

Treatment of Pelvic Organ Prolapse in Women

Pelvic organ prolapse is a common condition in women that causes the pelvic organs to descend, often resulting from a weakened pelvic floor. Pelvic organs supported by the pelvic floor, such as the bladder, bowel, or uterus, can descend to such a degree that they project out from a woman's body typically via the vagina. Pelvic floor stress or trauma, like vaginal childbirth, can cause pelvic organ prolapse. Women with pelvic organ prolapse also often experience other conditions, such as incontinence or the involuntary leakage of urine or fecal matter. As a result, while many women experience pressure or fullness from the prolapse itself, other common symptoms of pelvic organ prolapse are those involving the bladder or the bowel. Treatments for prolapse depend on the woman's symptoms, and include pessaries, surgery, and pelvic floor exercises. As of 2021, researchers and physicians continue to study pelvic organ prolapse to determine how different treatments can be tailored to specific causes or symptoms.

A woman's pelvic floor supports her pelvic organs in their anatomical locations, but when that support fails, prolapse and incontinence can occur as a result. Although men can experience prolapse of the bladder or rectum through the anus, the condition is much more common in women. The female pelvis is comprised of two hip bones that attach to the woman's spine. The area between the hip bones, known as the pelvic cavity, contains the pelvic organs, such as the uterus and bladder. The pelvic floor muscles comprise the bottom of the pelvic cavity, and separate it from the vagina and anus. There are also ligaments that attach those pelvic muscles to the pelvic bones, and damage to those ligaments can also result in the descent of pelvic organs. Women have a larger pelvic cavity than men to allow room for the uterus to expand during pregnancy. Pregnancy and childbirth can lead to trauma or damage to the pelvic floor, which often results in prolapse of pelvic organs. However, while pregnancy and childbirth are the most common causes of pelvic floor trauma, other causes include obesity, previous pelvic surgery, and certain genetic predispositions.

Women can have several types of pelvic organ prolapse, defined by which organ or organs, are affected. One type of pelvic organ prolapse is uterine prolapse. In women with uterine prolapse, the uterus descends into the woman's vagina, often causing a feeling of heaviness, and in severe cases, is visible outside of her vaginal opening. However, physicians generally consider prolapse a progressive condition, meaning that the organs descend over time rather than all at once. In women with bladder prolapse, or cystocele, a woman's bladder drops and creates a protrusion into the front wall of her vagina. Due to pressure on the woman's bladder, women with bladder prolapse often also experience urinary incontinence. In a woman with rectal prolapse, or rectocele, her rectum descends and protrudes in the back wall of her vagina. In women who have had a hysterectomy, the most common type of prolapse to occur after surgery is vaginal vault prolapse. In women with that type of prolapse, the top of their vagina descends, creating a protrusion.

Researchers have written that women have likely been affected by pelvic organ prolapse for centuries. One of the first records of the condition is from an ancient Egyptian text from nineteenth century BCE, or approximately four thousand years ago. In the text, the unknown author states that a woman described pain in her genital area, and that physicians during that time called it a falling womb. Hippocrates, a physician from Greece who practiced medicine around the fifth century BCE, proposed solutions for pelvic organ prolapse based on the idea that the uterus acted on its own, separate from the woman's body. He proposed treatments such as the application of an acidic liquid on the uterus followed by an insertion of a vinegar-soaked sponge into the woman's vagina. If that was unsuccessful, Hippocrates then advised to tie the woman upside down by her feet and bounce her repeatedly to reduce the prolapse, a method he called succussion.

Soranus, a physician from the first century CE, disapproved of Hippocrates's solutions. Instead, he proposed medical practitioners should mold a woolen tampon in the shape of the woman's vagina. After dipping the tampon in oil, he suggested inserting it into the woman's vagina and using gentle pressure, moving the prolapsed uterus back into place. According to obstetrician Keith Downing, researchers before and after Soranus poorly understood female anatomy, and instead believed it was made up of several chambers and could float around the body. As a result, it was difficult for physicians to treat pelvic organ prolapse and other female reproductive disorders. Modern scientists and physicians know that the uterus is not made up of several chambers, but a single cavity.

