“Levator Trauma is Associated with Pelvic Organ Prolapse” (2008), by Hans P. Dietz and Judy M. Simpson [1]


Hans Peter Dietz and Judy Simpson published, “Levator Trauma is Associated with Pelvic Organ Prolapse,” in the journal BJOG: An International Journal of Obstetrics and Gynecology in 2008. In their article, Dietz and Simpson estimated the risk of pelvic organ prolapse in women who attained injuries to the pelvic levator muscles. The levator muscles, also known as the levator ani, are a major muscle group that comprise the pelvic floor. Along with other muscles, the pelvic floor supports organs in a woman’s pelvis, such as the bladder, uterus [5], and rectum. Vaginal childbirth can cause a weakening of the pelvic muscles. That can lead to pelvic organ prolapse, which results in the descent of the pelvic organs towards a woman’s vaginal opening. In, “Levator Trauma is Associated with Pelvic Organ Prolapse,” Dietz and Simpson found that women were more likely to have pelvic organ prolapse if they had levator trauma, and called for further research to understand the relationship between levator ani trauma and pelvic organ prolapse.

At the time of their article’s publication, Dietz and Simpson worked in Sydney, Australia, as researchers and professors. Dietz worked as a professor of obstetrics and gynecology and a practicing physician at the Sydney Medical School at the University of Sydney in Sydney, Australia. Obstetrics and gynecology is a broad branch of medicine focusing on women’s reproduction, pregnancy [6], and childbirth. According to the University of Sydney, Dietz is an expert in pelvic floor imaging and has researched the prevention and treatment of pelvic floor trauma in women after childbirth. Simpson also worked as a professor of biostatistics at the University of Sydney at the time of publication. As of 2021, Simpson had published over 200 articles, many focusing on women’s reproductive health outcomes during and after childbirth.

Dietz and Simpson divided their article, “Levator Trauma is Associated with Pelvic Organ Prolapse,” into five sections. In the introduction, the authors provide background on levator ani trauma resulting from vaginal childbirth, and explain that their study will determine the association between levator trauma and pelvic organ prolapse. In the methods section, the authors describe their study in detail, including how they assessed the women in their study for trauma and pelvic organ prolapse. Then, while discussing the results, Dietz and Simpson demonstrate that women with levator trauma are more likely to have pelvic organ prolapse. In the discussion section, the authors state that their findings strengthen the argument that trauma that occurs during vaginal delivery can result in pelvic organ prolapse. Dietz and Simpson also explain the significance of their findings, specifically for future research on interventions that could prevent levator trauma in women during childbirth. Finally, in their conclusions, the authors briefly summarize the key findings of their study and its overall significance.

In the introduction, Dietz and Simpson explain the link between pelvic organ prolapse and levator damage resulting from vaginal childbirth. They begin by defining levator trauma as the partial or complete detachment of that muscle from the pelvic wall. The pelvic wall is the extensive structure composed of muscles and ligaments that forms the interior of the pelvis. The authors state that previous studies demonstrated that levator detachment almost always results from vaginal childbirth, specifically when the head of the neonate exits the woman’s vagina [7]. Such trauma can result when excessive pressure is put on the woman’s pelvic muscles from the fetus [8] pushing on the woman’s pelvic floor. One study reported that thirteen to thirty-six percent of women who had a vaginal delivery had a levator injury, further stating that the trauma is associated with the enlargement of the levator hiatus, a condition common in women with pelvic organ prolapse. The levator hiatus is part of the opening of the pelvic floor muscle, the enlargement of which enables the pelvic organs to prolapse.

Then, Dietz and Simpson specify that levator trauma is often associated with an operative vaginal delivery, where medical instruments such as forceps are used by physicians to assist the women. Physicians typically use an operative vaginal delivery if the physician is concerned about the health of the woman or neonate during labor. Often, there is a possibility that a woman’s vagina [7] is not expanding, or dilating, quickly enough to accommodate the neonate, which is a reason for concern. As a result, they will monitor the woman closely, and if labor does not progress, they will perform an operative delivery. Physicians often use forceps, a type of medical instrument, to help guide the head of a neonate out of a woman’s vagina [7]. The authors also mention that vaginal childbirth is not the only cause of pelvic organ prolapse. Other known factors for pelvic organ prolapse include older age and obesity. The authors state that the goal of their study was to estimate the link between trauma to the levator muscles and pelvic organ prolapse and to explore the potential benefit of preventative measures.

Next, in the methods section, Dietz and Simpson explain that their study included 934 women who answered questions about their prolapse symptoms, followed by a comprehensive physical exam to assess the extent of their prolapse and any associated pelvic muscle injuries. After assessment, the authors excluded 153 women from the study’s final results. The comprehensive
physical exam encompassed a verbal interview about the women’s symptoms and multiple ultrasound [8] scans of the pelvic organs and surrounding structures. In addition, Dietz performed a bimanual exam on each woman, which is when a physician inserts their fingers into a woman’s vagina [7] to assess the pelvic organs. Dietz and Simpson describe that many of the women in their study had a higher maternal age. The authors then explain that seventy-six percent of the women stated they experienced stress incontinence, which results from strain, and that thirty-eight percent of the women had some organs beginning to prolapse. Women with incontinence are unable to control their bladder and often experience urine leakage.

