelvic organ prolapse.^{39,40} To what extent these changes to the levator ani musculature represent a direct cause or consequence of pelvic organ prolapse is not fully certain. (Figure 3.4)

Connective Tissues and Ligaments

In the etiology of post-childbearing pelvic floor disorders, endopelvic connective tissue injuries have an established role.⁴¹ Recent efforts have been focused on identifying “site specific” breaks and detachments of the endopelvic connective tissue from their anatomical insertion sites, as the origins for pelvic organ prolapse.⁴² These include paravaginal defects in the anterior vaginal compartment, site-specific defects in the rectovaginal (Denonvilliers) fascia, and ligamentous/fascial detachments of the vaginal apex. Stretch injuries to the endopelvic connective tissue during childbirth may account for various other forms of prolapse outlined in other chapters.

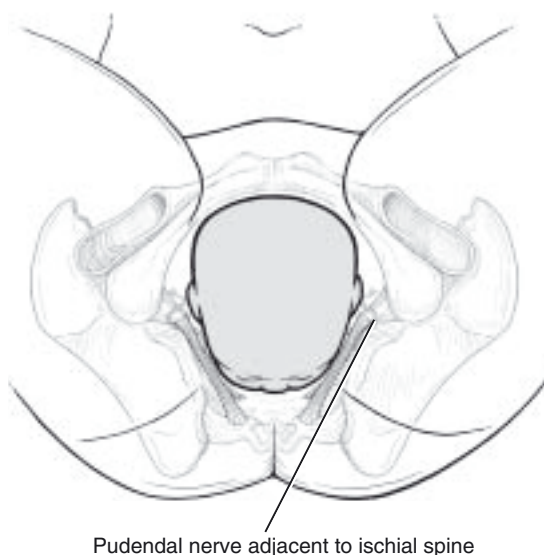


FIGURE 3.4. Compression of pudendal nerve during labor.

Urinary Incontinence and Childbirth: The Connection

Stress urinary incontinence occurs symptomatically in 32% to 85% of pregnant women, peaking in the third trimester.^{43–45} Francis⁴³ showed an intrapartum prevalence of 85% in multiparas and 53% in nulliparas, with nearly half of these patients noting some degree of incontinence before the observed pregnancy. When SUI arises with pregnancy and childbirth, it may often fail to resolve. Stanton et al.⁴⁶ found 38% of nulliparas had SUI during the third trimester and 6% had persistent postpartum leakage. Among 98 multiparas, 10% had SUI prior to pregnancy, 42% had SUI in the third trimester and 11% had persistent postpartum incontinence. Meyer et al.⁴⁷ found that 22% of patients with stress incontinence during pregnancy had persistence after delivery.

Mode of delivery may have a significant impact on the persistence of incontinence. Viktrup et al.⁴³ prospectively studied incontinence symptoms before, during, and after pregnancy in 305 primiparous women. The multivariate analysis identified the length of labor pushing, fetal head circumference, episiotomy, and birth weight as

risk factors for postpartum SUI, whereas cesarean birth was protective against incontinence. Among women with SUI during pregnancy, 21 of 167 women (13%) had persistent incontinence postpartum compared to none of the 35 delivered by cesarean ($p < 0.05$). At three months postpartum only 4% had persistent stress incontinence complaints; after one year, only 3% still had leakage. However, in subsequent pregnancies it appears that these patients are at greater risk for more severe incontinence, with earlier onset and persistence beyond the puerperium. Viktrup and Lose⁴⁸ questioned 91% of their cohort five years later and found a 30% prevalence of SUI. Nineteen percent of women who were not incontinent in the original trial developed SUI during that time period. Again, cesarean delivery was found to significantly decrease the risk of incontinence.

Anatomically speaking, urethral hypermobility is an important change associated with SUI^{49,50} and is significantly increased after vaginal delivery when compared to cesarean delivery in both primiparous and multiparous women ($p < 0.001$).⁵¹ Vaginal delivery is also associated with decreased urethral closure pressure and functional urethral length⁵²; the absence of these changes after cesarean delivery highlights the importance of birth mode rather than of only pregnancy.