In the sixteenth century, scientists' descriptions of female anatomy became more accurate, following artists' depictions of the human body after anatomical dissections. As a result, physicians created new methods for treating pelvic organ prolapse. Jacopo Berengario da Carpi, a professor and physician in Italy during the sixteenth century, was one of the first to state that the uterus was a single cavity. Several decades later, Andreas Vesalius, a professor studying anatomy, published his book, *De Corporis Humani Fabrica* (On the Fabric of the Human Body) during his time in Padua, Italy. In his book, Vesalius described the female reproductive system, including the ligaments of the uterus that make up the pelvic floor. Keith Downing, a physician at Albert Einstein College of Medicine in New York City, New York, credits the accurate depictions of the female reproductive tract within Vesalius's book as an important historical moment that would enable physicians to better treat female reproductive conditions, especially those involving the female pelvic floor.

Around the same time that Vesalius published his book detailing female anatomy in the sixteenth century, physicians were commonly using pessaries to help women manage pelvic organ prolapse. A pessary is a device that is inserted into a woman's vagina to help support her pelvic organs and reduce the prolapse. Pessaries typically do not protrude from the vagina and are designed so that the muscles in the vagina can support it in place without having to readjust it. The pessary provides support by internally lifting the woman's descended pelvic organs, relieving strain on the weakened or damaged pelvic muscles. They come in many different shapes and sizes, can be flexible or solid, and are made with a variety of materials. While modern pessaries are made from plastic or silicone, when they were first used, it was common for them to be made from wax, wood, glass, metal, or halved fruit soaked in vinegar. Around the same time as physicians began treating women with pessaries, others treated women's pelvic organ prolapse symptoms by applying leeches to the vagina, introducing gonorrhoea to the vagina, deliberately inducing pelvic infections, and administering sea water douches.

The use of pessaries became controversial around the 1800s, as many physicians asserted that they were dangerous. One proponent of their use was Hugh Hodge, a surgeon practicing in Philadelphia, Pennsylvania. He stated that a major way for physicians to overcome their apprehensions for prescribing pessaries to treat pelvic organ prolapse was to ensure the materials would not deteriorate and allow for normal movement without pain. Around the time Charles Goodyear invented vulcanized rubber in 1844, Hodge developed his own pessary, called a lever pessary, that physicians still use in more modern variations to manage pelvic organ prolapse, as of 2020. However, physicians with dissenting opinions wrote that it was unnecessary to have such a wide range of pessaries, citing that there were over 123 different types around 1864. One physician stated that he thought putting foreign objects, including pessaries, into women's vaginas as a medical practice was outrageous. Though there was disagreement in the medical community, physicians continued to prescribe pessaries to treat women with pelvic organ prolapse.

By the nineteenth and twentieth centuries, physicians had begun performing successful surgeries involving patients' internal organs, which established the requisite knowledge necessary to understand the exact anatomical features of pelvic organ prolapse. Alwin Mackenrodt, a professor and physician in Berlin, Germany, published work about the role of connective tissue in pelvic floor anatomy, in 1895. The ligaments he described, modernly called the Mackenrodt ligaments, attach the uterus to the wall of the pelvis and provide support to the uterus. His work was some of the first to describe the structures that support the pelvic organs. Other physicians of the time held different beliefs, including that the pelvic fascia, or a thin layer of tissue surrounding certain organs, supported the pelvic organs in place. In the early twentieth century, Josef Halban and Julius

Tandler, professors in Vienna, Austria, published their thesis describing uterine support, describing the levator ani muscles as some of the most vital support components of the pelvic floor. The levator muscles are part of the pelvic floor and provide support to the pelvic organs. Halban and Tandler also disagreed that pelvic fascia could serve as the sole support for the pelvic organs as it was too thin and fragile. As of 2020, researchers note the importance of those ligaments and muscles for pelvic floor support, and thus, pelvic organ prolapse.

In the twentieth century, more surgical treatments for pelvic organ prolapse became available. One of the first surgical treatments was a hysterectomy, which is the complete surgical removal of a woman's uterus, and often other reproductive organs like the ovaries, cervix, and fallopian tubes as well. However, physicians found that a hysterectomy alone would not cure pelvic organ prolapse, and that prolapses of other pelvic organs would oftentimes occur after the surgery. Kurt Richter, a physician in Germany, surgically treated a vault pelvic organ prolapse by attaching the prolapse to a nearby pelvic ligament using sutures, surgically accessing the site through the woman's vagina, which is known as an intravaginal approach. According to Downing, that surgical approach became a standard treatment across Europe for women with vault pelvic organ prolapse. In 1971, Clyde Randall and David Nichols published a study that reported the outcomes of that same operation method on eighteen patients. They noted that the surgical approach was effective for treating vaginal vault prolapse and restoring the typical vaginal depth. Physicians still use those methods with only slight refinements to treat women with pelvic organ prolapse as of 2021.