Also in the methods section, the authors describe that they used the pelvic organ prolapse quantification system known as POP-Q to assess the extent of the women’s prolapse. POP-Q is a standardized system used by physicians to diagnose and quantify the severity of a woman’s pelvic organ prolapse. The researchers used an ultrasound [9] to assess the level of detachment of the woman’s levator muscle. An ultrasound [9] is an imaging method that uses sound waves to produce images of internal body structures and organs.

In the results section, Dietz and Simpson determine the relative risk of a woman experiencing prolapse if she has a levator injury. Relative risk explains the probability of an event, such as having pelvic organ prolapse, in one group compared to another group. To determine the relative risk of prolapse, the authors noted the number of women in their study who physicians had diagnosed with significant prolapse using the POP-Q system. They then calculated the relative risk of a woman having pelvic organ prolapse if she has a levator injury compared to that of a woman without a levator injury. Dietz and Simpson state that eighty-three percent of women who had a levator injury also had a prolapse, compared with forty-four percent of women who did not have an injury, but who also experienced a prolapse.

Dietz and Simpson express their results in terms of the location of the prolapse and severity of the levator defect. Because pelvic organ prolapse refers to the broad definition of pelvic organs descending into a woman’s vagina [7], physicians oftentimes refer to the type of prolapse based on the organ affected. The authors describe three types of prolapse, including cystocele, uterine prolapse, and rectocele. Cystocele occurs when a woman’s bladder descends into her vagina [7]. Uterine prolapse occurs when her uterus [8] bulges into her vagina [7], and rectocele refers to when her rectum descends into her vagina [7]. They found that the more severe the prolapse at any of the locations, the more likely the woman was to have a levator injury. That suggests there is an association between levator injury and severity, but not between levator injury and location or organ affected.

In the discussion section of their article, the authors describe the link between vaginal childbirth and levator trauma, and how both can lead to pelvic organ prolapse in women. They explain that vaginal childbirth is a known cause of pelvic organ prolapse and levator muscle trauma. The authors then assert that their data strengthens the argument that levator trauma due to vaginal childbirth is likely a significant factor in developing pelvic organ prolapse. They explain that their findings encourage further research into the prevention of levator trauma, or interventions that would decrease the severity of the trauma. The authors articulate that those studies could contribute to reducing the number of muscular traumas through physician education, and may eventually lead to a decrease in the frequency of resulting prolapses. Simpson and Dietz do disclose that there are other childbirth-induced causes of pelvic organ prolapse, but claim levator muscle injuries are some of the most prolific causes.

In the conclusion section, Dietz and Simpson state that women with levator trauma were twice as likely to have a prolapse than those women who did not have an injury to the levator muscles. The authors also disclose that further analysis of their results showed that women with significant prolapse, based on the POP-Q system, were four times more likely to have a levator injury than those without significant prolapse. They finish by explaining that their results show the need for further studies examining the association between childbirth-induced levator trauma and pelvic organ prolapse in women.

As of 2021, “Levator Trauma is Associated with Pelvic Organ Prolapse,” has been cited over 500 times. Many of the citing researchers examined risk factors of levator trauma, pelvic floor disorders, and the association between vaginal childbirth and pelvic floor dysfunction. Dietz and Simpson’s work has prompted further research on the link between levator trauma, its causes, and pelvic organ prolapse. Dietz continued to do work in that area of research after the publication of “Levator Trauma is Associated with Pelvic Organ Prolapse.” He has since written several articles on levator trauma, pelvic floor imaging, and the effect of childbirth on the pelvic floor and organs. Simpson has written several articles since publishing “Levator Trauma is Associated with Pelvic Organ Prolapse.” Her articles have broadly focused on improving public health and medicine through the use of biostatistics.

Dietz and Simpson’s article, “Levator Trauma is Associated with Pelvic Organ Prolapse,” confirmed an association between pelvic organ prolapse and injuries to a woman’s levator muscles from vaginal childbirth. In their article, the authors demonstrated that women who had levator trauma were more likely to have pelvic organ prolapse. And, while not all pelvic organ prolapses occur in women with levator muscle injuries, the authors found that women with severe pelvic organ prolapses often had levator injuries. As a result, they emphasized the need for further research for the prevention and intervention of pelvic organ prolapse, especially during pregnancy [6] and vaginal childbirth.
Levator Trauma is Associated with Pelvic Organ Prolapse,” Dietz and Simpson found that women were more likely to have pelvic organ prolapse, which results in the descent of the pelvic organs towards a woman’s vaginal opening. In, "Pelvic Wall." NCI Dictionary of Cancer Terms, National Cancer Institute. [18] https://www.cancer.gov/publications/dictionaries/cancer-terms/def/pelvic-wall (Accessed February 22, 2020).


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