One common question is whether the risk of incontinence and pelvic floor dysfunction increases with subsequent deliveries or whether the majority of damage occurs with the first birth. Some work⁵³ has suggested that childbearing beyond the first delivery has minimal impact on pelvic floor neurophysiology and that most pudendal nerve damage occurs during the first vaginal delivery. Hojberg et al.⁵⁴ reported that the first vaginal delivery was the major risk factor for incontinence, and subsequent deliveries had little effect. However, other population-based observational studies and prospective trials have shown strong associations between SUI and increasing parity.⁵⁵ Moller et al.,⁵⁶ for instance, found an association of parity and stress incontinence with an odds ratio of 2.2 after one vaginal delivery, 3.9 after a second vaginal delivery, and 4.5 after a third delivery. Marshall et al.⁴⁵ studied 7771 women early in puerperium and found a strong association between parity and stress incontinence. A 1989 consensus conference of

the National Institutes of Health identified parity as an established risk factor for urinary incontinence.⁵⁸

Sexual Function

Female sexual problems after childbirth—those occurring during the postpartum period and others presenting years later—receive little attention in clinical practice, even in the “age of Viagra.” But various studies indicate that approximately one in four childbearing women report adverse sexual changes persisting beyond six months postpartum, with 17% reporting painful intercourse. Among women with overactive bladders, 23.8% report that this bladder condition impacts their sex lives.⁵⁹ Coital incontinence (leakage during sex) is reported by one in four sexually active women in a urogynecologic setting, and 72% report that it adversely affects their sexual enjoyment.

The physiological changes accounting for loss of sexual function may include pudendal nerve injury, poor perineal healing, vaginal laxity, and loss of levator ani muscle tone. One study found that persistent dyspareunia at 6 months was least likely after cesarean birth (3.4%), and most likely after operative vaginal delivery (14%).⁶⁰ However, a recent study comparing 562 identical twin sisters (the first study comparing parous and nonparous women) found that total parity—and not the mode of delivery—was the primary determinant of sexual dysfunction as measured by the validated “PISQ” (Pelvic Organ Prolapse-Incontinence) sexual quality-of-life questionnaire.^{60a} The good news? Twenty-five percent of women enjoy sex *more* after their first childbirth than before conception—perhaps due to loss of psychological inhibition or in some cases, perineal and vaginal relaxation providing relief of entry dyspareunia or vaginismus.

Validated questionnaires now exist for primary care providers interested in screening for these conditions and assessing their impact on quality of life. But in fact, asking a few pointed questions (*such as “do you have any problems with sexual function that you wish to discuss?”*) can be a very effective means of identifying patients in your practice who would benefit from referral. Female

sexual disorders and associated treatment strategies are discussed in Chapter 11.

Preventing Obstetrical Pelvic Floor Injury

It could be argued that pelvic floor disorders are “inevitable” consequences of childbirth just as skin cancer is an “inevitable” consequence of sun exposure. Both are associated with identifiable risk factors, both can greatly affect quality of life, and both are preventable in many cases. Primary care clinicians are in a unique role to dispel the myth that incontinence and pelvic disorders are unavoidable costs of motherhood and to encourage strategies for reducing the risk of these disorders.

During Pregnancy

Daily pelvic floor exercises may consist of 20 to 30 daily repetitions throughout pregnancy and are discussed in Chapter 6. Improved tone and effective isolation of the pelvic floor muscles may enhance the patient’s ability to voluntarily relax them during labor and delivery. Prenatal pelvic floor exercises may reduce the likelihood of incontinence symptoms after delivery.^{61,62} Perineal massage is another low-tech modality that involves gentle stretching of the lubricated perineum in preparation for delivery. Two studies of perineal massage begun during the third trimester have reported a modestly decreased risk of perineal laceration, ranging from 9% to 12%.^{63,64}

Patients should be encouraged to avoid excessive weight gain—not only for the sake of their general health maintenance, but also to reduce the strain of pregnancy and childbirth on the pelvic floor. One study demonstrated that, although the postpartum improvement of transient urinary incontinence during pregnancy is common, *persistent* leakage is more likely among women who gain more weight before delivery. Body mass index ≥ 30 has been identified as a risk factor for postpartum SUI and urgency.^{65,66} A reasonable target for weight gain is roughly 2lbs to 4lbs during the first trimester and one pound per week thereafter, translating into 25lbs to 35lbs for a

full-term pregnancy. For women with preexisting obesity, significantly less weight gain is acceptable. Exercise during pregnancy should be tailored to specific considerations including changes in posture, balance, and coordination; altered respiratory patterns; increased joint and ligament mobility due to relaxin; and increased vulnerability of the pelvic floor beneath the gravid uterus.