In the twenty-first century, physicians began treating pelvic organ prolapse with vaginal mesh. Though vaginal meshes improved overall efficiencies and success rates of the surgical management of pelvic organ prolapse, it became controversial after serious adverse events began to occur. While physicians have used mesh-like devices since around the 1950s, often to treat things like hernias, modern fabrications of vaginal meshes for the treatment of pelvic organ prolapse became popular around the early 2000s. When a physician surgically inserts it into the woman's body, vaginal mesh, a net-like implant, can reinforce the weakened area of the pelvic floor. A vaginal mesh is meant to induce a response within the body that enables tissue growth through the lattice-like holes within the mesh itself in order to securely graft and surround the implant within the body's tissues. While research has indicated that vaginal mesh is generally effective for treating pelvic organ prolapse, many adverse symptoms reported with the use of vaginal meshes included pain, infection, bleeding, scarring, nerve damage, and erosion of certain pelvic tissues. In 2019, the US Food and Drug Administration, or the FDA, ordered all device manufacturers producing vaginal meshes intended to treat pelvic organ prolapse to cease sales and distribution of their products, asserting that there was not enough evidence to support the risks of using the mesh outweighed the benefits. However, meshes used for other purposes were not included in that order.

Also in the twenty-first century, physicians used laparoscopic surgery to treat women with pelvic organ prolapse as a less invasive and safer alternative than other surgical approaches. With laparoscopic surgery, surgeons make small incisions with a scalpel and use a tool, called an endoscope or laparoscope, to visualize the inside of the patient's body. Using the laparoscopic approach in women with pelvic organ prolapse, physicians can suspend the prolapsed organ or organs by attaching it to a surrounding ligament for support. Physicians have noted that one advantage of laparoscopic surgery is that the surgeon can visualize the inside of the woman's body while only making a few small incisions. Another surgical option for some types of pelvic organ prolapse using laparoscopic techniques is robotic-assisted surgery using the da Vinci Surgical System. With that approach, a physician sits at a console that controls robotic arms designed to more precisely emulate the physician's own hand movements.

Another method of management for women with pelvic organ prolapse is pelvic floor strengthening exercises. One type is the kegel exercise, in which a woman contracts and relaxes her pelvic floor muscles, which can help alleviate the symptoms of pelvic organ prolapse and incontinence if muscle function is increased. While pelvic floor exercises can typically help manage the symptoms of the condition, like incontinence, they typically do not treat the prolapse itself. Some researchers suggest that women with mild prolapse have reported that pelvic floor strengthening exercises improved their quality of life. However, for women with severe prolapses, physicians often do not recommend those exercises based on a lack of evidence supporting its efficacy.

Treatment for pelvic organ prolapse can depend on the severity of the diagnosis. The classification, or diagnosis, of a woman's pelvic organ prolapse changes based on which of the three main diagnostic systems a healthcare professional uses. The first classification system is based on the site of the organ affected in the prolapse. One downfall to that system is that it is often not applicable to women who have had a hysterectomy, as it is based on typical female anatomy, which is not present after a hysterectomy. Healthcare professionals using the second system, called the Baden-Walker Halfway Scoring System, score six pre-determined anatomical sites from zero to four. The physician bases the scores on the measure of descent, using the vagina as a fixed reference point. Some physicians note that although that system is more descriptive than the standard anatomical approach, it does not specify the location of any muscle or ligament defects and the measurements can be subjective among physicians. Doctors using the third system, the Pelvic Organ Prolapse Quantification System, also known as POP-Q, take specific measurements of six points to determine the severity and location of the prolapse. Researchers have noted that the POP-Q system is more objective than the Baden-Walker Halfway Scoring System, and that there is an increase in reliability and accuracy using that method.

According to a Harvard University interview with gynecology professor Samantha Pulliam, pelvic organ prolapse is one of the most common reproductive conditions to affect women over the age of fifty. It occurs in as many as fifty percent of women in that age group. Prolapse often occurs as a result of a weakened, or otherwise damaged, pelvic floor. While the exact causes of pelvic floor trauma are not well-known, scientists have suggested that there are several known risk factors for a woman developing pelvic organ prolapse, with vaginal childbirth being the most well-known. Since the complete array of causes and risk factors are still largely unknown, despite the condition affecting such a large group of women, researchers continue to conduct studies to learn more about what causes pelvic organ prolapse and potential treatment interventions, as of 2021. Among the several options to manage prolapse, such as pessaries, pelvic floor strengthening exercises, and surgery, physicians and researchers continue to investigate which methods are most efficient for treating pelvic organ prolapse.

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