Avoiding constipation is another important strategy for minimizing pelvic floor strain during pregnancy, as gastrointestinal motility decreases due, in part, to increased progesterone and iron supplementation. Valsalva straining during defecation increases stress on pelvic floor supports and should be discouraged as a chronic habit. Dietary fiber should be accompanied by adequate hydration, exercise, and stool softeners.

Labor and Delivery: The Pelvic Floor Perspective

Pushing Positions & Techniques

The most common labor strategy in modern obstetrical settings involves pushing in the lithotomy position, starting right after full cervical dilation is determined by vaginal examination. However, a number of approaches actually exist, and their potential effects on the pelvic floor should be considered. Full dilation, it should be understood, refers exclusively to the cervix; from the standpoint of the major pelvic floor supports discussed in this and other chapters, an enormous degree of tissue dilation has yet to occur for most women.

As mentioned, lithotomy is a common labor position, with the lower extremities flexed and abducted during each contraction. Although some practitioners suspect that the “uphill” orientation of this position may increase the difficulty of delivery, specific disadvantages for pelvic floor function have not been proven. Squatting is purported to increase the diameter of the pelvic outlet and help shift the tailbone posteriorly and has been associated with reduced rates of forceps delivery and perineal lacerations when compared with a semi-recumbent position.^{67,68} (Figure 3.5)

Sitting has been associated with quicker labor; however, studies evaluating birthing chairs have



FIGURE 3.5. Woman squatting during labor.

shown a greater likelihood of perineal swelling and labial lacerations, as well as increased blood loss. Lateral positioning (“side lying”) may be useful for multiparous women with an already-relaxed introitus by improving control over the speed of fetal expulsion at the end of second stage labor, thereby helping to avoid perineal injury caused by a precipitous delivery. Upright (“stand and deliver”) positioning has been advocated as a means to shorten labor and reduce the need for forceps or vacuum assistance. Randomized trials have found lower rates of perineal injury and postpartum pain, with a decreased risk of undergoing episiotomy, in upright positioning as compared with lithotomy.⁶⁹ A Cochrane analysis concluded similar benefits of upright or lateral, compared with supine, positioning.⁷⁰ The upright, sitting, and squatting positions should be avoided if significant perineal swelling develops.

Immediate versus Delayed Pushing

Advocates of early pushing (beginning at full cervical dilation) argue that the duration of labor grows too long in the absence of a constant maternal expulsive effort, introducing more stress for the baby and a greater likelihood of maternal neuromuscular injury. Critics of active pushing, on the other hand, maintain that early or aggressive pushing shortens labor to a lesser degree than is often assumed, while increasing maternal exhaustion, stressing the pelvic floor supports, and possibly increasing the risk for pelvic injury. Among primigravid women, active pushing for longer than one hour has been shown to confer an increased risk of pudendal neuropathy and denervation injury.

“Delayed” pushing usually means resisting the urge to push while allowing the fetus to passively descend past the pelvic supports. One multicenter study⁷¹ evaluated a delayed pushing strategy among 1862 nulliparous women, all with epidural analgesia, randomized to either immediate pushing at full dilation or delayed pushing for up to two hours before pushing. Difficult deliveries were less likely in the delayed pushing group, and forceps assistance was less often necessary. A more recent randomized controlled trial of delayed pushing found no increase in adverse events, despite prolongation of second stage of up to 4.9 hours.⁷² Physiologic (or spontaneous) pushing is similar to the delayed approach, involving a delay until the onset of an overwhelming physical urge. One comparative study found that advanced perineal lacerations were less likely, and an intact perineum more likely, with spontaneous rather than directed pushing⁷³. In contrast, another RCT of 350 women found no differences between active or spontaneous pushing with respect to perineal injury or duration of labor.⁷⁴

Longer pushing stages appear to be associated with higher rates of pelvic floor injury and neuropathy. Pushing longer than 2 hours has been associated with higher rates of new-onset flatal incontinence (73% vs 44%).⁷⁵ A prolonged pushing stage may also predispose to maternal exhaustion. If this results in a greater likelihood of operative delivery by forceps or vacuum, the increased risk for pelvic floor injury resulting from these interventions should be recognized.

Forceps and Vacuum: Impact on Pelvic Function

Although in years past both forceps and vacuum procedures were advocated as a means to avoid pelvic injury and provide a more controlled delivery, today it is widely accepted that operative delivery tends to increase, rather than decrease, the risk of perineal injury and often has a negative impact on other pelvic floor structures.⁷⁶ Although vacuum and forceps procedures retain a valuable role in obstetrical care, they should not be routinely performed.

Forceps delivery markedly increases the risk of advanced perineal lacerations⁷⁷ as well as pelvic neuropathy—perhaps not surprising, since the average force of forceps against the surrounding pelvic tissues has been estimated at 75psi. Up to 80% of women who undergo forceps delivery will have anal sphincter injuries detectable by transanal ultrasound.⁴ Forceps use also confers an elevated risk of urinary incontinence. In fact, one study indicated the odds of SUI seven years after childbirth may be up to 10 times higher among women with a previous forceps delivery.⁷⁸ Compared with spontaneous vaginal delivery, urinary incontinence after forceps delivery is more likely to persist compared with cases presenting after spontaneous vaginal or vacuum delivery.⁷⁹ Women have significantly weaker levator and anal strength after forceps delivery compared with those who had a spontaneous vaginal birth.⁸⁰

There is evidence to suggest that, compared with forceps, vacuum delivery is generally associated with lower rates of severe perineal lacerations and anal injury.^{81–83} A Cochrane report concluded that vacuum delivery is associated with significantly less risk of perineal injury compared with forceps.⁸⁴

Pelvic Risks of Macrosomia

Macrosomia is associated with a variety of potential fetal problems, including birth trauma, shoulder dystocia, and lower Apgar scores. On the maternal side, potential complications include higher rates of spontaneous perineal injury and episiotomies and increased risk of perineal injuries involving the anorectum,^{20,85–87} pudendal nerve

injury,⁸⁸ and significantly weaker anal squeeze pressures.⁸⁹ Vaginal delivery of one or more babies weighing at least 4000 grams raises the risk of long-term stress incontinence.⁹⁰ A decision analysis of elective cesarean delivery for macrosomia determined that a policy of elective cesarean delivery would prevent one case of anal incontinence for every 539 such performed. The expected quality of life associated with the elective cesarean delivery policy was also greater.⁹¹

Elective Cesarean Delivery to Protect the Pelvic Floor

The use of cesarean delivery for the prevention of pelvic injury is a divisive issue and the subject of much ongoing debate. In a 1996 survey of obstetricians published in the *Lancet*,⁹² 31% of female obstetricians reported that for an ordinary full-term pregnancy they would personally select cesarean over vaginal delivery, and 80% of this subgroup cited concern over perineal injury as their main rationale. A similar survey conducted among 135 midwives, in contrast, found that only 6% would choose cesarean delivery to protect their pelvic floor. Whether this reflects the fact that midwives provide care only to women before and during childbirth, and are not usually exposed to their pelvic floor problems later in life, is unclear.

Medically, it is important to emphasize that pregnancy itself may for some women be enough to cause pelvic floor injury, with the route of delivery playing only a minor role. Nonetheless, cesarean birth clearly appears to reduce the likelihood of several different pelvic floor disorders. Pelvic nerve and muscle function are generally protected by cesarean delivery,⁸⁸ with the timing of intervention largely determining the degree of protection. When cesareans were performed before the onset of first labor, pudendal nerve injury is effectively prevented.⁹³ Clearly, the most protective cesarean deliveries appear to be those performed before the onset of a woman's first labor.

Stress urinary incontinence is less common after cesarean delivery compared with vaginal birth, although it is not fully eliminated.^{43,95} A recent study of 542 identical twin sisters⁹⁶

provided new insight into the relationship between obstetrical delivery mode and stress urinary incontinence among younger post-reproductive women (mean age 47 years). By comparing genetically identified individuals, the identical twin study design offered a unique biological control group that facilitated the analysis of environmental determinants. The major environmental predictors of stress urinary incontinence were parity ($P = .001$), obesity ($P = .002$), and birth mode, with vaginal delivery conferring a considerable increase in the risk of SUI relative to cesarean birth (odds ratio 2.28, 95% confidence interval 1.14 to 4.55, $P = .019$). It was concluded that among premenopausal childbearing women, vaginal delivery mode represents a potent determinant of stress urinary incontinence, carrying more than twice the risk of cesarean delivery.

Anal sphincter lacerations are nearly nonexistent after cesarean deliveries that are performed before the onset of labor.⁹⁷ And yet, since anal incontinence is a relatively uncommon outcome, it remains uncertain under which circumstances an elective cesarean delivery would be an appropriate consideration for preventing anal injury.

Even if the likelihood of pelvic floor dysfunction could be decreased by elective cesarean for some women, in this debate it is essential to factor the broad medical impact and costs that would be required to achieve this narrow gain. Cesarean birth is by no means always in the best interest of mother or baby. Thus, despite the fact that up to 31% of British female obstetricians would personally choose a cesarean birth for themselves, most societies remain appropriately ambivalent regarding each woman's right to choose cesarean birth.

Postpartum Strategies

Surprisingly little attention is devoted to recuperation of the pelvic floor after delivery, despite the remarkable level of physical stress it has just endured. Immediately postpartum, strategies for pelvic floor recuperation should be discussed. Perineal care may include ice packs and lower extremity elevation to counteract swelling. Perineal hygiene is important to avoid infection and early suture breakdown. Lotions and ointments,

and direct scrubbing of the perineal area, should be avoided. Breastfeeding may contribute to vaginal discomfort, as hypoestrogenic changes throughout the vagina and lower urinary tract result in dryness and atrophy, diminished urethral function, and occasionally increased severity of stress and urge incontinence. Estrogen-dependent symptoms will improve after the cessation of breastfeeding as normal ovarian function resumes.

Pelvic floor exercises should be resumed during the postpartum period. An appropriate postpartum Kegel exercise routine may consist of 2 to 5 daily sessions of 10 to 20 slow levator contractions for up to 10 seconds, as outlined in Chapter 6. Exercising in the recumbent position may help to minimize caudal traction on the pelvic floor supports before full involution of the uterine fundus. Several studies have demonstrated the potential efficacy of postpartum pelvic floor exercises in preventing incontinence and other pelvic floor symptoms.^{98–101} Morkved and Bo demonstrated that postpartum urinary incontinence could be reduced by eight weeks of structured group training, combined with home exercises three times weekly, and that benefits are still present at one year postpartum. When pelvic floor exercises are combined with biofeedback and electrostimulation, stress incontinence is reduced for up to 19% of women.⁹⁸ For any exercise-based regimen, it is important to consider that sustained symptom relief will require a long-term daily commitment, which becomes unrealistic for many women to maintain. If incontinence or pelvic symptoms persist beyond 3 to 6 months postpartum, referral should be strongly considered.

Constipation and straining should be avoided to protect the integrity of perineal sutures and to minimize stress against the pelvic floor. For multiparas with descent of the perineal body, perineal branches of the pudendal nerve may be particularly prone to cumulative stretch injury during physical straining. Dietary fiber and stool softeners, along with occasional laxatives or suppositories, should be used as needed. Women returning to exercise and physical activity should take into consideration the vulnerability of pelvic floor supports, with limited weight bearing for the first several months to reduce abdominopelvic

straining. Bracing the pelvic floor (quick flexion of the pelvic floor muscles) during sudden physical stress may be useful for reducing leakage episodes and repetitive strain on the pelvic floor supports.

Conclusions

Primary care clinicians are in the unique position of encountering women before, during, and long after their childbearing; and at all stages, attention to pelvic floor issues can positively influence a woman's quality of life. In some cases, postreproductive problems can be prevented. In other cases, early recognition can allow an affected individual to avoid long-term incontinence and pelvic floor dysfunction—conditions that generations of women have suffered in silence. The basic connections between childbirth and the pelvic floor—indeed, between obstetrics and gynecology—should be familiar to all practitioners interested in treating these important female disorders.

Key Points

- Whether childbirth is long or short, easy or difficult, millions of women experience physical sequelae in the years and decades that follow. Pudendal nerve abnormalities, and levator muscle injuries, are relatively common.
- Mode of delivery appears to play an important role in the risk of stress incontinence in premenopausal women. Differences in SUI rates diminish after menopause, and with the great equalizer of advancing age.
- Risk factors for various types of injury include vaginal birth mode, episiotomy, macrosomia, and operative delivery.
 - Strategies for improving pelvic health, and avoiding injury, exist for before, during, and after childbirth. Examples include pelvic floor conditioning, avoidance of routine episiotomy and operative vaginal delivery, avoidance of prolonged second stage labor, and attention to pelvic floor rehabilitation during the postpartum period.

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